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Corporate governance in European banks

Essays on bank ownership

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Corporate governance in European banks: Essays on bank ownership

Key words: bank ownership, agency problems, regulation, traditional vs. non-traditional bank operations, profitability, risk

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This journey started with the simple notion that I wanted to know more about banks. After exploring a number of potential research areas, ranging from estimation of operational risk in the new Basel II framework to identification of participants in the financial innovation development process, I became intrigued by the changing role of banks and the fact that agency problems are different in banks than non-bank companies. Hence, bank corporate governance became the focus of my research. For me personally, the key learning from this journey is that, even though I now do know much more about banks, there are still many aspects of the complex world of banks for me to explore.

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PART I: RESEARCH AREA AND CENTRAL FINDINGS

1 INTRODUCTION

In the financial system, funds can be channelled between agents either through financial markets or financial intermediaries, such as banks. Financial markets are more suited for products which are standardised, are easy to understand and price and have gained substantial volume, whereas financial intermediaries are appropriate when transaction costs and asymmetric information hinders customers from acting directly on financial markets (Merton, 1995a). The importance of transaction costs has, however, diminished over the past decades due to rapid technological development and development of sophisticated financial instruments. Hence, asymmetric information, whether it is ex-ante adverse selection, interim moral hazard or ex-post costly state verification, is the main market friction explaining the existence of banks (Bhattacharya & Thakor, 1993). Therefore, banks are specialised in managing contracts on information intensive assets, which are (next to) impossible to resell (Benston & Smith, 1976, Flannery, 1994). Moreover, financial markets allow agents to hedge risk, whereas banks have traditionally been superior in intertemporal risk sharing (Allen & Gale, 1995). The financial markets and financial intermediaries benefit from each other rather than being competitive institutions (Merton, 1995a). Financial intermediaries create new products that eventually are traded on financial market, hence facilitating market growth. Financial markets, on the other hand, support financial intermediaries in creating customer tailored products by offering low cost production of new financial innovations.

A well functioning financial system is the key to economic prosperity. The theoretical model set forth in King & Levine (1993b) show that financial intermediaries promote growth by evaluating investment projects, mobilising resources to finance the promising investment projects and facilitating risk management. Furthermore, they build on and confirm the empirical analysis of King & Levine (1993a) that financial development¹ is positively related with economic growth, capital accumulation and economic efficiency improvements. Levine & Zervos (1998) examine the impact of banking development and stock market liquidity on economic growth and find that both elements are of importance for the prosperity of a country as they provide different services. Banks affect the economic growth in a number of ways. Bernanke (1983) argues that, as bank loans are the main source of external financing for most of companies, there would be significant real effects of a weakening in the banking system. The access to bank financing is particularly important for informationally opaque small companies. The long-term relationship lending of banks, during which banks collect proprietary information, locks in the customer enabling banks to offset potential early losses of these risky small companies by charging higher interest rates later on in the bank relation (Sharpe, 1990, Rajan, 1992). The proprietary information also enables banks to tailor securities to match the needs of the individual customer, which in the long-run ensures its financial well-being (Allen & Gale, 1999). Furthermore, banks have incentives to foster these long-term, close relationships as the borrower-specific proprietary information cannot be sold at a fair price as the true value of the information is only known by the bank. The banks thus have incentives to ensure that the borrower avoids bankruptcy and are hence willing to protect the relationship by restructuring the debt of the borrower in case of financial distress (Thakor, 1996). Hence, the close involvement of banks in the corporate governance of

¹ Financial development is measured as the size of the financial system, i.e. the ratio of liquid liabilities to GDP, the importance of deposit banks relative to the central bank in allocating domestic credit, the credit issued to non-financial private firms divided by total credit and the credit issued to non-financial private firms divided by GDP.

companies through direct ownership and board representation is particularly important in periods of company distress and bankruptcy (Gorton & Winton, 2002). Note, moreover that the option to renegotiate debt contracts, which naturally comes with stricter covenant requirements, is particularly attractive to companies with high credit risk hence plagued with greater agency problems (Berlin & Mester, 1992).

The impact on economic growth depends on the efficiency of banks. Berger *et al.* (2004) examine the way in which banks transmit prosperity in an economy. They find that economies where small, private, domestically owned banks are more efficient and have higher market share have faster GDP growth than other economies. The ability of managers to control costs and maximise revenues have a greater impact on bank profitability than finding the optimal scale or scope of the operations. Berger & Mester (1997) report that X-inefficiencies in banks amount to as high as 20% of total costs, whereas the empirical findings on the existence of scale or scope economies in banking are inconclusive, amounting at best to about 5% of total costs (Chang *et al.*, 1998). Altunbas *et al.* (2001b) present similar findings for the European banking market, i.e. that X-inefficiencies are more important than scale economies. These findings suggest that banks should focus on managerial inefficiencies rather than focusing on achieving scale economies through growth.

Appropriate and efficient corporate governance systems are one aspect to be considered in the aim for managerial efficiency. Compared to the vast amount of research on corporate governance in non-bank companies, the corporate governance of banks has received limited attention. The models and empirical findings developed for non-bank companies are not directly applicable in a banking setting, as the efficiency of corporate governance mechanisms are affected by bank regulation and the greater opacity of bank operations (Berlin *et al.*, 1991, Levine, 2004). Previous studies on bank ownership have primarily focused on the impact of state and foreign ownership on economic growth or bank performance (see e.g. La Porta *et al.*, 2002, Berger *et al.*, 2005, Altunbas *et al.*, 2001a, Grigorian & Manole, 2002, Bonin *et al.*, 2005, Micco *et al.*, 2007, Barros *et al.*, 2007, Staikouras *et al.*, 2008 and de Nicolo & Loukoianova, 2007). The number of studies addressing the impact of blockholder, management and board ownership on the performance of banks are limited, especially in a European setting. Caprio *et al.* (2007) and Laeven & Levine (2008) examine the impact of blockholder ownership on bank valuations and risk, respectively, using international samples of banks. Using samples of US banks, DeYoung *et al.* (2001) examine the impact of management and board ownership on bank efficiency, whereas Saunders *et al.* (1990), Chen *et al.* (1998), Cebenoyan *et al.* (1999) and Sullivan & Spong (2007) examine the impact of management ownership on bank risk. The number of studies comparing the performance of European commercial, savings and cooperative banks is also limited (Altunbas *et al.*, 2001a, Iannotta *et al.*, 2007). Hence, the objective of this doctoral thesis is to examine the corporate governance mechanisms of European banks, while focusing on the ownership characteristics which so far have received limited attention, i.e. different types of blockholder owners, management and board ownership as well as the distinction between commercial, savings and cooperative banks. Moreover, bank regulation and other features making bank corporate governance different from corporate governance in non-bank companies are addressed.

The thesis consists of two parts. In Part I, I discuss the underlying themes associated with the research area of corporate governance in European banks as well as the central findings. I start with a brief description of *The role of banks* covering four main functions which banks are responsible for, bank regulation and the link between the changing role of banks and the current financial crisis. This discussion is by no means

exhaustive and I recognise that I have taken on a great challenge in describing the theoretical background in a very condensed format. In the next section, *Bank corporate governance and ownership*, I discuss the factors making bank corporate governance different and the previous literature on bank ownership. Note that this small survey of primarily empirical papers has a rather narrow focus as only the ownership characteristics examined in the three essays are discussed. The section on *Bank performance and risk* gives some flavour of what other factors, apart from the ownership characteristics, affect bank profitability and risk. The main objective in the section on *The European banking sector* is to examine the level of homogeneity of the sample countries. Moreover, the *Data* used in the empirical studies are presented. Finally, I present a *Summary of the three essays* and present some *Concluding remarks*. The three essays included in the thesis are presented in Part II. In Essay I, *Bank corporate governance in different regulatory environments*, I discuss the special features of bank regulation and the impact of deposit insurance and the too-big-to-fail (TBTF) government guarantee on bank corporate governance. In the empirical part, I examine whether the ownership structure of banks vary with the regulatory environment of their home country. In Essay II, *The impact of management and board ownership on profitability in banks with different strategy*, I combine the diversification and corporate governance literature. I examine whether the impact of different ownership characteristics on profitability and risk vary across traditional, diversified and non-traditional banks as the severity and characteristics of the agency problem in these banks differ. As Essay II includes only bank holding companies (BHCs), commercial and investment banks, Essay III, *Comparison of profitability and risk in commercial, savings and cooperative banks*, addresses the particular features of savings and cooperative banks. The main objective is to examine whether the profitability and risk of savings and cooperative banks is different from the ones of commercial banks merely due to the organisational form or due to differences in operational or ownership characteristics.

2 THE ROLE OF BANKS

2.1. What do banks do

The role of banks within the financial system has been categorised by many. Thakor (1996) define the ways in which a financial system may affect the real sector as 1) screening activities of banks, 2) credit rationing by banks, 3) banks' role in liquidity creation and the impact of bank runs, 4) bank loan commitments, 5) debt restructuring, and 6) the feedback role of the financial market. Merton (1995a), on the other hand, distinguishes between six core functions of the financial system. These are to provide 1) a payments system for the exchange of goods and services, 2) a mechanism for the pooling of funds to undertake large-scale indivisible enterprise, 3) a way to transfer economic resources through time and across geographic regions and industries, 4) a way to manage uncertainty and control risk, 5) price information that helps coordinate decentralised decision-making in various sectors of the economy, and 6) a way to deal with asymmetric information and incentive problems when one participant in a financial transaction has more information than the other participant. Freixas & Rochet (1997) distil four functions of which banks are responsible from previous categorisations. These are to 1) provide the economy with a payment system, 2) transform assets, 3) manage risk and 4) process information and monitor borrowers. The structure of this section is based on this latter categorisation.

Initially the role of providing the economy with a *payment system* entailed only money changing in different currencies (Freixas & Rochet, 1997). To facilitate the money changing role deposits were kept at the bank. The deposits were, however, not lent to borrowers as is the situation today. At the end of the nineteenth century, clearing activities developed, laying the foundation for the network which facilitates the transfer of funds between bank accounts, which we today call the payment system. In recent years, in particular, interbank payments and loans have grown dramatically. As a result the systemic risk of the payment system have hence increased, as interbank loans are neither collateralised nor insured and as interbank payments increase the interlinkages between banks (Rochet & Tirole, 1996).

Banks create liquidity by *transforming assets* with respect to convenience, quality as well as maturity and liquidity, while reducing the transaction costs induced by indivisibilities in transaction technologies (Benston & Smith, 1976). When transforming convenience, banks facilitate resource allocation in a situation when large investors are only interested in large indivisible amounts, unattainable for small depositors. Banks can also improve the quality of an asset by issuing a claim in its own name rather than selling or securitising a portfolio of loans. Quality transformation gives, in particular, small investors with limited diversification opportunities improved access to better risk-return characteristics in that banks alter the characteristics of the attributes of the claim by process the risk (Bhattacharya & Thakor, 1993). Finally, banks provide maturity and liquidity transformation. There is a demand for liquidity and maturity transformation due to differences in consumption timing preferences (Bhattacharya & Thakor, 1993). Banks channel funds in the economy by issuing long-term illiquid loans to agents in need of capital and financing the loans with highly liquid short-term demand deposits (Diamond & Dybvig, 1983). Note, however, that banks are to an increasing extent funded not only by deposits, but by asset-backed claims from securitisation transactions (Bhattacharya & Thakor, 1993). Moreover, banks create liquidity in the economy by backing commercial papers with loan commitments or standby letters of credit (Gorton & Winton, 2002).

Risk management has always been inherent in banking operations, much more so than in non-banking operations (Merton, 1995a). The liquidity risk inherent due to the difference in duration between loans and deposits, is born by the bank and hence banks expose themselves to withdrawal risk and, in the extreme, bank runs (Boot & Thakor, 2008). In addition to the liquidity risk, banks bear credit and interest rate risk, and to an increasing extent risks of off-balance sheet operations (Bhattacharya & Thakor, 1993, Freixas & Rochet, 1997). Traditionally banks have managed risk, their own and on behalf of their customers, by holding liquid reserves and smoothing the results over time, i.e. intertemporally (Allen & Santomero, 2001). Due to increased competition from capital markets, this risk management strategy has become increasingly challenging as investors have the opportunity to withdraw their deposits and invest them in higher yielding products on the capital markets. Furthermore, banks have strived to become less dependent on traditional banking operations as transaction costs and costs arising due to asymmetric information decrease and as competition from traditional and new players as well as capital markets have become increasingly fierce. Risk management is hence to an increasing extent accomplished with more sophisticated methods, involving the use of derivative instruments. Allen & Santomero (1998) argue that banks have found their own niche within non-traditional banking operations due to increasing participation costs. There are fixed costs of learning about complex financial instruments and the actual trading processes related to risk management. In addition, the marginal cost of monitoring markets on a day-to-day basis, which is necessary if investors are to follow dynamic trading strategies, is substantial. Therefore, many private individuals and companies are not willing to invest the time and money required to manage the risk, but rather let banks manage the risk on their behalf. The increasing need for expert opinions on complex financial issues is also driving the growth of wealth management and investment banking. Merton (1995b) argue that the rapid growth of the over-the-counter (OTC) derivatives market is an indication of increasing confidence in banks' and other financial institutions' pricing and risk management ability.

Banks have a comparative advantage in acquiring and *processing information* about borrowers' ability to repay debts and in *monitoring* the borrower (Benston & Smith, 1976). By processing information and monitoring borrowers, banks take on the role of delegated monitor as defined by Diamond (1984). Instead of trying to find interested borrowers to their savings on their own, depositors place their savings in a bank, which promises them a fixed rate of return on their savings. The bank provides loans to a large number of borrowers, hence diversifying the loan portfolio and eliminating some of the default risk. Even so, the bank has to monitor the borrowers in order to ensure payment of the fixed rate of return to the depositors. The aggregate monitoring costs are, however, lower as it is only the bank, rather than all depositors independently that monitor the borrower. Moreover, banks have a competitive advantage in monitoring as there are economies of scale in gathering information about borrowers and as banks have superior access to sensitive financial information due to their reputation for discretion. That is, banks are able to communicate proprietary information about borrowers at lower cost than what would be possible in a situation where saver and borrower would communicate directly (Leland & Pyle, 1977). In order to limit the risk of shirking, banks invest in informational technology, which facilitate the screening and monitoring process (Holmstrom & Tirole, 1997). Furthermore, the renewal process of short-term loans entails periodic evaluation of the borrower. As bank loans are junior to other fixed payoff instruments, a positive renewal decision signals to holders of higher-priority payoff claims that similar evaluations are not needed, hence reducing the monitoring costs of these investors (Fama, 1985).

With the first investment banks established in the nineteenth century, a new role of banks was introduced. Instead of simple lending against good guarantees, investment banks took on higher risk when providing industrial companies with financing (Freixas & Rochet, 1997). The main role of investment banks is to intermediate when companies sell securities on the asymmetrically informed financial markets. By developing close relationships and establishing mutually compatible commitments with the issuing companies, underwriters reduce the uncertainty about participation among other market players, hence increasing the attractiveness of an issue (Mayer, 1988). In order to reduce the cost of asymmetric information, the investment banks interact repeatedly with the capital market thus creating a reputation. Chemmanur & Fulghieri (1994) find that investment banks with higher reputation are superior in reducing the impact of asymmetric information on the equity market. Note, also that investment banks become cautious with increasing reputation. The more prestigious investment banks engage in underwriting with lower risk companies than less prestigious investment banks do.

2.2. Bank regulation

The special tasks of providing the general public with a payment system and funding their operations with deposits are the main reasons why banks are regulated, i.e. there is a need for a safety net to protect depositors from the risk of bank runs and failures (Freixas & Rochet, 1997). Bank operations are restricted in a number of ways. First of all, bank operations are subject to approval from authorities, i.e. they are licensed (Benston & Smith, 1976). This means that there are restrictions on entry on both the domestic and foreign banking market. Furthermore, there may be restrictions on what kind of activities a bank can engage in, e.g. whether it is allowed for banks to have non-banking operations or other financial services than traditional banking operations. Second, the explicit deposit insurance and implicit TBTF government guarantees are the main components of the safety net (Freixas & Rochet, 1997). All European banks are obliged to participate in a deposit insurance system, whereas the system design varies across countries with respect to coverage as well as with how the system is funded and managed (Barth *et al.*, 2007). Third, there is regulation on the level of capital banks have to retain. The first international standard with respect to capital adequacy requirements was presented by the Basel Committee in 1998. The required level of capital in relation to the total risk-weighted assets of the bank was set in Basel I at 8%. The revised version of the capital requirement presented in 2003, i.e. Basel II, encompass not only a revised set of minimum capital requirements, but also supervisory review and market discipline requirements (Basel Committee on Banking Supervision, 2003).

There are some differences in how large bank holding companies (BHCs), commercial, savings and cooperative banks are regulated. There may be restrictions on the scope of the activities savings and cooperative banks can operate in. For example, small savings banks are generally allowed to operate only in a restricted geographical area and are obliged to service less fortunate customers (Altunbas *et al.*, 2001a). On the other hand, differences in regulation may have a positive impact on the performance of savings and cooperative banks. Public sector savings and cooperative banks are frequently AAA rated due to the government guarantees, which may give them a competitive advantage in purchasing money in the wholesale markets (Chakravarty & Williams, 2006). The regulation of investment banks is less stringent. On the other hand, investment banks

do not enjoy the security of the governmental deposit insurance as they do not offer liquidity in the same way as ordinary banks do (Bhattacharya & Thakor, 1993)².

2.3. The current financial crisis

Many seek the roots of the current financial crises in the rapid development of financial innovations and the increasing focus of banks on non-traditional commission- and fee-based banking operations. There are, however, substantial benefits from financial innovation development. Financial innovations have increased the efficiency of the financial system in that they have improved the ability to spread risk, lowered transaction costs and reduced the level of asymmetric information (Merton, 1995b, Rajan, 2006). Moreover, the liquidity created by financial innovations improve the ability of banks in providing resources to the real sector (Santomero & Trester, 1998). Hence, the main challenge with financial innovations may be the implementation of them rather than the actual products. More specifically, banks may have been unable to properly modify structures and incentive schemes designed for traditional banking operations to be appropriate as focus increasingly is on non-traditional banking operations where financial innovations have a significant role. In essence many banks have moved from an “originate and hold” business model to a “originate and distribute” business model. In the latter business model, the bank does not hold the assets they originate, i.e. the loans, until maturity, but rather distribute them to investors through the issuance of structured finance products. This new business model increases bank risk. Santomero & Trester (1998) model the impact of the ease of selling bank assets to other investors and indeed find a positive connection between financial innovation market growth and bank risk. As loans are no longer held on the banks books, the incentives for screening and monitoring borrowers is reduced as banks are no longer residual claimants on the loans (Kane, 2008, Gorton, 2009). Moreover, the quality of the process with selecting the assets to be bundled and resold deteriorate, hence increasing the risk of the portfolio (Ashcraft & Schuermann, 2008). Gorton (2009) recognises that some risk was indeed born by the banks in their role as originators and underwriter; significant write-downs have been made by numerous banks. An improvement in the incentives and information flow between the participants in the “originate and distribute” model is called for in order to make the structured finance market efficient (European Central Bank, 2008).

The incentive schemes, in particularly of the sub-prime mortgage loan officers, have also been named as a scapegoat. The roots in the excessive supply of sub-prime mortgage loans is, however, to be found in governmental decisions to provide every US citizen with the opportunity to own their own home (Gorton, 2009). Volume based incentives schemes only added to the rapid growth in this market. By constructing sub-prime loans with very low fixed rate interest rates during the initial period of two or three years, unsophisticated customers were attracted through what is now called “predator lending” (Ashcraft & Schuermann, 2008). The growth in the sub-prime loan market resulted in rapid increase in house prices, i.e. the product fed into one of the macroeconomic factors its value relied on (Mian & Sufi, 2008). This is, however, not the first time that extraordinary growth on the real estate market has ended in a market collapse (Calomiris, 2008).

² In an attempt to save two of the largest US investment banks, the US Federal Reserve accepted Morgan Stanley's and Goldman Sach's applications to become BHCs in the end of September 2008 (The Financial Times, September 22nd, 2008).

The nexus of providers of off-balance sheet vehicles, derivatives, securitization and interbank market such as investment banks, hedge funds, mortgage originators, which is now commonly called the “shadow banking system”, is opaque. Information about the actual value of the claims along the chain from the underlying mortgages to the investor in a residential mortgage-backed security (RMBS), a collateralised debt obligation (CDO) or other instrument holding tranches of CDOs or a structured investment vehicles (SIV) have been lost due to challenges in understanding the core assets involved (Gorton, 2009). The structure of the products has become increasingly layered and broader in the geographic span as banks has placed tranches of loans with foreign and non-bank companies (Kane, 2008). The opacity of financial innovations and, in particular, the complex and layered process by which the cash flow rights and risks are channelled across the financial system make it next to impossible for an outsider to understand the full picture. To make evaluation even harder, there is no market for many of the products of the “shadow banking system”. Note that the increased interlinkage of banks has broadened the concept of TBTF to banks which are too-net-worked-to-fail (Caprio *et al.*, 2008). As a result of opacity, investors handed over an increasing part of the due diligence to credit agencies and investment banks (Kane, 2008). The credit agencies are not objective in their assessment in that they are paid for their opinion by the arranger of the securitization deal rather than the investors (Ashcraft & Schuermann, 2008). As a result of the long period of market growth, participants were willing to invest in new and increasingly exotic instruments pushing providers to develop products and offer them to a broader range of investors (European Central Bank, 2008). Over-dimensioned commissions and fees as well as focus on short term profits rather than worrying about potential future losses, created incentives for rapid growth in this market (Caprio *et al.*, 2008). Moreover, misconception in the differences in the ratings for structured products and corporations used in investment mandates enabled asset managers to seek out the greater spreads of the structured products (Ashcraft & Schuermann, 2008). Eventually, the lack of information and increasing uncertainty about the credit worthiness of counterparties, created a situation where financial intermediaries refused to conduct business with each other, resulting in the interbank market meltdown (Gorton, 2009).

Kane (2008) argues that bank regulation, in particularly the explicit deposit insurance and the implicit TBTF government guarantee, has induced the current financial crisis, as insolvent banks remain active only as a result of governmental rescue. Moreover, the government guarantees increase the risk appetite of banks tremendously. The arguments presented by Goodhart (2008) are along the same lines. Moreover, the current regulatory perspective of institutions rather than functions provokes market players to engage in “regulatory arbitrage”, i.e. to create synthetic products to replace the original product under regulation, hence make profits by circumventing regulation (Merton, 1995b). The increased use of off-balance sheet items after the implementation of Basel II is one example of regulatory arbitrage; as the weights for the capital requirements are defined along product or asset type categories, derivative instruments are used to move assets off-balance sheet (Caprio *et al.*, 2008). Moreover, the increasing reliance on credit ratings in a regulatory setting has been strongly criticised (Caprio *et al.*, 2008). Both Caprio *et al.* (2008) and Kane (2008) also points a finger at supervisors and argue that too little attention was given to new financial innovations in the US as they enabled US companies to compete more efficiently on the international market. IMF, among others, has a similar view as they see deficient regulation, especially of the “shadow banking system”, as the main cause for the current financial crisis (The Economist, March 6th, 2009). Finding the right balance of regulation and supervision, i.e. being able to distinguish between situations where regulation improve efficiency and situations where government intervention would be harmful, is

challenging. But it is also important to recognise that there has always been and will always be imbalances between financial innovation development and regulation (Merton, 1995b) and that the regulated will always be able to move more often and more quickly than the regulator (Caprio *et al.*, 2008). Merton (1995b) promotes a functional perspective rather than the currently common institutional perspective on regulation, i.e. economically equivalent transactions would be treated similarly. While discussing the main reasons for the current financial crisis, IMF gives support to Merton's arguments by stating that regulation should focus on activities rather than entities (The Economist, March 6th, 2009). More importantly, there should be a revision of bank supervision to ensure that deliberate transparency reductions and risk mispricing are acted upon (Caprio *et al.*, 2008).

The causes to the financial crises have also been sought in global imbalances in trade and financial sector as well as wealth and income inequalities (Lim, 2008). The global imbalances, i.e. the surplus of countries like China and the huge US deficit, is argued to be the blame for the financial crisis in that the excessive US consumption have been financed from abroad and that the increased demand for structured finance products reflects the channelling of funds across countries.

To sum this very brief discussion on the potential reasons for the current financial crisis, it appears evident that a number of different factors have affected the development of a sub-prime crisis in the US to a full fledged global financial crisis, having substantial impact on the real economy. Moreover, the causes and consequences are by no means independent. Hence, the answers have to be sought in the joint impact of increased reliance on non-traditional banking operations, deficiencies in incentive schemes and organisational structures, laxity in regulation and, in particular, supervision as well as imbalances both in national and the world economy. However, it appears as if bank corporate governance play a significant role in most of the above listed factors. Finally, note that the reason for substantial measures taken to revitalise the banking sector across different countries can be sought in the central role of banks in the financial system.

3 BANK CORPORATE GOVERNANCE AND OWNERSHIP

3.1. Why bank corporate governance is different

Bank corporate governance is important as poor corporate governance may result in bank failures thus endangering the stability of the financial system. Furthermore, poor corporate governance may lead to lost market confidence in the bank's ability to manage its assets, which may in turn trigger bank runs or liquidity crises³ (Basel Committee on Banking Supervision, 2006). Hence, banks are regulated. In addition, bank operations are less transparent, the range of stakeholders affected by the operations is wider and the different characteristics of traditional and non-traditional banking operations impose challenges on bank corporate governance. These four elements make bank corporate governance different from corporate governance in other companies.

The *government regulated* deposit insurance and the implicit guarantee that large banks will be bailed-out by the government to ensure financial system stability, reduce the efficiency of corporate governance mechanisms (Berlin *et al.*, 1991). In addition to reducing the incentives for depositors to monitor the bank, deposit insurance also encourage banks to take on more risk (Merton, 1977). The implicit guarantee that the government will not let large banks fail as it would disturb the stability of the whole financial system reduces the incentives to monitor in particularly large banks (O'Hara & Shaw, 1990).

It is difficult for outsiders to assess the true risk of bank assets as privileged information on e.g. loans, cannot be communicated to outsiders and as banks can transform the composition of its asset base rapidly (Flannery, 1994, Bhattacharya *et al.*, 1998). Hence, banks are seen by many as *less transparent* than other companies, thus making the monitoring of operations difficult. Morgan (2002) finds that rating agencies disagree more frequently when it comes to banks and insurance companies than companies in other industries. He concludes that banks and insurance companies are more opaque. Iannotta (2006) replicates Morgan (2002) for European banks, and do find that the banking industry is more opaque than some industries, but not all industries. On the other hand, based on dispersion in analysts' earnings forecasts, Flannery *et al.* (2004) conclude that banks are not more opaque than other companies. Similarly, Adams & Mehran (2003) find that the stock-return volatility in their sample of BHC is relatively low, indicating that the monitoring costs are lower than in industrial companies.

Due to the special nature of banks, the *range of stakeholders is wider*. In addition to shareholders, the interests of depositors have to be addressed (Macey & O'Hara, 2003). Furthermore, the interests of governmental regulators of sustaining a sound financial system should be accounted for (Boot & Thakor, 1993). These corporate governance principles are formalised by the Basel Committee on Banking Supervision (2006) as they state that "Good corporate governance should meet the obligation of accountability to their shareholders and take into account the interests of other recognised stakeholders. Supervisors, governments and depositors are among the stakeholders due to the unique role of banks in national and local economies and financial systems, and the associated implicit or explicit deposit guarantees".

³ The loss of confidence in banks resulted in the evaporation of the interbank market in the autumn of 2008.

The *combination of traditional and non-traditional banking operations*, i.e. interest income based operations, such as taking deposit and issuing loans, vs. commission- and fee-based operations, such as securities trading, wealth management and underwriting, has created new challenges in bank corporate governance. Boot & Schmeits (2000) argue that the increased transaction orientation of banks has opened up new opportunities for cross-subsidisation from relatively low-risk relationship banking activities to more risky trading activities. The Basel Committee on Banking Supervision (2006) has also recognised this risk. In particular, they state that a situation where the management is “unwilling or unable to exercise effective control over the activities of apparent “star” employees should be avoided and that this situation is particularly problematic where managers fail to question employees who generate returns that are out of line with reasonable expectations (e.g. where supposedly low-risk, low-margin trading activity generates unexpectedly high returns) for fear of losing either revenue or the employee”. Furthermore, the Basel Committee recommend that “banks should only approve complex financial structures, instruments or products if the material financial, legal and reputational risks arising from their use or sale can be properly assessed and managed”.

The senior management and board of directors of a bank have the primary responsibility for good corporate governance (Basel Committee on Banking Supervision, 2006). The main responsibility for the external monitoring lies with the ones who benefit the most from good performance, i.e. the shareholders and directors with significant ownership (Sullivan & Spong, 2007). There are also other stakeholders, which can influence the conduct of a bank. Depositors and other customers can choose not to conduct business with banks that are operated in an unsound manner, whereas government authorities can act through laws, regulations, enforcement and an effective judicial framework⁴.

3.2. Previous empirical studies on bank ownership

3.2.1. Individual ownership characteristics

State ownership is the individual ownership characteristic which has received the most attention in previous empirical studies due to the important role of banks in the financial system and its vulnerability to bank runs. State ownership is also seen as the most complete form of bank regulation (Bertus *et al.*, 2008). The focus has been either on the impact on economic growth or on the performance of banks in which the state has substantial influence through ownership. La Porta *et al.* (2002) represent the first strand of literature. They find that government ownership in banks is particularly high in countries with low level of income per capita, undeveloped financial systems and poor protection of shareholder rights. State ownership appears to have a negative impact on economic growth among these developing countries, whereas there is no correlation between state ownership and growth in developed countries. La Porta *et al.* (2002) conclude that the developed countries manage the distortions that arise from

⁴ The other parties listed by Basel Committee on Banking Supervision (2006) are securities regulators, stock exchanges and other self-regulatory organisations (through disclosure and listing requirements), auditors (through a well-established and qualified audit profession and audit standards), banking industry associations (through initiatives related to voluntary industry principles and publication of sound practices), professional risk advisory firms and consultancies (through assisting banks in implementing sound corporate governance practices), credit rating agencies (through review and assessment of the impact of corporate governance practices on a bank’s risk profile), and employees (through communication of concerns regarding illegal or unethical practices).

government ownership of banks better than developing countries. Micco *et al.* (2007) present a somewhat different interpretation; in developed countries, state owned banks merely mimic the behaviour of private banks, whereas in developing countries state owned banks still play a development role and have hence a political or social agenda. With respect to the impact of state ownership on the performance of banks, Berger *et al.* (2005) and Micco *et al.* (2007) present findings on international samples, whereas Altunbas *et al.* (2001a), Iannotta *et al.* (2007) and Karas *et al.* (2008) present findings on European samples. Using a sample of Argentinean banks, Berger *et al.* (2005) report that the long-term performance is lower in state owned banks than in other banks. Furthermore, they find that the banks selected to be privatised have had poor performance and that their performance improve dramatically after the privatisation. Using a global sample, Micco *et al.* (2007) find that in developing countries state owned banks appear to have lower profitability than the private banks, whereas no correlation is found in developed countries. Moreover, the difference in performance of state owned and private banks appear to be greater during election years. This finding, which indicate that political agendas are driven through state owned banks, is prevalent both in developing and developed countries. Using a sample of German banks, Altunbas *et al.* (2001a) find no difference in the efficiency of privately owned banks and state owned savings banks or mutually owned cooperative banks. This finding agrees with the one presented in Micco *et al.* (2007) that there is no correlation between state ownership and bank performance in developed countries. Finally, Karas *et al.* (2008) report rather surprising results on the efficiency of Russian banks. They find that the efficiency is higher in domestic public banks than domestic private banks. Moreover, the introduction of deposit insurance system in 2004, which gave also the private banking sector access to government guarantees, did not have a narrowing impact on the efficiency gap.

As with the impact of state ownership, the impact of *foreign ownership* is different in developing and developed countries. Foreign banks appear to be less efficient than domestic banks in developed countries, whereas foreign banks appear to be more efficient than or approximately equally efficient as private, domestic banks in developing countries. Chang *et al.* (1998) examine US multinational commercial banks and find that foreign owned banks are less efficient than US owned banks. The empirical findings on the positive impact of foreign ownership in developing countries are conclusive. Micco *et al.* (2007) find that foreign banks tend to be more profitable than private domestic banks. Using a samples of transitional economies in Europe, Grigorian & Manole (2002) find that foreign ownership with controlling power enhance commercial bank efficiency, whereas Bonin *et al.* (2005) find that foreign owned banks are more cost-efficient than other banks, and that they also provide better service. On a sample of South East European banks, Staikouras *et al.* (2008) find that foreign banks and banks with higher foreign bank ownership have higher efficiency than the peer banks. Finally, Karas *et al.* (2008) examine the efficiency of Russian banks and find that foreign banks are more efficient than domestic private banks. Furthermore, foreign ownership does also appear to have an impact on bank risk. Using a sample of banks from over 130 developing countries, de Nicolo & Loukoianova (2007) find that the risk profiles of foreign banks are significantly higher than those of private domestic banks.

Blockholder ownership and the type⁵ of blockholder owner have received some attention in the empirical banking literature. Glassman & Rhoades (1980) distinguish between management and owner controlled banks based on the level of ownership concentration and find that the profitability is lower in banks which does not have concentrated ownership, i.e. in management controlled banks. This finding supports the hypothesis that management focuses on non-profit maximising activities if there is no strong blockholder owner to prevent it or if their incentives have not been aligned with the ones of shareholders true management ownership. Caprio *et al.* (2007) and Laeven & Levine (2008) examine the impact of the level of cash flow rights of the ultimate owner on bank, on bank valuation and risk, respectively. In line with expectations, Caprio *et al.* (2007) find that bank valuation increases with the cash-flow rights of the controlling owner and Laeven & Levine (2008) find that bank risk increases with the cash-flow rights of the controlling owner. With respect to the type of blockholder owner, Caprio *et al.* (2007) differentiate between state, family and private individual, financial and non-financial company and trust or foundation controlling owners in the descriptive analysis, but do not include these variables in the regression analysis. Laeven & Levine (2008) examine the impact of a blockholder owner with a seat on the board, but do not find any significant impact on bank risk.

Management incentives affect bank profitability and risk. Houston & James (1995) find that the relation between equity-based incentives and company performance is stronger in banks than in industrial companies. They also find that CEOs of banks hold fewer stock options and receive a smaller fraction of total pay in equity-linked remuneration compared to CEOs in other industries. Similarly, Adams & Mehran (2003) report that the level of stock options and equity holdings in relation to salary plus bonuses are smaller for CEOs in BHCs than in manufacturing companies. Adams & Santos (2005) find that keeping own shares in trust, thus giving management the authority to use voting rights but not giving them access to dividends, has a positive impact on bank performance. Garcia-Cestona & Surroca (2008) find that Spanish savings banks, which are controlled by insiders, i.e. employees, depositors and founders, focus more on profit maximisation, than banks controlled by Public Administrations, i.e. city halls and local and regional governments. Moreover, Garcia-Cestona & Surroca (2008) find that the insider controlled banks also perform better. DeYoung *et al.* (2001) examine the impact of the level of *management ownership* in a sample of small US banks. They find that management ownership has a positive impact on the profit efficiency in banks run by hired managers, whereas there is no impact of management ownership in the owner-managed banks. Furthermore, they find that the relation between management ownership and profit efficiency is non-linear in the hired-manager banks; it is positive until a management ownership level of 17%, where after it is negative. The main empirical findings on the impact of management ownership on bank risk are presented in Saunders *et al.* (1990), Brewer & Saidenberg (1996), Cebenoyan *et al.* (1999), Chen *et al.* (1998) and Sullivan & Spong (2007). Saunders *et al.* (1990) study the effect of managerial ownership on bank risk in a sample of US BHCs, whereas Sullivan & Spong (2007) use a sample of US state-chartered banks. Both studies report findings which are inline with the hypothesis that hired managers with little or no ownership stake are likely to be more risk averse than managers with a significant ownership position, i.e. banks with management ownership have higher level of risk than their peers. Chen *et al.* (1998), on the other hand, find a negative and significant connection between management ownership and bank risk.

⁵ Different owners have different interest and will thus drive different issues in the main arena of influence, i.e. the board, (Levine, 2004) and the ability to monitor the bank differs with the type of blockholder owner, e.g. banks have greater incentives and the ability to monitor a peer bank than other outside owners (Adams & Mehran, 2003, Rochet & Tirole, 1996).

The diverging results of Saunders *et al.* (1990) and Chen *et al.* (1998) may be due to differences in the time periods examined, as the regulatory environment is more stringent in the latter period hence giving management less room for excessive risk-taking. The impact of management ownership and risk preferences is typically non-linear. Brewer & Saidenberg (1996) find that there is a U-shape relation, whereas Cebenoyan *et al.* (1999) find that S&Ls with management ownership have higher risk provided that the level of ownership is higher than 23-28%. Finally, the results presented in Sullivan & Spong (2007) confirm that the risk awareness of managers increases as a greater share of the management's total wealth is tied to the bank.

DeYoung *et al.* (2001) is one of the rare studies examining the impact of *board ownership* on bank performance. The hypothesis is that external monitoring by the board is more important in banks with hired-managers rather than owner-managers. They do, however, not find support for the hypothesis that strong and motivated monitors enhance the performance of hired-manager banks. With respect to the impact of board ownership on bank risk⁶, Sullivan & Spong (2007) find that the distance to default is greater if a board member has a substantial share of his wealth concentrated in the bank. As previously mentioned, Laeven & Levine (2008) do not find that a bank with a blockholder owner on the board of directors would have higher risk.

Finally, the *type of bank*, i.e. whether it is a commercial, savings or a cooperative bank, has also attracted some interest. Mester (1993) examines the efficiency of US savings and loans (S&Ls) by applying a modified cost frontier approach. Somewhat surprisingly, she finds that on average stock S&L are less efficient than mutual S&Ls. On the other hand, Cebenoyan *et al.* (1993), find no difference in the efficiency of stock and mutual S&Ls. Similarly to the findings of Mester (1993), while focusing on the German market, Altunbas *et al.* (2001a) find no evidence that privately owned commercial banks are more efficient than mutually owned cooperative or publicly owned savings banks. When studying the determinants of bank growth in five major EU countries, Goddard *et al.* (2004) find that the profitability persistence is greater in savings and cooperative banks than in commercial banks. However, this finding is argued to be due to competitive restrictions rather than superior performance. Using a sample of large banks from 15 European countries, Iannotta *et al.* (2007) find that mutual cooperative banks and public owned banks exhibit lower profitability than privately owned banks, even if the costs to income ratio is lower. The bank risk, both in terms of loan loss provisions and z-score, is also lower in the mutual cooperative banks. Similarly, Garcia-Marco & Robles-Fernandez (2008) report that Spanish savings banks are less inclined to take on risk than Spanish commercial banks.

3.2.2. Interaction between ownership characteristics and regulation

Bank regulation is seen as subsidised monitoring and disciplining of management due to the (threat of) prompt corrective actions (Booth *et al.*, 2002). Booth *et al.* (2002) examine the interrelation between the internal monitoring mechanisms (percentage of outside directors, officer and director ownership, and CEO and board of director chair duality) and whether the interrelations differ across unregulated and regulated industries. They find that the interrelation is weaker in regulated companies, i.e. banks

⁶ Simpson & Gleason (1999) do also examine the impact of ownership on the probability of financial distress, but they examine the joint ownership of management and board of directors. They do not find a significant connection between ownership and probability of financial distress. This result is most probable is due to the fact that they do not account for the fact that management and board of directors may have different interests by separating the ownership of the two groups.

and utilities, a finding which suggests that regulation reduces the importance of internal monitoring mechanisms. Elyasiani & Jia (2008), on the other hand, examine the impact of institutional ownership stability on the company performance. They find that the association is weaker in BHCs than in comparable utility and industrial companies and that the association in BHCs is stronger in periods of deregulation. Furthermore, the impact of management ownership on the risk-taking behaviour in banks appears to depend on the regulatory regime. Cebenoyan *et al.* (1999) examine the risk-taking of S&Ls. In S&Ls with substantial ownership, the risk-taking appears to have been unprofitable in the mid-1980s when banks were relatively less regulated and profitable in the mid-1990s when bank regulation was stricter. Similarly, Anderson & Fraser (2000) find that the relation between management ownership and bank risk was positive in the late 1980s when banks were relatively less regulated, whereas the relation is negative as regulatory changes designed to reduce risk-taking incentives had been implemented.

Building on the notion that the impact of corporate governance mechanisms vary across regulatory regimes, Caprio *et al.* (2007) examine the joint impact of ownership and regulation on bank valuation. They report that widely held banks are more common in countries with stronger legal rights. They find that bank valuations are significantly higher in countries with strong legal protection of shareholders than in countries with weak legal protection of shareholders. In addition of having an impact on the level of ownership concentration, the regulatory regime of a country appears to have an impact on its attractiveness for foreign owners. Bertus *et al.* (2008) examine the impact of market discipline, i.e. level of monitoring, on the attractiveness of a country with the respect to foreign entry. They find a negative relation between level of monitoring and foreign ownership. However, they note that as the monitoring index is decreasing in income, this finding might be an indication of a negative relation between a country's level of economic development and foreign ownership rather than the relation of market discipline and foreign ownership. Lensink *et al.* (2008) examine the impact of institutional quality in the host and home country on the efficiency of foreign banks. The negative effect of foreign ownership appears to be lower if the institutional quality of the host country is high, if the institutional quality of the home country is high and if the institutional quality of the home and host country is similar. Similarly, Barros *et al.* (2007) find that foreign banks from common law countries have a higher probability of being among the best performing banks, the reason being that they have superior competitive and regulatory conditions to export to the host country.

When it comes to the joint impact of ownership characteristics and regulation on the risk-taking behaviour of banks, Laeven & Levine (2008) provide some new insights. They examine the impact of a particular regulatory feature, the government guaranteed deposit insurance, on the risk-taking behaviour of banks, while accounting for differences in ownership characteristics. They find that the impact of deposit insurance on the risk-taking behaviour of managers differ with the level of ownership concentration; the explicit deposit insurance increases the risk in banks with a majority owner, whereas there is no significant impact of explicit deposit insurance in widely-held bank.

4 BANK PROFITABILITY AND RISK

As discussed in the previous section, different bank ownership characteristics have only rather recently received increasing attention as determinants of bank profitability and risk. The determinants of bank profitability have traditionally been divided into external factors such as regulation, financial system sophistication, level of competition and growth on the banking market as well as macroeconomic factors such as interest rates and GDP growth and internal factors such as operational characteristics of the bank (Bourke, 1989). The focus in this section is on the internal factors size, focus and funding of operations⁷.

When examining bank efficiency one distinguishes between economies of scale, economies of scope and X-inefficiencies; the first two concepts relate to whether the size and width of the bank operations are optimal, whereas the third examines whether banks use the input efficiently (Hughes & Mester, 1993). It appears as if there are significant X-inefficiencies in banking amounting to as much as 20% of total costs in US banks (Berger & Mester, 1997). As for the international or US studies, the majority of European studies examining bank efficiency have focused on an individual country or a particular type of banks (Altunbas *et al.*, 2001b). Berg *et al.* (1993) are one of the first to take a broader geographical view as they examine banking productivity in the three Nordic countries Finland, Norway and Sweden. By applying Data Envelopment Analysis (DEA) they find that the Swedish banks are more efficient than both Finnish and Norwegian banks. They also find that Swedish banks were best positioned to expand on the Nordic banking market, a prediction that we have seen come true. Altunbas *et al.* (2001b) has an even broader geographic scope and examine banks from 15 European countries. They report that the X-inefficiencies range between 20% and 25%. Hence, if banks would operate at the efficient frontier, they could produce the same amount of output with 75-80% of the current input. This finding indicates substantial room for improvement in how banks are run, emphasising the importance of appropriate corporate governance mechanisms.

The empirical evidence on the existence of economies of scale is, on the other hand, inconclusive (Berger & Humphrey, 1997)⁸. At best the scale and scope inefficiencies account for about 5% of total costs (Chang *et al.*, 1998, Hughes & Mester, 1998). However, the size of the bank appears to have an impact on the existence of economies of scale; there is no evidence of economies of scale in large banks, whereas there appears to be economies of scale in small banks. While examining large US banks, Benston *et al.* (1982) do not find evidence of economies of scale. On a sample of banks

⁷ See e.g. Demircuc-Kunt & Kane (2002) on the impact of bank regulation on bank risk, Barth *et al.* (2007) on the impact of bank supervision on bank performance, Demircuc-Kunt & Huizinga (2000) on the impact of financial development and structure on bank profitability, Bourke (1989) on the impact of competition and Berger *et al.* (2000) on the impact of competition as well as regional and microeconomic shocks on performance persistence.

⁸ The inconclusive results are partly due to differences in the methodological approach used. Initially cost function methodologies, such as data envelopment analysis (DEA), "thick frontier" analysis, and stochastic econometric cost frontier analysis were used to estimate the efficiency of banks (Hughes & Mester, 1993), whereas the translog functional form is now widely used (Altunbas *et al.*, 2001b). One of the challenges with these estimation techniques is the definition of input and output. Depending on the school of thought, deposits are seen as an input or output (Hughes & Mester (1993) test for whether deposits are inputs or outputs and find that they are inputs). Furthermore, Mester (1996) argues that risk should be accounted for as for example risk-increasing activities such as cost-cuts in the credit evaluation process or increased sales in high risk products may result in improved efficiency estimates. Moreover, there is disagreement on whether off-balance sheet items should be accounted for or not. Finally, note that the focus frequently has been on cost efficiency rather than on profit efficiency.

from 15 European countries, Altunbas *et al.* (2001b) report that the economies of scale in banks from 15 European countries range between 5% and 7% and appears to be greatest in smallest banks, whereas they find constant or diseconomies of scale in the largest banks. The latter finding is, however, not found in Denmark, Germany, Netherlands and UK. Finally, Barros *et al.* (2007) find that smaller banks have a higher probability of being among the best performing European banks. They argue that this is due to competitive advantage in being specialised and having the ability to evaluate customers and their risks.

The studies on bank efficiency frequently also address economies of scope, i.e. whether a bank can benefit from operating in several business areas rather than being focused on one. It appears as if economies of scope are limited in a banking setting (Hughes & Mester, 1998). Building on the research of economies of scope, a number of studies⁹ have followed Lang & Stulz (1994) and examined the impact of diversification on performance, profitability and risk in a banking context¹⁰. Laeven & Levine (2007) find that diversified banks trade at a discount. Moreover, diversification appears to have a negative impact on risk-adjusted profitability (Stiroh, 2004b, Acharya *et al.*, 2006, Stiroh & Rumble, 2006, Mercieca *et al.*, 2007, Goddard *et al.*, 2008). Due to the increased focus on non-traditional banking operations across banks both in the US and Europe, many studies have not only examined whether the bank is diversified or not, but also where on the continuum from traditional to non-traditional banking the banks operate. The empirical findings suggest that non-traditional banking operations are more risky than traditional banking operations (DeYoung & Roland, 2001, Stiroh, 2006) and has a negative impact on risk-adjusted profitability (Stiroh, 2004a).

Finally, the funding of the bank, i.e. its reliance on deposits and equity, has an impact on its profitability and risk. There are two aspects of the reliance on deposits which have implications for bank profitability. First, due to the government regulated deposit insurance deposits are seen as subsidised funding. Moreover, Hughes & Mester (1993) find that large banks, which are seen as TBTF receive a more favourable price for their uninsured deposits. Second, banks which rely heavily on deposits appear to be less efficient and profitable (Mester, 1993, Demircuc-Kunt & Huizinga, 1999). The level of capitalisation is associated with the level of risk. A well capitalised bank is seen as less risky as the probability for financial distress and bankruptcy is smaller (Berger, 1995). Moreover, low capital to assets ratios may increase the severity of the moral hazard problem as low capitalised banks have the incentive to engage in high-risk projects as they will benefit from the upside but loses only a limited amount of capital if the gamble does not succeed (Mester, 1996). Hence, the funding costs are lower in well capitalised banks (Bourke, 1989, Demircuc-Kunt & Huizinga, 1999). The empirical findings on the impact on efficiency is inconclusive; Mester (1993) find a positive connection between level of capitalisation, whereas Berger & di Patti (2006) report a negative connection.

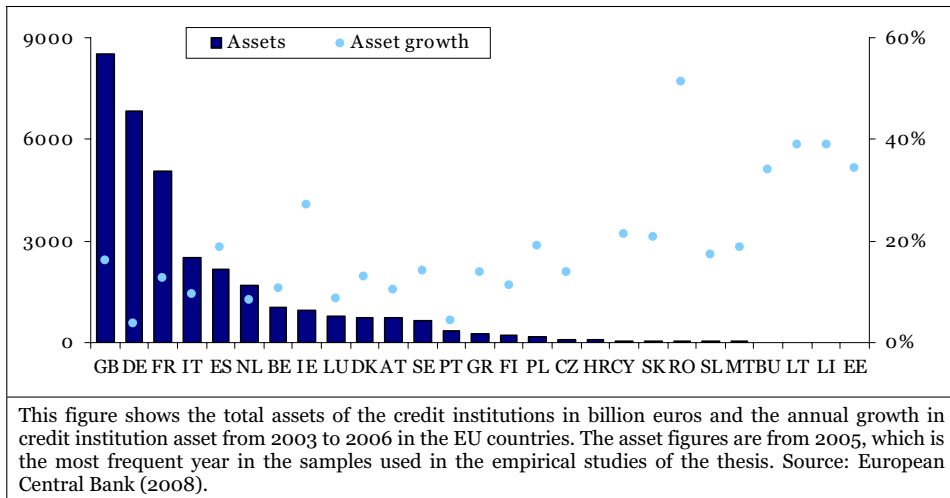
⁹ These studies are presented in greater detail in Essay II.

¹⁰ There are two avenues for estimating diversification; one uses the Herfindahl-Hirschman Index (HHI) to estimate level of concentration in the operation and the other categorises banks as focused or diversified based on financial ratios giving indication of the structure of income or assets.

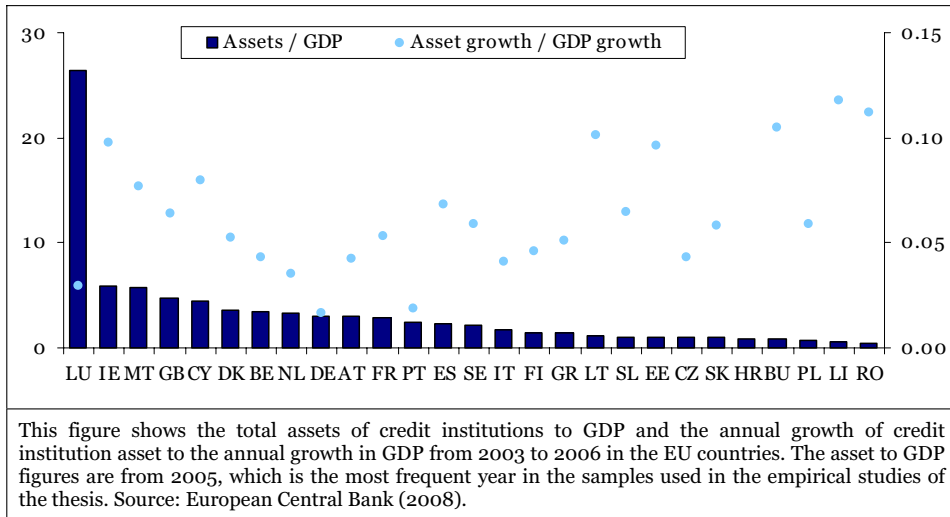
5 THE EUROPEAN BANKING SECTOR

European companies have traditionally relied heavily on bank loans as the main source of external capital rather than financing the operations directly on the financial markets. Even though the importance of the financial markets has grown over the past decades, banks still have a strong position in most of the European countries. The market-based financial systems in UK and Switzerland are the exceptions among the European bank-based financial systems. The size, growth and position of the banking sector do, however, vary. In absolute terms the banking sector is by far largest in the UK, Germany and France, followed by Italy, Spain and the Netherlands (see Figure 1). Even though the growth in bank assets has been significant, the size of the banking sector is still small in the new EU member countries¹¹. The total banking asset to GDP ratio gives an indication of the position of the banking sector, whereas the asset growth to GDP growth ratio gives an indication of the change in the position of the banking sector in a particular country. Luxembourg's bank asset to GDP ratio of 26 is a result of the countries exclusively strong position as a financial centre (see Figure 2). Among the other old EU member countries, the ratio ranges from Ireland's and UK's 5, to Finland's 1.5. Malta and Cyprus stand out among the new EU member countries with ratios of 5.7 and 4.5, respectively. The position of the banking sector has strengthened the most in Lithuania, Romania, and Poland.

Figure 1 Total assets of credit institutions



¹¹ The old EU members are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and UK. In 2004 Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia joined the EU. Hence, Belarus, Croatia, Iceland, Liechtenstein, Macedonia, Moldova, Norway, Switzerland, Turkey, Ukraine and Russia are the countries in the sample which do not belong to the EU.

Figure 2 Bank assets to GDP

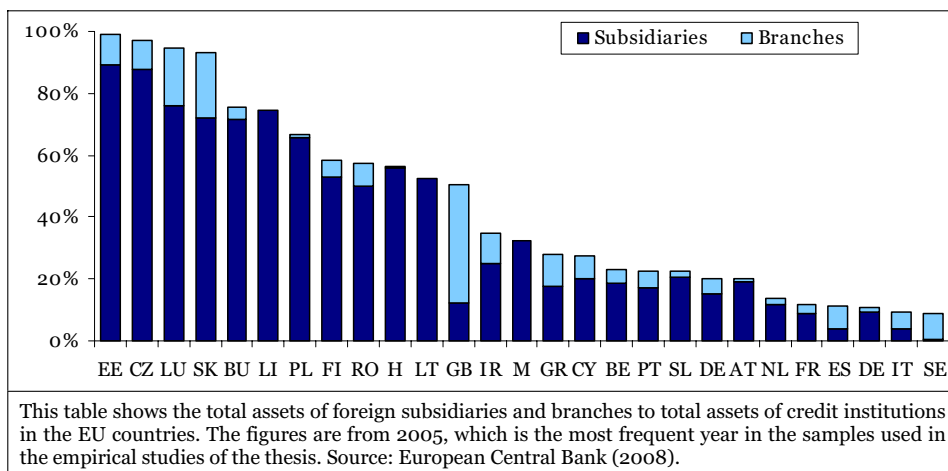
A number of measures have been taken to speed up the integration of the banking sector in Europe. First, greater harmonisation of banking regulation has been achieved through the Second Banking Directive (implemented in 1993) and the financial services action plan (implemented in 1999). The objective of the Second Banking Directive was to harmonise the banking regulation and reduce the barriers to entry across the EU countries. The objective of the financial services action plan, on the other hand, was to create a single financial services market across EU. Second, the implementation of the European Monetary Union¹² does also increase cross-border consolidation by facilitating trade and eliminating currency conversion costs (Berger, 2003). The level of foreign bank activity across the European countries gives an indication of the level of integration. The level of foreign ownership does differ greatly across the European countries as it ranges from 10 to 20% in the Western European countries and 60 to 70% in most of the transitional countries of Eastern Europe (see Figure 3). Among the Western European countries Luxembourg and UK are the exceptions with strong foreign presence due to their positions as international banking and financial centres. The banking sector in Estonia, Czech Republic and Slovakia is almost entirely run by foreign owned banks. One reason for the high foreign ownership in the transitional Eastern European countries is the privatisation process¹³ in which the state rather recently has reduced its dominance, hence lowering some of the barriers to entry (Berger, 2007). Note that most of the foreign activity is run through subsidiaries rather than branches, which also indicates that there are still barriers to full entry across the European banking market. Dahl *et al.* (2008) report evidence that the activity mix of banks in Denmark, Italy, France, Germany, Spain, Switzerland and UK are far from uniform. The level of convergence is lowest in Italy and highest in UK and Spain. Furthermore, the differences in activity mix are greater among small banks than large banks, which support the notion that small banks service smaller customers in the local

¹² Among the old EU countries, Denmark, Norway, Sweden and the UK have chosen to remain outside the euro area. Of the new EU member countries, Slovenia joined the euro area in 2007, whereas Cyprus and Malta joined as of January 2008 and Slovakia as of January 2009.

¹³ The privatisation programmes in most new EU member states were fully completed by 2003. The state does, however, still have a dominant role in Poland (27%), Slovenia (13%) and Hungary (11%). Even though partial bank privatisation was achieved relatively quickly in Russia, foreign bank entry remained limited during the first 15 years of transition (Karas *et al.*, 2008).

banking markets. The slow integration of the retail market is due to lack of consumer confidence in an unfamiliar foreign bank, which increases the switching costs and due to lack of access to private information on local borrowers, which complicates the screening process for foreign banks (Goddard *et al.*, 2007). Finally, note that there are also drawbacks of increased integration. Due to weaker cross-border linkages, large European banks are less vulnerable to the risk of contagion in a banking crisis than the US banks (Hartmann *et al.*, 2005). This finding indicating that the contagion risk, and hence also the systemic risk, grows with increased integration.

Figure 3 Foreign subsidiary and branch asset share of total assets



The European banking markets are consolidating. The most notable recent cross-border transactions are the merger between the Banco Santander and the UK based Abbey, the merger between Italian UniCredito and German HVB and the acquisition of ABN Amro by Royal Bank of Scotland, Fortis and Banco Santander (European Central Bank, 2008). Most of the M&A activity has, however, been within individual European countries (Berger, 2003). There is no clear pattern in which countries the consolidation has been most pronounced. The share of the five largest banks has grown both in large old EU member countries (France and the United Kingdom), in small old EU member countries (Portugal, Sweden and Greece) and in new EU member countries (Cyprus, Lithuania and Romania) (see Figure 4). The level of concentration has decreased both in the new EU member countries Malta, Poland, and Slovenia, as well as in Luxembourg, Spain and Italy. The level of concentration in the latter three countries is already among the lowest. Not surprisingly, Germany and UK are also found to be among the most competitive banking markets measured as level of concentration.

Universal banking¹⁴ has a long tradition in Europe and has been a rather successful concept. European banks appear to have been able to produce a broader product and service portfolio more efficiently than the US banks. The production of new products and services have resulted in improved revenue efficiency but reduced cost efficiency in the US banking industry (Berger & Mester, 2003), whereas European financial

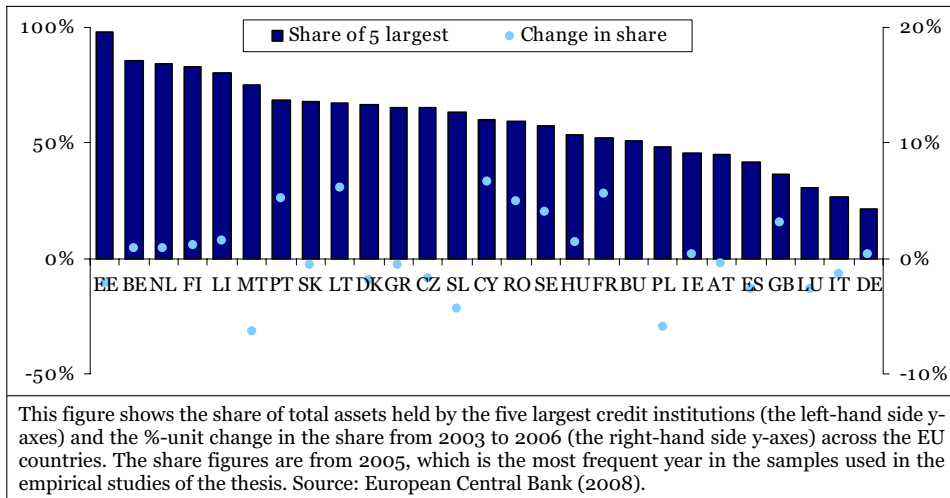
¹⁴ Until the late 1990s US banks were prohibited by the Glass–Steagall Act to operate in other than traditional banking operations. The Gramm–Leach–Bliley Act has enabled US Financial Holding Companies to operate in a broader range of business areas since 1999. European banks have been able to operate in wealth management, securities trading or investment banking since 1989 when the Second Banking Coordination Directive came into force.

conglomerates have been able to maintain, or even improve, the cost efficiency level, while becoming more revenue efficient than specialised financial intermediaries (Vander Vennet, 2002). The non-traditional banking operations have become increasingly important in Europe. Goddard *et al.* (2007) report that the non interest income to total income ratio for EU banks increased from 28% in 1992 to as high as 50% in 2000, after which the ratio has fallen to 40% in 2003.

There has also been a shift in the funding of bank operations from deposits to capital market instruments, such as asset-backed securities (ABS) (European Central Bank, 2005, Boot & Thakor, 2008). Even though there has been a growth in the issuance of ABSs, the European market is small in comparison to the US market; in 2007 total issuance volume in the US was five times higher than the issuance volume in Europe (European Central Bank, 2008). Even so, the European banks are exposed to the risks related to these products, since they have had substantial investments in US originated ABSs. Hence, many European banks have had to make substantial write-downs, lean on governmental support and launch extensive restructuring programs as the market collapsed.

To conclude, the European banking sector is still heterogeneous. This entails both an opportunity and a challenge for the empirical study. The main benefit is that the heterogeneity enables the assessment of the interaction of ownership variables and different regulatory regimes presented in Essay I. The main drawback is the reduced comparability across countries. To address the latter issue, country level dummy variables are included in the model specifications applied in Essay II and Essay III.

Figure 4 The share of the five largest credit institutions in total assets



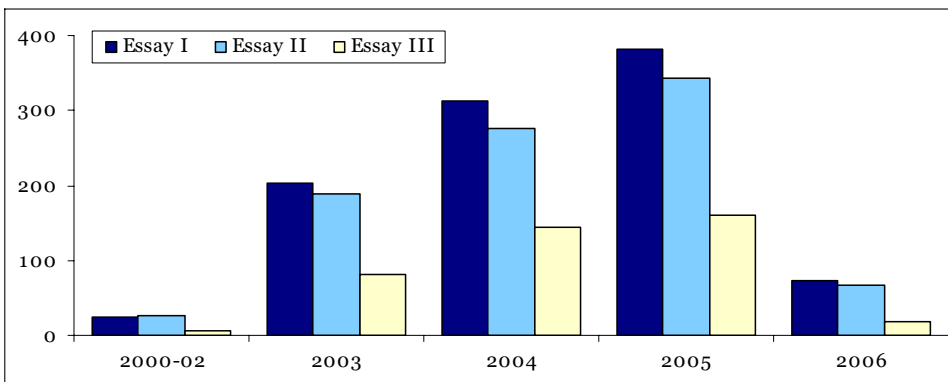
6 THE DATA

The main reason for focusing on European banks is that most of the limited empirical research on bank ownership structure has been done on US or international data, hence leaving room to explore this research area in a European setting. I include both listed and unlisted banks in the sample as unlisted bank is of great importance in Europe. About two thirds of the banks in the sample are unlisted.

Financial and ownership data is retrieved from the BankScope International Bank Database, which is provided by Fitch/Bureau Van Dijk. The data is gathered from three BankScope DVDs dated December 2004, December 2005 and December 2006. Each DVD contains data on the ownership structure of the bank for a particular point in time and financial data for up to seven years.

I have matched financial and ownership data of active banks so that the year of the information date is the same. Note that the information dates of the ownership data on occasion is the same on all three DVDs, which implies that the data has not been updated. In this situation only one bank-year observation is included in the sample. When the information dates of the eight owners or ownership groups included in the database are from different years, the most recent year is defined as the year of the observation. As a result there is one to three bank-year observations of matched financial and ownership data for each bank in the sample. The number of bank-year observations varies across years (see Figure 5).

Figure 5 The number of bank-year observations across years in each of the three essays



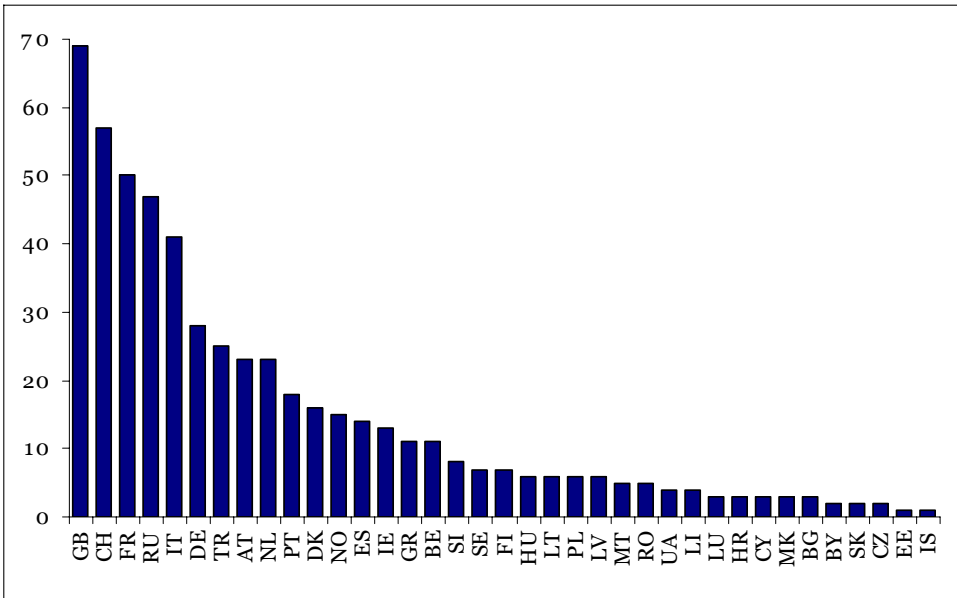
I restrict the financial data to consolidated financial statements in order to bring the perspective as close to the ultimate owners as possible. The use of consolidated data also brings the analysis closer to the real economic situation faced by owners and managers; Stiroh & Rumble (2006) argue that one can presume that strategic decisions are made with the entire operation in mind. Moreover, this approach ensures that non-traditional banking operations frequently held in subsidiaries are included in the financial data used. This is particularly important in Essay II, where the impact of management and board ownership is examined in e.g. banks focusing on non-traditional banking operations. Similarly, the consolidated approach improves the comparability of the commercial, savings and cooperative banks examined in Essay III. Furthermore, the legal selection bias in operating as a subsidiary or branch network abroad is eliminated. The use of consolidated financial statements does, however,

impose a risk of multiple counting of entries of the same organisation at different level of consolidation (Bonin *et al.*, 2005, Micco *et al.*, 2007). Hence, I impose a cap on institutional ownership and exclude banks which are majority owned by another European bank assumed to be included in the database.

The categorisation of the owners has required some manual work. In the BankScope database an owner can for example be categorised as “Management and employees”. The number of owners in this category is, however, negligible. Hence, I have cross-checked the names of the owners categorised as “Individuals and families” with information on the individuals on the management team and board of directors found on the company home pages and in annual reports. As a result these two categories have been recoded as “Management”, “Board”, “Employees” and “Private”. Furthermore, an owner is defined as a family owner if there are several owners with the same family name or the owner is defined as a family or family foundation or fund.

The samples used in the three essays vary both with respect to the type of banks and countries included in the studies. Essay I include all types of banks, i.e. BHCs, commercial, savings, cooperative and investment banks. As management and board ownership is rare in savings and cooperative banks, these are not included in Essay II. Savings and cooperative banks are, on the other hand, given special attention in Essay III. Hence, the sample used in the third empirical study includes commercial, savings and cooperative banks. The banks included in the three studies are listed in Appendix 1. Essay I and II include all 37 European countries for which financial and ownership data of a bank is available, whereas Essay III include only the countries where financial and ownership data on savings or cooperative banks is available. The number of banks from each country varies greatly, with the highest representation from UK, Switzerland, France, Russia and Italy (see Figure 6).

Figure 6 Number of banks from each country included in the sample of Essay I



7 SUMMARY OF THE ESSAYS

Each of the three essays included in this doctoral thesis addresses the interaction of bank ownership characteristics with some other feature affecting bank operations, hence accounting for the complexity of bank corporate governance. Essay I addresses the interaction of ownership characteristics and regulatory environment, Essay II addresses the joint impact of ownership characteristics and strategy on profitability, whereas Essay III examine the joint impact of type of bank and operational as well as ownership characteristics on profitability and risk.

7.1. **Essay I: Bank corporate governance in different regulatory environment**

The regulatory environment a bank operates in is expected to have an impact on the efficiency of corporate governance mechanisms. As in non-bank companies, the legal protection of shareholders is the backbone of any corporate governance system. In a banking setting, the legal protection of depositors is, however, as important as the legal protection of shareholders. The government regulated deposit insurance and the implicit guarantee that, in particularly, large banks will be bailed-out by the government to ensure financial system stability, reduce the efficiency of corporate governance mechanisms.

Little is, however, known about the interaction between features of the regulatory environment and ownership structure of banks. Hence, the objective of Essay I is to examine these interactions in a sample of banks from 37 European countries. As indicators of the regulatory environment I use the Moral Hazard Index developed in Demircuc-Kunt & Detragiache (2002), and classifications of countries into sub-samples of countries with similar deposit insurance system, legal protection of shareholders and legal origin as well as the level of integration to the European community. Similarly, the 995 bank-year observations are classified into sub-samples with similar ownership characteristics. I use a broad set of ownership variables covering the level of ownership concentration and type of blockholder owner as well as management, board, private individual, family and state ownership.

The empirical results suggest that the ownership structure of banks do vary with the regulatory environment in the home country of the bank. I confirm previous empirical findings on the link between legal protection of shareholders and ownership structure. The novelty of this essay is that it shows that the severity of the moral hazard problem, induced by the different features of the deposit insurance system, appears to have an impact on the attractiveness of different ownership characteristics. These findings indicate that banks optimise their ownership structure to match the regulatory environment of their home country. Moreover, I compare the profitability and risk of banks operating in a similar regulatory environment. I find that banks with the most common ownership structure are more risky than other banks only in countries where the moral hazard problem is severe. This finding indicate that the regulatory objective of financial system stability is achieved in other countries, whereas in countries where a generous deposit insurance system induces risk taking other measures to improve corporate governance efficiency has not been taken or not been successful.

Even though the study presents some new insights on the interrelation between regulatory environment and ownership structure of banks, the full complexity of the

different elements affecting the corporate governance of banks is far from covered. The impact of other than deposit insurance system related bank regulation is not accounted for. More importantly, the recent changes to deposit insurance systems across most of the European countries, creating exceptionally generous deposit insurance systems, have not been addressed in this study. This leaves room for future research on e.g. the interaction of regulatory environment and ownership structure in times of crisis. I do, however, believe that the findings in this study can provide some guidance as deposit insurance systems are refined as the circumstances normalise. First, all different features of the deposit insurance system should be accounted for when balancing the impact of the deposit insurance system on the probability of bank runs vs. the severity of the moral hazard problem. Second, excessive generosity in the deposit insurance system should be avoided in normal circumstances.

7.2. Essay II: The impact of management and board ownership on profitability in banks with different strategy

A bank can be categorised as traditional, diversified or non-traditional based on the level of interest income to total operating income, loans to total earning assets and amount of off-balance sheet items it has. The main hypothesis in this essay is that the efficiency of two different corporate governance mechanisms, management and board ownership, differ with the strategy of the bank. This argument is based on two lines of reasoning. First, the severity and characteristics of the agency problem differ across banks with different strategy as the impact of bank regulation and the level of opacity differs with the operational characteristics of banks. Second, I argue that the impact of management and board ownership on the profitability of banks may differ with the monitoring incentives of outsiders and risk-taking incentives of insiders. Hence, the objective of Essay II is to determine whether the impact of management and board ownership on profitability differ with the strategy of the bank. There is limited empirical evidence on the impact of management and, in particular, board ownership on bank profitability hence this essay fills a gap in the ownership literature. The novelty in this essay is, however, the examination of the joint impact of ownership structure and bank strategy. The increased focus on non-traditional banking operations as well as the notion that non-traditional banking operations is very differently from traditional banking operations (Gorton, 2009), make a study comparing the impact of corporate governance mechanism, while accounting for differences in strategy, very topical.

Using a sample of 901 bank-year observations from 37 different European countries, I confirm previous empirical findings that management ownership has a positive impact on profitability and that board ownership does not have a significant impact on profitability. When examining the joint impact of ownership structure and bank strategy, I find that management ownership has a positive impact on profitability in diversified and non-traditional banks, whereas board ownership has a positive impact on profitability in traditional banks. These findings support the notion that management ownership is important in banks which are difficult to monitor due to greater opacity, whereas board ownership is important in banks where government guarantees reduce the incentives to monitor. I do, however, not find a significant connection between the ownership variables and risk-adjusted profitability, which suggests that the higher profitability is achieved by increasing the risk of the operations. The results are robust to a number of alternative model specifications, controlling in particular for endogeneity, sample selection bias and the categorisation of banks into traditional, diversified and non-traditional banks.

7.3. Essay III: Comparison of profitability and risk in commercial, savings and cooperative banks

The objectives of commercial, savings and cooperative banks differ. Commercial banks are seen as value maximising banks, whereas savings banks most commonly have a social or regional agenda and cooperative banks focus on providing value to the customer-owners. Hence, it is generally thought that savings and cooperative banks are less profitable than commercial banks. But is this really due to the different objectives or rather due to differences in operational and ownership structure?

The objective of Essay III is to examine the differences in profitability and risk of commercial, savings and cooperative banks, while accounting for differences in operational and ownership characteristics. Instead of only adding the operational and ownership characteristics as control variables in the profit and risk regressions, I conduct the comparison in sub-samples of similar banks. Hence, I use a broad set of operational and ownership variables to classify commercial, savings and cooperative banks from 14 European countries into sub-samples with similar characteristics.

I find that the profitability and risk differences between commercial, savings and cooperative banks do depend on the operational and ownership characteristics of the comparison group. Moreover, the profitability differences are smaller in countries with a competitive banking sector. The findings indicate that some savings and cooperative banks maintain their traditional non-profit maximising objectives, whereas other savings and cooperative banks operate more like commercial banks and are hence increasingly focused on profit maximisation. An alternative interpretation is that the savings and cooperative bank organisational form simply is more suited for banks with particular operational or ownership characteristics. Hence, I conclude that distinct operational and ownership characteristics rather than only the mere fact that a bank is a savings and cooperative banks explain the differences in profitability and risk.

An examination of ownership structure in a savings and cooperative bank setting propose a peculiar challenge; due to their particular organisational form there are no explicit ownership in many of the European savings and cooperative banks. Hence, only the descriptive presentation of the ownership structure of savings and cooperative banks adds to previous knowledge of the ownership structure of these two types of banks. The lack of ownership data does, moreover, suggest a natural avenue for future research, in which data on ownership and control as indicated by voting rights of board presences could be combined.

8 CONCLUDING REMARKS

The objective of this doctoral thesis was to examine the corporate governance mechanisms of European banks, while focusing on different types of blockholder owners, management ownership, board ownership and type of bank, as well as to examine the interaction between regulatory environment and bank ownership structure. To this end I have discussed different aspects of the role of banks, why bank corporate governance is different and what implications that has on bank regulation and bank ownership structure. In the three essays I take a closer look at particular parts of bank corporate governance.

The main contribution of this doctoral thesis is twofold. First, I use a broad and detailed set of ownership variables and present new insights in the ownership structure of European banks. Second, the examination of the joint impact of ownership characteristics with the regulatory environment a bank operates in (Essay I), with the strategy of the bank (Essay II) and with the type of bank and operational characteristics (Essay III) give a coherent picture of the complexity of corporate governance in European banks. The main insight from the three essays is that the impact of ownership characteristics on bank profitability and risk depends on other factors, making bank corporate governances very complex. The take away for further research is that an assessment of a particular ownership characteristic should be conditional on the regulatory environment it operates in and on bank specific factors such as strategy, operational characteristics as well as other ownership characteristics.

There have been dramatic changes in the banking sector during the past two years and one could argue that banking will not be the same after the current financial crisis. I do, however, believe that some structures inherent to banking will survive. This is particularly true for smaller, local banks focusing on traditional banking operations, whereas there still is a lot to be learned about highly networked global banking operations, where the focus is on non-traditional banking operations. Hence previous research, including what has been presented in this doctoral thesis, is not fully outdated. On the contrary, it provides appropriate frameworks for evaluating what went wrong as well as giving fruitful insights with respect to future directions.

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Appendix 1 The banks included in the empirical studies of the three essays

This table lists the banks which are included in Essay I, Essay II and Essay III, respectively. In addition to the bank name, the BankScope Index Number (BS Index) and the type of bank, i.e. whether the bank is a Bank Holding Company (<i>BHC</i>), a commercial bank (<i>COM</i>), a savings bank (<i>SAVE</i>), a cooperative bank (<i>COOP</i>) or an investment bank (<i>INV</i>) is presented. For each essay the years for which matched financial and ownership data is available are indicated in the table.										
Bank Name	BS Index	Type	Essay I			Essay II			Essay III	
Austria										
MDM Holding GMBH-MDM Financial Group	17754	<i>BHC</i>	02	03	04	02	03	04		
Raiffeisen Bausparkasse GmbH	18572	<i>COOP</i>	04	05					04	05
Allianz Investmentbank AG	19591	<i>INV</i>	02	03		02	03			
M & A Privatbank AG	19925	<i>COM</i>	04	05		04	05		04	05
Volkbank International AG	29927	<i>COM</i>	05			05			05	
Bank Winter & Co. AG	30669	<i>COM</i>	04	05		04	05		04	05
BAWAG PSK Group	43719	<i>COM</i>	04	05		04	05		04	05
BTV-Bank für Tirol und Vorarlberg AG	43887	<i>COM</i>	04	05		04	05		04	05
Bank Styria	43890	<i>SAVE</i>	04	05	06				04	05
Dornbirner Sparkasse Bank AG	43944	<i>SAVE</i>	03	04	05				03	04
Meinl Bank AG	44095	<i>COM</i>	04			04				
Raiffeisen Zentralbank Oesterreich AG - RZB	44096	<i>COOP</i>	03	04	05				03	04
Bank Gutmann AG	44133	<i>INV</i>			05	03	04	05		
Oberbank AG	44316	<i>COM</i>	04	05		04	05		04	05
Oesterreichische Volksbanken AG	44482	<i>COOP</i>	03	04	05				03	04
Oesterreichische Kontrollbank AG	44750	<i>COM</i>	05	06		05	06		05	06
BKS Bank AG	45107	<i>COM</i>	04	05		04	05		04	05
Hypo Alpe-Adria-Group-Hypo Alpe-Adria Bank International AG	45364	<i>BHC</i>	03	05		03	05			
Kaerntner Sparkasse	45365	<i>SAVE</i>	03	04	05				03	04
Service Bank GmbH	46102	<i>COM</i>	03			03			03	
Erste Bank der Oesterreichischen Sparkassen AG	46146	<i>SAVE</i>	03	05	06				03	05
Porsche Bank AG	46841	<i>COM</i>	02	04	05	02	04	05	02	04
Autobank AG	49426	<i>COM</i>	03	05		03			03	05
Belarus										
Slavneftbank	18988	<i>COM</i>	05			05				
Priorbank	32063	<i>COM</i>	05			05				
Belpromstroibank	37111	<i>COM</i>	04	05		04	05			
Belgium										
Diericx, Leys & Cie Effectenbank	40914	<i>INV</i>	05			05				
AXA Bank Belgium	41465	<i>SAVE</i>	03	04	05				03	04
Bank Degroof NV-Banque Degroof SA	43165	<i>COM</i>	03	04		03	04		03	04
Banque Delen NV	44462	<i>COM</i>	03	04	05	03	04	05	03	04
Dexia	45621	<i>BHC</i>	05			05				
Fortis	45678	<i>BHC</i>	05	06		05	06			
KBC Groupe SA	48888	<i>BHC</i>	06			06				
Fortis Bank	49013	<i>COM</i>	03	04	05	03	04	05	03	04
Bulgaria										
UnionBank Commercial Bank AD	43149	<i>COM</i>	02	05		02	05			
First Investment Bank	43151	<i>COM</i>	03	05	06	03	05	06		
Croatia										
Privredna Banka Zagreb Group	31139	<i>COM</i>	02	04	05	02	04	05		
Erste & Steiermärkische Bank dd	31492	<i>COM</i>	05			05				
OTP banka Hrvatska dd	35074	<i>COM</i>	03			03				
Centar Banka dd	44725	<i>COM</i>	05			05				
Cyprus										
Bank of Cyprus Group-Bank of Cyprus Limited	30823	<i>COM</i>	04	05		04	05			
Laiki Bank-Cyprus Popular Bank Ltd	31582	<i>COM</i>	04	05	06	04	05	06		
Hellenic Bank Public Company Limited	31583	<i>COM</i>	06			06				
Czech Republic										
Czech Moravian Guarantee and Development Bank	44566	<i>COM</i>	02	03	04	02	03	04		
Denmark										
Bankaktieselskabet Alm. Brand Bank	10307	<i>COM</i>	03			03			03	
Sparekassen Kronjylland	10376	<i>SAVE</i>	03						03	
DiBa Bank A/S	10483	<i>COM</i>	03	04	05	03	04	05	03	04
Sparekassen Faaborg A/S	10533	<i>COM</i>	04	05		04	05		04	05
Danske Bank A/S	10607	<i>COM</i>	05			05			05	
Jyske Bank A/S (Group)	10609	<i>COM</i>	04	05		04	05		04	05
Spar Nord Bank	10612	<i>COM</i>	04	05		04	05		04	05

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Denmark (cont'd)					
Amagerbanken, Aktieselskab	10615	COM	04 05	04 05	04
Sydbank A/S	10629	COM	04 05	04 05	04 05
Faroe Islands Savings Bank	10632	SAVE	04 05		04 05
Alm. Brand A/S	40899	BHC	04 05	04 05	
Fionia Bank A/S	42757	COM	03 04 05	03 04 05	03 04 05
Vestjysk Bank A/S	43539	COM	02 05	02 05	02 05
Arbejdernes Landsbank A/S	43629	COM	03 04 05	03 04 05	03 04 05
Svendborg Sparekassen	44927	COM	04 05	04 05	04 05
Estonia					
Tallinn Business Bank Ltd	19162	COM	02 05	02 05	
Estonian Credit Bank	38516	COM	03	03	
Finland					
Evli Bank Plc	18582	COM	03 05	03 05	03 05
Amanda Capital Plc	19511	INV	05	05	
Bank of Aland Plc	34811	COM	04 05	04 05	04 05
Norvestia Oyj	42194	INV	03	03	
Aktia Savings Bank plc	42284	SAVE	03 04 05		03 04 05
Sampo Plc	47566	BHC	04 05 06	04 05 06	
France					
Banque Chabrières	10655	COM	05	05	05
Banque FINAMA	10673	COM	04 05	04 05	04 05
Banque Palatine	10690	COM	05	05	05
Crédit Maritime Mutuel	10703	COOP	04 05	04 05	04 05
Banque EDEL Snc	10719	COM	03 04	03 04	03 04
GE Money Bank	10729	COM	03	03	03
Crédit Agricole Loire Haute-Loire	10738	COOP	04 05		04 05
Caisse d'épargne et de prévoyance Aquitaine-Nord	10747	SAVE	04		04
Banque Accord	10791	COM	04	04	04
GMAC Banque SA	10816	COM	03 04	03 04	03 04
Banque de la Réunion	10826	COM	04 05	04 05	04 05
BLOM Bank France SA	10831	COM	03 04 05	03 04 05	03 04 05
HSBC Hervet	10891	COM	03 04	03 04	03 04
Calyon	10898	COM		05	
BNP Paribas	10931	COM	05	05	05
Banque CIAL	11046	COM	05		
JP Morgan et Cie SA	11106	COM	03 04 05	03 04 05	03 04 05
Banque SBA	11130	COM	03 04 05	03 04 05	03 04 05
Société Générale	11150	COM	05	05	05
Société Marseillaise de Crédit	11157	COM	03 05	03 05	03 05
UBAF	11172	COM	03 04	03 04	03 04
Union Financière de France Banque	11176	COM	04 05	04 05	
Caisse Centrale du Crédit Mutuel	11303	COOP	03 04 05		03 04 05
Caisse d'Epargne et de Prévoyance de Champagne-Ardenne	11659	SAVE	04		04
Caisse d'épargne et de prévoyance des Pays de l'Adour	11675	SAVE	04		04
Caisse d'Epargne et de Prévoyance de Picardie	11676	SAVE	04		04
Crédit Agricole de l'Ille-et-Vilaine	11768	COOP	05		05
Crédit Agricole S.A.	11948	COOP	04 05		04 05
I.R.D. Nord Pas-de-Calais-	12610	BHC	05 04	04	
Caisse d'épargne et de prévoyance Provence Alpes Corse SA	12805	SAVE	04		04
RCI Banque	12953	COM	04	04	04
Crédit Agricole d'Ile-de-France	12985	COOP	04 05		04 05
OSEO bdpme	12990	COM	03 04	03 04	03 04
CIFD	17451	COM	04 05	04 05	04 05
Crédit Agricole d'Aquitaine	17480	COOP	05		05
Compagnie Financière Saint-Honoré	17494	BHC	03 04	03 04	
Banque Fédérale des Banques Populaires	18428	COOP	03 05		03 05
Crédit Agricole Nord de France	19915	COOP	05		05
Caisse d'Epargne et de Prévoyance de Midi-Pyrénées	27002	SAVE	04		04
Caisse Nationale des Caisses d'Epargne et de Prévoyance - CNCE	27034	COM	03	03	03
Cofitem - Cofimur	28017	COM	04 05	04 05	04 05

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
France (cont'd)					
Caisse Régionale de Crédit Agricole Brie Picardie	29134	SAVE	05		05
Crédit Agricole de Toulouse et du Midi Toulousain	38635	COOP	05		05
Crédit Agricole de Lorraine	40120	COOP	05		05
Banque Chaix	41120	COM	03 05	03 05	05
Banque de Financement et de Trésorerie - BFT	42285	COM	05 04	04	04
Crédit Agricole Alpes Provence	43505	COOP	05		05
Crédit Agricole Centre Loire	43961	COOP	05		05
Crédit Agricole de la Touraine et du Poitou	44274	COOP	05		05
Crédit Agricole Sud Alliance	44579	COOP	03		03
Banque PSA Finance	44582	COM	04 05	04 05	04 05
Crédit Agricole de l'Oise	44697	COOP	05		05
Crédit Agricole Sud Rhône Alpes	45061	COOP	04 05		04 05
Natixis	45333	COM	05	05	05
State Street Banque SA	45737	COM	03 04	03 04	03 04
ODDO et Compagnie	47729	INV	03 04 05	05	
Banque AGF	47757	COM	03 04 05	03 04 05	03 04 05
Legal & General Bank (France)	49573	COM	03 04 05	03 04 05	03 04 05
Germany					
Commerzbank AG	13190	COM	03 05	05	03 05
Deutsche Bank AG	13216	COM	03 04 05	03 04 05	03 04 05
Aareal Bank AG	13222	COM	03 04	03 04	03 04
Dresdner Bank AG	13247	COM	04 05	04 05	04 05
Edekabank Aktiengesellschaft	13250	COM	04 05	04 05	04 05
Gallinat-Bank AG	13270	COM		03 05	
HASPA Finanzholding	13289	BHC	05	05	
Hesse Newman and Co AG	13304	COM		05	
MKB Mittelrheinische Bank GmbH	13562	COM	05		
Nassauische Sparkasse	13570	SAVE	04		04
WGZ-Bank AG	14019	COOP	05		05
Bürgerschaftsbank Baden-Württemberg GmbH	14111	COM	03 04 05	03 04 05	03 04 05
Deutsche Postbank AG	14133	COM	03 04 05	03 04 05	03 04 05
B. Metzler seel Sohn & Co Holding AG	14282	BHC	03 04 05	03 04 05	
MKG Bank GmbH	14412	COM	04	04	04
Baden-Wuerttembergische Bank AG	14903	COM	03	03 04	03
Sal Oppenheim Jr. & Cie KGAA	15379	COM		04 05	
LBB Holding AG	15517	INV	05 06 06	05 06	
Hypo Real Estate Holding AG	16697	BHC	04 05 06	04 05 06	
MWB Wertpapier-handelsbank AG	17312	COM	05	05	05
Deutsche Zentral-Genossenschaftsbank-DZ Bank AG	17881	COOP	03 04 05		03 04 05
Concord Effekten AG	18503	INV	05		
Wüstenrot & Württembergische	18830	BHC	04 05	04 05	
M.M. Warburg & CO Gruppe KGaA	19898	BHC	03	03 04 05	
BHF-Bank AG	23549	COM	05	05	05
Bankhaus Lampe KG	41239	COM	03 05 06	03 05 06	03 05 06
Toyota Kreditbank GmbH	41456	COM	04 05	04 05	04 05
Comdirect Bank AG	43869	COM	03 04 05	03 04 05	03 04 05
VON ESSEN GmbH & Co KG Bankgesellschaft	44991	COM	04 05	04 05	04 05
Hauck & Aufhaeuser Privatbankiers KGaA	46604	COM	04 05	04 05	05
Baader Wertpapier-handelsbank AG	47958	COM	03 04 05	04 05	04 05
Greece					
Panellinia Bank	16240	COM	03 04 05	03 04 05	
Proton Bank S.A.	16506	COM		05	
NovaBank A.E.	17047	COM	05	05	
Bank of Attica SA	20006	COM	04	04	
Marfin Financial Group Holdings SA	29923	BHC	05	05	
Aspis Bank SA	40037	COM	04 05	04 05	
Alpha Bank AE	41109	COM	04 05	04 05	
National Bank of Greece SA	43085	COM	05	04 05	
Piraeus Bank SA	44317	COM	04 05	04 05	
Agricultural Bank of Greece	46284	COM	05 06	05 06	
Egnatia Bank SA	48113	COM	06	06	
EFG Eurobank Ergasias SA	49514	COM	05 06	05 06	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Hungary					
Raiffeisen Bank Zrt	33925	COM	03 05	03 05	
Altalanos Ertekeforgalmi Bank Rt-General Banking and Trust Co Ltd	35023	COM	04 05	04 05	
Budapest Bank Nyrt	35605	COM		03 04 05 03	
Central-European International Bank Nyrt - CIB Bank	37332	COM	05	04 05	
Inter-Europa Bank Nyrt	42258	COM	03 04 05	03 04 05	
KDB Bank (Hungary) Ltd	42785	COM	03 04	03 04	
MKB Bank Nyrt	44318	COM		03	
OTP Bank-National Savings and Commercial Bank Plc	44850	COM	03	03	
Iceland					
Icebank Ltd	32526	COM	04	04	
Glitnir Bank	37814	COM		06	
Kaupthing Bank hf	46315	COM		06	
Ireland					
Zurich Bank	18958	COM	03 04 05	03 05	
Depfa Bank Plc	19814	COM	05	05	
Allied Irish Banks plc	20103	COM	05 06	05 06	
Anglo Irish Bank Corporation Plc	20106	COM	05	05	
Bank of Ireland	20112	COM	05 06	05 06	
National Irish Bank limited	20151	COM	03	03	
Ulster Bank Ireland Limited	20160	INV	04 05	04 05	
Scotiabank (Ireland) Limited	42786	INV	03 04 05	03 04 05	
Commerzbank Europe (Ireland)	45378	COM	03 04	04	
JP Morgan Bank (Ireland) Plc	47250	COM	03 05	03 05	
LBBW Bank Ireland Plc	47635	COM	05	05	
RMB International (Dublin) Limited	48237	COM	06	06	
Irish Life & Permanent Plc	48505	COM	05 06	05 06	
Italy					
Banca Esperia SpA	16078	COM	04 05	04 05	04 05
Banca Flnat Euramerica SpA	16150	COM	04 05	04 05	04 05
BPU Banca-Banche Popolari Unite	16185	COOP	04 05		04 05
Banca Ifis SpA	18555	COM	05 06	05 06	05 06
Banco Popolare di Verona e Novara	18556	COOP	05 06		05 06
Banca del Lavoro e del Piccolo Risparmio	19036	COM	02	02	02
Generabanca-Banca Generali SpA	19107	COM	04	04	04
Banca Nazionale del Lavoro SpA - BNL	20304	COM			05
Banca Popolare di Cividale Societa Cooperativa per azioni	20361	COOP	04		04
Suedtiroler Sparkasse-Cassa di Risparmio di Bolzano SpA	20489	SAVE	04 05		04 05
Cassa di risparmio di Ferrara SpA	20513	SAVE	04 05		04 05
Cassa di risparmio di Rimini SpA CARIM	20543	SAVE	05		05
Banca di Credito Cooperativo dell'Alta Brianza (Como)	20837	COOP	04		04
Gruppo Monte dei Paschi di Siena	21413	COM	05 06	05 06	05 06
Rasbank SpA	21477	COM	05	05	05
Banca Popolare di Milano ScaRL	21480	COOP	05 06		05 06
Banca Carige SpA	21498	COM	05	05	05
Gruppo Delta-Delta SpA	29495	BHC	04		
Credito Valtellinese SCarl	41128	COOP	04 05		04 05
Banco Desio	41144	COM	04 05	04 05	04 05
Banca Popolare Italiana - Banca Popolare di Lodi	41434	COOP	05		05
Banca Popolare dell' Etruria e del Lazio SpA	41500	COOP	04 05		04 05
Banca Fideuram SpA	41670	COM		05	
Banca Italease SpA	43884	COM	04 06	04 06	04 06
Unipol Banca SpA	45281	COM	04 05	04 05	04 05
Sella Holding Banca SpA	45282	COM	04 05	04 05	04 05
Banca Antonveneta	45413	COM	05	05	05
Banca delle Marche SpA	45739	COM	04	04	04
TERCAS	45799	SAVE	04 05		04 05
Gruppo Bancario Banca Popolare Pugliese	45822	COOP	04 05		04 05
BancaApulia	46194	COM	05	05	05
Banca Intermobiliare di Investimenti e Gestioni	46316	INV	04 05 06	04 05 06	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Italy (cont'd)					
Banca Intesa SpA	46616	COM	05 06	05 06	05 06
Cassa di Risparmio di Ravenna SpA	46672	SAVE	04		04
Banca di Bologna	46699	COOP	03 04		03 04
Banca Mediolanum SpA	46983	COM	04	04	04
San Paolo IMI	47316	COM	05	05	05
Banca CR Firenze SpA	47701	SAVE	05		05
Banca Lombarda e Piemontese SpA	47760	COM	06	06	06
Banca Popolare di Bari Scarl	48114	COOP	04		04
Si Holding SpA	48319	BHC	05		
Iccrea Holding SpA	48329	BHC	04 05	04 05	
Unibanca SpA-Gruppo Bancario Unibanca	48874	COM	04 05	04 05	04 05
Latvia					
Baltic Trust Bank	30375	COM	05	05	
AS DnB NORD Banka	33110	COM	05	05	
JSC Parex Bank	37037	COM	03 04 05	03 04 05	
Multibanka	42516	COM		03	
Rietumu Bank Group	44200	COM	03 05	03 05	
Trust Commercial Bank	45023	COM		03	
Mortgage and Land Bank of Latvia	48881	COM	05	05	
VEF Banka	48984	COM	01	01	
Liechtenstein					
Serica Bank AG	16411	COM	03 04 05	03 04 05	
LGT Group Foundation	43910	BHC	04 05	04 05	
Banque Privée de Gérance SA- VP Bank	43952	COM	03 04 05	03 04 05	
Lithuania					
Siauliu Bankas	38681	COM	03 05 06	03 05 06	
Bankas Snoras	45014	COM	03 04 05	03 04 05	
AB Utkio Bankas	47499	COM	05 06	03 05 06	
UAB Medicinos Bankas	47638	COM	03 04 05	03 04 05	
Luxembourg					
Banque Safra-Luxembourg SA	22044	COM	04	04	
Espirito Santo Financial Group S.A.	22141	BHC	06	06	
Société Générale Bank & Trust	22198	COM	03 05	03 05	
Standard International Holdings S.A.	45973	BHC	04 05	04 05	
Insinger de Beaufort Holdings SA	46893	BHC	04 05	04 05	
Macedonia					
Export & Credit Bank Inc-Izvozna I Kreditna Banka AD	19934	COM	03 04 05	03 04 05	
Komercijalna Banka A.D. Skopje	35919	COM	03	03	
NLB Tutunska Banka A.D. Skopje	44793	COM	03 04	03 04	
Malta					
Bank of Valletta Plc	33376	COM	03 04 05	03 04 05	
HSBC Bank Malta Plc	41260	COM	03 04 05	03 04 05	
FIMBank Plc	44193	COM	04 05 06	04 05 06	
Moldova					
Moldova Agroindbank SA	46537	COM		04	
Netherlands					
DSB Bank N.V.	16926	COM	03 04 05	03 04 05	
Delta Lloyd Bankengroep NV	17734	BHC	04 05	04 05	
Bank of Tokyo Mitsubishi UFJ (Holland) NV	22222	COM	03 04 05	03 04 05	
Bank Nederlandse Gemeenten NV, BNG	22225	COM	06	06	
Banque Artesia Nederland NV	22232	COM		04	
Van Lanschot NV	22273	BHC		06	
INDOVER Bank	22287	COM	04	04	
Kas Bank NV	22292	INV	04 05 06	04 05 06	
Dexia Bank Nederland NV	22293	COM	03 05		
ING Groep NV	22304	BHC	04 05	04 05	
ABN Amro Holding NV	22414	COM	05	05	
Concordia BV	29366	BHC	04	04	
DHB Bank-Demir-Halk Bank (Nederland) N.V	40053	COM	03 05 06	03 05 06	
BinckBank NV	40921	COM	05	05	
Triodos Bank NV	41778	COM	03 04	03 04	
Van der Hoop Bankiers N.V.	42240	INV	04	04	
Finansbank (Holland) N.V.	44090	COM	04	04	
Bank Insinger de Beaufort NV	44178	INV	04 05	04 05	
NMB Heller Holding NV	45433	BHC	03	03	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Netherlands (cont'd)					
SNS Reaal Groep NV	45620	BHC	06	06	
LeasePlan Corporation NV	46570	COM	04	05 04	
AEGON Bank NV	46674	COM	03 04	04	
NIBC N.V.	49668	INV	04 05	04 05	
ABN Amro Bouwfonds Nederlandse Gemeenten NV	49710	COM	04	04	
Holding Bercoop Groep NV	49793	BHC	04 05	04 05	
Norway					
Sparebank 1 Nord-Norge	31234	SAVE	05		05
Sparebanken Midt-Norge	31810	SAVE	04 05		04 05
Sandsvaer Sparebank	32221	SAVE	04 05		04 05
Fokus Bank ASA	34490	COM	03 04 05	03 04 05	03 04 05
Sparebanken Vest	35896	SAVE	04 05		04 05
Rygge-Vaaler Sparebank	37043	SAVE	05 06		05 06
Sparebank 1 Rogaland SR-BANK	41321	SAVE	04		04
Sparebanken More	43634	SAVE	04 05		04 05
Totens Sparebank	44135	SAVE	04 05		04 05
SpareBank 1 Vestfold	45687	SAVE	04		04
Sparebanken Ost	46449	SAVE	04 06		04 06
Helgeland Sparebank	47017	SAVE	05 06		05 06
DnB Nor ASA	48594	BHC	06	06	
Sparebank 1 Nordvest	49263	SAVE	03		03
Sandnes Sparebank	49565	SAVE	05		05
Sparebank 1 Gruppen	49899	SAVE	04		04
Poland					
Bank Handlowy w Warszawie S.A.	30746	COM	05	05	05
Bank Zachodni WBK S.A.	32473	COM	04 05	04 05	04 05
PKO BP SA	33088	SAVE	05		05
Bank Gospodarki Zywnosciowej BGZ	34219	COOP	04		04
BOS SA	42453	COM	04 05	04 05	04 05
Bank Millennium	45307	COM	05 06	05 06	05 06
Nordea Bank Polska SA	48321	COM	05	05	05
Portugal					
Banco Mais SA	17547	COM	03 04	03 04	03 04
Banif-Banco de Investimento SA	18587	INV	04 05	04 05	
Finibanco Holding SGPS SA	18892	BHC	04 05 06	04 05 06	
Banco Espirito Santo SA	22509	COM	03 05	03 05	03 05
Santander Totta SGPS	22521	BHC	04 05	04 05	
Caixa Economica Montepio Geral	22527	SAVE	05		05
Caixa Geral de Depositos	22529	SAVE	04 06		04 06
Millennium bcp-Banco Comercial Português, SA	22541	COM	05 06	05 06	05 06
Banco Bilbao Vizcaya Argentaria (Portugal) SA	22554	COM	04 05	04 05	04 05
BANIF SGPS SA	22563	BHC	05 06	05 06	
Banco Finantia SA	36849	INV	03 04 05	03 04 05	
Banco Itau Europa S.A.	43560	COM	04 05	04 05	04 05
Banco Santander de Negocios Portugal - BSN	43759	INV	04	04	
Banco BPI SA	45638	BHC	04 05	04 05	
Banco Privado Portugues SA	46748	INV	02 03	02 03	
Banco Millennium BCP Investimento SA	46767	INV	04 05	04 05	
Banco de Investimento Global SA - BIG	48706	INV	03	03	
Banco INV SA	49367	COM	03 05	03 05	03 05
Romania					
Banca Comerciala Carpatica SA	16820	COM	02 04	02 04	02 04
Romexterra Bank S.A.	17133	COM	03	04 05	
Raiffeisen Bank SA	19835	SAVE	03		03
Romanian Commercial Bank SA	38557	COM	04 05	04 05	04 05
Transilvania Bank	44741	COM	05 03 04	05 03 04	03 04
Russia					
Transcapitalbank	16865	COM		05	
Bank Center-INV	16900	COM	04	04	
Rosselkhozbank-Russian Agricultural Bank Group	16930	COM	04 05	04 05	
Expobank	17394	COM	05	05	
Russian Standard Bank JSC	17395	COM	03	03	
Moscow Bank for Reconstruction & Development	17557	COM	05	05	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Russia (cont'd)					
Absolut Bank	18509	COM	05	05	
CentroCredit Bank	18686	COM	03	03	
International Bank of St Petersburg	18964	COM	03 04 05	03 04 05	
Trust INVment Bank	19018	COM	04 05	04 05	
JSC Yugbank	19228	COM	03	03	
RosEvroBank	19519	COM	05	05	
Russ-Bank-Russian Interregional Bank for Development	29136	COM	05	05	
Ural Bank for Reconstruction & Development	32233	COM	03	03	
Bank Saint-Petersburg	36424	COM	03 04 05	03 04 05	
Industry & Construction Bank - ICB	36425	COM	02	02	
Conversbank Ltd	36785	COM	04	04	
Chelindbank Group	37394	COM		03 04 05	
Vozrozhdeniye Bank	37396	COM	05	05	
Russian Regional Development Bank	40130	COM	05	05	
Close joint stock company LOCKO-Bank	40834	COM	05	05	
Moscow Industrial Bank	42523	COM	04	04	
ABH Financial Limited	43032	COM	04	04	
Baltiyskiy Bank	43141	COM	03 05	03 05	
UralTransBank	44704	COM	04 06	04 06	
Probusiness Bank	45-6	COM	03 06	03 06	
ING Bank (Eurasia)	45211	COM	03	03 04 05	
Bank Zenit	45246	COM	04 05 06	04 05 06	
Nizhegorodsky Bankirsky Dom-NBD Bank	45410	COM	04	04	
NOMOS-Bank-Joint-Stock INVment Commercial Bank Novaya Moskva	45436	COM	00	00	
Evrofinance Mosnarbank	45586	COM	03 04 05	03 04 05	
ZAO Citibank	45870	COM	05	03 05	
SotsINVbank - Credit Bank of Social Development	46094	COM	03	03	
Joint Stock Commercial Bank - Bank of Moscow	46198	COM	02 04 05	02 04 05	
International Industrial Bank	46493	COM	03	03	
Bank for Foreign Economic Affairs	46670	COM		04	
Joint Stock Bank Sobinbank	46769	COM	03	03	
AK Bars Bank	46833	COM	04 05	04 05	
Joint Stock Bank Avangard	46851	COM	04 05	04 05	
Promsvyazbank	47715	COM	03 05	03 05	
Gazprombank Group	48130	COM	02 03 05	02 03 05	
Bank Petrocommerce	48274	COM	04	04	
Credit Bank of Moscow	48462	COM	05	05	
SDM Bank	48731	COM	03	03	
TransCreditBank Group	48757	COM	03	01 03	
Bank of Khanty-Mansiysk	48815	COM	05	05	
JSC Rosbank	49084	COM	04 05	04 05	
KMB Bank / Small Business Credit Bank	49124	COM	03 05	03 05	
National Bank Trust	49337	COM	04 05	04 05	
Russian Bank for Development	49933	COM	02 03	02 03	
Slovakia					
J&T Finance Group	16512	BHC	04	04	
Vseobecna Uverova Banka a.s.	35884	COM	03 04 05	03 04 05	
Slovenia					
Nova Kreditna Banka Maribor d.d.	31186	COM	02 04 05	02 04 05	
Nova Ljubljanska Banka d.d.-NLB dd	31238	COM	03 04 05	03 04 05	
Abanka Vipava dd	35837	COM	03 04 05	03 04 05	
Probanka d.d. Maribor	45387	COM	04 05	04 05	
Factor Banka d.d.	45629	COM	05	05	
Banka Koper d.d.	48179	COM	03	03	
Spain					
Banco Bilbao Vizcaya Argentaria SA	22628	COM	05 06	05 06	
Bankinter SA	22713	COM	04 05	04 05	
Banco Pastor SA	22720	COM	06	06	
Banco Popular Espanol SA	22724	COM	05 06	05 06	
Banco de Finanzas e Inversiones - Fibanc	23283	COM		05	
Banco Guipuzcoano SA	23327	COM	04 05	04 05	
Banco de Sabadell SA	23370	COM	04 05 06	04 05 06	
Banco Halifax Hispania SA	43673	COM		05	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Spain (cont'd)					
Bankoa SA	44555	COM		05	
Banco Cooperativo Espanol	45161	COM	04 05	04 05	
ARESBANK-Banco Arabe Español SA	45465	COM	03	03	
Banco de la Pequena y Mediana Empresa SA - Bankpyme	45466	COM	05 06	05 06	
Banco Espirito Santo	45467	COM	05	05	
Citibank España	45575	COM	05	05	
EBN Banco-EBN Banco de Negocios SA	45579	COM	04 05	04 05	
Banco de Europa SA	46355	COM		05	
Banco de Valencia SA	46356	COM	04 05 06	04 05 06	
Santander Central Hispano Group-Banco Santander Central Hispano	47560	COM	04 06	04 06	
Sweden					
D. Carnegie & Co AB	17061	INV	03	03	
SkandiaBanken	17098	COM	04 05	04 05	04 05
Hagströmer & Qviberg AB	19919	INV	05	05	
Länsförsäkringar AB	29189	BHC	05	05	
Svenska Handelsbanken	30723	COM	05	05	05
Swedbank AB	31268	SAVE	04		04
Skandinaviska Enskilda Banken AB	33297	COM	05	05	05
Invik & Co AB	39396	BHC	05	05	
E. Öhman J:or AB	40703	INV		05	
IKANO Banken AB	40906	COM	05	05	05
Länsförsäkringar Bank AB	47597	COM	03 04	03 04	03 04
Nordea Bank AB	49434	BHC	05	05	
Switzerland					
Heritage Bank & Trust	16901	COM	03 04 05	03 04 05	03 04 05
SIS Swiss Financial Services Group AG	16968	BHC	03 04 05	03 04 05	
Swissquote Group Holding Ltd.	17909	BHC	04 05	04 05	
Clientis AG	23575	COM	04	04	04
Compagnie Financière Tradition	29030	INV	05	05	
Banque Privée Edmond de Rothschild S.A., Genève	30272	INV	03 04 05	03 04 05	
Banca Unione di Credito-Credit Union Bank	31305	COM	03 04 05	03 04 05	03 04 05
Julius Baer Holding Ltd	31340	BHC	04 05	03 04 05	
Credit Suisse Group	31398	BHC	05 06	05 06	
Bank Coop AG	31727	COM	05	05	05
Lienhardt & Partner Privatbank Zürich AG	31741	COM	03 04	03 04	03 04
AIG Private Bank Ltd-AIG Private Bank Group	31765	INV	03 04 05	03 04 05	
Bank Leumi Le-Israël (Schweiz) AG	31890	COM	03 04	03 04	03 04
Vontobel Group-Vontobel Holding AG	31989	BHC	03 04 05	03 04 05	
Banca del Sempione	3-53	COM	03	03	03
Pargesa Holding SA	32116	BHC	04 05	04 05	
Bank Jacob Safra (Switzerland) Ltd	33124	COM	03 04	03 04	03 04
Unigestion Holding	33894	BHC	02	02	
Banque de Patrimoines Privés Genève BPG SA	33951	COM	03 04	03 04	03 04
Coutts Bank von Ernst AG	35929	INV	03 04	03 04	
Privatbank Von Graffenried AG	37729	COM	03	03	03
Bank Sarasin & Co Ltd.	41747	INV	04	04	
Crédit Agricole (Suisse) SA	42201	SAVE	05		05
OZ Holding-OZ Gruppe	42205	BHC	03 04 05	03 04 05	
Banque Audi (Suisse) SA	42324	COM	03	03	03
Rothschild Bank AG	42497	COM	04 05	04 05	04 05
Morval Vonwiller Holding S.A.	42603	BHC	03	03	
Union Bancaire Privée UBP	43196	INV	03 04 05	03 04 05	
Corner Banca S.A.	43638	COM	03 04 05	03 04 05	03 04 05
Finter Bank Zürich	43691	INV	03 04 05	03 04 05	
BNP Paribas (Suisse) SA	43716	INV	03 04 05	03 04 05	
Banca del Gottardo	43845	COM	03	03	03
EFG Bank European Financial Group	43943	INV	04 05	04 05	
Banque Safdie SA	44245	INV	03 04 05	03 04 05	
Banque du Bois AG	44286	COM		03	
Bank EEK	45126	COM	03	03	03
Habib Bank AG Zurich	45167	COM	03 04 05	03 04 05	03 04 05
PKB Privatbank AG	45287	COM	03	03	03
Rothschild's Continuation Holdings AG	46210	BHC	02 04 05	02 04 05	
ING Bank (Suisse) SA	46526	COM		03 04 05 03	03
Valiant Holding	46574	BHC	04 05	04 05	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I	Essay II	Essay III
Switzerland (cont'd)					
Banque SCS Alliance Groupe	46773	COM	06	06	05 06
Amas Bank (Switzerland) Ltd.	46806	COM	01 04 05	01 04 05	01 04 05
UBS AG	46911	COM	03 04 05	03 04 05	03 04 05
Bantleon Bank AG	47616	INV	03 04 05	03 04 05	
BSI AG	47618	COM	03 04 05	03 04 05	03 04 05
Banca Arner S.A.	47996	COM	04	04	04
GEFS (Suisse) AG	47997	COM	03 04		
Swissfirst Group	48530	BHC	03 05 06	03 05 06	
Banco Mercantil (Schweiz) AG	49008	INV	03 04 05	03 04 05	
HSBC Private Banking Holdings (Suisse)	49864	BHC	05	05	
Turkey					
C Bank-Bankpozitif Kredi ve Kalkinma Bankasi AS	16812	COM	03 04 05	03 04 05	03 04 05
Turkiye is Bankasi A.S. - ISBANK	30739	COM	03 04 05	03 04 05	03 04 05
T.C. Ziraat Bankasi	30963	COM	04	04	
Turkiye Halk Bankasi A.S.	31028	COM	02 04 05	02 04 05	04 05
Akbank T.A.S.	31259	COM	04 05	04 05	04
Yapi Ve Kredi Bankasi A.S.	31274	COM	03		
Turkiye Garanti Bankasi A.S.	31302	COM	03 04 05	03 04 05	03 04 05
Arab Turkish Bank	31429	COM	02 03 04	02	02
Development Bank of Turkey Inc	31776	COOP	03 04		03 04
Sekerbank T.A.S.	32539	COM	04 05	04 05	04 05
Industrial Development Bank of Turkey	32615	INV	06	06	
Turk Ekonomi Bankasi A.S.	33161	COM	03 04 05	03 04 05	03 04 05
Tekstil Bankasi A.S.-Tekstilbank	33384	COM	03 04 05	03 04 05	03 04 05
Finansbank A.S.	33817	COM	06	06	
Kuwait Turkish Participation Bank Inc	35795	INV	03 04 05	03 04 05	
Tekfenbank	36056	COM	03	03	03
Oyak Bank A.S.	36338	COM	03	03	03
Turkish Bank A.S.	36840	COM	03 04 05	03 04 05	03 04 05
Alternatifbank A.S.	36863	COM	04 05	04 05	04 05
MNG Bank AS	37021	COM	03 04 05	03 04 05	03 04 05
Haci Omer Sabanci Holding AS	40007	BHC	05	05	
Denizbank A.S.	46367	COM	04 05	04 05	04 05
Anadolubank A.S.	46749	COM	03	03	03
Turkiye Vakiflar Bankasi TAO	48323	COM	03 05	03 05	05
GSD Yatirim Bankasi AS	48936	INV	03 04		
UK					
JP Morgan International Bank Ltd	16001	COM	05		
Fairbairn Private Bank Ltd	16012	COM	04 05	04 05	
INVec Plc	16137	INV	03 04	03 04	
Persia International Bank Plc	16331	COM	03 04	03 04	
Hitachi Capital (UK) Plc	16369	INV	05		
JPMorgan Cazenove Holdings	16778	INV	03 04 05	03 04 05	
Cuscatlan Bank and Trust Limited	16949	COM		05	
Barclays Private Bank & Trust Limited	16976	COM	04 05	04 05	
HBOS Plc	17577	BHC	05 06	05 06	
Household International Europe Limited	17701	BHC	03 04	03 04	
Adam & Company Group plc	24004	BHC	04	04	
Sabanci Bank Plc	24010	COM	03 04 05	03 04 05	
Bank Leumi (UK) Plc	24091	COM	03 05	03 05	
Banc of America Securities Limited	24097	INV	03 04 05	03 04 05	
Barclays Bank Plc	24151	COM		05	
Barclays Plc	24158	BHC	05 06	05 06	
C. Hoare & Co	24-7	COM	04 05	04 05	
Citibank International Plc	24253	INV	04 05	04 05	
Clydesdale Bank Plc	24265	COM	03 04 05	03 04 05	
Co-operative Bank Plc (The)	24280	COM	05 06	05 06	
Daiwa Securities Trust and Banking (Europe) plc	24305	COM	03 04	03 04	
Dunbar Bank Plc	24322	INV	03	03	
Duncan Lawrie Limited	24323	INV	04 05	04 05	
FCE Bank Plc	24382	COM	04 05	04 05	
Ansbacher & Co Limited	24448	INV	04	04	
Heritable Bank Ltd	24450	INV	05	05	
Bank Saderat Plc	24479	INV	03 04 05	03 04 05	

Appendix 1 (cont'd)

Bank Name	BS Index	Type	Essay I			Essay II			Essay III
UK (cont'd)									
London Scottish Bank Plc	24554	COM	04	05	06	04	05	06	
Ruffler Bank Plc	24557	COM	01	04	05	01	04	05	
Butterfield Holdings (UK) Ltd	24573	BHC				05			
N M Rothschild & Sons Limited	24632	INV	05			05			
Northern Bank Limited	24676	COM	03	05		03	05		
R Raphael & Sons Plc	24732	COM	04						
Royal Bank of Canada (Channel Islands) Limited	24756	COM	03	04	05	03	04	05	
Royal Bank of Scotland Plc (The)	24760	COM	04	05		04	05		
Royal Bank of Scotland Group Plc (The)	24762	BHC	05	06		05	06		
Gulf International Bank (UK) Ltd	24783	INV	03	05		03	05		
Schroders Plc	24789	BHC	04	05	06	04	05	06	
Kaupthing Singer & Friedlander Group Plc	24811	BHC	04			04			
Standard Bank Plc	24822	INV				05			
Standard Chartered Plc	24831	BHC	05	06		05	06		
British Arab Commercial Bank Limited	24903	COM	05	06		05	06		
Ulster Bank Limited	24905	COM	05			05			
Ahli United Bank (UK) Plc	24917	COM	03	04		03	04		
Unity Trust Bank Plc	24924	COM	04	05		04	05		
Whiteaway Laidlaw Bank Ltd	24943	COM	04	05		04	05		
Wintrust Plc	24945	INV	04			04			
EFG Private Bank Limited	24977	COM	05	04		05	04		
INVec Bank (UK) Limited	24985	COM	05			05			
Arbuthnot Banking Group Plc	25004	BHC	05	06		05	06		
Kaupthing Singer & Friedlander Ltd	25049	COM	04	05		04	05		
Butterfield Bank (Guernsey) Limited	25058	COM	03	04	05	03	04	05	
HSBC Holdings Plc	34727	BHC	03	06		03	06		
LCH Clearnet Group Limited	40326	INV				05			
CitiFinancial Europe Plc	41012	COM	03	04	05	03	04	05	
Abbey National Treasury Services Plc	41409	COM	05			05			
Private Financial Holdings Limited	41715	BHC	03			03			
MBNA Europe Bank Ltd.	42461	COM	03	04	05	03	04	05	
Paragon Group of Companies Plc	42605	BHC	03	04	05	03	04	05	
GE Capital Bank Limited	43197	COM	04	05		04	05		
Lloyds TSB Group Plc	43418	BHC	06			06			
London Forfaiting Company Limited	43687	INV				04			
Fortis Bank (C.I.) Limited	44251	COM	04			04			
Bank of New York Europe Ltd (The)	46096	COM	04			04			
Northern Rock Plc	46531	COM	05	06		05	06		
Julian Hodge Bank	46630	COM	03	04	05	03	04	05	
Cheltenham & Gloucester Plc	46662	COM	05			05			
Bankers Trust International Plc	46680	INV		05		04	05		
Bristol & West Plc	46681	COM	06						
Standard Life Bank Ltd	47310	COM	03	04	05	03	04	05	
Weatherbys Bank Limited	47940	COM	03	05		03	05		
EGG Plc	49047	COM	05			05			
Polar Capital Technology Trust Plc	49436	INV	05						
Euroclear Plc	49988	INV	03	04	05	03	04	05	
Bradford & Bingley Plc	49990	COM	05	06		05	06		
Ukraine									
TAS-Kommerzbank AG	18531	COM	04			04			
PromINVbank	37620	COM				03			
JSIB UkrSibbank	38483	COM	02	04	05	02	04	05	
Vseukrainsky Aktsionerny Bank-VABank	38624	COM	04			04			
PrivatBank	44922	COM	03	05		03	05		
East-Ukrainian Stock Exchange Bank Grant	46942	COM				02			
Nadra Bank	47941	COM	03			03			
Kreditprombank	48737	COM	03			03			

PART II: THE ESSAYS

Essay I

Bank corporate governance in different regulatory environments

Abstract

The legal protection of shareholders is the backbone of any corporate governance system. In a banking setting, the legal protection of depositors is as important as the legal protection of shareholders. The safety net designed to protect depositors is composed of the government regulated deposit insurance and the implicit guarantee that large banks will be bailed-out by the government. These mechanisms do, however, reduce the efficiency of corporate governance mechanisms in that they reduce monitoring incentives and induce risk-taking. There is some empirical evidence of interaction between regulatory and ownership characteristics as well as on their joint impact on bank profitability and risk indicating. The objective of this study is to examine these interactions in more detail. Using a sample of banks from 37 European countries, I find that the ownership structure of banks do vary with the severity of the moral hazard problem induced by the deposit insurance system as well as with the level of shareholder protection of their home country.

Keywords: bank, ownership, regulation, deposit insurance, too-big-to-fail, moral hazard, legal protection of shareholders

JEL classification: G21, G28, G32, G38

1 INTRODUCTION

The legal protection of shareholder is the backbone of any corporate governance system. As a result, differences in legal protection of shareholders explain a substantial part of the differences in the ownership structures across countries (Shleifer & Vishny, 1997). For instance, minority blockholder owners can exercise their rights only in countries with a developed legal system, whereas majority ownership is a more viable option in countries with a weak legal system (La Porta *et al.*, 1998). The informal relations of trusts and importance of reputations are, however, also connected to the viability of dispersed ownership hence also explaining some of the differences in ownership structure across countries (Franks *et al.*, 2009). Furthermore, the level of legal protection of shareholders has an impact on how well management ownership aligns the interests of management and shareholders. In countries where the legal protection of minority shareholders is limited, management is inclined to extract private benefits and divert resources from the company. This is true even if management holds ownership in the company as extraction of private benefits still is more attractive than the value increase in the shareholding, as the management in the former situation does not have to share any of the benefits with outsiders (Shleifer & Vishny, 1997). The legal protection of shareholders might be even more important in a banking setting, as the opacity of banks reduces the ability of outsiders to monitor bank operations (Levine, 2004). Caprio *et al.* (2007) find support for this argument as they report that widely held banks are more common in countries with strong legal protection of shareholders.

In banks, the legal protection of depositors is as important as the legal protection of shareholders. The government regulated deposit insurance and the implicit guarantee that large banks will be bailed-out by the government in order to avoid bank runs and hence maintain financial system stability, reduce the efficiency of corporate governance mechanisms (Berlin *et al.*, 1991). In addition to reducing the incentives for depositors to monitor the bank, deposit insurance encourages banks to take on more risk (Merton, 1977, Brewer & Mondschean, 1994). Marcus & Shaked (1984) show that the probability that a bank with great loan loss provisions takes on high risk projects, increases with the generosity of the deposit insurance system. Furthermore, both Demirguc-Kunt & Detragiache (2002) and Barth *et al.* (2004) report that banking crises are more common in countries with generous deposit insurance systems. Moreover, the particular deposit insurance features, such as the funding and management of the system, have an even stronger connection to banking crisis than the mere existence of a deposit insurance system (Demirguc-Kunt & Detragiache, 2002). The impact of deposit insurance on the risk-taking behaviour of managers differs with the ownership characteristics of banks. Laeven & Levine (2008) find that explicit deposit insurance increases the risk in banks with a majority owner, whereas there is no significant impact if the bank is widely-held. This finding suggests that the impact of the moral hazard problem induced by the deposit insurance system vary with ownership characteristics.

Little is, however, known about how regulation, in particularly bank regulation, interacts with corporate governance mechanisms in banks. Demirguc-Kunt & Detragiache (2002) make a note on the interaction of deposit insurance and state ownership, Caprio *et al.* (2007) present descriptive statistics on differences in level and type of ownership concentration across countries with different bank regulation and Laeven & Levine (2008) report how regulatory variables correlate with the level of ownership concentration, with whether or not the bank has a blockholder owner with a

board seat or has management ownership. Hence, the objective of this study is to examine how the ownership structure of European banks interacts with the regulatory environment they operate in. Note that the main aim of the study is not intended to imply causality, but rather to examine whether a particular ownership structure is more prevalent in one particular regulatory environment than another.

This study contributes to the understanding of the interaction between regulatory environment and ownership in a banking setting by accounting for the complexity in the different deposit insurance systems applied across European countries by examining the features simultaneously rather than one by one. The interaction between deposit insurance system and other regulatory environment features, such as level of shareholder protection, legal origin and level of integration in the European community, are also accounted for. Similarly, the set of ownership characteristics, covering information on level of ownership concentration, type of blockholder owner as well as state, management, board, private individual and family ownership, is wider than the ones used in earlier studies. I account for simultaneity in ownership characteristics by classifying the banks into sub-samples of banks with similar characteristics. Finally, I control for differences in operational characteristics of the banks as the efficiency reduction impact of deposit insurance and too-big-to-fail (TBTF) government guarantee on corporate governance mechanisms such as ownership characteristics varies with bank size, focus, funding and profitability.

Using a sample of 995 bank-year observations from 548 banks headquartered in 37 European countries, I do find that the ownership structure of banks interact with the severity of the moral hazard problem induced by the deposit insurance system, the different features of the deposit insurance system and the level of legal protection of shareholders. These findings confirm the notion addressed in Caprio *et al.* (2007) and Laeven & Levine (2008), that it is crucial to examine the joint impact of ownership characteristics and regulatory environment features rather than only the impact of individual corporate governance mechanisms. Moreover, I find that the severity of the moral hazard problem has a non-linear relation to the level of financial system development, i.e. initially the problem becomes increasingly severe after which it declines as the deposit insurance and bank bail-out mechanisms become more sophisticated. Finally, when comparing the profitability and risk of the banks operating in a similar regulatory environment, I find that banks with the most common ownership structure is more risky than other banks only in countries where the moral hazard problem is severe. This finding indicates that the corporate governance of banks in these countries is not optimal from the perspective of financial system stability.

2 BANK REGULATION AND OWNERSHIP STRUCTURE

2.1. Bank regulation

Banks are regulated as they have a central role in the financial system thus making the financial system vulnerable to bank runs and defaults. Entry of both domestic and foreign banks are subject to approval from authorities (Benston & Smith, 1976). Related to the issue of potential restrictions of entry of foreign banks and foreign bank ownership, are also other restrictions on bank ownership, for example on the level of ownership concentration. Furthermore, there may be restrictions on the kind of operations a bank can engage in, there are requirements on the level of capital to be held as buffers and reserves to be held at the central bank, on the risk management tools and processes to be used and on the information to be reported to bank supervisors and capital markets. The deposit insurance system is, however, seen as the main mechanism for preventing bank runs (Diamond & Dybvig, 1983).

On one hand, bank regulation is seen as subsidised monitoring and disciplining of management through (the threat of) prompt corrective actions (Booth *et al.*, 2002). On the other hand, particular aspects of bank regulation reduce the efficiency of corporate governance mechanisms (Berlin *et al.*, 1991). The explicit and implicit deposit insurance reduces the incentive for depositors to monitor banks as it covers potential losses in case of bank failure (O'Hara & Shaw, 1990). In effect, a bank seen as TBTf has an insurance coverage not only the deposits covered by the formal deposit insurance, but for all its liabilities thus reducing the monitoring incentives of both depositors and other debt holders (Deng *et al.*, 2007). The reduced monitoring incentives induce a moral hazard problem in banks, hence increasing the incentives for risk-shifting. Merton (1977) shows that a fixed rate deposit insurance scheme has the same features as a put option contract on the bank's assets. It appears as if banks do exercise this option; Cebenoyan *et al.* (1999) examine the risk-taking of S&Ls and find that in S&Ls with substantial management ownership, risk-taking appears to have been unprofitable in the mid-1980s when banks were relatively less regulated and profitable in the mid-1990s when bank regulation was stricter. The value of the deposit insurance vary with bank specific characteristics; it decreases with the level of capitalisation as the bankruptcy risk is lower hence reducing the probability that the bank will utilise the deposit insurance guarantee, whereas it increases with bank risk (Brewer & Mondschean, 1994). Cebenoyan *et al.* (2004) examine the risk-taking behaviour and performance persistence of US stock chartered thrifts. They find support for the existence of moral hazard as banks with low charter value appear to maximise the put option of deposit insurance and are hence persistently among the poorly performing banks. Banks with high charter value, on the other hand are consistently among persistently well performing, a finding which indicates that these banks avoid excessive risk-taking in order to protect the valuable charter (Cebenoyan *et al.*, 2004). These findings suggest that banks engage in risk-shifting activities in order to create wealth on the expense of the stakeholders funding the deposit insurance system.

Deposit insurance systems vary with respect to explicit and implicit coverage of deposits, the funding and management of the deposit insurance system and the legal right of the deposit insurance agency¹. The severity of the moral hazard problem in a particular country depends on how the deposit insurance system is structured as the

¹ The rest of the section is based on Bhattacharya *et al.* (1998), Garcia (1999), Cordella & Levy Yeyati (2002), Demirguc-Kunt & Detragiache (2002) and Demirguc-Kunt & Kane (2002).

impact of the different features of a deposit insurance system on the monitoring incentives of depositors and the risk-shifting incentives of banks varies. Note, however, that two very different deposit insurance systems may induce a moral hazard problem of the same magnitude. First, the coverage of the deposit insurance system is affected by several features. In addition to the specific absolute limit on insured deposits per person or account, whether or not there is coinsurance, i.e. that the insured deposits are explicitly not covered in full in case of bank failure, has an impact on the level of coverage. Recognising that the monitoring ability varies across depositors and that it is primarily small depositors which are in need of protection from bank runs, not all deposit types are covered by the deposit insurance. For example, foreign currency or interbank deposits may or may not be covered in case of a bank failure. The severity of the moral hazard problem increase with the coverage of the deposit insurance system; the monitoring incentives decrease and risk-shifting incentives increase with increasing coverage. Second, the implicit deposit insurance over and above the explicit deposit insurance has an impact on the severity of the moral hazard problem. The implicit TBTF government guarantee is greater in countries where bank bail-outs have been more frequent than in other countries, hence strengthening the belief that the government will act similarly in the future. Third, there is great variation in how the deposit insurance system is funded and managed. In some countries the deposit insurance system is funded ex-ante and in some ex-post to a bank-failure. The funding can be provided either by the private, the public or both the private and public sector. Furthermore, the premium paid to the deposit insurance fund is adjusted for the risk of the paying bank in some countries. If the funding of the deposit insurance system is guaranteed through ex-ante funding, the moral hazard problem is expected to be greater. If the protection of depositors is guaranteed by the fund, the monitoring incentives are reduced not only among depositors, but among bank creditors and shareholders as they are in a better position to push the government for protection in case of bank failure. Note, however, that inadequate funding prolongs the closure of failed banks, which is socially suboptimal. If the fund is privately funded by the banks, the incentives to engage in risk-shifting behaviour are reduced. Similarly, proper pricing of the deposit insurance by accounting for risk restrain the risk-shifting behaviour of banks. Furthermore, the risk-adjusted premium reduces the substitution between strong and weak banks by allowing lower premiums for low risk than high risk banks, which are more likely to tap into the deposit insurance fund. Note, however, that it is very difficult to determine a proper price for the deposit insurance as the banks have private information. Forth, the management of the deposit insurance fund may be the responsibility of the private, the public or both the private and public sector. The moral hazard problem is expected to be smaller in a deposit insurance system managed by the private sector as there is less room for risk-shifting behaviour as peer banks are seen as superior monitors of fellow banks. This feature is particularly important in ex post funded deposit insurance systems. Fifth, in some countries the deposit insurance agency has the authority to take legal actions against bank directors or other bank officials if there are violations against laws and regulations. The threat of corrective actions is expected to restrain banks from risk-shifting².

Finally, note that the deposit insurance systems features are usually altered during times of severe and systemic crises (Garcia, 1999). Increasing the limit of explicit deposit insurance is frequently the first remedy, but only full coverage can prevent flight to higher quality or foreign banks. For example, Finland and Sweden temporarily offered a full deposit insurance coverage during the early 1990s banking crises. Similarly, Turkey began to offer full deposit insurance coverage as a result of the

² Buser *et al.* (1981) argue that regulatory interference, i.e. actions taken by the deposit insurance agency or other governmental authorities, gives the explicit and implicit deposit insurance a risk-adjustment feature.

financial crises of 1994 and 2000 (Demirguc-Kunt *et al.*, 2005). During the current financial crises governments across the world have taken measurable actions. In addition to liquidity and lending guarantees, interest rate cuts, recapitalisation and asset purchases to bail-out troubled banks, the explicit deposit insurance coverage has been increased substantially (The Economist, October 6th, 2008, The Financial Times, October 13th, 2008). Following the EU Council agreement in the beginning of October 2008 that all membership states should have an explicit deposit insurance coverage of at least 50 000 euros, the coverage has been doubled in Finland, Sweden, and UK and is now 50 000, 69 000 and 56 000 euros, respectively, and has been five-fold to 100 000 euros in Greece and Spain. Ireland has reserved 400 billion euros to guarantee the deposits at the largest banks operating in Ireland, whereas Austria and Germany now offer full coverage on deposits. The non-EU country Switzerland followed suit and raised the explicit deposit insurance coverage to 67 000 euros. Moreover, in October 2008 the European Commission presented a proposal for amending the Deposit Insurance Directive from 1994. In addition to the increase in the minimum deposit insurance coverage, time to payout in case of bank failure is reduced and the use of coinsurance is terminated as a result of the new rules. Some criticism has been raised towards aligning the deposit insurance systems of the EU countries. For example, Huizinga (2005) points out that the deposit insurance coverage in relation to the GDP is much higher in the new-EU countries than in the old-EU countries, hence resulting in over-insurance in some countries. Moreover, he notes that some features of the deposit insurance system, such as level of premium, ex-ante vs. ex-post funding or the management of the deposit insurance fund, have been given limited attention.

2.2. Interaction of deposit insurance system and ownership structure

According to Demsetz (1983) companies strive to optimise their ownership structure while accounting for the circumstances they operate in, thus maximising company value. Apart from company specific treats, the level of regulation affects the ownership structure (Demsetz & Lehn, 1985, Demsetz & Villalonga, 2001). In a banking setting, the different features of the deposit insurance system may have an impact on what ownership structure is seen as optimal. Banks may, for example, strive for increased concentration in ownership in order to be able to fully exploit risk-shifting opportunities. This is not in the interest of the regulatory authority, which should be alert to the reduced efficiency of some corporate governance mechanisms and promote the use of alternative mechanisms. On the other hand, banks may alter the regulatory environment they operate in rather than the ownership structure. Kane (2008) argues that differences in bank regulation and enforcement have created an international market for regulatory services. Banks utilise this situation by establishing operations in countries with a regulatory system that is most appropriate for a particular banking activity. Moreover, whether these operations are established as subsidiary or branch operation may depend on the deposit insurance system (Huizinga, 2005). Once again, the regulatory authority in a country should be aware of what kind of operations is drawn to the particular regulatory environment of their country and whether banks with a particular ownership structure are more prone to exploit these regulatory differences.

State ownership is a natural starting point when assessing the interaction of deposit insurance system features and ownership characteristics as state ownership can be seen as the extreme of heavy government regulation (Bertus *et al.*, 2008). Hence, one can argue that explicit deposit insurance is not needed in a country where state ownership is common (Demirguc-Kunt & Detragiache, 2002, Levine, 2004). However, Demirguc-

Kunt & Detragiache (2002) report that state ownership is more common in countries with explicit deposit insurance than in countries with only implicit deposit insurance.

Caprio *et al.* (2007) examine the joint impact of shareholder protection laws and ownership characteristics on bank valuations while controlling for differences in bank regulation. They define the ultimate owners for the ten largest banks across 44 countries and categorise the bank as either widely held, controlled by a family or private individual, a state, a trust or foundation, a widely held non-financial corporation or a widely held financial company. They find that a great majority of the banks in the sample has concentrated ownership. When comparing the frequency of ownership type across countries with different regulatory environment, they find that widely held banks are more common in countries with strong shareholder protection and independent bank supervisory authority, that family ownership is more common in countries with strong bank supervisor authority, that state ownership is more common in countries with high restrictions on bank activities and low independence of bank supervisory authority. Moreover, they find that financial company ownership is more common in countries with strong shareholder protection, low restrictions on bank activities and low independence of bank supervisory authority, whereas non-financial company ownership is more common in countries with high independence of bank supervisory authority. On the joint impact of shareholder protection laws and ownership on bank valuation, which is the main focus of their study, Caprio *et al.* (2007) find that the positive impact of ownership concentration on bank valuation is greater in countries where shareholder protection is weak. Moreover, Caprio *et al.* (2007) include the Moral Hazard Index developed by Demirguc-Kunt & Detragiache (2002) in the model specification and find that high ownership concentration have a negative impact on bank valuations in countries with generous deposit insurance systems³. This finding is in conflict with the expectation set in Caprio *et al.* (2007) that that bank valuations would be higher in banks with concentrated ownership, where the incentives and ability to exploit a generous deposit insurance system is higher.

Laeven & Levine (2008) study the joint impact of bank regulation and ownership characteristics on bank risk in the ten largest banks across 48 countries. They distinguish between banks that are widely held, ultimately controlled by managers or members of the board, or a (founder) family. State owned banks are excluded from the study. As Caprio *et al.* (2007), Laeven & Levine (2008) report that concentrated ownership, measured as the cash flow rights of the largest owner is negatively correlated with the legal protection of shareholders. They also find that majority owners with a board seat are less common in countries with weak shareholder protection. Moreover, the level of cash flow rights and probability that a controlling blockholder owner is a member of the board are positively correlated with restrictions on bank activities and capital requirements, whereas management ownership is positively correlated only with capital requirements. They find that the explicit deposit insurance⁴ increases the risk in banks with a majority owner, whereas the impact is insignificant if the bank is widely-held⁵. Taken on an aggregate level, these findings suggest that a generous deposit insurance system induces risk-taking in particularly in

³ In addition, Caprio *et al.* (2007) test whether bank regulation with respect to official supervisory power and independence, restrictions on activities and capital requirements has an impact on bank valuation, but none of these factors appear to have an impact on bank valuation.

⁴ Deposit insurance is defined as a dummy variable taking the value one if the country has explicit deposit insurance or if depositors were fully compensated the last time a bank failed if the country did not have formal deposit insurance and zero otherwise.

⁵ Laeven & Levine (2008) also find that the impact of capital stringency regulation, which account for what source of funds count as regulatory capital, whether authorities actually verify the true source of bank capital, and restrictions on bank activity on bank risk vary with the level of ownership concentration.

countries where concentrated bank ownership is common. Restrictive regulatory mechanisms may not be the optimal solution; Laeven & Levine (2008) find that owners with sufficient power compensate the loss of utility imposed by stricter capital requirements and activity restrictions by increasing bank risk through other avenues. Hence, corporate governance mechanisms which reduce the incentives of risk-shifting are expected to be particularly appealing in countries where concentrated ownership is common.

These findings suggest that the ownership structure of banks and the regulatory environment they operate in interact and that both aspects have to be accounted for when assessing the impact of corporate governance mechanisms on bank valuation and, in particular, bank risk. Hence, the objective of this study is to examine the interaction between bank regulation and ownership characteristics on a more detailed level than what has been done in the studies presented in this section. Specifically, I account for the different features of the deposit insurance system and use a broad set of ownership characteristics covering both the level of ownership concentration and type of blockholder owner as well as state, management, board, private individual and family ownership.

3 METHODOLOGY

3.1. Data

The sample includes listed and unlisted Bank Holding Companies (BHCs), commercial, savings, cooperative and investment banks from 37 European countries⁶. Financial and ownership data is retrieved from the BankScope International Bank Database, which is provided by Fitch/Bureau Van Dijk. I restrict the financial data to consolidated financial statements in order to bring the perspective as close to the ultimate owners as possible. The use of consolidated data also brings the analysis closer to the real economic situation faced by owners and managers; Stiroh & Rumble (2006) argue that one can presume that strategic decisions are made with the entire operation in mind. In addition, this approach ensures that non-traditional banking operations frequently held in subsidiaries are included in the financial figures. Furthermore, the legal selection bias in operating as a subsidiary or branch network abroad is eliminated. The use of consolidated financial statements does, however, impose a risk of multiple counting of entries of the same organisation at different level of consolidation⁷. Hence, I impose a cap on institutional ownership and exclude banks which are majority owned by another European bank assumed to be included in the database. I start with 1585 bank-year observations with matched consolidated financial statement and direct ownership data. Due to the restriction on majority ownership of another European bank, 476 observations are excluded reducing the sample to 1109 observations. Of these observations, 114 are regarded as outliers as the return on equity ratio is outside the 5% and 95% percentile⁸. The final sample includes 995 bank-year observations of matched financial and ownership data for 548 European banks. There are 64 BHCs, 355 commercial banks, 42 savings banks, 34 cooperative banks and 53 investment banks. Most of the banks (76%) are headquartered in a Western European country, but also 62 banks headquartered in an Eastern European country and 68 headquartered in Russia or an ex-Soviet state are included in the sample. With only few exceptions the bank-year observations are from the years 2003 to 2006 (2% are from the years 2000 to 2002).

The data on the deposit insurance system features are retrieved from the databases presented in Demirguc-Kunt *et al.* (2005) and Barth *et al.* (2007), in which information gathered through surveying 154 country officials in 2003 and early 2004 is documented. Hence, this study examines the interaction of deposit insurance system features and ownership structure of banks of a relatively normal period with respect to bank regulation (as previously noted, the deposit insurance system in many European countries have been revised due to the current financial crisis). The data on shareholder protection rights is retrieved from the Index of Economic Freedom, which is maintained by The Wall Street Journal and The Heritage Foundation, whereas the data on legal origin is taken from La Porta *et al.* (1998) and La Porta *et al.* (2002).

⁶ Western Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and UK. Eastern Europe: Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Slovakia, Slovenia and Turkey. Russia and ex-Soviet states: Belarus, Estonia, Latvia, Lithuania, Russia and Ukraine.

⁷ This issue has been raised by e.g. Bonin *et al.* (2005) and Micco *et al.* (2007).

⁸ Winzorising the observations, i.e. outliers would have been given the value of the 5% and 95% percentile, would have been an alternative approach. The selected approach does, however, ensure that very poorly performing banks on the brink of bankruptcy and banks with substantial non-bank operations, such as high performing venture capital operations, are excluded from the sample.

3.2. Analysis framework

In the first step of the empirical analysis, I account for the interaction between different regulatory variables. First, I extend the analysis of Demirguc-Kunt & Detragiache (2002) and define the Moral Hazard Index (MHI) for all European countries in the sample. Second, I define sub-samples of countries with similar regulatory environment by applying Two Way Indicator Species Analysis (TWINSPAN) classification⁹. In the TWINSPAN classification the data set is divided from the top, i.e. first the whole data set is divided into two sub-samples, which in the second step are divided into two sub-samples each generating four sub-samples, which in the third step are split into two sub-samples each generating eight sub-samples, and so forth. The division is based on several variables (polythetic classification) and is done based on the scores along the first ordination axes of a Principal Components Analysis (PCA) where the observations are weighted.

In the second step, I acknowledge the fact that ownership characteristics are used as substitutes¹⁰. Hence, I group the banks into sub-samples of banks with similar ownership characteristics with the help of a broad set of ownership characteristics. Once more, TWINSPAN classification is the methodology used.

In the third step, I examine whether a particular ownership structure is more or less prevalent in banks operating from a home country with a particular regulatory environment. Recall that the main aim of the study is not intended to imply causality, merely to examine the interactions. To this end I use a logit regression model specification (see Equation (1)). The dependent variable *OWN* is a dummy variable taking the value one if the bank *i*, in a particular point in time *t*, has a particular ownership structure, as defined in step two, and zero otherwise. The independent variable, *REGULATION*, is a country level regulatory variable, which is a dummy variable taking the value one if the home country of the bank has a particular regulatory characteristic and zero otherwise¹¹. Bank specific control variables to account for differences in size, focus and funding and profitability are also included in the model specification¹². The vector *BANK* includes these variables. Finally, year dummy variables (*YEAR*) are included in the model specification to capture time-varying factors in the data¹³.

$$OWN_{i,t} = \alpha + \beta * REGULATION_c + \beta * [BANK_{i,t}] + \beta * [YEAR_{i,t}] + \varepsilon_{i,t} \quad (1)$$

⁹ See Hill, 1979 for a detailed description of TWINSPAN.

¹⁰ Demsetz & Villalonga (2001) and Agrawal & Knoeber (1996) find that management and blockholder ownership are used as substitute corporate governance mechanisms in non-financial companies, whereas Allen & Cebeňoyan (1991) and Belkhir (2006) report similar findings in samples of banks.

¹¹ Potential restrictions on bank ownership is a country specific regulatory issue which have a direct impact on bank ownership and should hence be accounted for when assessing the relation between regulatory environment and bank ownership variables in a particular country. The restrictions in the sample countries are, however, negligible (Barth *et al.*, 2007). Only Luxembourg, Norway and Moldavia restrict the maximum percentage of bank capital that can be owned by a single owner, non-financial companies can own shares, including voting shares, in banks in all sample countries and foreign bank entry has rarely been denied. Moreover, there are restrictions on foreign bank operations and ownership only in Russia. Therefore, no control variable for bank ownership restrictions is included in the model specification.

¹² The results are similar when the bank specific control variables are excluded from the model specification.

¹³ Country dummy variables are not included in the model specification as the correlation with the regulatory variables *MHI**, *DISYS_X* and *REG_X* by construction is high.

3.3. Definition of variables

3.3.1. Regulatory environment variables

The regulatory environment variables included in the study account for differences in deposit insurance system features, level of shareholders protection and status with respect to integration to the European community.

The Moral Hazard Index (MHI) presented in Demirguc-Kunt & Detragiache (2002) would be ideal to assess the interaction between the severity of the moral hazard problem and ownership structure of banks. Unfortunately, this variable is only available for fifteen Western European countries. Hence, I attempt to extend the MHI to the rest of the countries included in this study. As Demirguc-Kunt & Detragiache (2002), I use data on the coverage, funding and management of the deposit insurance system¹⁴. The variables included in the analysis are the deposit insurance limit per person (*DI*), if there is coinsurance (*COINS*), if a premium is collected ex-ante to fund the deposit insurance system (*EXANTE*)¹⁵, if the deposit insurance premium is risk-adjusted (*RISK*), if the deposit insurance fund is managed solely by the private sector (*PRIVATE*), by the public sector (*PUBLIC*) or jointly by private and public officials (*JOINT*), if the deposit insurance agency can take legal action in case of violations against laws and regulations (*POWER*), and if the deposit insurance agency ever has taken legal action in case of violations against laws and regulations (*ACTION*) and zero otherwise. In addition, I account for the government's attitude towards bank bail-outs. Recall that Laeven & Levine (2008) regard full coverage of insured deposits the last time a bank failed as an indication of explicit deposit insurance. Hence, I define two dummy variables taking the value one if insured depositors were fully compensated to the extent of legal protection the last time a bank failed (*COVER*) and if any deposits not explicitly covered by deposit insurance were compensated the last time a bank failed (*IMPLDI*), and zero otherwise. See Table 1 for detailed definitions of the deposit insurance system variables.

To replicate the Principal Components Analysis (PCA) used in Demirguc-Kunt & Detragiache (2002) is not a viable option as a PCA is very sensitive to sample differences (Demirguc-Kunt & Detragiache, 2002 use an international sample of 61 countries, whereas I would use an European sample covering both Western and Eastern European countries and ex-Soviet states). Hence, I estimate the determinants of the MHI by regressing MHI on the deposit insurance system feature variables. As expected the results indicate that the severity of the moral hazard problem is positively connected with the level of explicit deposit insurance (*DI*) and the implicit deposit insurance (*IMPLDI*) and negatively connected with the coinsurance dummy variable (*COINS*). However, I find a negative connection between MHI and the ex-ante funding dummy variable (*EXANTE*) and a positive connection between MHI and the risk-adjustment dummy variable (*RISK*). Similarly, the results, with respect to the management of the deposit insurance funding, conflict with the expectation. The higher level of MHI in countries where the deposit insurance agent has the power of intervene

¹⁴ A number of variables accounted for in Demirguc-Kunt & Detragiache (2002) are not relevant for this study as there is too little variation across the European countries. These are whether everyone is a member in the deposit insurance system or not (yes), whether the deposit insurance system is funded by the government, the banks, or both (by banks), whether the deposit insurance scheme cover foreign currency (yes) or interbank deposits (no).

¹⁵ Note that the 1994 EU Directive on Deposit Insurance (31994L0019) impose a compulsory levy on member banks in case of bank failure, hence making ex-post and ex-ante funding rather similar (Garcia, 1999).

Table 1 Definition of deposit insurance system variables

<i>DI</i>	Deposit insurance limit per person in euros (at the currency of December 29 th , 2006)
<i>DI_HIGH</i>	Dummy variable taking the value 1 if the deposit insurance limit per person is above the median in the sample and 0 otherwise
<i>COINS</i>	Dummy variable taking the value 1 if there is coinsurance and 0 otherwise
<i>COVER</i>	Dummy variable taking the value 1 if insured depositors were fully compensated to the extent of legal protection the last time a bank failed and 0 otherwise
<i>IMPLDI</i>	Dummy variable taking the value 1 if any deposits not explicitly covered by deposit insurance were compensated the last time a bank failed and 0 otherwise
<i>EXANTE</i>	Dummy variable taking the value 1 if a premium is collected ex-ante to fund the deposit insurance system and 0 otherwise
<i>RISK</i>	Dummy variable taking the value 1 if deposit insurance premium vary based on some assessment of bank risk and 0 otherwise
<i>PRIVATE</i>	Dummy variable taking the value 1 if the deposit insurance fund is managed solely by the private sector and 0 otherwise
<i>PUBLIC</i>	Dummy variable taking the value 1 if the deposit insurance fund is managed solely by the public sector and 0 otherwise
<i>JOINT</i>	Dummy variable taking the value 1 if the deposit insurance fund is managed jointly by private and public officials and 0 otherwise
<i>POWER</i>	Dummy variable taking the value 1 if the deposit insurance agency/fund can take legal action in case of violations against laws, regulations, and bylaws against bank directors or other bank officials and 0 otherwise
<i>ACTION</i>	Dummy variable taking the value 1 if the deposit insurance agency/fund ever has taken legal action in case of violations against laws, regulations, and against bank directors or other bank officials and 0 otherwise

may, however, be an indication that the attitude towards bank bail out is positive making the safety net too generous. Even though some of the coefficients do not have the expected impact, I use the regression coefficients to estimate a refined MHI for each country (see Equation (2) for the definition). This variable is denoted MHI^* . By construction the correlation between MHI and MHI^* is high, i.e. 91%.

$$MHI^*_c = 2.3 * DI_c - 1.6 * COINS_c - 1.3 * EXANTE_c + 1.4 * RISK_c + 0.8 * PRIVATE_c - 2.5 * PUBLIC_c - 1.8 * COVER_c + 3.5 * IMPLDI_c + 2.1 * POWER_c - 1.8 * ACTION_c \quad (2)$$

Furthermore, I classify the countries into sub-samples of countries with similar deposit insurance features. In this setting a dummy variable for the level of deposit insurance limit is used rather than the continuous variable DI . Hence, DI_HIGH take the value one if the deposit insurance limit is greater than the median in the sample, i.e. 20 000 euros, and zero otherwise. The classification generates six sub-samples of countries (see Table 2 for the different steps in the classification process). These countries can be described as countries with jointly managed deposit insurance systems with high deposit insurance and coinsurance ($DISYS_1$), ex-ante funded deposit insurance system, with low deposit insurance and partial coverage of insured deposits in case of bank failure ($DISYS_2$), publicly managed, ex-ante funded deposit insurance system with restricted coverage of insured deposits in case of bank failure ($DISYS_3$), privately managed, ex-post funded deposit insurance system with full coverage of insured deposits in case of bank failure ($DISYS_4$), high deposit insurance, no coinsurance, risk-adjusted premium and a deposit insurance agency with no power ($DISYS_5$) and risk-adjusted funding and deposit insurance agency prone to take action ($DISYS_6$) (see also the descriptive statistics presented in Table 4).

Table 2 Classification of European countries based on deposit insurance system features

	Countries: 37				
Step 1	Eigenvalue: 0.245				
	Countries: 28	Countries: 9			
Step 2	<p><i>DI_LOW</i> (22,2), <i>EXANTE_N</i> (7,1), <i>RISK_N</i> (28,0), <i>PUBLIC</i> (11,1), <i>COVER_N</i> (7,0)</p> <p><i>COINS_Y</i> (11,2), <i>COINS_N</i> (17,7), <i>EXANTE_Y</i> (21,8), <i>JOINT</i> (12,5), <i>COVER_Y</i> (17,8), <i>IMPLDI_Y</i> (7,2), <i>IMPLDI_N</i> (18,7), <i>POWER_Y</i> (10,4), <i>POWER_N</i> (18,5), <i>ACTION_N</i> (25,5)</p>				
	Eigenvalue: 0.204	Eigenvalue: 0.269			
	Countries: 15	Countries: 5	Countries: 4		
Step 3	<p><i>COINS_Y</i> (10,1), <i>JOINT</i> (9,3), <i>IMPLDI_Y</i> (6,1), <i>POWER_N</i> (13,5)</p> <p><i>DI_HIGH</i> (3,3), <i>DI_LOW</i> (12,10), <i>EXANTE_Y</i> (14,7), <i>RISK_N</i> (15,13), <i>COVER_Y</i> (11,6), <i>IMPLDI_N</i> (7,11), <i>ACTION_N</i> (15,10)</p>				
	Eigenvalue: 0.205	Eigenvalue: 0.288	Eigenvalue: 0.269		
	Countries: 4	Countries: 8	Countries: 5		
	<p><i>DI_HIGH</i> (3,0), <i>EXANTE_N</i> (1,0), <i>POWER_Y</i> (2,0)</p> <p><i>COINS_Y</i> (4,6), <i>EXANTE_Y</i> (3,1), <i>RISK_N</i> (4,11), <i>JOINT</i> (3,6), <i>COVER_Y</i> (3,8), <i>IMPLDI_Y</i> (4,5), <i>IMPLDI_N</i> (2,5), <i>ACTION_N</i> (4,11)</p>	<p><i>DI_HIGH</i> (3,0), <i>EXANTE_Y</i> (6,1), <i>PUBLIC</i> (7,0), <i>COVER_N</i> (5,0)</p> <p><i>DI_LOW</i> (5,5), <i>COINS_N</i> (7,5), <i>RISK_N</i> (8,5), <i>IMPLDI_N</i> (7,4), <i>POWER_Y</i> (6,2), <i>ACTION_N</i> (7,3)</p>	<p><i>EXANTE_N</i> (2,4), <i>PRIVATE</i> (0,3), <i>JOINT</i> (1,2), <i>COVER_Y</i> (1,5), <i>POWER_N</i> (2,3), <i>ACTION_Y</i> (1,2)</p> <p>Split not included as sub-samples become too small</p>	<p><i>POWER_N</i> (5,0), <i>ACTION_N</i> (5,0)</p> <p><i>DI_HIGH</i> (4,3), <i>DI_LOW</i> (1,1), <i>COINS_Y</i> (1,1), <i>COINS_N</i> (4,3), <i>EXANTE_Y</i> (4,4), <i>RISK_Y</i> (5,4), <i>PRIVATE</i> (2,1), <i>JOINT</i> (3,2), <i>COVER_Y</i> (4,4), <i>IMPLDI_Y</i> (1,1), <i>IMPLDI_N</i> (4,3)</p> <p>Division fails as there is too few items</p>	
CZ, GB, IS, PL	HR, DK, IE, LV, NL, SI, SE, UA	AT, CH, ES, LI, LU	FI, IT, NO, PT, RO	BE, FR, HU, TR	
<i>DISYS_1</i>	<i>DISYS_2</i>	<i>DISYS_3</i>	<i>DISYS_4</i>	<i>DISYS_5</i>	<i>DISYS_6</i>

This table shows the steps of the classification of countries based on the deposit insurance system variables as defined in Table 1. Note that the counterparties of each dummy variable are included and hence given the extension *_Y* or *_N* to indicate whether the dummy variable takes the value 1 or 0, respectively. The eigenvalue indicates the explanatory power of the split of countries into the two sub-samples on each step. The negative and positive preferentials are the variables dictating the split. The negative preferentials are listed to the left, the positive preferentials to the right. The non-preferentials listed below the left and right preferentials do not have an impact on the classification at that particular step. The figures in the parenthesis indicate the occurrence of the variable in the negative vs. positive preferential group. The countries in each class as well as the denotation of the class are listed at the bottom of the table.

The differences in legal protection of shareholders are accounted for in two ways. First, I include the level of “Property rights” as defined in the Index of Economic Freedom and a dummy variable taking the value one if the level of property rights in a particular country is higher than the median, i.e. 70, and zero otherwise. These variables are denoted *RIGHTS* and *RIGHTS_HIGH*, respectively. Second, I account for the legal origin of the country as defined in La Porta *et al.* (1998) and La Porta *et al.* (2002). Hence, I distinguish between *COMMON* law, *FRENCH*, *GERMAN* or *SCANDINAVIAN* civil law or ex-*SOCIALIST* countries¹⁶. Following the notion that the EU countries are following similar strategies, especially in times of crisis, I also separate between countries which are old-EU members, new-EU members and non-EU countries¹⁷. These variables are denoted *OLDEU*, *NEWEU* and *NONEU*.

Finally, I classify the countries into sub-samples of countries accounting for both differences in the deposit insurance system features, shareholder protection and status with respect to integration to the European community. The main reason for combining the deposit insurance system variables and the shareholder protection variables in the second classification is that the two sets of regulatory variables are interrelated. Kane (2000) shows that differences in the level of transparency and contracting environment affect the optimal design of the deposit insurance system. Moreover, the moral hazard problem induced by the deposit insurance system may be curbed in economies with strong legal tradition (Demirguc-Kunt & Detragiache, 2002). Furthermore, shareholder protection laws may not be sufficient to protect small bank shareholders due to the greater complexity and opacity of banks, hence advocating additional bank regulations (Caprio *et al.*, 2007). This classification also generates six sub-samples of countries (see Table 3 for the different steps in the classification process). These countries can be described as low legal rights countries with high deposit insurance and a deposit insurance agency prone to take action (*REG_1*), ex-Socialist, low legal rights, non-EU countries with a public deposit insurance system with low deposit insurance and no coinsurance (*REG_2*), ex-Socialist, low legal rights new-EU countries with low deposit insurance and coinsurance (*REG_3*), German civil law, high legal rights countries with low deposit insurance and full coverage of insured deposits in case of bank failure (*REG_4*), Scandinavian civil or Common law, high legal rights, old-EU countries with restricted coverage of insured deposits in case of bank failure (*REG_5*) and French civil law, low legal rights, old-EU countries with risk-adjusted premium and deposit insurance agency prone to take action (*REG_6*) (see also the descriptive statistics presented in Table 4).

I do find that the severity of the moral hazard problem differ across the deposit insurance and regulatory environment classes (see *MHI** in Table 4). It appears as the moral hazard problem is very severe in *DISYS_5* countries, rather severe in *DISYS_6* countries and least severe in *DISYS_2* countries (see Panel A). There are even greater differences in *MHI** across the regulatory environment classes, even though many other aspects apart from the deposit insurance system features are accounted for in this classification (see Panel B). The moral hazard problem is non-existing in *REG_2* and very small in *REG_3* countries, whereas it is very severe in *REG_1* countries.

¹⁶ Common law: Ireland or United Kingdom, French Civil law: Belgium, Spain, France, Italy, Luxembourg, Malta or Netherlands, German Civil law country, Austria, Switzerland, Cyprus, Germany, Greece, Liechtenstein, Portugal or Turkey, Scandinavian Civil law, Denmark, Finland, Iceland, Norway or Sweden, ex-Socialist law, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russia, Slovakia, Slovenia or Ukraine.

¹⁷ Old-EU: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and UK. New-EU: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia. Non-EU: Belarus, Croatia, Iceland, Liechtenstein, Macedonia, Norway, Switzerland, Turkey, Ukraine and Russia.

Table 3 Classification of European countries based on all regulatory environment variables

	Countries: 37	
Step 1	Eigenvalue: 0.254	
	Countries: 17 PUBLIC (9,3), IMPLDI_Y (6,3), RIGHTS_LOW (16,5), SOCIALIST (15,0), NEWEU (11,1)	Countries: 20 EXANTE_N (1,7), PRIVATE (0,6), RIGHTS_HIGH (1,15), FRENCH (1,6), GERMAN (1,7), SCAND (0,5), OLDEU (0,15)
	DL_HIGH (5,8), DL_LOW (12,12), COINS_Y (8,5), COINS_N (9,15), EXANTE_Y (16,13), RISK_Y (3,6), RISK_N (14,14), JOINT (8,9), COVER_Y (12,13), COVER_N (4,3), IMPLDI_N (10,15), POWER_Y (6,8), POWER_N (11,12), ACTION_N (14,16), NONEU (6,4)	
Step 2	Eigenvalue: 0.238	
	Countries: 4 DL_HIGH (4,1), EXANTE_N (1,0), RISK_Y (2,1), POWER_Y (4,2), ACTION_Y (2,1), GERMAN (1,0)	Countries: 15 EXANTE_N (6,1), RISK_N (13,1), ACTION_N (14,2), RIGHTS_HIGH (14,1), GERMAN (6,1), SCAND (5,0), NONEU (4,0)
	Countries: 13 DL_LOW (0,12), COVER_N (0,4), IMPLDI_N (1,9), POWER_N (0,11)	Countries: 5 RISK_Y (2,4), ACTION_Y (1,3), RIGHTS_LOW (1,4), FRENCH (2,4)
	COINS_Y (2,6), COINS_N (2,7), EXANTE_Y (3,13), RISK_N (2,12), JOINT (2,6), PUBLIC (2,7), COVER_Y (3,9), IMPLDI_Y (2,4), ACTION_N (2, 12), RIGHTS_LOW (4,12), SOCIALIST (3,12), NEWEU (3,8), NONEU (1,5)	DL_HIGH (5,3), DL_LOW (10,2), COINS_Y (4,1), COINS_N (11,4), EXANTE_Y (9,4), PRIVATE (4,2), JOINT (6,3), COVER_Y (8,5), IMPLDI_N (10,5), POWER_Y (5,3), POWER_N (10,2), OLDEU (10,5)
Step 3	Eigenvalue: 0.187	
	Countries: 6 COINS_N (5,2), PUBLIC (5,2), POWER_Y (2,0), NONEU (5,0)	Countries: 8 DL_LOW (7,3), PRIVATE (3,1), COVER_Y (7,1), IMPLDI_Y (3,0), POWER_N (7,3), GERMAN (6,0), NONEU (3,1)
	Countries: 7 COINS_Y (1,5), JOINT (1,5), IMPLDI_Y (1,3), NEWEU (1,7)	Countries: 7 DL_HIGH (1,4), COINS_Y (1,3), PUBLIC (0,3), COVER_N (0,3), POWER_Y (1,4), COMMON (0,2), SCAND (1,4)
Division falls as there is too few items	Countries: 6 DL_LOW (6,6), EXANTE_Y (6,7), RISK_N (6,6), COVER_Y (4,5), COVER_N (2,2), IMPLDI_N (5,4), POWER_N (4,7), ACTION_N (5,7), RIGHTS_LOW (6,6), SOCIALIST (6,6)	Countries: 7 COINS_N (7,4), EXANTE_Y (4,5), EXANTE_N (4,2), RISK_N (7,6), JOINT (4,2), IMPLDI_N (4,6), ACTION_N (7,7), RIGHTS_HIGH (7,7), OLDEU (4,6)
CZ, HU, SI, TR	BY, HR, LV, MK, RU, UA	AT, CH, CY, DE, GR, LI, LU, NO
REG_1	REG_2	REG_3
	REG_4	REG_5
		REG_6
BE, ES, FR, IT, PT		

This table shows the steps of the classification of countries based on all regulatory variables as defined in section 3.3.1. Note that the counterparties of each dummy variable are included and hence given the extension _Y or _N to indicate whether the dummy variable takes the value 1 or 0, respectively. The eigenvalue indicates the explanatory power of the split of countries into the two sub-samples on each step. The negative and positive preferentials are the variables dictating the split. The negative preferentials are listed to the left, the positive preferentials to the right. The non-preferentials listed below the left and right preferentials do not have an impact on the classification at that particular step. The figures in the parenthesis indicate the occurrence of the variable in the negative vs. positive preferential group. The countries in each class as well as the denotation of the class are listed at the bottom of the table.

Table 4 Sub-sample means of regulatory environment variables in the deposit insurance system and regulatory environment classes

Panel A Sub-samples of <i>DISYS</i> classes							Panel B Sub-samples of <i>REG</i> classes						
	<i>DISYS_1</i>	<i>DISYS_2</i>	<i>DISYS_3</i>	<i>DISYS_4</i>	<i>DISYS_5</i>	<i>DISYS_6</i>		<i>REG_1</i>	<i>REG_2</i>	<i>REG_3</i>	<i>REG_4</i>	<i>REG_5</i>	<i>REG_6</i>
<i>DI</i>	28791	15444	19489	19592	82214	37944	<i>DI</i>	23523	8397	17678	47592	28585	47658
<i>DI_HIGH</i>	0.750	0.000	0.500	0.000	0.800	0.750	<i>DI_HIGH</i>	1.000	0.167	0.143	0.125	0.571	0.600
<i>COEINS</i>	1.000	0.545	0.125	0.000	0.200	0.250	<i>COEINS</i>	0.500	0.167	0.714	0.125	0.429	0.200
<i>COVER</i>	1.000	0.800	0.167	1.000	1.000	1.000	<i>COVER</i>	1.000	0.667	0.714	1.000	0.250	1.000
<i>IMPLDI</i>	0.333	0.500	0.000	0.200	0.200	0.250	<i>IMPLDI</i>	0.667	0.167	0.429	0.429	0.000	0.000
<i>EXANTE</i>	0.750	1.000	0.750	0.200	0.800	1.000	<i>EXANTE</i>	0.750	1.000	1.000	0.500	0.714	0.800
<i>RISK</i>	0.000	0.000	0.000	0.000	1.000	1.000	<i>RISK</i>	0.500	0.000	0.143	0.125	0.143	0.800
<i>PRIVATE</i>	0.000	0.000	0.000	0.600	0.400	0.250	<i>PRIVATE</i>	0.000	0.000	0.000	0.375	0.143	0.400
<i>PUBLIC</i>	0.000	0.364	0.875	0.000	0.000	0.250	<i>PUBLIC</i>	0.500	0.833	0.286	0.000	0.429	0.000
<i>JOINT</i>	0.750	0.545	0.125	0.400	0.600	0.500	<i>JOINT</i>	0.500	0.167	0.714	0.500	0.286	0.600
<i>POWER</i>	0.500	0.000	0.750	0.400	0.000	1.000	<i>POWER</i>	1.000	0.333	0.000	0.125	0.571	0.600
<i>ACTION</i>	0.000	0.000	0.125	0.400	0.000	1.000	<i>ACTION</i>	0.500	0.167	0.000	0.125	0.000	0.600
<i>MHI</i>	0.731	-0.282	-0.066	1.927	0.838	2.220	<i>MHI</i>	3.454	n.a.	n.a.	0.823	0.564	0.702
<i>MHI*</i>	0.216	-1.162	-0.559	0.977	1.656	0.992	<i>MHI*</i>	1.530	-2.258	-1.095	1.255	0.601	0.320
<i>RIGHTS</i>	75	55	65	85	70	70	<i>RIGHTS</i>	60	33	53	84	90	74
<i>RIGHTS_HIGH</i>	0.500	0.273	0.500	0.800	0.400	0.250	<i>RIGHTS_HIGH</i>	0.000	0.000	0.143	0.875	1.000	0.200
<i>COMMON</i>	0.250	0.000	0.125	0.000	0.000	0.000	<i>COMMON</i>	0.000	0.000	0.000	0.000	0.286	0.000
<i>FRENCH</i>	0.000	0.091	0.125	0.400	0.200	0.500	<i>FRENCH</i>	0.000	0.000	0.143	0.125	0.143	0.800
<i>GERMAN</i>	0.000	0.273	0.000	0.600	0.200	0.250	<i>GERMAN</i>	0.250	0.000	0.000	0.750	0.000	0.200
<i>SCAND</i>	0.250	0.000	0.250	0.000	0.400	0.000	<i>SCAND</i>	0.000	0.000	0.000	0.125	0.571	0.000
<i>SOCIALIST</i>	0.500	0.636	0.500	0.000	0.200	0.250	<i>SOCIALIST</i>	0.750	1.000	0.857	0.000	0.000	0.000
<i>OLDEU</i>	0.250	0.182	0.500	0.600	0.600	0.500	<i>OLDEU</i>	0.000	0.000	0.000	0.500	0.857	1.000
<i>NEWEU</i>	0.500	0.545	0.250	0.000	0.200	0.250	<i>NEWEU</i>	0.750	0.167	1.000	0.125	0.000	0.000
<i>NONEU</i>	0.250	0.273	0.250	0.400	0.200	0.250	<i>NONEU</i>	0.250	0.833	0.000	0.375	0.143	0.000

This table presents the sub-sample means of countries belonging to different deposit insurance system classes (*DISYS_X*) and different regulatory environment classes (*REG_X*). The *DISYS_X* classes presented in Panel A are as defined in Table 2 and the *REG_X* classes presented in Panel B are as defined in Table 3. The deposit insurance system variables are as defined in Table 1. *MHI* is the Moral Hazard Index as defined in Demircuc-Kunt & Detragiache (2002) and *MHI** is the extended version of *MHI* discussed in section 3.3.1. The legal rights and origin variables as well as the EU status variables are similarly discussed in section 3.3.1. Sub-sample means not within one standard deviation from the full sample mean is presented in bold.

3.3.2. Ownership variables

As previously noted, the empirical finding of previous studies that management and blockholder ownership are used as substitute corporate governance mechanisms is the starting point when selecting the ownership characteristics to be included in the analysis. Hence, I define management ownership as a dummy variable taking the value one if any of the eight owners included in the BankScope database are members of the management team and zero otherwise¹⁸. Furthermore, I define a blockholder owner variable as a dummy variable taking the value one if the owner with the largest direct ownership is an external owner with a direct ownership of at least 10%. These two variables are denoted *MGT* and *BLOCK_EXT*.

¹⁸ In the BankScope database owners are categorised e.g. as “Management and employees” or “Individuals and families”. These owners have been checked and recoded as “Management”, “Board”, “Employees” and “Private” with the help of company home pages and annual reports.

In the first addition to the list of ownership characteristics, I account for the fact that the ability of the blockholder owner in aligning the interests of management and shareholders may depend on whether the rest of the ownership in the bank is dispersed or concentrated to a few owners, i.e. whether the blockholder owner has substantial power in comparison to smaller owners. Unfortunately, an inclusion of a variable accounting for the power of the largest shareholder in relation to smaller shareholders or variables for multiple blockholder owners would decrease the sample size substantially. Hence, I choose to rely on a dummy variable taking the value one if the bank is listed and zero otherwise (*LISTED*). Moreover, the type of the blockholder owner is of importance. Different owners have different interest and will thus drive different issues in the main arena of influence, i.e. the board (Levine, 2004) and the ability to monitor the bank differs with the type of blockholder owner, e.g. banks have greater incentives to monitor a peer bank than other outside owners (Adams & Mehran, 2003, Rochet & Tirole, 1996). Hence, the blockholder owners (*BLOCK_EXT*) are categorised as institutional blockholder owners (*BL_INST*), state blockholder owners (*BL_STATE*) or private individual blockholder owners (*BL_INDIVID*) including board, named private individuals and family members. Furthermore, the institutional blockholder owners are categorised as banks (*BL_BANK*), financial companies (*BL_FINANCIAL*), industrial companies (*BL_INDUSTRY*), insurance companies (*BL_INSURANCE*), mutual or pension funds, trusts or nominees (*BL_FUND*), or foundations (*BL_FOUND*). In addition, I account for whether the institutional blockholder owner is foreign or not by including a dummy variable taking the value one if the home country of the blockholder owner is different from the one of the bank, and zero otherwise. This variable is denoted *BL_FOREIGN*.

Finally, I extend the list of ownership characteristics with four dummy variables taking the value one if any of the eight owners included in the BankScope data base is a government authority, member of the board¹⁹, a named private individual or a family member, respectively, and zero otherwise. These variables are denoted *STATE*, *BOARD*, *PRIVATE* and *FAMILY*. The definitions of the all ownership variables are presented in Table 5.

Following the notion that ownership characteristics complement each other and should hence be studied simultaneously, I use the full set of ownership variables to classify the banks into nine classes of banks with similar ownership characteristics (see Table 6 for the different steps in the classification process). The banks in the different ownership classes can be described as banks with state ownership (*OWN_1*), unlisted banks with foreign bank blockholder owner (*OWN_2*), listed banks with bank or financial company blockholder owner (*OWN_3*), unlisted banks with bank blockholder owner (*OWN_4*), unlisted banks with foreign industrial company blockholder owner (*OWN_5*), listed banks with industrial company blockholder owner (*OWN_6*), listed banks with no management or external blockholder owner (*OWN_7*), unlisted banks with management and board ownership and no external blockholder owner (*OWN_8*) and banks with management owner and board, private individual or family (blockholder) owner (*OWN_9*) (see also the descriptive statistics in Table 7).

¹⁹By separating management and board ownership, I address the criticism presented in Demsetz & Villalonga (2001) that many studies on the impact of management ownership has included board ownership in the management or insider ownership variable even though the interests of the management and board are different.

Table 5 Definition of ownership variables

<i>Management ownership</i>	
<i>MGT</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database is a management team member and 0 otherwise
<i>Dispersed vs. concentrated ownership</i>	
<i>BLOCK_EXT</i>	Dummy variable taking the value 1 if the direct ownership of the largest direct owner is at least 10% and the largest direct owner is external, i.e. an institution, a government authority or a named private individual other than a management team member, and 0 otherwise
<i>LISTED</i>	Dummy variable taking the value 1 if the bank is listed and 0 otherwise
<i>Type of external blockholder owner</i>	
<i>BL_INST</i>	Dummy variable taking the value 1 if the external blockholder owner is an institution and 0 otherwise
<i>BL_STATE</i>	Dummy variable taking the value 1 if the external blockholder owner is a government authority and 0 otherwise
<i>BL_INDIVID</i>	Dummy variable taking the value 1 if the external blockholder owner is a board member or a named private individual and 0 otherwise
<i>Type of institutional blockholder owner</i>	
<i>BL_BANK</i>	Dummy variable taking the value 1 if the external blockholder owner is a bank and 0 otherwise
<i>BL_FINANCIAL</i>	Dummy variable taking the value 1 if the external blockholder owner is a financial company and 0 otherwise
<i>BL_INDUSTRY</i>	Dummy variable taking the value 1 if the external blockholder owner is an industrial company and 0 otherwise
<i>BL_INSURANCE</i>	Dummy variable taking the value 1 if the external blockholder owner is an insurance company and 0 otherwise
<i>BL_FUND</i>	Dummy variable taking the value 1 if the external blockholder owner is a mutual or pension fund, a trust or nominee and 0 otherwise
<i>BL_FOUND</i>	Dummy variable taking the value 1 if the external blockholder owner is a foundation and 0 otherwise
<i>BL_FOREIGN</i>	Dummy variable taking the value 1 if the external blockholder owner is foreign, i.e. its home country is different from the one of the bank, and 0 otherwise
<i>Some selected ownership characteristics</i>	
<i>STATE</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database is a government authority and 0 otherwise
<i>BOARD</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database are board members and 0 otherwise
<i>PRIVATE</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database are named private individuals and 0 otherwise
<i>FAMILY</i>	Dummy variable taking the value 1 any of the eight owners included in the BankScope database is defined as a family member, i.e. if there are several owners with the same family name or the owner is coded in the BankScope database as a family or family foundation or fund (family members are also categorised as management team or board member, named private individuals or foundations)

Table 6 Classification of the bank-year observations based on ownership variables

Bank-year observations: 995								
Eigenvalue: 0.221								
Step 1	<p>Obs: 881 BLOCK_EXT_Y (775,28), unli sted(584, 40) BL_INST (715,4), BL_BANK (189,0), BL_INDUSTRY (303, 0), BL_FOREIGN (211,0) MGT_N (773,117), STATE_N (745,171), BOARD_N (772,134), PRIVATE_N (757,123), FAMILY_N (777,150)</p> <p>Obs: 177 MGT_Y (45,60), BLOCK_EXT_N (43,149) LISTED(234,137), BOARD_Y (46,43), PRIVATE_Y (61,54)</p>							
Step 2	<p>Obs: 273 LISTED (166,68), BL_BANK (138,51), BL_FOREIGN (132,79), STATE_Y (68,5)</p> <p>Obs: 545 UNLISTED (107,477), BL_INDUSTRY (16,287)</p> <p>Obs: 143 BLOCK_EXT_N(144,5), PRIVATE_N (122,1), FAMILY_N (141,9)</p> <p>Obs: 30 MGT_Y (41,19), BLOCK_EXT_Y (3,25), UNLISTED (25,15), BL_INDIVID (3,20), BOARD_Y (26,17), PRIVATE_Y (25,29), FAMILY_Y (6,21)</p>							
Step 3	<p>Obs: 53 BL_STATE (43,0) STATE_Y (52,16) MGT_N (50,208), BLOCK_EXT_Y (52,221), LISTED (23,143) UNLISTED (29,78), BOARD_N (52,206), PRIVATE_N (52,206), FAMILY_N (52,218)</p> <p>Obs: 221 BL_INST (9,221), BL_BANK (2,136), BL_FOREIGN (0,132), STATE_N (0,205)</p> <p>Obs: 456 UNLISTED (456,21)</p> <p>Obs: 89 LISTED (0,68), BL_INDUSTRY (200,87), FAMILY_Y (15,23)</p> <p>Obs: 118 MGT_N (106,0), LISTED (118,4) BOARD_Y (13,13)</p> <p>Obs: 29 MGT_Y (12,29), UNLISTED (0,25), BOARD_Y (13,13)</p>							
Step 4	<p>Obs: 100 UNLISTED (78,0), BL_BANK (100,36), BL_FOREIGN (100,32)</p> <p>Obs: 121 LISTED (22,121) BL_FINANCIAL (0,32)</p> <p>Obs: 170 BLOCK_EXT_N (43,0), BL_BANK (51,0)</p> <p>Obs: 286 BL_FINANCIAL (0,62), BL_INDUSTRY (0,200), BL_FOREIGN (5,74)</p>							
OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9

This table shows the steps of the classification of bank-year observations based on the ownership variables as defined in Table 5. Note that the counterparties of each dummy variable are included and hence given the extension_Y or_N to indicate whether the dummy variable takes the value 1 or 0, respectively. The eigenvalue indicate the explanatory power of the split of bank-year observations into the two sub-samples on each step. The negative and positive preferentials are the variables dictating the split. The negative preferentials are listed to the left, the positive preferentials to the right. The non-preferentials listed below the left and right preferentials do not have an impact on the classification at that particular step (n.a. indicates that these are excluded due to space limitations where the previous steps give indications of the results). The figures in the parenthesis indicate the occurrence of the variable in the negative vs. positive preferential group. The denotation of the class is listed at the bottom of the table.

Table 7 Sub-sample means of ownership variables in the ownership classes

	OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9
<i>Management ownership</i>									
MGT	0.038	0.070	0.050	0.006	0.056	0.146	0.102	1.000	0.633
<i>Dispersed vs. concentrated ownership</i>									
BLOCK_EXT	1.000	1.000	1.000	0.747	1.000	1.000	0.025	0.000	0.833
LISTED	0.442	0.220	1.000	0.000	0.000	0.764	1.000	0.138	0.500
<i>Type of external blockholder owner</i>									
BL_INST	0.173	1.000	1.000	0.688	0.976	1.000	0.000	0.000	0.133
BL_STATE	0.827	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033
BL_INDIVID	0.000	0.000	0.000	0.059	0.024	0.000	0.025	0.000	0.667
<i>Type of institutional blockholder owner</i>									
BL_BANK	0.038	1.000	0.298	0.300	0.000	0.000	0.000	0.000	0.000
BL_FINANCIAL	0.019	0.000	0.264	0.000	0.217	0.000	0.000	0.000	0.067
BL_INSURNACE	0.000	0.000	0.025	0.188	0.000	0.011	0.000	0.000	0.000
BL_FUND	0.115	0.000	0.157	0.112	0.059	0.011	0.000	0.000	0.033
BL_INDUSTRY	0.000	0.000	0.132	0.000	0.699	0.978	0.000	0.000	0.000
BL_FOUND	0.000	0.000	0.124	0.088	0.000	0.000	0.000	0.000	0.033
BL_FOREIGN	0.000	1.000	0.264	0.029	0.259	0.000	0.000	0.000	0.000
<i>Some selected ownership characteristics</i>									
STATE	1.000	0.160	0.000	0.000	0.017	0.000	0.042	0.000	0.033
BOARD	0.000	0.040	0.091	0.065	0.042	0.090	0.110	0.448	0.567
PRIVATE	0.000	0.050	0.083	0.024	0.087	0.191	0.178	0.138	0.967
FAMILY	0.000	0.010	0.017	0.000	0.052	0.258	0.034	0.069	0.700

This table presents the sub-sample means of bank-year observations belonging to different ownership classes (OWN_X) as defined in Table 6. The ownership variables are as defined in Table 5. The means not within one standard deviation from the full sample mean is presented in bold.

3.3.3. Operational variables

Operational characteristics appear to have an impact on the efficiency of ownership characteristics as corporate governance mechanisms. Recall that depositors' incentives to monitor a bank are reduced by the deposit insurance and the implicit TBTF government guarantee (O'Hara & Shaw, 1990). This is particularly true in banks which rely on deposits as funding and are large. Furthermore, the opacity varies with the characteristics of the bank operations. Iannotta (2006) and Flannery *et al.* (2004) find that the opaqueness of a bank increases with bank size, share of net loans to total equity and share of interest income to total operating income, level of financial assets to total assets, capital to asset ratio and profitability. When comparing the opacity of interest income vs. non interest income operations such as trading and securitisation operations in a Demsetz & Lehn (1985) setting, where greater profit volatility is seen as an indication of greater opaqueness, the expectation is reversed; the opacity is expected to be greater in non interest income operations, where the profit volatility is higher (DeYoung & Roland, 2001, Stroh, 2006). In particular, off balance sheet activity is perceived as difficult for outsiders to monitor (Caprio *et al.*, 2008). Moreover, the risk-shifting incentives decrease with the capital asset ratio and increase with the level of risk (Brewer & Mondschean, 1994). Hence, operational variables are included in the model specification. These are the natural logarithm of total assets (*SIZE*), total

deposits to total funding (*DEPOSITS*), equity to total assets (*EQUITYASS*), total loans to total earning assets (*LOANS*), off-balance sheet items to total assets (*OFFBALANCE*), total interest income to total operating income (*INTINC*) and return on average equity (*ROE*). The definitions of the operational variables along with the expected impact on the incentives and difficulty to monitor the bank as well as on the risk-shifting incentives are presented in Table 8.

Table 8 Control variables and their expected impact on incentives and difficulty to monitor as well as on risk-shifting incentives

		Incentives to monitor	Difficulty to monitor	Risk-shifting incentives
<i>SIZE</i>	Natural logarithm of total assets	-	+	
<i>DEPOSIT</i>	Deposits to total funding	-		
<i>EQUITYASS</i>	Equity to total assets		+	-
<i>LOANS</i>	Loans to total earnings assets		+ /-	-
<i>OFFBALANCE</i>	Off balance sheet items to total assets		+	+
<i>INTINC</i>	Non interest income to total operating income		+ /-	-
<i>ROE</i>	Return on average equity		-	+

The descriptive statistic of the operational variables confirms that there is a great variation in the size, funding, focus and profitability of the operations in the sample banks (see Panel A of Table 9). *SIZE* ranges from 2.98 to 14.08, which correspond to assets of 19 million and 1 308 billion euros, respectively. The funding of the operations also varies substantially (see *DEPOSITS* and *EQUITYASS*). The focus of the operations range from full focus on traditional interest income based operations to full focus on non-traditional banking operations where off-balance sheet operations play an important part (see *LOANS*, *OFFBALANCE* and *INTINC*).

The logit regression of operational variables on the ownership classes presented in Panel B of Table 9, support the expectation that the ownership structure differ with the operational characteristics of a bank. In particular, size, capitalisation and focus, measured as the interest income to total operating income, appear to interact with the ownership structure. Listed banks and banks with state ownership appear to be larger and better capitalised than other banks (see *SIZE* and *EQUITYASS* in Columns I, III, IV and VII). State banks and banks with an external blockholder owner appear to focus more on traditional interest rate based banking operations than banks without blockholder ownership (see *INTINC* in Columns I, II, VII and VIII). Banks with both management and blockholder ownership appear to be smaller, less well capitalised and more focused on non-traditional commission and fee-based banking operations than other banks in the sample (see Column IX). There are also profitability differences across the banks in the different ownership classes. There appears to be a positive and significant connection between profitability and state ownership, a finding which does not support the general expectation that state ownership would have a negative impact on profitability. Recall, however, that Karas *et al.* (2008) report that in Russia, domestic public banks are more efficient than domestic private banks. Moreover, banks with dispersed ownership appear to be more profitable than other banks, whereas unlisted banks with a bank blockholder owner appears to be less profitable, a finding indicating that these banks may be subsidiaries in a banking group where profits are optimised on a higher level in the organisation.

Based on these findings, it is hard to infer whether the differences in ownership structure are due to differences in incentives and ability of outsiders to monitor the bank or other factors such as the age of the bank or the stage of financial development in the home country of the bank. The findings do, however, indicate that it is important to control for operational characteristics when assessing the interaction between regulatory environment and ownership structure.

Table 9 Descriptive statistics of the operational variables and the connection between them and the ownership classes

Panel A Descriptive statistics							
	Mean	Std.dev.	Min	1 st quartile	Median	3 rd quartile	Max
<i>SIZE</i>	8.126	2.180	2.980	6.553	7.968	9.328	14.084
<i>DEPOSITS</i>	0.660	0.212	0.000	0.540	0.715	0.822	0.972
<i>EQUITYASS</i>	0.131	0.134	-0.019	0.062	0.091	0.146	0.959
<i>LOANS</i>	0.537	0.273	0.000	0.328	0.587	0.753	0.999
<i>OFFBALANCE</i>	0.215	0.763	0.000	0.000	0.063	0.186	12.784
<i>INTINC</i>	0.514	0.304	-4.500	0.357	0.573	0.674	2.454
<i>ROE</i>	0.119	0.068	-0.025	0.066	0.110	0.165	0.305

Panel B Relation between operational characteristics and ownership structure									
Observations	I	II	III	IV	V	VI	VII	VIII	IX
	<i>OWN_1</i>	<i>OWN_2</i>	<i>OWN_3</i>	<i>OWN_4</i>	<i>OWN_5</i>	<i>OWN_6</i>	<i>OWN_7</i>	<i>OWN_8</i>	<i>OWN_9</i>
	Banks with state ownership	Unlisted banks with foreign bank blockholder owner	Listed banks with bank or financial company blockholder owner	Unlisted banks with bank blockholder owner	Unlisted banks with foreign industrial company blockholder owner	Listed banks with industrial company blockholder owner	Listed banks with no management or external blockholder owner	Unlisted banks with management and board ownership and no external blockholder owner	Banks with management owner and board, private individual or family (blockholder) owner
Constant	-6.950*** [1.943]	-1.004 [1.280]	-5.330*** [1.212]	0.626 [1.075]	0.108 [1.002]	-2.846*** [1.068]	-4.825*** [1.188]	-2.492 [3.042]	2.057 [1.549]
<i>SIZE</i>	0.223** [0.100]	-0.117 [0.084]	0.186*** [0.070]	-0.100 [0.074]	-0.199*** [0.061]	0.124 [0.084]	0.298*** [0.083]	-0.232 [0.187]	-0.464*** [0.152]
<i>DEPOSITS</i>	0.354 [1.377]	-0.033 [0.939]	0.992 [0.899]	-0.892 [0.638]	0.923 [0.647]	-0.181 [0.698]	-1.217* [0.630]	1.366 [1.898]	-0.621 [1.166]
<i>EQUITYASS</i>	3.408 [2.183]	-1.201 [1.464]	4.643*** [1.267]	-3.015** [1.414]	-0.990 [1.251]	0.899 [1.198]	-2.323 [1.758]	0.163 [3.043]	-4.624*** [1.712]
<i>LOANS</i>	0.019 [0.716]	-1.428** [0.660]	0.720 [0.503]	0.117 [0.502]	-0.221 [0.465]	0.082 [0.577]	2.053*** [0.605]	-0.481 [0.879]	-1.427* [0.802]
<i>OFFBALANCE</i>	-0.548 [0.529]	-0.487 [0.370]	-0.130 [0.177]	0.048 [0.118]	-0.042 [0.089]	-0.120 [0.171]	0.095 [0.134]	0.278** [0.126]	0.000 [0.124]
<i>INTINC</i>	1.538** [0.706]	1.218** [0.583]	0.037 [0.420]	-0.355 [0.424]	0.500 [0.426]	-0.283 [0.351]	-0.964*** [0.374]	-0.705** [0.359]	-0.949** [0.386]
<i>ROE</i>	4.525* [2.631]	-2.778 [2.113]	3.071* [1.740]	-4.022** [1.738]	0.414 [1.364]	-3.198 [2.080]	4.138** [1.949]	0.878 [2.226]	-0.879 [2.079]
Pseudo R-squared	0.079	0.057	0.059	0.043	0.044	0.019	0.182	0.079	0.097

This table shows the descriptive statistics of the operational variables as well as their relation to the ownership classes. Panel A presents the descriptive statistics. Panel B presents the results of the logit model $OWN_X = \alpha + \beta*[BANK] + \beta*[YEAR] + \varepsilon$, where the ownership classes (*OWN_X*) are as defined in Table 6 and *BANK* is a vector including the operational variables as defined in Table 8. The descriptions of the ownership classes are included to facilitate interpretation. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

4 EMPIRICAL EVIDENCE

4.1. Descriptive statistics

4.1.1. Regulatory environment variables

The deposit insurance systems vary greatly across the European countries (see Panel A of Table 10). On average the deposit insurance limit per person (*DI*) is 29 600 euros, but ranges from 226 euros in Ukraine to unlimited coverage in Turkey. The 1994 EU Directive on Deposit Insurance (31994L0019) requires that the minimum deposit insurance is 20 000 euros. Hence this level is applied in 13 of the 37 countries. There is coinsurance (*COINS*) in one third of the countries. With respect to realised coverage, which give an indication of the implicit deposit insurance, the insured deposits were fully covered the last time a bank failed in three of four countries, whereas uninsured deposits were covered in one out of four countries (see *COVER* and *IMPLDI*). The deposit insurance system fund is funded ex-ante in three out of four countries, whereas the premium is risk-adjusted only in one of four countries (see *EXANTE* and *RISK*). In 16% of the countries the deposit insurance fund is managed by the private sector, in 32% it is managed by the public sector and in 46% it is jointly managed by private and public officials (see *PRIVATE*, *PUBLIC* and *JOINT*). In close to 40% of the countries the deposit insurance agency has the legal power to intervene in case of violations against laws and regulations, but actions have been taken only in half of these countries (see *POWER* and *ACTION*). Due to these variations, it is natural that the severity of the moral hazard problem induced by the deposit insurance system also varies across European countries. As previously noted, the Moral Hazard Index (*MHI*) presented in Demirguc-Kunt & Detragiache (2002), is only available for 15 Western European countries. Looking at these countries only, it appears as if the moral hazard problem is severest in Turkey, Finland and Switzerland and least severe in Greece, Ireland, Portugal and Sweden. When using the extended Moral Hazard Index (*MHI**), I can confirm that the same countries are in the right end of the spectrum. Among the new countries for which the *MHI** has been estimated, there are, however, countries with even higher respectively lower *MHI** values; Norway represents the first category and Russia, Croatia, Estonia and Poland represent the second category. Moreover, I can report that there is also variation in the legal protection of shareholders; *RIGHTS* is 30 in seven countries, 50 in seven countries, 70 in seven countries and 90 in fifteen countries. Ireland and UK are the only Common law countries in the study. Among the Civil law countries the German legal origin is dominating, followed by the French and Scandinavian legal origin countries. 41% of the countries in the sample are ex-Socialist countries. Finally, when categorising the countries with respect to level of integration to the European community measured as the EU status, 40% of the countries are old-EU countries, one third are new-EU countries and about one third are non-EU countries. Note the heterogeneity of the last group, which includes Switzerland, Norway and Iceland as well as Turkey, Russia and a number of ex-Soviet countries.

There appears to be some interrelations between the deposit insurance system features and the legal tradition of a country (see Panel B of Table 10). The deposit insurance limit per person (*DI*) is on average higher in the Scandinavian civil law countries than in other countries. Both Common law countries in the sample have coinsurance (*COINS*), whereas coinsurance is rare in French civil law countries. The coverage of the deposit insurance system is greatest in German civil law countries; the insured deposits

Table 10 Country specific values and descriptive statistics of the regulatory environment variables

	Full sample	Austria (AT)	Belarus (BY)	Belgium (BE)	Bulgaria (BG)	Croatia (HR)	Cyprus (CY)	Czech Republic (CZ)	Denmark (DK)	Estonia (EE)	Finland (FI)	France (FR)	Germany (DE)	Greece (GR)	Hungary (HU)	Iceland (IS)	Ireland (IE)	Italy (IT)	Latvia (LV)	Liechtenstein (LI)	Lithuania (LT)	Luxembourg (LU)	Macedonia (MK)	Malta (MT)	Netherlands (NL)	Norway (NO)	Poland (PL)
DI	29048	20000	759	20000	18983	13605	20000	23455	40236	12782	25000	70000	20000	20000	23831	20000	20000	103291	12909	19292	1481	20000	20000	20000	20000	24277	22500
DI_HIGH	0.385	0	0	0	0	0	0	1	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1
COINS	0.359	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	1	0	1	0	0	1	1
COVER	0.794	1	1	1	1	1	n.a.	1	0	1	n.a.	1	1	0	1	n.a.	0	1	0	1	0	1	0	0	0	0	1
IMPLDI	0.250	0	1	0	1	0	n.a.	0	0	0	0	0	1	0	0	n.a.	0	0	0	0	1	0	0	0	0	1	0
PREMIUM	0.795	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1
RISK	0.282	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRIVATE	0.154	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0
PUBLIC	0.308	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0
JOINT	0.487	0	0	1	1	0	1	1	1	1	0	0	0	1	1	1	0	0	1	0	0	0	0	1	0	1	1
POWER	0.359	0	0	1	0	1	0	1	1	0	0	1	0	0	1	1	0	1	0	1	0	0	0	0	1	0	0
ACTION	0.179	0	0	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
MHI	0.653	1.5	n.a.	2.0	n.a.	n.a.	n.a.	n.a.	2.5	n.a.	2.9	1.2	1.9	-2.5	n.a.	n.a.	-2.5	2.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.2	n.a.	n.a.
MHI*	-0.023	0.8	-0.5	0.3	2.1	-3.7	0.4	2.6	2.6	-3.1	2.7	1.4	0.4	-1.4	-1.3	0.8	-1.7	2.6	-0.1	0.8	-0.3	0.8	-1.4	-3.8	1.3	4.6	-3.1
DISYS	n.a.	4	2	6	2	3	2	1	3	2	5	6	2	2	6	1	3	5	3	4	2	4	2	2	3	5	1
RIGHTS	66	90	30	90	30	30	90	70	90	70	90	70	90	50	70	90	90	70	50	n.a.	50	90	30	90	90	90	50
RIGHTS_HIGH	0.410	1	0	1	0	0	1	0	1	0	1	0	1	0	0	1	1	0	0	1	0	1	0	1	1	1	0
COMMON	0.051	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
FRENCH	0.179	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0
GERMAN	0.231	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
SCAND	0.128	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SOCIALIST	0.410	0	1	0	1	1	0	1	0	1	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	1	0
OLDEU	0.410	1	0	1	0	0	0	0	1	0	1	1	1	1	0	0	1	1	0	0	0	1	0	0	1	0	0
NEWEU	0.333	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	1
NONEU	0.256	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	0
REG	n.a.	4	2	6	3	2	4	1	5	3	5	6	4	4	1	5	5	6	2	4	3	4	2	3	5	4	3

Panel A (cont'd)										Panel B Shareholder rights, legal origin and EU status sub-sample means											
	Portugal (PT)	Romania (RO)	Russia (RU)	Slovakia (SK)	Slovenia (SI)	Spain (ES)	Sweden (SE)	Switzerland (CH)	Turkey (TR)	Ukraine (UA)	United Kingdom (GB)	DI	RIGHTS_HIGH	COMMON	FRENCH	GERMAN	SCAND	SOCIALIST	OLDEU	NEWEU	NONEU
DI	25000	15000	2884	20000	21282	20000	27654	18669	No limit	226	47208		37552	3604	39042	20494	71133	14980	33226	18935	37579
DL_HIGH	1	0	0	0	1	0	1	0	0	0	1	DL_HIGH	0.313	0.500	0.286	0.286	0.800	0.333	0.467	0.417	0.200
COEINS	1	0	1	0	0	0	0	0	0	0	1	COEINS	0.313	1.000	0.143	0.286	0.200	0.467	0.267	0.583	0.200
COVER	1	1	1	1	n.a.	1	n.a.	1	1	0	1	COVER	0.667	0.500	0.714	1.000	0.786	0.786	0.769	0.700	0.889
IMPLDI	0	0	0	1	n.a.	0	0	1	1	0	1	IMPLDI	0.214	0.000	0.000	0.429	0.250	0.357	0.067	0.400	0.444
PREMIUM	1	1	1	1	0	1	1	1	1	0	0	PREMIUM	0.625	0.500	0.571	0.571	1.000	0.933	0.667	0.917	0.800
RISK	1	1	0	0	0	0	0	0	1	0	0	RISK	0.188	0.000	0.429	0.286	0.400	0.133	0.333	0.167	0.200
PRIVATE	0	0	0	0	0	0	0	0	1	0	0	PRIVATE	0.250	0.000	0.429	0.286	0.200	0.000	0.333	0.000	0.100
PUBLIC	0	0	1	0	1	0	1	0	1	1	0	PUBLIC	0.250	0.500	0.286	0.143	0.200	0.467	0.200	0.333	0.500
JOINT	1	1	0	1	0	1	0	1	0	0	0	JOINT	0.375	0.000	0.286	0.429	0.600	0.533	0.333	0.667	0.400
POWER	0	0	0	0	1	1	1	1	1	0	0	POWER	0.375	0.500	0.571	0.286	0.400	0.333	0.400	0.333	0.400
ACTION	0	0	0	0	1	1	0	1	1	0	0	ACTION	0.125	0.000	0.429	0.286	0.000	0.133	0.200	0.083	0.300
MHI	-2.5	n.a.	n.a.	n.a.	n.a.	-2.5	2.3	3.5	3.5	n.a.	0.7	MHI	1.120	-0.880	1.880	0.709	0.973	n.a.	0.549	n.a.	2.901
MHI*	-1.6	0.0	-5.7	0.4	1.3	-1.1	-2.1	3.7	3.5	-2.2	0.5	MHI*	0.764	-0.581	0.217	0.886	1.735	-0.993	0.967	-0.396	0.100
DISYS	5	5	2	2	3	4	3	4	6	3	1										
RIGHTS	70	30	30	50	50	70	90	90	50	30	90	RIGHTS	90	90	81	73	90	45	82	58	52
RIGHTS_HIGH	0	0	0	0	0	0	1	1	0	0	1	RIGHTS_HIGH	n.a.	1.000	0.571	0.571	1.000	0.000	0.667	0.167	0.400
COMMON	0	0	0	0	0	0	0	0	0	0	1	COMMON	0.125	n.a.	n.a.	n.a.	n.a.	n.a.	0.133	0.000	0.000
FRENCH	0	0	0	0	0	0	0	0	0	0	0	FRENCH	0.250	n.a.	n.a.	n.a.	n.a.	0.400	0.083	0.000	
GERMAN	1	0	0	0	0	0	0	1	1	0	0	GERMAN	0.313	n.a.	n.a.	n.a.	n.a.	0.267	0.083	0.300	
SCAND	0	0	0	0	0	0	1	0	0	0	0	SCAND	0.313	n.a.	n.a.	n.a.	n.a.	0.200	0.000	0.200	
SOCIALIST	0	1	1	1	1	0	0	0	0	1	0	SOCIALIST	0.000	n.a.	n.a.	n.a.	n.a.	0.000	0.893	0.500	
OLDEU	1	0	0	0	1	1	1	0	0	0	1	OLDEU	0.625	1.000	0.857	0.571	0.600	0.000	n.a.	n.a.	n.a.
NEWEU	0	1	0	1	1	0	0	0	0	0	0	NEWEU	0.125	0.000	0.143	0.000	0.000	0.667	n.a.	n.a.	n.a.
NONEU	0	0	1	0	0	0	0	1	1	1	0	NONEU	0.250	0.000	0.000	0.429	0.400	0.333	n.a.	n.a.	n.a.
REG	6	3	2	3	1	6	5	4	1	2	5										

This table presents the regulatory environment variables. The full sample means and the country specific values are presented in Panel A, whereas sub-sample means for countries with different shareholder rights, legal origin and EU status are presented in Panels B. The deposit insurance system variables are as defined in Table 1, MHI is the Moral Hazard Index as defined in Deming-Kunt & Detragiache (2002) and MHI* is the extended version of MHI discussed in section 3.3.1, the deposit insurance system classes (DISYS_X) are as defined in Table 2 and the regulatory classes (REG_X) are as defined in Table 3. Sub-sample means not within one standard deviation from the full sample mean is presented in bold.

were covered in full and uninsured deposits were covered in every second country the last time a bank failed (see *COVER* and *IMPLDI*). The deposit insurance system is funded ex-ante in all Scandinavian civil law and almost all ex-Socialist countries (see *EXANTE*). The risk of the bank is accounted for most frequently in French and Scandinavian civil law countries (see *RISK*). There is no clear relation between the management of the deposit insurance fund and legal origin of the country (see *PRIVATE*, *PUBLIC* and *JOINT*). The deposit insurance agency has most power and is most prone to act in French civil law countries (see *POWER* and *ACTION*). The two Moral Hazard Indices give diverging indications of the severity of the moral hazard problem in countries with different legal origin; the original index (*MHI*) indicate that the moral hazard problem is severest in French civil law countries, whereas it according to the extended index (*MHI**) is severest in the Scandinavian civil law countries. Considering the high correlation of the two variables, this divergence is somewhat surprising. It may, however, be that the lower *MHI** value for French civil law countries is due to the low *MHI** value of Malta, whereas the higher *MHI** value for Scandinavian civil law countries is due to the very high *MHI** value of Norway. Neither Malta nor Norway is included in the original Moral Hazard Index. The indices are aligned for the Common law countries, in which the moral hazard problem appears to be limited. The lowest *MHI** estimate given to the ex-Socialist countries, cannot be confirmed as the *MHI* is not available for any of these countries. With respect to the legal protection of shareholders, I can confirm the finding of previous studies that the shareholders rights are highest in the Common law and Scandinavian civil law countries and lowest in ex-Socialist countries (see *RIGHTS*). The main difference in the deposit insurance systems when comparing across old-EU, new-EU and non-EU countries is that the coverage of insured and in particularly uninsured deposits is substantially higher in non-EU countries (see *COVER* and *IMPLDI*) (see Panel B of Table 10). Moreover, ex-ante funding is less frequent, whereas risk-adjusted funding is more frequent in old-EU countries than in non-EU, and in particularly, new-EU countries. The management of the deposit insurance system is *PRIVATE* or *JOINT* in the old-EU countries, *JOINT* in the new-EU countries and *PUBLIC* in the non-EU countries.

4.1.2. Ownership variables

The mean *MGT* is only 11%, suggesting that management ownership is not very common in European banks (see Table 11). On the other hand, most of the banks have a concentrated ownership. As many as four out of five banks have an external blockholder owner (see *BLOCK_EXT*). As only one third of the banks are *LISTED*, the ownership is concentrated not only in the unlisted banks of the sample. When looking at the type of blockholder owner, I find that most of the blockholder owners are institutional blockholder owners (see *BL_INST*). Only a small minority of the banks have a government authority or a named private individual as a blockholder owner (see *BL_STATE* and *BL_INDIVID*). When examining the institutional blockholder owners further, I find that industrial company is the most common type, followed by banks and financial companies (see *BL_INDUSTRY*, *BL_BANK* and *BL_FINANCIAL*). One of five institutional blockholder owners is foreign (*BL_FOREIGN*). Finally, I note that 8% of the banks in the sample have state ownership, 9% has board ownership and 12% has named private individual ownership. 7% of the banks are categorised as having family ownership held by a member of the management team, a member of the board, a named private individual and/or a foundation (see *STATE*, *BOARD*, *PRIVATE* and *FAMILY*).

The ownership structure does not appear to differ dramatically across banks operating from home countries with different shareholder rights, legal origin or EU status; none of the values for the ownership variables are outside the one standard deviation range used as indication for dispersion in the variable (see Table 11). Note, however, that management ownership (*MGT*) is highest in countries with high shareholder rights and old-EU countries. The ownership is particularly dispersed in the Scandinavian civil law countries; only half of the banks have external blockholder ownership (*EXT_BLOCK*) and 70% of the banks are listed. This ownership is, however, not anonymous; as many as one out of four banks has a named private individual owner (*PRIVATE*). Not surprisingly, *STATE* ownership is highest in the ex-Socialist countries.

Table 11 Descriptive statistics of the ownership variables

	Full sample		<i>RIGHTS _HIGH</i>	<i>COMMON</i>	<i>FRENCH</i>	<i>GERMAN</i>	<i>SCAND</i>	<i>SOCIALIST</i>	<i>OLDEU</i>	<i>NEWEU</i>	<i>NONEU</i>
	Mean	Std.dev.									
<i>Management ownership</i>											
<i>MGT</i>	0.106	0.307	0.140	0.187	0.047	0.119	0.085	0.103	0.104	0.069	0.121
<i>Dispersed vs. concentrated ownership</i>											
<i>BLOCK_EXT</i>	0.807	0.395	0.767	0.800	0.820	0.847	0.500	0.863	0.796	0.851	0.814
<i>LISTED</i>	0.373	0.484	0.365	0.245	0.395	0.388	0.707	0.269	0.373	0.525	0.318
<i>Type of external blockholder owner</i>											
<i>BL_INST</i>	0.723	0.448	0.706	0.781	0.793	0.743	0.439	0.663	0.762	0.614	0.675
<i>BL_STATE</i>	0.044	0.206	0.018	0.000	0.012	0.037	0.061	0.137	0.016	0.149	0.068
<i>BL_INDIVID</i>	0.040	0.197	0.043	0.019	0.016	0.067	0.000	0.063	0.018	0.089	0.071
<i>Type of institutional blockholder owner</i>											
<i>BL_BANK</i>	0.190	0.392	0.156	0.271	0.305	0.119	0.049	0.149	0.221	0.158	0.132
<i>BL_FINANCIAL</i>	0.097	0.297	0.097	0.090	0.125	0.116	0.037	0.057	0.101	0.129	0.079
<i>BL_INSURANCE</i>	0.036	0.187	0.039	0.019	0.051	0.031	0.073	0.023	0.042	0.030	0.025
<i>BL_FUND</i>	0.063	0.244	0.077	0.097	0.016	0.052	0.171	0.074	0.062	0.050	0.071
<i>BL_INDUSTRY</i>	0.305	0.460	0.318	0.303	0.227	0.394	0.073	0.360	0.296	0.248	0.343
<i>BL_FOUND</i>	0.031	0.174	0.020	0.000	0.070	0.031	0.037	0.000	0.039	0.000	0.025
<i>BL_FOREIGN</i>	0.212	0.409	0.225	0.323	0.160	0.190	0.073	0.297	0.182	0.446	0.193
<i>Some selected ownership characteristics</i>											
<i>STATE</i>	0.079	0.270	0.049	0.058	0.023	0.064	0.085	0.206	0.039	0.208	0.121
<i>BOARD</i>	0.089	0.286	0.091	0.123	0.086	0.086	0.085	0.074	0.085	0.149	0.079
<i>PRIVATE</i>	0.116	0.320	0.150	0.116	0.063	0.147	0.232	0.080	0.088	0.119	0.175
<i>FAMILY</i>	0.068	0.252	0.099	0.103	0.027	0.125	0.024	0.011	0.052	0.020	0.121

This table presents the descriptive statistics of the ownership variables for the full sample of 995 bank-year observations as well as the sub-sample means for countries with different shareholder rights, legal origin and EU status as defined in section 3.3.1. The ownership variables are as defined in Table 5. The means not within one standard deviation from the full sample mean is presented in bold.

4.2. Regression results

I start the regression analysis by examining the interaction between *MHI** and the ownership classes and find that there is a connection (see Panel A of Table 12). Listed banks with no management ownership or external blockholder ownership (*OWN_7*) and banks with management owner and board, private individual or family (blockholder) owner (*OWN_9*) are more frequent in countries where the deposit insurance system induces severe moral hazard problems. On the other hand, banks with state ownership (*OWN_1*) and unlisted banks with foreign industrial company

blockholder ownership (*OWN_5*) are more frequent in countries with less severe moral hazard problems. The results for *OWN_1* and *OWN_5* are confirmed, when examining the results of the regressions with the deposit insurance system classes; there is a positive and significant connection between *OWN_1* and *DISYS_2*, in which the moral hazard problem is very limited, whereas there is a negative and significant connection between *OWN_5* and *DISYS_5*, in which the moral hazard problem is very severe (see Panel B). One of the ownership classes, i.e. listed banks with bank or financial company blockholder ownership (*OWN_3*), has a negative and significant connection to one of the deposit insurance system classes with severity of the moral hazard problems in the mid range (*DISYS_1*) and a positive and significant connection to the other deposit insurance system class with severity of the moral hazard problems in the mid range (*DISYS_6*). This finding indicates that it is not only the severity of the moral hazard problem, but specific deposit insurance system features that drive the result. The main difference between *DISYS_1* and *DISYS_6* is whether there is coinsurance or not and whether the premium is risk-adjusted, suggesting that either of these two features is of particular interest for banks in *OWN_3*. Finally, recall that Caprio *et al.* (2007) argue that the incentives and ability to exploit a generous deposit insurance system is highest in banks with concentrated ownership. Hence, I take a closer look at the deposit insurance class with particularly high deposit insurance per account; *DISYS_5*. Indeed there is a positive and significant connection between *DISYS_5* and the ownership classes with unlisted banks with bank blockholder owner (*OWN_4*). However, the connection is opposite to other ownership classes with blockholder owners. Moreover, the connection between *DISYS_5* and the ownership class of listed banks with no management or external blockholder owner (*OWN_7*) is positive and significant. Hence, it appears as if the level of deposit insurance does not explain the connection in some settings. Alternatively, the slight differences in level of shareholder protection may drive the results.

When examining the connection between the ownership classes and the legal rights variables, I do find that the results for listed banks with bank or financial company blockholder ownership (*OWN_3*) and listed banks with no management ownership or external blockholder ownership (*OWN_7*) are driven by differences in shareholder protection (see Panel A of Table 13).²⁰ The results suggest that these two ownership classes are more frequent in countries with strong shareholder protection. Moreover, banks with state ownership (*OWN_1*) are more frequent in countries with weak shareholder protection and in ex-Socialist countries (see Panel B). Bank or financial company blockholder ownership, whether it is in a listed or unlisted bank, appear to be more frequent in French civil law countries than in other countries (see *OWN_3* and *OWN_4*). Foreign industrial company ownership in unlisted banks appear to be frequent in Common law countries, whereas it is rare in Scandinavian civil law countries (see *OWN_5*). Finally, listed banks with no management or external blockholder owner are more frequent in Scandinavian civil law countries than in other countries, a finding which the previously presented descriptive statistics on the ownership variables already indicated. The main differences across countries with different EU status is again to be found in how common banks with state ownership (*OWN_1*) are; there is a negative and significant connection to *OLDEU* and a positive and significant connection to *NEWEU* and *NONEU* (see Panel C). Unlisted banks with either bank or foreign industrial company owner is the most common ownership

²⁰ Note, that the variable *RIGHTS* is not a continuous variable, but rather a categorical variable, which take the value 30, 50, 70 or 90. In the regression, countries with *RIGHTS* equal to 30 are set as the reference group. Hence, the coefficients of *RIGHTS_50*, *RIGHTS_70* and *RIGHTS_90* indicate how much more or less common a particular ownership class is in countries with *RIGHTS* equal to 50, 70 and 90, respectively, in comparison to countries with *RIGHTS* equal to 30.

Table 12 Interaction between deposit insurance system features and ownership structure

	OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9
Panel A Deposit insurance system indices									
Observations	995	995	995	995	995	995	995	995	995
<i>MHI</i>	-0.167* [0.088]	-0.056 [0.053]	0.043 [0.055]	0.047 [0.044]	-0.088** [0.037]	0.060 [0.064]	0.270*** [0.083]	-0.132 [0.123]	0.311** [0.131]
Panel B Deposit insurance system classes									
Observations in each regression	995	995	995	995	995	995	995	995	995
<i>DISYS_1</i> Jointly managed deposit insurance systems with high deposit insurance and coinsurance (Mid/High)	-1.270 [0.799]	1.231*** [0.356]	-1.290** [0.627]	-0.316 [0.340]	0.412 [0.290]	-0.408 [0.558]	-0.378 [0.386]	-0.294 [0.718]	-0.373 [0.870]
<i>DISYS_2</i> Ex-ante funded deposit insurance system, with low deposit insurance and partial coverage of uninsured deposits in case of bank failure (Very low/Very low)	1.429*** [0.443]	-0.441 [0.392]	-0.137 [0.382]	-0.344 [0.322]	0.039 [0.238]	0.058 [0.425]	0.158 [0.373]	0.393 [0.595]	-0.601 [0.736]
<i>DISYS_3</i> Publicly managed, ex-ante funded deposit insurance system with restricted coverage of insured deposits in case of bank failure (Low/Low)	0.117 [0.660]	-0.022 [0.443]	0.399 [0.381]	0.007 [0.342]	-0.126 [0.305]	-1.552** [0.776]	0.365 [0.420]	0.514 [0.749]	-0.715 [0.759]
<i>DISYS_4</i> Privately managed, ex-post funded deposit insurance system with full coverage of insured deposits in case of bank failure (High/Very High)	-2.601** [1.082]	-0.891* [0.493]	-0.063 [0.387]	-0.447 [0.350]	0.495* [0.264]	0.641* [0.366]	-0.140 [0.399]	0.370 [0.623]	1.056* [0.621]
<i>DISYS_5</i> High deposit insurance, no coinsurance, risk-adjusted premium and a deposit insurance agency with no power (Very high/Mid)	0.009 [0.652]	0.061 [0.472]	-0.432 [0.440]	0.668** [0.296]	-0.858** [0.345]	-0.436 [0.503]	0.937*** [0.344]	-0.461 [1.062]	0.390 [0.755]
<i>DISYS_6</i> Risk-adjusted funding and deposit insurance agency prone to take action (Mid/Mid)	-0.034 [0.514]	-0.218 [0.459]	0.896*** [0.332]	0.393 [0.291]	-0.252 [0.287]	0.517 [0.359]	-1.796*** [0.509]	-1.522** [0.753]	-0.726 [1.227]

This table presents the results of the logit model $OWN_X = \alpha + \beta * REGULATION + \beta' * BANK + \beta'' * YEAR + \epsilon$. In Panel A *REGULATION* is the extended Moral Hazard Index (*MHI**) as defined in section 3.3.1. In Panel B *REGULATION* is one of the deposit insurance classes *DISYS_X* as defined in Table 6. The ownership classes *OWN_X* are as defined in Table 5. The bank specific control variables included in the vector *BANK* are as defined in Table 8. Only the coefficients for the deposit insurance class included in each regression are shown in the table. The descriptions of the deposit insurance and ownership classes are included to facilitate interpretation (the parentheses include indications of the severity of moral hazard problem and level of shareholder property rights). ***, **, * denote the significance at 1%, 5% and 10%, respectively.

Table 13 Interaction between shareholder rights, legal origin and EU status and ownership structure

	<i>OWN_1</i>	<i>OWN_2</i>	<i>OWN_3</i>	<i>OWN_4</i>	<i>OWN_5</i>	<i>OWN_6</i>	<i>OWN_7</i>	<i>OWN_8</i>	<i>OWN_9</i>
	Banks with state ownership	Unlisted banks with foreign bank blockholder owner	Listed banks with bank or financial company blockholder owner	Unlisted banks with bank blockholder owner	Unlisted banks with foreign industrial company blockholder owner	Listed banks with industrial company blockholder owner	Listed banks with no management or external blockholder owner	Unlisted banks with management and board ownership and no external blockholder owner	Banks with management owner and board, private individual or family (blockholder) owner
Panel A Legal rights variable									
Observations	987	987	987	987	987	987	987	768	987
<i>RIGHTS_50</i>	-0.124 [0.584]	-0.078 [0.550]	1.513** [0.765]	-0.215 [0.483]	-0.788** [0.390]	1.063 [0.748]	1.153 [0.803]	-1.417 [1.202]	0.715 [1.342]
<i>RIGHTS_70</i>	-2.246** [0.887]	-0.912 [0.574]	1.473** [0.745]	1.168*** [0.410]	-0.587 [0.366]	0.718 [0.754]	1.184 [0.828]	n.a.	-0.145 [1.315]
<i>RIGHTS_90</i>	-2.344*** [0.740]	-0.457 [0.455]	0.732 [0.738]	-0.014 [0.399]	-0.005 [0.325]	0.646 [0.731]	1.992** [0.801]	-0.970 [0.772]	0.887 [1.068]
Panel B Legal origin variables									
Obs in each regression	995	995	995	995	995	995	995	995	995
<i>COMMON</i>	-1.886* [1.048]	1.198*** [0.349]	-1.970** [0.801]	-0.409 [0.339]	0.615** [0.285]	-0.527 [0.563]	-0.250 [0.356]	0.315 [0.571]	-0.483 [0.906]
<i>FRENCH</i>	-1.510* [0.899]	-0.539 [0.398]	0.898*** [0.296]	1.064*** [0.255]	-0.237 [0.250]	-0.512 [0.364]	-0.723** [0.352]	-1.704** [0.679]	-0.599 [0.674]
<i>GERMAN</i>	-0.045 [0.452]	-0.932** [0.392]	-0.137 [0.294]	-0.610** [0.300]	0.406* [0.230]	1.154*** [0.315]	-0.012 [0.311]	-0.327 [0.584]	0.847 [0.569]
<i>SCAND</i>	-0.012 [0.675]	-0.631 [0.562]	0.335 [0.470]	0.004 [0.470]	-1.846*** [0.500]	-0.930 [0.782]	2.250*** [0.466]	0.157 [1.103]	0.048 [0.791]
<i>SOCIALIST</i>	2.483*** [0.654]	0.764** [0.354]	-0.111 [0.458]	-0.432 [0.335]	-0.258 [0.271]	-0.762 [0.583]	-1.283** [0.536]	1.340* [0.743]	-0.536 [0.876]
Panel C EU status variables									
Obs in each regression	995	995	995	995	995	995	995	995	995
<i>OLDEU</i>	-2.526*** [0.592]	-0.185 [0.299]	-0.256 [0.299]	0.876*** [0.286]	0.506** [0.224]	0.076 [0.373]	-0.669* [0.393]	-0.972* [0.497]	-0.837 [0.599]
<i>NEWEU</i>	1.893*** [0.633]	0.713* [0.401]	1.253*** [0.428]	-0.551 [0.475]	-1.468*** [0.382]	-0.465 [0.595]	-0.145 [0.514]	0.228 [0.890]	0.120 [0.775]
<i>NONEU</i>	1.038** [0.468]	-0.191 [0.366]	-0.464 [0.346]	-0.729** [0.308]	0.041 [0.225]	0.083 [0.380]	0.768** [0.366]	0.810 [0.533]	0.759 [0.589]

This table presents the results of the logit model $OWN_X = \alpha + \beta * REGULATION + \beta' * BANK + \varepsilon$. In Panel A *REGULATION* is *RIGHTS*, whereas in Panel B *REGULATION* is either *COMMON*, *FRENCH*, *GERMAN*, *SCAND* or *SOCIALIST* as described in section 3.3.1. The ownership classes *OWN_X* are as defined in Table 6. The bank specific control variables included in the vector *BANK* are as defined in Table 8. Only the coefficients for the regulatory variables are shown in the table. n.a. indicates that the regulatory variable predicts failure perfectly and there are hence no results for the regression. The descriptions of the ownership classes are included to facilitate interpretation. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

structure in old-EU countries (see *OWN_4* and *OWN_5*). Apart from banks with state ownership, listed banks with bank or financial company blockholder owner (*OWN_3*) is the most common ownership structure in new-EU countries and listed banks with no management or external blockholder owner (*OWN_7*) is the most common ownership structures in non-EU countries.

Finally, I use the regulatory environment classes to account for the interaction between deposit insurance features and shareholder protection when assessing whether differences in the regulatory environment explain differences in the ownership structure of European banks. I find that there is a connection between the regulatory environment and ownership classes (see Table 14). There is a positive (negative) and significant connection between the regulatory classes where the shareholder protection is weak (strong) and the ownership class of banks with state ownership (*OWN_1*). There are also indications that listed banks with industrial company blockholder owner (*OWN_6*) are more common in countries with severer moral hazard problems. There are, however, also diverging results indicating that it is not only the level of shareholder protection which drives the results. For example, unlisted banks with foreign bank blockholder owner (*OWN_2*) have a negative and significant connection with *REG_4* and a positive and significant connection with *REG_5*, two regulatory environment classes with high or very high level of shareholder protection. The previous *MHI** regression results does not suggest that the connection between the level of moral hazard and *OWN_2* would be significant (see Panel A of Table 12). Therefore, it appears as if particular features of the deposit insurance system drive the results. Similarly, the diverging results for the unlisted banks with management and board ownership and no external blockholder owner (*OWN_8*) is not driven by differences neither in shareholder protection (see Panel A of Table 13) nor in severity of the moral hazard problem (see Panel A of Table 12). The diverging results for unlisted banks with foreign industrial blockholder owner (*OWN_5*) are, however, driven by differences in *MHI**.

To summarise the examination of the interaction between regulatory environment and ownership classes, I sort the deposit insurance system and regulatory environment classes with respect to the level of shareholder protection, which gives an indication of the level of financial system development (see Figure 1). In addition, I include an indicative illustration of the severity of the moral hazard problem based on mean the mean *MHI** of the deposit insurance system and regulatory environment classes. In countries with the least developed financial system both the legal protection of shareholders and depositors is weak. As the financial system develops, the legal protection of both shareholders and depositors improve, but the features of the (very basic) deposit insurance system result in severe moral hazard problems. In countries with the most developed financial system, the moral hazard problem has been curbed by applying a more sophisticated deposit insurance system; there is a refined balance between high explicit deposit insurance coverage, coinsurance, ex-ante vs. ex-post funding, private stakeholders have a substantial role in the funding and/or management of the deposit insurance system and the execution of the TBTF government guarantee is more selective in that there is a wider range of mechanisms to manage banks on the brink of failure.

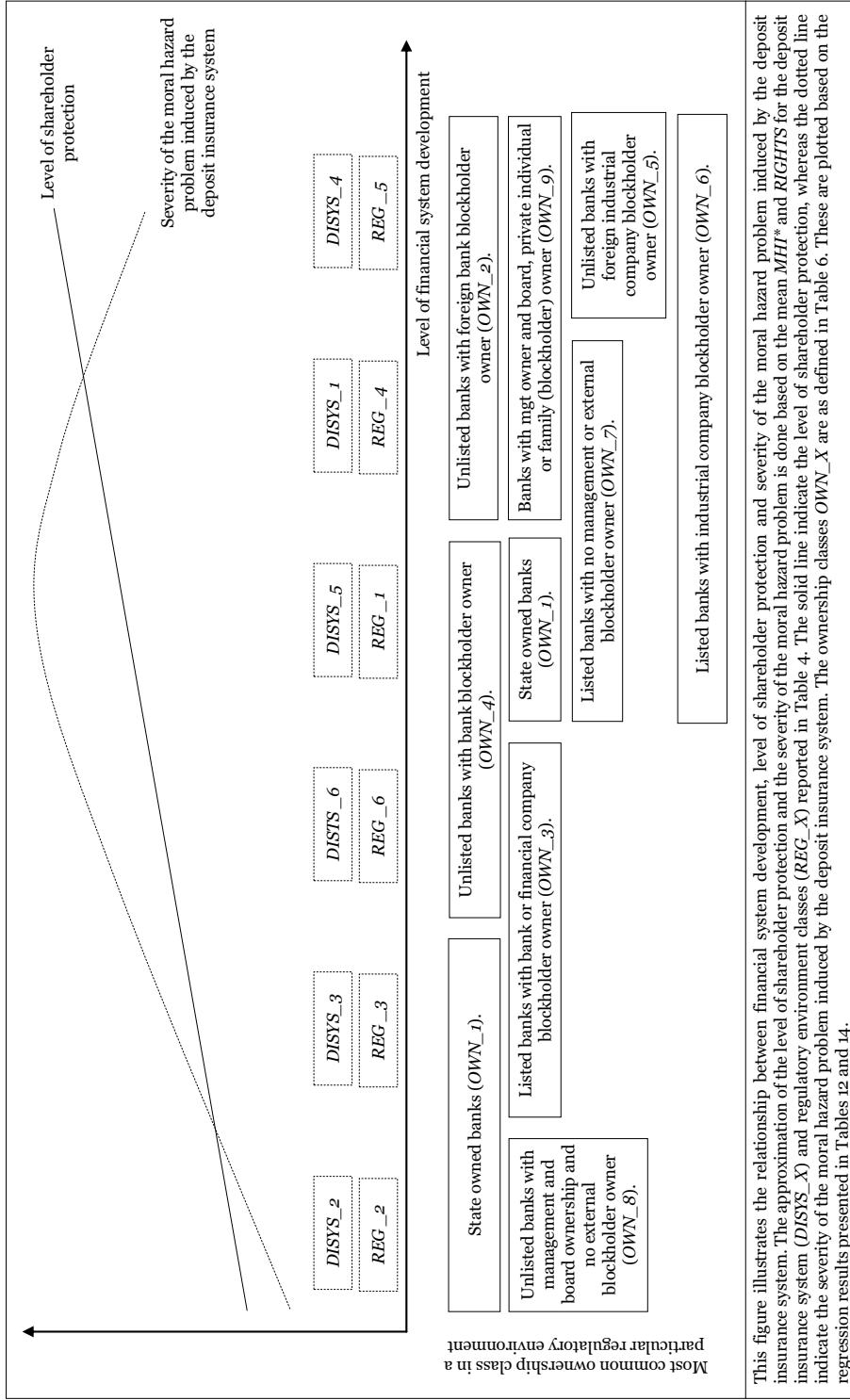
Even though some of the ownership classes appear to be connected to particular features in the deposit insurance system (or other factors not accounted for in this study), I find that the ownership classes fit rather well along the financial system development axes (see Figure 1). First, as expected, state ownership appears to be most common in countries with weak shareholder protection. Note, that the results with respect to the interaction of severity of the moral hazard problem do diverge as state ownership is common both in countries with limited moral hazard problems (*REG_2*) and in countries with severe moral hazard problems (*REG_1*). The first finding is inline with the one reported in Demirguc-Kunt & Detragiache (2002) that state ownership is more common in countries with explicit deposit insurance than in countries with only implicit deposit insurance, whereas the latter finding is more inline with the hypotheses

Table 14 Interaction between regulatory environment and ownership structure

	OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9
Observations in each regression	995	995	995	995	995	995	995	995	995
<i>REG_1</i>	Banks with state ownership	Unlisted banks with foreign bank blockholder owner	Listed banks with bank or financial company blockholder owner	Unlisted banks with bank blockholder owner	Unlisted banks with foreign industrial company blockholder owner	Listed banks with industrial company blockholder owner	Listed banks with no management or external blockholder owner	Unlisted banks with management and board ownership and no external blockholder owner	Banks with management owner and board, private individual or family (blockholder) owner
<i>REG_1</i>	Low legal rights countries with high deposit insurance and a deposit insurance agency prone to take action (Very high/Mid)	0.745 [0.492]	0.752 [0.482]	-1.459* [0.836]	-0.977** [0.419]	1.255*** [0.447]	-2.127** [1.018]	n.a.	0.575 [1.059]
<i>REG_2</i>	Ex-Socialist, low legal rights, non-EU countries with a public deposit insurance system with low deposit insurance and no coinsurance (Very low/Very low)	0.079 [0.501]	-2.058*** [0.752]	-0.179 [0.369]	0.479 [0.319]	-1.426 [1.067]	-1.454* [0.782]	1.989** [0.779]	n.a.
<i>REG_3</i>	Ex-Socialist, low legal rights new-EU countries with low deposit insurance and coinsurance (Low/Low)	0.841 [0.560]	1.587*** [0.539]	-0.522 [0.618]	-1.386** [0.553]	n.a.	-0.686 [0.776]	-0.782 [0.951]	0.763 [0.831]
<i>REG_4</i>	German civil law, high legal rights countries with low deposit insurance and full coverage of insured deposits in case of bank failure (High/High)	-0.484 [0.597]	-1.246*** [0.440]	-0.501 [0.333]	-0.529* [0.310]	0.635** [0.308]	1.182*** [0.324]	-0.038 [0.606]	0.737 [0.545]
<i>REG_5</i>	Scandinavian civil law or Common law, high legal rights, old-EU countries with restricted coverage of insured deposits in case of bank failure (Mid/Very high)	-1.467** [0.708]	0.846*** [0.317]	-0.509 [0.366]	-0.231 [0.274]	-0.791* [0.473]	0.034 [0.349]	0.180 [0.559]	-0.179 [0.588]
<i>REG_6</i>	French civil law, low legal rights, old-EU countries with risk-adjusted premium and deposit insurance agency prone to take action (Mid/Mid)	-1.663** [0.781]	-0.833* [0.458]	0.517* [0.287]	1.264*** [0.264]	-0.078 [0.354]	-0.591* [0.330]	-1.568** [0.701]	-1.109 [0.934]

This table present the results of the logit model $OWN_X = \alpha + \beta * REGULATION + \beta * BANK + \beta * YEAR + \epsilon$, where *REGULATION* one of the regulatory environment classes *REG_X* as defined in Table 3. The ownership classes *OWN_X* are as defined in Table 6. The bank specific control variables included in the vector *BANK* are as defined in Table 8. Only the coefficients for the regulatory variables are shown in the table. N.a. indicates that the regulatory variable predicts failure perfectly and there are hence no results for the regression. The descriptions of the regulatory environment and ownership classes are included to facilitate interpretation (the parentheses include indications of the severity of moral hazard problem and level of shareholder rights). ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Figure 1 Level of shareholder protection, moral hazard induced by the deposit insurance system and financial system development



presented in Demircuc-Kunt & Detragiache (2002) that explicit deposit insurance is not needed in a country with substantial state ownership as state ownership can be seen as an extreme form of government regulation. Second, the finding that unlisted banks with management and board ownership, and no external blockholder owner (*OWN_8*) are most common in ex-Socialist countries with low shareholder rights is unexpected; private individual shareholdings are expected to be low due to limited legal protection of shareholders. Falling back on Shleifer & Vishny (1997), this result suggest that in this particular setting, management and board ownership facilitates expropriation of resources, making the private individual ownership attractive even though the legal protection of shareholders is limited. Third, there is bank blockholder ownership in three different ownership classes, which are spread along the financial system development axes. The listed banks with bank and financial company blockholder ownership (*OWN_3*) appear to be more common in countries with less severe moral hazard problems and weak shareholder protection, unlisted banks with bank blockholder owner (*OWN_4*) appear to be most common in countries with shareholder protection in the mid range, whereas unlisted banks with foreign bank blockholder owner (*OWN_2*) is common in the most developed financial systems. These findings partially support the finding reported in Caprio *et al.* (2007) that financial company ownership is more common in countries with strong shareholder protection, but also indicate that the connection depends on a combination of ownership characteristics rather than only one ownership characteristic. Recall, moreover, the finding that the ownership classes with unlisted banks with bank blockholder owner had a positive and significant connection to the deposit insurance classes with the highest explicit deposit insurance coverage. This finding is inline with the argument presented by Caprio *et al.* (2007) that the ability and incentives to exploit a generous deposit insurance system is greatest in banks with concentrated ownership, making such an ownership structure more attractive. However, this result reverses for banks with other types of blockholder owners (see next point). Forth, industrial company blockholder ownership become common only as the financial system reaches a certain level of development. Listed banks with industrial company blockholder owner (*OWN_6*) are common already in countries with shareholder protection in the mid range, whereas unlisted banks with foreign industrial company blockholder owner (*OWN_5*) are common only in the most development countries. For the latter ownership class a reduction in the severity of the moral hazard problem appears to be crucial (the connection between *OWN_5* and *MHI** is negative and significant). Fifth, as Caprio *et al.* (2007) and Laeven & Levine (2008), I find that banks with truly dispersed ownerships, i.e. listed banks with no management or external blockholder owner (*OWN_7*), are common only in countries with high shareholder rights. Moreover, I find that there is a positive and significant connection between the severity of the moral hazard problem and the frequency of banks with this ownership structure. This finding indicates that the reduced incentives to monitor the banks, which may make a dispersed ownership structure unattractive, is outweighed by the positive impact of high shareholder rights on the corporate governance of banks. Finally, I find that banks with management ownership and board, private individual or family (blockholder) owner (*OWN_9*), appear to become more common as the severity of the moral hazard problems increases. I do, however, only find weak support for the finding reported in Laeven & Levine (2008) that board ownership is more common in countries with strong shareholder protection (the connection between *DISYS_4* and *OWN_9* is significant only at 10% confidence level and the connection between *RIGHTS* and *OWN_9* is insignificant).

4.3. Comparison of risk and profitability

Up to this point, the focus has been on the interaction between regulatory environment features and the ownership characteristics of European banks. The natural follow-up question is whether the most common ownership structure in a particular regulatory environment is optimal. The comparison of risk is natural, as it is the main focus of regulators due to their goal of avoiding bank runs and maintaining financial system stability. In addition, I examine profitability as it, in particularly in relation to the risk level, may give indications of shareholder or managerial objectives which are not necessarily inline with the ones of shareholders and, in particularly, the regulators. Hence, I compare the mean *Z-SCORE* and *ROE* of banks with the most common ownership class with the mean of other banks operating in a particular regulatory environment. The z-score gives the number of standard deviations that a bank's return on asset (*ROA*) has to drop before the bank is insolvent, i.e. the equity is depleted (see Equation (3) for the definition of the *Z-SCORE*, where *EQUITYASS* equals total equity to total assets). The average equity and asset figures are used rather than year end figures. Due to limited availability of historical data, the standard deviation in *ROA* ($\sigma(ROA)$) is estimated only over three years. I take the natural logarithm of the *Z-SCORE* as it is highly skewed. The number of bank-year observations drops to 603.

$$Z - SCORE = \frac{ROA + EQUITYASS}{\sigma(ROA)} \quad (3)$$

The general finding from the comparison across deposit insurance system classes is that the risk and profitability of banks with the most common ownership structure is no different from other banks in the same deposit insurance class (see Figure 2). The risk is significantly lower among listed banks with no management or external blockholder owner (*OWN_7*) when compared to other banks operating in countries with high deposit insurance, no coinsurance, risk-adjusted premium and a deposit insurance agency with no power (*DISYS_5*), i.e. in countries where the severity of moral hazard problem is very high. Moreover, I find that the most common ownership structure in countries with jointly managed deposit insurance system with high deposit insurance and coinsurance (*DISYS_1*) are less profitable than other banks, whereas the most common ownership structure in countries with risk-adjusted funding and deposit insurance agency prone to take action (*DISYS_6*) are more profitable than other banks.

The differences in risk and profitability are greater when the comparison is done across regulatory environment classes (see Figure 3). The regulatory aim of lower risk is achieved in three regulatory environment classes; ex-Socialist, low legal rights, non-EU countries with a public deposit insurance system with low deposit insurance and no coinsurance (*REG_2*), Scandinavian civil or Common law, high legal rights, old-EU countries with restricted coverage of insured deposits in case of bank failure (*REG_5*) and French civil law, low legal rights, old-EU countries with risk-adjusted premium and deposit insurance agency prone to take action (*REG_6*). In two of the classes the lower risk goes hand in hand with lower profitability. Note that these two classes, *REG_2* and *REG_5*, are positioned at the opposite ends of the financial system development axes with very low vs. very high legal protection of shareholders. In two of the regulatory environment classes, low legal rights countries with high deposit insurance and a deposit insurance agency prone to take action (*REG_1*) and German civil law, high legal rights countries with low deposit insurance and full coverage of insured deposits in case of bank failure (*REG_4*), banks in the most common ownership class have higher risk than other bank. In these two regulatory environment classes the severity of the moral hazard problem is rather high. Hence, this finding does give support to the finding

reported in Marcus & Shaked (1984), that a generous deposit insurance induce risk-taking. The two ownership classes differ with respect to ownership concentration, hence suggesting that severe moral hazard problems induce risk taking both in banks with and without a blockholder owner. Recall that Laeven & Levine (2008) find that a generous deposit insurance induce risk-taking in banks with blockholder owners, but not in widely held banks. Note also that the two classes are positioned in the middle of the financial system development axes. Hence, the avenues for increased risk taking can possibly be found in the changing role of banks, i.e. the banks are in a transition from traditional interest income based banking operations towards non-traditional commission and fee-based banking operations, which is more common in the most developed financial systems. Establishment in non-traditional banking operations most probably increases the bank risk instantaneously, whereas profit improvement may be slower as banks in transition have to gain a certain amount of know-how in the new activities before they can generate profits (Stiroh, 2004). In order to achieve the goal of improved financial system stability, regulators in these countries may be tempted to impose restrictions on bank activities. In the aftermath of the US savings and loans (S&L) crisis in the 1980s, Brewer & Mondschean (1994) examined the impact of junk bond investment on bank risk. They argue that prohibition of a particular asset class is only an attack on the symptom rather than the disease as banks will find other avenues to risk-shifting as long as the deposit insurance system is inducing them to do so.

Figure 2 Differences in profitability and risk across ownership classes in countries with similar deposit insurance systems

			OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9
	Severity of the moral hazard problem (MH*)	Level of shareholder rights (RIGHTS)	State ownership	Unlisted banks with foreign bank blockholder owner	Listed banks with bank or financial company blockholder owner	Unlisted banks with bank blockholder owner	Unlisted banks with foreign industrial company blockholder owner	Listed banks with industrial company blockholder owner	Listed banks with no management or external blockholder owner	Unlisted banks with management and board ownership and no external blockholder owner	Banks with management owner and board, private individual or family (blockholder) owner
DISYS_1	Mid	High		Lower profit***							
DISYS_2	Very low	Very low	No difference								
DISYS_3	Low	Low									
DISYS_4	High	Very high					No difference	No difference			No difference
DISYS_5	Very high	Mid				No difference			Lower risk*		
DISYS_6	Mid	Mid			Higher profit***						

This figure summarises the main results of Panel B of Table 12. The white squares indicate that there is a positive and significant connection between the particular deposit insurance system and ownership classes. In addition, the results of the unpaired *t*-tests of differences in mean risk (*Z-SCORE*) and profitability (*ROE*) between banks with the ownership structure in the particular white square and other banks in the particular deposit insurance system class, are indicated verbally. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Similarly, as previously noted, Laeven & Levine (2008) find that restrictions on bank activities increase rather than reduce risk-taking in banks, in particularly if the ownership is concentrated. Hence, other measures to reduce the risk-taking incentives should be taken. In revising the deposit insurance system, the regulatory authority has no easy task; while limiting aggressive risk-taking, it has to ensure that the probability of bank runs remains low, that potential damages of bank run or defaults are controlled and kept in acceptable proportions and that the burden of the losses are allocated across the society as well as finding a balance between the benefits and costs of detecting and resolving insolvent banks (Kane, 2000). Finally, measures to reduce the attractiveness of these particular ownership structures could be taken or to promote the use of other corporate governance mechanisms, which are not affected by the efficiency reduction of deposit insurance to the same extent.

Figure 3 Differences in profitability and risk across ownership classes in countries with similar regulatory environment

			OWN_1	OWN_2	OWN_3	OWN_4	OWN_5	OWN_6	OWN_7	OWN_8	OWN_9
	Severity of the moral hazard problem (MHI*)	Level of shareholder rights (RIGHTS)	State ownership	Unlisted banks with foreign bank blockholder owner	Listed banks with bank or financial company blockholder owner	Unlisted banks with bank blockholder owner	Unlisted banks with foreign industrial company blockholder owner	Listed banks with industrial company blockholder owner	Listed banks with no management or external blockholder owner	Unlisted banks with management and board ownership and no external blockholder owner	Banks with management owner and board, private individual or family (blockholder) owner
REG_1	Very high	Mid	No difference					Higher risk***			
REG_2	Very low	Very low	Lower profit* Lower risk*							No difference	
REG_3	Low	Low			No difference						
REG_4	High	High						Lower profit***	Higher risk*		
REG_5	Mid	Very high		Lower profit*** Lower risk*							
REG_6	Mid	Mid			No difference	Lower risk**					

This figure summarises the main results of Table 14. The white squares indicate that there is a positive and significant connection between the particular regulatory environment and ownership classes. In addition, the results of the unpaired *t*-tests of differences in mean risk (*Z-SCORE*) and profitability (*ROE*) between banks with the ownership structure in the particular white square and other banks in the particular regulatory environment class, are indicated verbally. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

5 CONCLUSION

Corporate governance of banks is different and complex in that the interests of the broad range of stakeholders diverge in particularly with respect to risk-taking and in that bank regulation reduces the efficiency of corporate governance mechanisms. One aspect of the complex net of mechanisms to be used in bank corporate governance is the interaction between the regulatory environment a bank operates in and its ownership structure. Caprio *et al.* (2007) and Laeven & Levine (2008) are the first to examine the joint impact of ownership characteristics and regulatory environment on bank valuation and risk. They find that the impact of regulatory measures, in particularly on bank risk, depends on the ownership structure of banks.

In order to be able to examine the joint impact of regulatory environment and ownership characteristics on bank valuation and risk further, a more refined picture of the interaction is of interest. This paper sets out to strengthen the basis for this work by exploring these interactions in more detail. To this end I use a detailed set of deposit insurance system features and address the interaction between deposit insurance system and shareholder protection features. Similarly, the data set on ownership characteristics is more detailed than previously applied.

I find that the variation in ownership structure can be explained by the regulatory environment of the home country of the bank, i.e. by the severity of the moral hazard problem induced by the deposit insurance system as well as the level of legal protection of shareholders. Many of the findings on the connection between ownership structure and level of shareholder protection confirm previously presented findings. The results with respect to the severity of the moral hazard problem and, in particularly, the different deposit insurance system features, give some new insights with respect to the interaction between the regulatory environment and ownership structure of banks. Specifically, the type of blockholder owner appears to have an impact on the connection to the severity of the moral hazard problem.

This paper has pointed to a number of interrelations between regulatory environment and ownership structure of banks. Whether the interactions can be explained by value maximising activity by the shareholders or management, extraction of private benefits by the management, refinement of ownership structure to address the efficiency reduction in some corporate governance mechanisms or regulatory restrictions remains an open question. Moreover, due to the multiple motivations and avenues for risk-shifting, this study only points to combinations of regulatory environment and ownership structure which may have a destabilising effect on the financial system, rather than giving any suggestions for remedies.

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Essay II

The impact of management and board ownership on profitability in banks with different strategy

Abstract

The characteristics of the agency problem are different in traditional, diversified and non-traditional banks. The deposit insurance reduces the incentives to monitor traditional and diversified banks, whereas non-traditional banks are more difficult to monitor due to greater opacity. Hence, the impact of ownership characteristics, which are used as corporate governance mechanisms, is expected to differ across banks with different strategy. In a sample of listed and unlisted banks from 37 different European countries, I do find that the impact of two particular ownership characteristics, management and board ownership, on profitability differ with the strategy of the bank. Management ownership has a positive impact on profitability in diversified and non-traditional banks, whereas board ownership has a positive impact on profitability in traditional banks. These findings support the expectation that management ownership is particularly important in banks which are difficult to monitor due to greater opacity and that board ownership is particularly important in banks where government guarantees reduce the monitoring incentives of outsiders. The profitability improvement is, however, achieved by increasing the risk of the operations.

Keywords: management ownership, board ownership, traditional vs. non-traditional banking operations, diversification, profitability

JEL classification: G2, G32, G34, L25

1 INTRODUCTION

A bank can be categorised as having one of three different strategies, i.e. as being a traditional, a non-traditional or a diversified bank. A traditional bank focuses on taking deposit and issuing loans, whereas the main source of income for a non-traditional bank is commissions and fees from e.g. securities trading, wealth management and underwriting. A diversified bank combines these two types of banking operations and hence has a balanced portfolio of traditional and non-traditional banking operations.

The severity and characteristics of the agency problem depend on the strategy of the bank. On one hand, the incentives and ability to monitor the operations vary with the strategy of the bank. The reduced incentives of monitoring due to the deposit insurance or too-big-to-fail (TBTF) government guarantee differ with the level of deposits and size of the bank (Merton, 1977, O'Hara & Shaw, 1990). However, banks are seen by many as more opaque than other companies making it difficult for outsiders to monitor the operations (Morgan, 2002). The level of opaqueness does, however, differ with the operational characteristics of the bank (Flannery *et al.*, 2004, Iannotta, 2006). On the other hand, whether agency costs arise due to a conflict of interest between management and shareholders with respect to risk, or due to the extraction of private benefits by the management, also expected to vary with the strategy of the bank.

Due to the differences in the severity and characteristics of the agency problems, I expect that the efficiency of two particular corporate governance mechanisms, management and board ownership, vary with the strategy of the bank. While Denis *et al.* (1997) study the impact of management and blockholder ownership on the performance of diversified industrial companies, the ownership and diversification literature has not previously been combined to study the issue in a banking context. Thus, the objective of this study is to determine whether the impact of management and board ownership on profitability is different in traditional, non-traditional and diversified European banks.

Previous studies on bank ownership have focused on the impact of type of bank (Altunbas *et al.*, 2001 Iannotta *et al.*, 2007), state ownership (La Porta *et al.*, 2002, Berger *et al.*, 2005, Micco *et al.*, 2007), foreign ownership (Berger *et al.*, 2005, Lensink *et al.*, 2008, Staikouras *et al.*, 2008) and blockholder ownership (Caprio *et al.*, 2007, Laeven & Levine, 2008) on bank performance. DeYoung *et al.* (2001) is the first study to examine the impact of the level of management and board ownership on bank efficiency. Whereas the study of DeYoung *et al.* (2001) is done on a sample of small US banks, this study uses a sample of both listed and unlisted European banks, hence assessing whether the findings of DeYoung *et al.* (2001) can be generalised to a broader banking setting.

Using a sample of banks from 37 different European countries, I find that the impact of management and board ownership on profitability varies with the strategy of the bank. More precisely, I find that management ownership has a positive impact on the profitability of diversified and non-traditional banks and that board ownership has a positive impact on the profitability of traditional banks. The connection between the ownership characteristics and risk-adjusted profitability is, however, insignificant, suggesting that greater profitability is achieved by increasing the risk of the operations.

2 DIFFERENT STRATEGIES IN BANKS

The traditional role of banks has been to channel funds by taking short-term deposits from a large number of investors and issue long-term loans to a more limited number of agents in need of capital hence creating liquidity in the financial system (Freixas & Rochet, 1997). Alongside the traditional banks, investment banks and mutual fund companies operate in securities trading, wealth management and underwriting, i.e. in non-traditional commissions and fee generating banking operations. Until the late 1990s US banks were prohibited by the Glass–Steagall Act to operate in other than traditional banking operations. The Gramm–Leach–Bliley Act has enabled Financial Holding Companies in the US to operate in a broader range of business areas since 1999. Traditional banks have utilised this opportunity by seeking new income streams within these commission- and fee-generating banking operations (Allen & Santomero, 2001, Shyu & Reichert, 2002). European banks have been able to operate in wealth management, securities trading or investment banking since 1989, when the Second Banking Coordination Directive came into force. Hence, diversified banks, active both in traditional and non-traditional banking operations, have a longer tradition in Europe than the US (Baele *et al.*, 2007).

Traditional, non-traditional and diversified banks tend to differ in terms of profitability and risk. When assessing the impact of increased focus on non-traditional banking operations it appears as potential profitability gains are outweighed by increased risk. Stiroh (2004b) find that increased reliance on non-traditional banking operations, in particular, trading operations, reduce the risk-adjusted profitability of banks. DeYoung & Roland (2001) and Stiroh (2006b) present empirical evidence that fee-based operations such as investment banking, securitisation income and trading are particularly volatile banking operations. DeYoung & Roland (2001) argue that the difference in risk is due to differences in the characteristics of the customer relationships; traditional banking operations are built on long-term customer relationships, which increase the information and switching costs, whereas non-traditional banking operations are likely to be based on less stable customer relations as informational costs are low and competition is fierce.

Moreover, diversified banks appear to be less profitable than focused banks, in particular in terms of risk-adjusted profitability. In a sample of small US community banks, Stiroh (2004a) finds that, when measured as risk-adjusted profitability, there is little benefits from diversification across unrelated banking activities, whereas there are some benefits from diversification across related banking activities. He concludes that diversification is beneficial only as long as the managerial skills and capacity are sufficient to manage an increasing mix of business activities. Similarly, Acharya *et al.* (2006) find that industrial and sector diversification of loan portfolios reduce the return of Italian banks while increasing the risk. They conclude that banks cannot benefit from diversification into industries where they lack experience or where the competition is fierce. Goddard *et al.* (2008) find that diversification has a negative impact on both the unadjusted and risk-adjusted profitability of small US credit unions. The connection between diversification and profitability is, however, insignificant in large US credit unions. Stiroh & Rumble (2006) contribute to the understanding of impact of bank strategy on profitability and risk by separating between the impact of diversification and increased focus on non-traditional banking operations. They find that there is a positive impact of diversification on the profitability of US financial holding companies (FHCs), but that the benefit is offset by the negative impact of increased risk of non-traditional banking operations. Using a similar methodology on a

sample of very small European banks, Mercieca *et al.* (2007) find that there is no benefit of diversification and that increased reliance on non-traditional banking operations has a negative impact on risk-adjusted profitability.

Finally, the choice of strategy has implications for the market value of a bank. Laeven & Levine (2007) find that diversified banks trade at a discount (the size of the diversification discount is smaller than the one documented by e.g. Lang & Stulz (1994) for industrial companies). This finding agrees with the notion that the increase in agency costs frequently outweighs the cost efficiency gains that can be realised through diversification (Santomero & Eckles, 2000). With respect to the impact of increased focus on non-traditional banking operations, the findings presented on US and European samples diverge. Stroh, 2006a find no connection between non interest income exposure and market returns among traded US BHCs, whereas increasing focus on non interest income appears to have a positive and significant impact on market return volatility. Baele *et al.* (2007), on the other hand, find that listed European banks that rely more on non-traditional banking operations have a greater franchise value. Moreover, they find a non-linear relation between reliance on non-traditional banking operations and total risk, a finding which support the notion that diversification reduces risk.

3 AGENCY COSTS IN BANKS

3.1. Characteristics of the agency problem

The role of the government guaranteed deposit insurance is to reduce the risk of bank runs and thus ensure the stability of the financial system (Diamond & Dybvig, 1986). The negative aspect of the deposit insurance is that the incentive for depositors to monitor banks is reduced as the deposit insurance covers potential losses to the depositors (Berlin *et al.*, 1991). Whether or not depositors have the incentives to monitor banks have the greatest impact on banks where deposits stand for a substantial part of the funding, hence reducing the importance of other debt holders and equity holders as monitors. This is presumably the situation in traditional banks.

The implicit guarantee that the government will bail-out banks which are seen as TBTF, will reduce the incentives to monitor them (O'Hara & Shaw, 1990). In effect, a large diversified bank has an insurance coverage for all its liabilities, not only the deposits covered by the explicit deposit insurance (Deng *et al.*, 2007), thus reducing the monitoring incentives of both depositors and other debt holders. Hence, I expect that the incentives to monitor due to the TBTF guarantee are lower in diversified banks than in focused banks.

The empirical evidence on whether banks would be more opaque than companies in other industries, thus making them more difficult to monitor, is inconclusive. The opaqueness do, however, appear to vary with the operational characteristics of the bank. Based on their findings on dispersion in analysts' forecasts and disagreement in bond ratings, Flannery *et al.* (2004) and Iannotta (2006) suggest that the greater complexity of large, frequently diversified, banks results in greater opaqueness and that a bank focusing on non interest income, i.e. non-traditional banking operations, is less opaque than other banks. Demsetz & Lehn (1985), on the other hand, argue that companies operating in an unstable business environment, thus plagued with high volatility in profits, are more difficult to monitor. Recall, that profit volatility increase with increased focus on non-traditional banking operations (DeYoung & Roland, 2001, Stiroh, 2006b), which following Demsetz & Lehn (1985) would indicate that these banking operations are more difficult to monitor. Moreover, non-traditional banking products are particularly complex. The nature of bank assets can be changed rapidly and the valuation, especially of off-balance sheet items, can fluctuate substantially, making it difficult for an outsider to assess a bank's risk. The increasing complexity and rapid development of new products and services have made it challenging even for regulatory and supervisory authorities to monitor non-traditional banking operations (Jones, 2000). Based on these arguments, I expect that non-traditional banks are more opaque and hence more challenging to monitor, than traditional and diversified banks.

Management may engage in risk-shifting if they can benefit from the potential success, without bearing the risk of loss (Gorton & Rosen, 1995). Incentives schemes that make managers focus on expected profits rather than risk, may result in a situation where risks beyond what shareholders, and in particular depositors and supervisors, would prefer are taken (Stiroh & Rumble, 2006). The deposit insurance increases the incentives for risk-shifting as it can be seen as a put option on the bank assets (Merton, 1977). There is no punishment on the management for engaging in risk-shifting activities, as the depositors do not have the incentive to price the increased risk of the deposits as it is not borne by them but rather by the government. It appears as if banks do exercise this option. Cebenoyan *et al.* (1999) examine the risk-taking of US savings

and loans (S&Ls) and find that in S&Ls with substantial management ownership, risk-taking appears to have been unprofitable in the mid-1980s when banks were relatively less regulated and profitable in the mid-1990s when bank regulation was stricter. Moreover, Marcus & Shaked (1984) show that the probability that a bank with great loan loss provisions take on high risk projects increases with the generosity of the deposit insurance system. The risk-shifting incentives depend on bank specific characteristics; Brewer & Mondschean (1994) show that they decrease with the capital asset ratio and increase with the level of risk. Cebenoyan *et al.* (2004) examine the risk-taking behaviour and performance persistence of US stock chartered thrifts. They find support for the existence of moral hazard as banks with low charter value appear to maximise the put option of deposit insurance and are hence persistently among the poorly performing banks. Banks with high charter value, on the other hand are persistently performing well, a finding which indicates that these banks avoid excessive risk-taking in order to protect the valuable charter (Cebenoyan *et al.*, 2004). Moreover, the increased transaction orientation of banks has opened up new opportunities for cross-subsidisation from relatively low-risk relationship banking activities to more risky trading activities, a challenge which is most common in diversified banks (Boot & Schmeits, 2000). Supporting the argument of existence of cross-subsidisation between high-risk and low-risk operations, Kahn & Winton (2004) show that an organisational structure separating high-risk and low-risk operations in two separated entities, dominates a unitary structure when risk-shifting incentives are high. Finally, the opacity of, in particular, non-traditional banking operations can also induce risk-shifting; for example too risky trading positions are not acknowledged in time due to inadequacies in internal monitoring mechanisms. Hence, the opaqueness of the operations enables management to capitalise on the option like incentive schemes. These arguments indicate that there are risk-shifting incentives in all banks regardless of their strategy; the deposit insurance system induce risk-taking in traditional banks, the cross-subsidisation challenge is greatest in diversified banks, whereas the opacity of non-traditional banks enable the concealment of excessive risk-taking.

Management may also be risk-averse, thus avoiding risky projects which would increase shareholder value. This is particularly likely when a substantial part of the management's personal wealth is concentrated in the bank (Sullivan & Spong, 2007). Risk-averse management may implement a diversification strategy in order to reduce the risk of the bank, which implicitly reduce the risk of the personal portfolio, or establish new business operations in order to secure their own position in the organisation, thus making sure that their undiversifiable human capital is utilised (Amihud & Lev, 1981). Hence, a diversification strategy may be implemented as a result of a risk-averse manager's actions, even though the decision is suboptimal for the bank.

Extraction of private benefits is more common in diversified than focused companies (Jensen, 1986). In addition to the reputational benefits of managing a large company, compensation size is frequently linked to company size, making growth through diversification an attractive strategy for managers (Jensen & Murphy, 1990, Milbourn *et al.*, 1999). Furthermore, as a result of managerial overconfidence the perceived private benefits are overstated resulting in implementation of diversification strategies and M&A transactions, which will not even benefit the management (Milbourn *et al.*, 1999). One obstacle in implementing a diversification strategy is that the managerial skills and capacity are not sufficient to manage the diverse parts of the operations. In a banking setting, the differences in cultures, risk structures and compensation schemes used in traditional and non-traditional banking operations make the managerial challenges even greater. Goddard *et al.* (2004) find empirical support for the notion that management is inclined to pursue growth strategies on the expense of profitability.

3.2. Expected impact of management and board ownership¹

Management ownership aligns the interests of the management and shareholders, thus reducing the agency costs (Jensen & Meckling, 1976). This appears to be true also in a banking setting. Glassman & Rhoades (1980) distinguish between management and owner controlled banks based on the level of ownership concentration and find that the profitability is lower in management controlled banks giving support for the hypothesis that management focus on non-profit maximising activities as long as an ownership stake does not alter their interests towards the ones of the shareholders. Houston & James (1995) find that the relation between the equity-based incentives and the company performance is stronger in banks than in industrial companies. Garcia-Cestona & Surroca (2008) find that Spanish savings banks, which are controlled by insiders, i.e. employees, depositors and founders, focus more on profit maximisation than banks controlled by Public Administrations, i.e. city halls, local and regional governments. Moreover, the insider controlled banks have a higher profitability than the government authority controlled banks. Adams & Santos (2005) argue that it is not only the cash-flow rights, but also the control rights, which work as incentives for management. They find that keeping own shares in trust, thus giving management the authority to use voting rights, but not giving them access to dividends, has a positive impact on bank performance. Using a sample of small US banks, DeYoung *et al.* (2001) find that a bank can improve its profitability by hiring an outside manager provided that his interests are aligned to the ones of the shareholders through management ownership.

When it comes to the expected impact of management ownership across banks with different strategy, I rely on the notion presented in Demsetz & Lehn (1985); management ownership is of particular importance in companies that are difficult for outsiders to monitor. Thus, I expect to observe a positive impact of management ownership on profitability, in particular in the more opaque non-traditional banks.

Stulz (1988) models the relation between management ownership and company value and finds an inverted U-shape relation. This relation is due to non-linearity in the relation between management ownership and risk-taking behaviour. Initially management ownership appears to increase risk-taking. However, the risk-taking may not improve profitability. Gorton & Rosen (1995) argue that with only low levels of ownership, bad managers will attempt to convince external shareholders that they are good managers, hence taking on riskier, but ultimately unprofitable, investments. Moreover, even the low level of management ownership is sufficient to give management protection from replacement. As the level of management ownership increases the risk-taking behaviour changes. With increasing ownership, a greater share of the managers' total wealth is presumably tied to the bank. With undiversified portfolio holdings, the manager is more prone to take on hedging and other risk-reduction strategies (Smith & Stulz, 1985). Hence, only in a situation where management ownership is substantial approaching full control, the risk-profiles are aligned. The empirical findings on the connection between management ownership and risk-taking behaviour are, however, inconclusive. Saunders *et al.* (1990) and Sullivan & Spong (2007) find that banks with management ownership have higher level of risk than banks without management ownership, whereas Chen *et al.* (1998) find a negative and significant connection. The diverging results of Saunders *et al.* (1990) and Chen *et al.* (1998) may be due to differences in the time periods examined, as the regulatory

¹ Note that the theoretical and empirical guidance with respect to the expected impact of the ownership characteristics in banks with different strategy is limited as this study is one of the first to combine the ownership and diversification literature in a banking setting.

environment is more stringent in the latter period hence giving management less room for excessive risk-taking. Brewer & Saidenberg (1996) and Cebenoyan *et al.* (1999) report empirical evidence on the non-linear connection between risk and insider control. Brewer & Saidenberg (1996) find that there is a U-shape relation, whereas Cebenoyan *et al.* (1999) find that S&Ls with management ownership have higher risk provided that the level of ownership is higher than 23-28%. Finally, Sullivan & Spong (2007) find that the level of bank risk reduces with the level of managerial wealth concentrated in the bank, giving support for the existence of risk-averse behaviour of management with substantial ownership. With respect to the non-linear connection between management ownership and profitability, Cebenoyan *et al.* (1999) find that in times of a lax regulatory regime there is a positive connection between management ownership and S&L profitability only if the level of ownership is below the threshold level of 24%. Similarly, DeYoung *et al.* (2001) report an inverted U-shaped relation between management ownership and profit efficiency in small US banks with hired management (the relation peaks at a 17%).

The guidance when it comes to differences in the expectations on finding the inverted U-shape relation in banks with different strategies is limited. We do know that the decision to implement a diversification strategy is seen as one example of risk-averse behaviour (Amihud & Lev, 1981). Furthermore, Denis *et al.* (1997) report a diversification discount among industrial companies when the management ownership is less than 10% or greater than 20%, which support the notion that management ownership is of value in diversified companies only in a limited range. Thus, I expect that the inverted U-shaped relation between management ownership and profitability is more pronounced in diversified banks than in traditional and non-traditional banks.

A monitor that is entitled to part of the success of the company has a greater incentive to be effective (Alchian & Demsetz, 1972). I expect this to hold in particular for the closest monitor, the board. Denis (2001) notes that companies restructuring the board often require that board members have ownership in the company. Another aspect of board ownership is that large shareholders, which also tend to be effective monitors, exercise their power through a board membership (Hermalin & Weisbach, 2003). Using a sample of takeovers in the UK, Cosh *et al.* (2006) find support for this notion; board ownership appear to have a positive impact on the operating performance of the company involved in a takeover. In a banking setting, DeYoung *et al.* (2001) report that greater (and more concentrated) board ownership is more common in banks with high profit efficiency. Moreover, Sullivan & Spong (2007) find that the distance to default in a bank is greater if a board member monitor has a substantial share of his wealth concentrated in the bank. Finally, I note that Adams & Ferreira (2007) argue that a management-friendly board, in contrast to an independent board without ownership in the bank, has a positive impact on performance. Thus, I expect that board ownership has a positive impact on the effectiveness of bank boards, and hence also on the profitability of banks.

Based on previous banking literature, I am not able to define clear expectations on whether board ownership would be more valuable in a bank with a particular strategy. It might be that greater incentives to monitor for the board is of greatest value in banks where deposit insurance and TBTF government guarantees reduce the monitoring incentives of depositors and other debt holders or in banks which are difficult for outsiders to monitor. I am, however, inclined to believe that greater monitoring incentives for board members has a greater impact where the monitoring incentives of other stakeholders is lower, rather than in banks which may be too difficult for board members to monitor, regardless of how great the incentives are.

3.3. Summary

The different characteristics of the agency problem and the expected impact of management and board ownership on the profitability of banks with different strategy are summarised in Table 1.

Table 1 Differences in characteristics of agency problem and expected impact of management and board ownership on profitability

	Traditional bank	Diversified bank	Non-traditional bank
<i>Characteristics of agency problem</i>			
Incentives to monitor	<ul style="list-style-type: none"> • Low due to deposit insurance. • (Low due to TBTF guarantee.) 	<ul style="list-style-type: none"> • Low due to TBTF guarantee. • (Low due to deposit insurance.) 	
Difficulty to monitor			<ul style="list-style-type: none"> • High due to high volatility in profitability. • High due to complexity in products.
Risk-shifting	<ul style="list-style-type: none"> • High due to deposit insurance. 	<ul style="list-style-type: none"> • High due to cross-subsidisation opportunities. 	<ul style="list-style-type: none"> • High due to low transparency.
Risk aversion		<ul style="list-style-type: none"> • May be reason to diversify. 	
Extraction of private benefits		<ul style="list-style-type: none"> • High due to complexity in business model. 	
<i>Expected impact of ownership characteristic on profitability</i>			
Management ownership		<ul style="list-style-type: none"> • Positive due to difficulty to monitor. 	<ul style="list-style-type: none"> • Positive due to difficulty to monitor.
Inverted U-shape of mgt ownership		<ul style="list-style-type: none"> • Most pronounced due to risk-aversion. 	
Board ownership	<ul style="list-style-type: none"> • Positive due to lower incentives for depositors to monitor. 	<ul style="list-style-type: none"> • Positive due to lower incentives for depositors to monitor. 	

4 METHODOLOGY

4.1. Data

I study listed and unlisted banks from 37 European countries. The sample includes Bank Holding Companies (BHCs), commercial and investment banks. Savings and cooperative banks are not included as ownership stakes are rarely held by the management or board in these banks. Financial and ownership data is retrieved from the BankScope International Bank Database, which is provided by Fitch/Bureau Van Dijk. I restrict the financial data to consolidated financial statements in order to bring the perspective as close to the ultimate owners as possible. The use of consolidated data also brings the analysis closer to the real economic situation faced by owners and managers; Stiroh & Rumble (2006) argue that one can presume that strategic decisions are made with the entire operation in mind. More importantly, this approach ensures that non-traditional banking operations, frequently held in subsidiaries are included in the financial data. Furthermore, the legal selection bias in operating as a subsidiary or branch network abroad is eliminated. The use of consolidated financial statements does, however, impose a risk of multiple counting of entries of the same organisation at different level of consolidation². Hence, I impose a cap on institutional ownership and exclude banks which are majority owned by another European bank assumed to be included in the database. Observations with a non interest income to total operating income ratio, which is one of the cornerstones of the strategy variables, is not within the 0 to 1 range and with extreme values in the main profitability variable, return on equity, are excluded from the sample (i.e. observations outside the 5% and 95% percentile are dropped). I start with 1534 bank-year observations for active BHCs, commercial and investment banks with matched consolidated financial statement and direct ownership data for a particular year. 466 observations are dropped due to the restriction on majority ownership of another European bank, reducing the sample to 1068 observations. Of these observations 167 are regarded as outliers, leaving me with a sample of 901 bank-year observations for 492 European banks. There are 64 BHCs, 374 commercial and 54 investment banks in the sample. One third of the banks are listed. More than three out of four banks are headquartered in a Western European country, but 58 Eastern European and 75 Russian or ex-Soviet state banks are also included in the sample. With few exceptions the bank-year observations are from the years 2003 to 2006 (3% are from 2000, 2001 and 2002).

4.2. Definition of variables

4.2.1. Profitability variables

When defining the profitability variables I rely on accounting data as both listed and unlisted banks are included in the sample. I include both return on equity, denoted as *ROE*, and return on assets, denoted as *ROA*, in the analysis. I regard *ROE* as the main profitability variable as it is the one of most interest to shareholders. Noting the importance of risk in the banking sector and recalling that increased returns are typically associated with increased risk, risk-adjusted profitability variables are also included in the study. To this end *ROE* and *ROA* are divided by the three year standard

² This issue has been raised by e.g. Bonin *et al.* (2005) and Micco *et al.* (2007).

deviation in the respective profitability variable. These variables are denoted *ROE_RA* and *ROA_RA*. The definitions of the profitability variables are summarised in Table 2.

4.2.2. Ownership variables

Two particular corporate governance mechanisms are examined in this study, i.e. management and board ownership. By separating management and board ownership, I address the criticism presented in Demsetz & Villalonga (2001) that many studies on the impact of management ownership has included board ownership in the management or insider ownership variable even though the interests of the management and board are different.

Both dummy variables for the existence of a particular type of owner as well as continuous variables for the level of ownership are included in the model specification³. Management ownership, denoted *MGT*, is a dummy variable taking the value one if at least one of the eight owners or ownership groups included in the BankScope database is a member of the management team or labelled as “management” and zero otherwise. Similarly, *BOARD* is a dummy variable taking the value one if at least one of the named private individual owners is a member of the board of directors and zero otherwise. The continuous variables are the level of management ownership, *MGT%*, and the level of board ownership, *BOARD%*, respectively. Recalling that the impact of management ownership is expected to be nonlinear, I also a squared *MGT%*. This variable is denoted *MGT%²*. The definitions of the ownership variables are summarised in Table 2.

4.2.3. Strategy variables

Following the approach taken in previous diversification studies, I base the definition of strategy variables on two ratios; non interest income to total operating income and other earning assets than loans to total earnings assets. The latter ratio includes off balance sheet items. As there are some concerns with both ratios⁴, I choose to combine the two (Laeven & Levine (2007) use a similar method in robustness tests). This procedure also reduces the noise of using only one bank-year observation of the ratio instead of averaging the ratio over several years. Hence, I calculate the average of the non interest income to total operating income ratio and other earning assets than loans to total assets ratio taking into account off-balance sheet items for each bank-year observation and use the average to categorise the bank-year observations as being from a traditional, diversified or non-traditional bank. I base the selection of the cut-off points on Laeven & Levine (2007), where highly diversified banks are defined as banks with a non interest income to total operating income ratio or other earning assets to total earnings assets in the range of 1/3 and 2/3⁵. Thus the dummy variable for traditional banks, *TRAD*, takes the value one if the average ratio is less than 1/3 and

³ The categorisation of the owners has required some manual work. In the BankScope database an owner can e.g. be categorised as “Management and employees”. The number of owners in this category is, however, negligible. Hence, I have cross-checked the names of the owners categorised as “Individuals and families” with information on the individuals on the management team and board of directors found on the company home pages and annual reports. As a result owners in these two categories have been recoded as “Management”, “Board”, “Employees” and “Private”.

⁴ First, net rather than gross interest income is available. Second, assets categorised as being traditional, such as loan, generate fee income, whereas securities categorised as being non-traditional generate interest income. Furthermore, traditional banking operations such as ATM and safety deposit box operations generate fees (Stiroh, 2004a, Laeven & Levine, 2007, Baele *et al.*, 2007).

⁵ I select these cut-off points rather than the 10% and 90% cut-off points used in the main analysis in Laeven & Levine (2007) in order to create three sub-samples of comparable size.

zero otherwise, the dummy variable for diversified banks, *DIV*, takes the value one if the average ratio is within the range of $1/3$ and $2/3$ and zero otherwise, and the dummy variable for non-traditional banks, *NONTRAD*, takes the value one if the average ratio is higher than $2/3$ and zero otherwise. Note that the bank-year observation is dropped if the non interest income to total operating income ratio and the other earning assets to total assets ratio give very controversial results, i.e. when one ratio indicates that the bank is traditional, whereas the other indicate that it is non-traditional, and visa verse. The definitions of the strategy variables are summarised in Table 2.

4.2.4. Control variables

A number of banks specific control variables are included in the model specification to ensure that the strategy variables stand for differences in monitoring incentives and ability as well as risk-shifting incentives rather than differences in operational characteristics. First, I account for differences in bank size. Large banks appear to be more efficient than small banks, whereas the findings on existence of economies of scale in a banking context are inconclusive (Berger & Humphrey, 1997). The more complicated management structure, with an increasing number of managerial layers, may reduce the efficiency of large banks (Williamson, 1967). Size do, however, appear to affect funding costs. Larger banks may have lower cost of funding due to better risk diversification opportunities (McAllister & McManus, 1993). Moreover, Hughes & Mester (1993) show that large banks pay a lower price on uninsured deposits due to the TBTF government guarantee. Bank size is measured as the natural logarithm of total assets and is denoted as *SIZE*. Second, I account for differences in funding. Banks with a high level of deposits to total funding have access to low cost funding that can be seen as subsidised funding due to the governmentally regulated deposit insurance. Furthermore, a well capitalised bank is associated with less risk as the probability for financial distress and bankruptcy is smaller, hence reducing the funding costs (Berger, 1995). The risk-shifting incentives induced by deposit insurance decreases with the level of capitalisation (Brewer & Mondschean, 1994), and hence the equity to asset ratio has been used as a proxy for management risk preferences (Hughes & Mester, 1998). Hence, the total deposits to total funding ratio, denoted *DEPOSITS*, and the total equity to total asset ratio, denoted as *EQUITYASS*, are included in the model specification.⁶ The definitions of the bank specific control variables are summarised in Table 2.

Institutional and environmental factors such as the regulatory environment, the level of economic and technological development, and the structure of the financial system, e.g. whether it is bank-based or market-based, the level of competition from other financial intermediaries as well as from capital markets, the level of consolidation, the level of product and service innovation in the financial markets have great impact on the ability of the bank to generate profits. These differences are accounted for by including country dummy variables (*COUNTRY*) in the model specification, with the modification that countries are grouped with a neighbouring country if there are less than 10 bank-year observations from the particular country. In addition, year dummy variables (*YEAR*) are included in the model specification to capture time-varying factors in the data.

⁶ These bank specific control variables have been used in previous diversification studies (see e.g. Stiroh & Rumble, 2006, Laeven & Levine, 2007, Baele *et al.*, 2007). In addition, the standard deviation in income or profitability over a number of years has been included as a measure of risk. Unfortunately, the availability of time series data is limited and such a variable would hence reduce the sample size significantly. For the same reason, lagged profitability is not included in the main model specification to account for performance persistence nor is indicators of growth.

4.2.5. Summary of variables

Table 2 Definition of the variables and their expected impact on profitability regardless of bank strategy

<i>Profitability variables</i>		
<i>ROE</i>	Return on average equity	
<i>ROA</i>	Return on average assets	
<i>ROE_RA</i>	<i>ROE</i> of the current year divided by the standard deviation in the past three years' <i>ROE</i>	
<i>ROA_RA</i>	<i>ROA</i> of the current year divided by the standard deviation in the past three years' <i>ROA</i>	
<i>Ownership variables</i>		
<i>MGT</i>	Dummy variable taking the value 1 if the bank has management ownership and 0 otherwise	+
<i>MGT%</i>	The level of direct management ownership in percentage	+
<i>MGT%²</i>	The square of <i>MGT%</i>	-
<i>BOARD</i>	Dummy variable taking the value 1 if the bank has board ownership and 0 otherwise	+
<i>BOARD%</i>	The level of direct board ownership in percentage	+
<i>Strategy variables</i>		
<i>TRAD</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total earnings assets taking into account off balance sheet items is below 1/3 and 0 otherwise	+ / -
<i>DIV</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total earnings assets taking into account off balance sheet items is within the range of 1/3 and 2/3 and 0 otherwise	-
<i>NONTRAD</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total earnings assets taking into account off balance sheet items is above 2/3 and 0 otherwise	+
<i>Bank specific control variables</i>		
<i>SIZE</i>	Natural logarithm of total assets	+
<i>DEPOSITS</i>	Total deposits to total funding	+
<i>EQUITYASS</i>	Total equity to total assets	+ / -

4.3. Model specification

In the baseline model specification, I examine the impact of either management or board ownership on the profitability of a bank i in a particular point in time t (see Equation (1)). The profitability variable $PROF$ is either ROE , ROA , ROE_RA or ROA_RA , whereas the ownership variable OWN is either MGT , $MGT\%$, $BOARD$ or $BOARD\%$. The vector $BANK$ includes the bank-specific control variables $SIZE$, $DEPOSITS$ and $EQUITYASS$, the vector $COUNTRY$ includes the country dummy variables and the vector $YEAR$ includes the year dummy variables.

$$PROF_{i,t} = \alpha + \beta_1 * OWN_{i,t} + \beta * [BANK_{i,t}] + \beta * [COUNTRY_{i,t}] + \beta * [YEAR_{i,t}] + \varepsilon_{i,t} \quad (1)$$

In order to be able to study the impact of an ownership characteristic on the profitability of a bank with a particular strategy, I include interaction terms in the

⁷ Management and board ownership is analysed separately to keep the presentation of the results simpler. The results do, however, remain intact when the ownership variables are included in the model specification simultaneously.

model specification (see Equation (2)). The interaction terms with the strategy variables *DIV* and *NONTRAD*, pick up the additional impact of the particular ownership type in diversified and non-traditional banks when comparing to the impact in the reference group of traditional banks.

$$\begin{aligned}
 PROF_{i,t} = & \alpha + \beta_1 * OWN_{i,t} + \beta_2 * OWN_{i,t} * DIV_{i,t} + \beta_3 * OWN_{i,t} * NONTRAD_{i,t} \\
 & + \beta_4 * DIV_{i,t} + \beta_5 * NONTRAD_{i,t} + \beta * [BANK_{i,t}] \\
 & + \beta * [COUNTRY_{i,t}] + \beta * [YEAR_{i,t}] + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

I use the model specification presented in Equation (3) to examine the nonlinearity of the relation between management ownership and profitability in the full sample of bank-year observations. Interaction terms cannot be used due to high multicollinearity in the model specification (VIF well above 20). Instead a modified version of Equation (3), where the strategy variables, *DIV* and *NONTRAD*, are excluded, is run for subsamples of banks with different strategy.

$$\begin{aligned}
 PROF_{i,t} = & \alpha + \beta_1 * MGT\%_{i,t} + \beta_2 * MGT\%^2_{i,t} + \beta_3 * DIV_{i,t} + \beta_4 * NONTRAD_{i,t} \\
 & + \beta * [BANK_{i,t}] + \beta * [COUNTRY_{i,t}] + \beta * [YEAR_{i,t}] + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

The main concern with the model specifications is potential endogeneity and sample selection bias. On the other hand, the level of profitability may trigger the selection of a particular ownership characteristic. For example, management or board members could be rewarded with shareholdings after a successful year. On the other hand, it is also possible that a poorly performing bank in need of drastic changes chooses to motivate the management with ownership shareholdings. Moreover, the strategy variables are not necessary exogenous; previous years' profitability, the size of the bank and owner preferences may have an impact on the strategic choices. These challenges are addressed in the robustness tests presented in section 5.3, as is the sensitivity of the results to the definition of some of the variables, in particularly the strategy variables. It is rather difficult to address these issues in particularly due to the limited access to time series ownership data, which would enable a change analysis. Therefore, I consider the simpler model specifications presented in this section more appropriate for the purpose of assessing whether the impact of management and board ownership varies across banks with different strategy.

5 EMPIRICAL EVIDENCE

5.1. Descriptive statistics

When categorising the banks according to the strategy variables defined in section 4.2.3, I find that the sub-sample of traditional banks (*TRAD*) include 200 bank-year observations, the sub-sample of diversified banks (*DIV*) include the majority of the bank-year observations, i.e. 485 bank-year observations, and the sub-sample non-traditional banks (*NONTRAD*) include 216 bank-observations (see Columns IX, XI and XIII in Table 3). Allied Irish Banks plc, Banco Popular Espanol SA, Danske Bank A/S, and Russian Agricultural Bank Group are examples of traditional banks, Barclays Plc, BNP Paribas, Commerzbank AG, Gazprombank Group, HBOS Pl, ING Groep NV, Kaupthing Bank hf, Nordea Bank AB and Zurich Bank are examples of diversified banks, and finally D. Carnegie & Co AB, Credit Suisse Group, Daiwa Securities Trust and Banking (Europe) plc, Deutsche Bank AG⁸, and Julius Baer Holding Ltd are examples of non-traditional banks. There are some movement from one category to another over time, e.g. UBS AG is categorised as a diversified bank in 2003 and 2004, but as a non-traditional bank in 2005. The three different bank types are found in all categories, but commercial banks are overrepresented among traditional and diversified banks and BHCs and investment banks are overrepresented among non-traditional banks. About one third of the traditional and diversified banks are listed, whereas the share of listed banks is somewhat lower among the non-traditional banks. The great majority of banks in each category are headquartered in a Western European country. Among traditional and diversified banks about one third of the banks are headquartered in an Eastern European, Russia or other ex-Soviet state country, whereas only 4% of the non-traditional banks are headquartered in the latter geographical areas.

Traditional and diversified banks are about the same *SIZE*, whereas non-traditional banks are significantly smaller (see “Bank specific control variables” in Table 3). Moreover, diversified banks have significantly higher *DEPOSITS* than the traditional banks. These two findings indicate that the banks in the sample do not fully meet the set expectations, i.e. that diversified banks would be larger than focused banks and that traditional banks would rely most on *DEPOSITS* as a source of funding. Hence, the expectations on the characteristics of agency problem as presented in Table 1 are refined; the TBTF guarantee is expected to have an impact on the monitoring incentives not only in diversified banks, but also in traditional banks, and the incentives to monitor due to the deposit insurance are reduced, not only in traditional banks, but even more so in diversified banks. *EQUITYASS* is the highest in non-traditional banks, most probably due to higher needed (or required) buffers to offset the risk of high volatility in income and profit streams.

⁸ Deutsche Bank AG is very close to the cut-off point between diversified and non-traditional banks having an average ratio of the non interest income to total operating income ratio and other earning assets than loans to total assets ratio taking into account off-balance sheet items of 72%.

Table 3 Descriptive statistics for the full sample and sub-samples of banks with different strategy

Sample	Full sample										TRAD		DIV		NONTRAD		TRAD-DIV		TRAD-NONTRAD	
	I	II	III	IV	V	VI	Median	3 rd quartile	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	Diff.	Diff.	
	Obs	Mean	Std.	Min	1 st quartile	Median	3 rd quartile	Max	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Diff.	Diff.	
Type of bank																				
<i>BHC</i>	901	0.131	0.338						200	0.120	485	0.095	216	0.222						
<i>COMMERCIAL</i>	901	0.752	0.432						200	0.840	485	0.829	216	0.500						
<i>INVESTMENT</i>	901	0.117	0.321						200	0.040	485	0.076	216	0.278						
Listed vs. unlisted																				
<i>LISTED</i>	901	0.349	0.477						200	0.375	485	0.363	216	0.292						
<i>UNLISTED</i>	901	0.627	0.484						200	0.615	485	0.602	216	0.694						
<i>DELISTED</i>	901	0.019	0.136						200	0.010	485	0.025	216	0.014						
Location of headquarter																				
<i>WESTERN</i>	901	0.737	0.441						200	0.710	485	0.647	216	0.963						
<i>EASTERN</i>	901	0.129	0.335						200	0.105	485	0.184	216	0.028						
<i>EX-SOVIET</i>	901	0.134	0.341						200	0.185	485	0.169	216	0.009						
Bank specific control variables																				
<i>SIZE</i>	901	7.992	2.206	2.832	6.438	7.754	9.237	14.084	200	8.147	485	8.120	216	7.562	0.027	0.585***	0.558***			
<i>DEPOSITS</i>	901	0.665	0.217	0.000	0.550	0.732	0.832	0.990	200	0.652	485	0.692	216	0.618	-0.040**	0.034***	0.074			
<i>EQUITYASS</i>	901	0.135	0.133	-0.019	0.065	0.096	0.154	0.959	200	0.107	485	0.120	216	0.194	-0.013	-0.087***	-0.074***			
Profitability variables																				
<i>ROE</i>	901	0.124	0.071	-0.016	0.067	0.118	0.172	0.314	200	0.124	485	0.128	216	0.115	-0.004	0.009**	0.013			
<i>ROA</i>	901	0.015	0.017	-0.004	0.006	0.011	0.019	0.186	200	0.013	485	0.014	216	0.020	-0.001	-0.007***	-0.006***			
<i>ROE_RA</i>	339	4.437	3.818	-0.430	1.880	3.341	5.899	19.988	55	5.305	197	4.465	87	3.827	0.841	1.478	0.637**			
<i>ROA_RA</i>	336	4.358	3.701	-0.480	1.912	3.263	5.902	17.385	59	5.607	191	4.271	86	3.694	1.336**	1.913	0.577***			
Ownership variables																				
<i>MGT</i>	901	0.122	0.328	0.000	0.000	0.000	0.000	1.000	200	0.095	485	0.101	216	0.194	-0.006	-0.099***	-0.093***			
<i>MGT%</i>	822	0.030	0.132	0.000	0.000	0.000	0.000	1.000	180	0.009	448	0.031	194	0.047	-0.022**	-0.038	-0.015***			
<i>MGT%²</i>	822	0.018	0.107	0.000	0.000	0.000	0.000	1.000	180	0.004	448	0.021	194	0.024	-0.017*	-0.020	-0.003**			
<i>BOARD</i>	901	0.098	0.297	0.000	0.000	0.000	0.000	1.000	200	0.110	485	0.095	216	0.093	0.015	0.017	0.002			
<i>BOARD%</i>	828	0.018	0.103	0.000	0.000	0.000	0.000	0.998	183	0.019	450	0.020	195	0.012	-0.001	0.007	0.009			

This table shows the summary statistics for the full sample and the sub-samples of traditional (*TRAD*), diversified (*DIV*) and non-traditional (*NONTRAD*) banks. Some background information on whether the bank is *LISTED* or *UNLISTED*, whether it is a *BHC*, *COMMERCIAL* or *INVESTMENT* bank and whether it is headquartered in a *WESTERN* European, *EASTERN* European or *EX-SOVIET* state, including Russia, is presented in the top of the table. The bank specific control variables *SIZE*, *DEPOSITS* and *EQUITYASS*, the profitability variables *ROE*, *ROA*, *ROE_RA* and *ROA_RA* and the ownership variables *MGT*, *MGT%*, *BOARD* and *BOARD%* are as defined in Table 2. The results of the unpaired *t*-tests for the difference in means of the sub-samples are included at the end of the table. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

The average profitability is 12% when measured by *ROE* and 1.5% when measured by *ROA* (see “Profitability variables” in Table 3). The distribution of *ROE* is close to normal, whereas the distribution of *ROA* is skewed to the left. Hence, I use the natural logarithm of *ROA* in the regression analysis (the results are not sensitive to the log transformation). The risk-adjusted profitability variables, *ROE_RA* and *ROA_RA*, both have an average of about 4.4 and are also slightly skewed to the left. When comparing the profitability across banks with different strategy, I find that the profitability differs with the strategy of the bank and that the difference varies with the profitability variable examined. Non-traditional banks appear to have significantly lower profitability than diversified banks when profitability is measured by *ROE*, whereas non-traditional banks appear to have significantly higher profitability than traditional and diversified banks when profitability is measured by *ROA*. The significantly higher *EQUITYASS* may be one reason for the lower profitability of non-traditional banks when measured by *ROE*, but a size effect may also explain the finding as non-traditional banks are significantly smaller than traditional and diversified banks. Hence, the findings of this univariate analysis support the inclusion of *EQUITYASS* and *SIZE* as bank specific control variables in the model specification. Finally, the risk-adjusted profitability variables suggest that the risks taken by non-traditional banks are not necessarily justified by additional profits.

When it comes to the ownership characteristics, I find that that the frequency of management ownership (*MGT*) in the full sample is 12% (see “Ownership variables” in Table 3). The frequency of management ownership is, however, very different in the sub-samples of banks with different strategy. In non-traditional banks *MGT* is 19%, versus only about 10% in traditional and diversified banks (see Columns X, XII and XIV). The level of direct management ownership (*MGT%*) also differs from one sub-sample to another. It is the highest in non-traditional banks and lowest in traditional banks. Thus, it appears as if there is management ownership in diversified banks, the level of ownership tends to be large. About 10% of the banks have board ownership (*BOARD*) and the average percentage of total board ownership (*BOARD%*) is less than 2%. There are no significant differences when comparing the sub-sample means of board ownership.

5.2. Regression analysis

I start the regression analysis by examining the impact of management ownership on profitability of banks without accounting for potential differences in their strategy, i.e. the baseline model specification defined in Equation (1) is used (see Column I to IV in Panel A of Table 4). I find that management ownership has a positive and significant impact on *ROE*, hence confirming the empirical finding of DeYoung *et al.*, 2001). Recalling that the average *ROE* is 12%, a 1.7%-unit increase can be seen as economically significant. The impact of management ownership on *ROA* and the risk-adjusted profitability variables *ROE_RA* and *ROA_RA* is, however, insignificant. Next, I consider whether the impact of management ownership depends on the strategy the bank has (see Column V to VIII). Management ownership does not appear to have a significant impact on *ROE* neither in the reference group of traditional banks nor in diversified banks (see *MGT* and *F*-test of $MGT+MGT*DIV=0$). Management ownership does, on the other hand, have a significant positive impact on the profitability of non-traditional banks (see *F*-test of $MGT+MGT*NONTRAD=0$). This finding supports the expectation that management ownership improves the profitability in banks where operations are difficult to monitor due to complexity in products and high volatility in income streams. The results are, however, sensitive to the profitability variable used;

the impact of management ownership on *ROA* is significant only among diversified banks (see *F*-test of $MGT+MGT*DIV=0$), which indicates that management ownership improves the profitability of banks where operations are difficult to monitor due to complexity in business model rather than complexity in products and where there are greater opportunities to extract private benefits. When the risk-adjusted profitability variables *ROE_RA* and *ROA_RA* are used as dependent variables, the positive impact of management ownership in diversified and non-traditional banks on profitability are no longer significant. This suggests that management with ownership improves the profitability of banks by increasing the risk-level of the operations. Note that management ownership has a positive and significant impact on the risk-adjusted profitability of banks in the reference group, i.e. traditional banks.

I fail to find a positive connection between the level of direct management ownership and profitability, but do find that the level of direct management ownership has a negative and significant impact on risk-adjusted profitability *ROA_RA* (see Column I to IV in Panel B of Table 4). The negative connection to unadjusted profitability is particularly severe in the reference group of traditional banks (see Column V and VI), whereas the negative connection to the risk-adjusted profitability is particularly severe in diversified banks (see *F*-test of $MGT\%+MGT\%*DIV=0$).

In order to gain a better understanding of the impact of the level of direct management ownership on profitability, I examine whether the hypothesised inverted U-shape can explain the failure to find a significant positive impact of level of direct management ownership on profitability. The results for the full sample suggest that the relation has an inverted U-shape; the coefficient for *MGT%* is positive and the coefficient for $MGT\%^2$ is negative and significant when *ROE* is used as the dependent variable (see Column I of Table 5). When accounting for the different strategies by running the same model for sub-samples of banks with different strategy, I find an inverted U-shape relation between level of direct management ownership and *ROE* among non-traditional banks (see Column VII), but not among diversified banks. These findings contradict the expectation that the inverted U-shaped relation would be most pronounced in diversified banks. The limited number of traditional banks with data on the level of direct management ownership is most probably behind the negative and significant sign of *MGT%* (see Column III).

Table 4 Impact of management ownership on profitability in banks with different strategy

Panel A Existence of ownership										Panel B Level of ownership									
	I	II	III	IV	V	VI	VII	VIII		I	II	III	IV	V	VI	VII	VIII		
Observations	901	901	554	555	901	901	554	555	Dependent variable	822	822	498	501	822	822	498	501		
ROE	ROE	ROA	ROE_RA	ROA_RA	ROE	ROA	ROE_RA	ROA_RA	Constant	ROE	ROA	ROE_RA	ROA_RA	ROE	ROA	ROE_RA	ROA_RA		
Constant	0.087*** [0.027]	0.006 [0.005]	4.172*** [1.326]	3.454*** [1.120]	0.087*** [0.027]	0.006 [0.005]	3.677*** [1.348]	3.071*** [1.157]	0.088*** [0.029]	0.007 [0.005]	3.440** [1.434]	3.505*** [1.257]	0.888*** [0.029]	0.007 [0.005]	3.358** [1.443]	3.451*** [1.270]			
MGT	0.017** [0.008]	0.002 [0.002]	0.484 [0.471]	0.404 [0.491]	0.000 [0.017]	0.003 [0.003]	3.820*** [1.406]	2.753** [1.177]	-0.004 [0.022]	-0.002 [0.004]	-0.993 [0.730]	-1.505* [0.809]	-0.106*** [0.039]	-0.015** [0.006]	1.486 [1.321]	1.546 [1.634]			
MGT*DIV					0.014 [0.020]	0.002 [0.004]	-3.978*** [1.440]	-2.765** [1.315]							-2.884* [1.762]	-3.399* [1.762]			
MGT*NONTRAD					0.030 [0.021]	0.000 [0.005]	-3.702** [1.539]	-2.755** [1.288]							-1.942 [1.854]	-2.891 [2.050]			
DIV	0.005 [0.006]	0.001 [0.001]	-0.622 [0.516]	-0.826 [0.566]	0.004 [0.007]	0.001 [0.001]	-0.210 [0.536]	-0.529 [0.610]	0.008 [0.007]	0.001 [0.001]	-0.327 [0.539]	-0.590 [0.632]	0.007 [0.007]	0.001 [0.001]	-0.265 [0.649]	-0.527 [0.649]			
NONTRAD	0.016* [0.008]	0.002 [0.002]	-1.066 [0.664]	-1.727** [0.729]	0.012 [0.009]	0.002 [0.002]	-0.696 [0.713]	-1.421* [0.786]	0.017* [0.009]	0.002 [0.002]	-0.837 [0.706]	-1.596** [0.807]	0.016* [0.009]	0.002 [0.002]	-0.830 [0.717]	-1.571* [0.819]			
SIZE	0.006*** [0.002]	0.000 [0.000]	0.068 [0.095]	0.101 [0.098]	0.006*** [0.002]	0.000 [0.000]	0.081 [0.094]	0.109 [0.099]	0.006*** [0.002]	0.000 [0.000]	0.092 [0.098]	0.059 [0.103]	0.006*** [0.002]	0.000 [0.000]	0.098 [0.098]	0.063 [0.105]			
DEPOSITS	-0.025 [0.017]	-0.005 [0.003]	1.680* [1.001]	1.577* [0.861]	-0.024 [0.017]	-0.005* [0.003]	1.557 [1.004]	1.482* [0.862]	-0.028 [0.018]	-0.006* [0.003]	1.586 [1.094]	1.654* [0.982]	-0.027 [0.018]	-0.006** [0.003]	1.576 [1.094]	1.631* [0.984]			
EQUITYASS	-0.069** [0.030]	0.077*** [0.013]			-0.068** [0.030]	0.077*** [0.014]			-0.066** [0.032]	0.080*** [0.014]			-0.066** [0.032]	0.080*** [0.014]					
R-squared	0.210	0.483	0.147	0.153	0.212	0.483	0.162	0.161	0.216	0.501	0.141	0.156	0.218	0.502	0.142	0.157			
Adj. R-squared	0.180	0.463	0.095	0.101	0.180	0.462	0.107	0.106	0.183	0.480	0.082	0.098	0.183	0.480	0.079	0.096			
F-test: $MGT+MGT*DIV=0$					0.014	0.004*	-0.158	-0.012					0.000	0.001	-1.398*	-1.853**			
Sum of coefficients					1.380	2.950	0.100	0.000					0.000	0.060	3.360	4.350			
F-value																			
F-test: $MGT+MGT*NONTRAD=0$					0.030**	0.002	0.118	-0.002					0.006	-0.006	-0.456	-1.345			
Sum of coefficients					4.770	0.070	0.030	0.000					0.040	0.510	0.110	1.070			
F-value																			

F-test: $MGT+MGT*DIV=0$
Sum of coefficients
F-value
F-test: $MGT+MGT*NONTRAD=0$
Sum of coefficients
F-value

This table shows results of the regressions for the impact of management ownership on profitability measured as return on equity (ROE), return on assets (ROA), risk-adjusted return on equity (ROE_RA) and risk-adjusted return on assets (ROA_RA). In Panel A management ownership is measured by the dummy variable for existence of management ownership (MGT), whereas it is measured by level of direct management ownership in percentage (MGT%) in Panel B. MGT and MGT% pick up the impact in the reference group of traditional banks, whereas the interaction terms with the strategy variables DIV and NONTRAD pick up the additional effect of management ownership in diversified and non-traditional banks compared to banks in the reference group of traditional banks. The bank specific control SIZE, DEPOSITS and EQUITYASS are as defined in Table 2. Year and country variables are included in the model specification. The standard errors are corrected for clusters of observations from the same bank. The results of the *F*-tests of the impact of management ownership in diversified and non-traditional banks are presented at the bottom of the panel. Robust standard errors are stated in brackets. ***, **, * and * denote the significance at 1%, 5% and 10%, respectively.

Table 5 Nonlinearity in the impact of management ownership on profitability

	I	II	III	IV	V	VI	VII	VIII
Observations	822	822	180	180	448	448	194	194
Sample	Full		TRAD		DIV		NONTRAD	
Dependent variable	ROE	ROA	ROE	ROA	ROE	ROA	ROE	ROA
Constant	0.085*** [0.028]	0.006 [0.005]	0.185*** [0.066]	0.014 [0.011]	0.067 [0.041]	0.003 [0.009]	0.156*** [0.050]	0.028** [0.014]
MGT%	0.110 [0.069]	0.015 [0.013]	-0.204* [0.115]	-0.024 [0.018]	0.136 [0.114]	0.024 [0.017]	0.117 [0.090]	0.015 [0.019]
MGT% ²	-0.146* [0.081]	-0.022 [0.016]	0.201 [0.134]	0.025 [0.021]	-0.171 [0.127]	-0.028 [0.021]	-0.201* [0.112]	-0.036 [0.023]
DIV	0.008 [0.007]	0.001 [0.001]						
NONTRAD	0.016* [0.009]	0.002 [0.002]						
SIZE	0.006*** [0.002]	0.000 [0.000]	-0.001 [0.004]	-0.001 [0.001]	0.009*** [0.002]	0.000 [0.001]	0.001 [0.003]	-0.001 [0.001]
DEPOSITS	-0.028 [0.018]	-0.006** [0.003]	-0.031 [0.038]	-0.003 [0.006]	-0.037 [0.025]	-0.006* [0.004]	-0.049 [0.031]	-0.017* [0.009]
EQUITYASS	-0.064** [0.032]	0.081*** [0.014]	-0.108 [0.089]	0.087*** [0.026]	-0.076 [0.064]	0.076*** [0.024]	-0.085** [0.042]	0.071*** [0.019]
R-squared	0.220	0.503	0.316	0.488	0.280	0.492	0.310	0.576
Adj. R-squared	0.187	0.481	0.172	0.381	0.224	0.453	0.207	0.513

This table shows results of the regressions testing the nonlinearity of the impact of management ownership on profitability measured as return on equity (ROE) and return on assets (ROA) in the full sample and sub-samples of traditional (TRAD) diversified (DIV) and non-traditional (NONTRAD) banks. MGT% is the level of direct management ownership in percentage and MGT%² is the square of MGT%. The bank specific control variables SIZE, DEPOSITS and EQUITYASS are as defined in Table 2. Year and country variables are included in the model specification. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Next, I examine the impact of board ownership on the profitability of banks (see Table 6). Board ownership does not appear to have an impact on profitability on an aggregate level (see Column I to IV in Panel A). As was the case with management ownership, the impact of board ownership on profitability does differ across banks with different strategy. The impact of board ownership is positive and significant in the reference group of traditional banks, whereas the positive coefficient is insignificant for diversified and non-traditional banks (see Column V and VI). The results are robust to whether ROE or ROA is used as dependent variable. This finding support the expectation that board ownership is most beneficial in banks where the monitoring incentives are reduced either due to the government guaranteed deposit insurance or the TBTF implicit government guarantee. The connection between board ownership and risk-adjusted profitability is insignificant (see Column VII and VIII in Panel A). This finding suggests that the positive impact on profitability in traditional banks is achieved by increasing the risk level of the bank.

The relation between the level of direct board ownership and profitability appear to be negative (see Column II and IV in Panel B of Table 6). The negative relation is particularly evident in diversified banks (see F -test of $BOARD\%+BOARD\%*DIV=0$ in Columns V and VI). This is in conflict with the expectation that greater incentives for the board would have a positive impact in banks where depositors have lower monitoring incentives.

Table 6 Impact of board ownership on profitability in banks with different strategies

Panel A Existence of ownership				Panel B Level of ownership													
	I	II	III	IV	V	VI	VII	VIII		I	II	III	IV	V	VI	VII	VIII
Observations	901	901	554	555	901	901	554	555	Observations	828	828	510	512	828	828	510	512
Dependent variable	ROE	ROA	ROE_RA	ROA_RA	ROE	ROA	ROE_RA	ROA_RA	ROE	ROA	ROE_RA	ROA_RA	ROE	ROA	ROE_RA	ROA_RA	
Constant	0.087*** [0.027]	0.006 [0.005]	4.494*** [1.309]	3.851*** [1.065]	0.088*** [0.027]	0.007 [0.005]	4.481*** [1.315]	3.773*** [1.077]	Constant	0.093*** [0.028]	0.009 [0.005]	3.782*** [1.358]	3.672*** [1.143]	0.094*** [0.028]	0.009 [0.005]	3.720*** [1.357]	3.672*** [1.146]
BOARD	0.014 [0.009]	0.001 [0.001]	-0.147 [0.698]	-0.511 [0.602]	0.045*** [0.015]	0.005*** [0.002]	0.247 [0.002]	0.920 [2.071]	BOARD%	-0.024 [0.018]	-0.008* [0.004]	0.844 [1.495]	-0.598 [0.761]	0.030 [0.027]	0.003 [0.004]	-2.794 [2.290]	-0.657 [2.168]
BOARD*DIV					-0.044** [0.019]	-0.006** [0.003]	-0.716 [2.394]	-1.747 [2.109]	BOARD*%*DIV					-0.072** [0.032]	-0.015** [0.006]	3.732 [2.740]	0.032 [2.185]
BOARD*NONTRAD					-0.036 [0.023]	-0.004 [0.004]	0.266 [2.655]	1.836 [2.130]	BOARD*%*NONTRAD					-0.044 [0.064]	-0.011 [0.012]	12.640* [7.407]	0.452 [2.773]
DIV	0.006 [0.006]	0.001 [0.001]	-0.589 [0.519]	-0.806 [0.568]	0.010 [0.007]	0.001 [0.001]	-0.518 [0.510]	-0.657 [0.570]	DIV	0.011* [0.006]	0.001 [0.001]	-0.404 [0.485]	-0.602 [0.594]	0.012* [0.006]	0.002* [0.001]	-0.453 [0.497]	-0.602 [0.600]
NONTRAD	0.017** [0.008]	0.002 [0.002]	-1.043 [0.661]	-1.741** [0.723]	0.021** [0.009]	0.003* [0.002]	-0.038 [0.651]	-1.597** [0.713]	NONTRAD	0.018** [0.009]	0.002 [0.002]	-0.886 [0.647]	-1.558** [0.754]	0.018** [0.009]	0.002 [0.002]	-0.976 [0.653]	-1.563** [0.760]
SIZE	0.006*** [0.002]	0.000 [0.000]	0.042 [0.092]	0.069 [0.094]	0.006*** [0.002]	0.000 [0.000]	0.043 [0.092]	0.074 [0.094]	SIZE	0.006*** [0.002]	0.000 [0.000]	0.095 [0.094]	0.074 [0.098]	0.006*** [0.002]	0.000 [0.000]	0.102 [0.094]	0.074 [0.098]
DEPOSITS	-0.025 [0.017]	-0.005* [0.003]	1.668 [0.999]	1.568* [0.859]	-0.028 [0.017]	-0.005** [0.003]	1.670* [0.989]	1.491* [0.852]	DEPOSITS	-0.030* [0.018]	-0.006** [0.003]	1.682 [1.029]	1.591* [0.939]	-0.031* [0.018]	-0.007** [0.003]	1.759* [1.035]	1.592* [0.941]
EQUITYASS	-0.065** [0.030]	0.077*** [0.033]			-0.068** [0.031]	0.077*** [0.033]			EQUITYASS	-0.070** [0.032]	0.075*** [0.014]			-0.071** [0.032]	0.075*** [0.014]		
R-squared	0.208	0.482	0.145	0.153	0.213	0.483	0.146	0.156	R-squared	0.224	0.483	0.142	0.153	0.226	0.485	0.147	0.153
Adj. R-squared	0.178	0.462	0.093	0.101	0.181	0.462	0.090	0.100	Adj. R-squared	0.192	0.462	0.084	0.096	0.192	0.462	0.086	0.092
<i>F</i> -test: BOARD+BOARD*DIV=0																	
Sum of coefficients					0.001	-0.001	-0.469	-0.827	Sum of coefficients					-0.042**	-0.012**	0.938	-0.625
F-value					0.010	0.010	0.42	1.92	F-value					6.400	6.320	0.33	0.69
<i>F</i> -test: BOARD+BOARD*NONTRAD=0																	
Sum of coefficients					0.009	0.001	0.513	-0.916	Sum of coefficients					-0.014	-0.008	9.846	-0.205
F-value					0.310	0.310	0.170	2.010	F-value					0.060	0.520	1.940	0.010

This table shows results of the regressions for the impact of board ownership on profitability measured as return on equity (ROE) and risk adjusted return on equity (ROE_RA). In Panel A board ownership is measured by the dummy variable for existence of board ownership (BOARD), whereas it is measured by level of direct board ownership in percentage (BOARD%) in Panel B. BOARD and BOARD% pick up the impact in the reference group of traditional banks, whereas the interaction terms with the strategy variables DIV and NONTRAD pick up the additional effect of board ownership in diversified and non-traditional banks compared to banks in the reference group of traditional banks. The bank specific control variables SIZE, DEPOSITS and EQUITYASS are as defined in Table 2. Year and country variables are included in the model specification. The standard errors are corrected for clusters of observations from the same bank. The results of the *F*-tests of the impact of board ownership in diversified and non-traditional banks are presented at the bottom of the panel. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

The sample includes both listed and unlisted banks, in which the impact of the ownership characteristics examined may differ as the agency problems in listed and unlisted banks are different (Loderer & Waelchli, 2006). Listed banks have to apply to stricter corporate governance rules. Furthermore, the market discipline and competitive pressure from equity markets push listed banks to improve performance. Financial targets and earnings guidance released by the bank put additional pressure to succeed on the management. Finally, the dual role of the board as both monitor of and advisors to the management may differ; i.e. the advisory role is expected to be more pronounced in smaller unlisted banks. Hence, internal corporate governance mechanisms are expected to be of lesser importance in listed than unlisted banks. However, when rerunning the regressions in sub-samples of listed and unlisted banks, the findings, in particularly for the impact of management ownership, contradict this expectation (see Panel A of Table 7). *MGT* has a positive impact on profitability in listed diversified and non-traditional banks, whereas the impact is insignificant in unlisted banks, regardless of their strategy. On the other hand, board ownership appear to have a positive impact on profitability both in listed and unlisted banks (see Columns II and III in Panel B), and the level of direct board ownership has a negative and significant impact on profitability in listed rather than unlisted diversified banks and a positive and significant impact in unlisted rather than listed traditional and non-traditional banks (see Columns V to VIII). In unreported regressions were only banks with an external blockholder owner with a direct ownership of more than 10% are included in the sample to address the potential implication of ownership concentration on the effectiveness of management and board ownership as corporate governance mechanisms, the impact of management ownership on the profitability of traditional and non-traditional banks remain unaltered. The unexpected positive impact of management ownership in listed diversified banks is, however, no longer significant. The negative impact of level of direct board ownership on the profitability of both unlisted diversified and unlisted non-traditional banks do, on the other hand, become significant, a finding which again is in conflict with the expectation.

Finally, a few words on the profitability of banks with different strategy as indicated by the strategy variables are called for. Contrary to the finding presented in Laeven & Levine (2007), it appears as diversified banks would not be less profitable than focused banks, which may be an indication that European banks in the sample used in this study have been able to implement a diversification strategy more successfully than the banks in the international sample used by Laeven & Levine (2007). The finding that the unadjusted profitability of non-traditional banks is significantly higher in non-traditional banks than in traditional and diversified banks is, on the other hand, in line with the findings presented in Stiroh & Rumble (2006) and Laeven & Levine (2007), whereas the finding that the risk-adjusted profitability of non-traditional banks appears to be significantly lower than the one in traditional and diversified banks are inline with the ones reported in Stiroh (2004b) and Stiroh & Rumble (2006) in US samples and in Mercieca *et al.* (2007) for a sample of very small European banks. When the strategy variables are interacted with the ownership variables the significance of the strategy variables change; the interaction with the management ownership variable weakens the significance and the interaction with the board ownership variable strengthens the significance. These finding indicates that the results of previous diversification studies may partly be driven by differences in the ownership structure of the banks in the samples. Note, however, that the impact of diversification and increased focus on non-traditional banking operations are not separated in this study.

Table 7 Impact of management and board ownership on profitability in listed and unlisted banks

Panel A Management ownership									
	I	II	III	IV		V	VI	VII	VIII
Observations	314	314	587	587	Observations	302	302	520	520
Sample	<i>LISTED</i>		<i>UNLISTED</i>		Sample	<i>LISTED</i>		<i>UNLISTED</i>	
Dependent variable	<i>ROE</i>	<i>ROA</i>	<i>ROE</i>	<i>ROA</i>	Dependent variable	<i>ROE</i>	<i>ROA</i>	<i>ROE</i>	<i>ROA</i>
<i>MGT</i>	-0.015 [0.024]	0.003 [0.000]	0.009 [0.024]	0.003 [0.006]	<i>MGT%</i>	-1.425*** [0.488]	-0.029 [0.063]	-0.089*** [0.032]	-0.014*** [0.005]
<i>MGT*DIV</i>	0.058* [0.030]	-0.001 [0.005]	-0.015 [0.027]	-0.001 [0.006]	<i>MGT%*DIV</i>	1.630*** [0.495]	0.045 [0.064]	0.064 [0.043]	0.013* [0.008]
<i>MGT*NONTRAD</i>	0.078*** [0.029]	0.006 [0.007]	-0.005 [0.028]	-0.007 [0.007]	<i>MGT%*NONTRAD</i>	1.810*** [0.493]	0.080 [0.070]	0.078* [0.041]	0.007 [0.009]
R-squared	0.423	0.714	0.186	0.377	R-squared	0.439	0.703	0.187	0.401
Adj. R-squared	0.350	0.679	0.136	0.339	Adj. R-squared	0.365	0.664	0.130	0.359
<i>F</i> -test: <i>MGT</i> + <i>MGT*DIV</i> =0					<i>F</i> -test: <i>MGT%</i> + <i>MGT%*DIV</i> =0				
Sum of coefficients	0.043**	0.002	-0.006	0.002	Sum of coefficients	0.205***	0.016**	-0.025	-0.001
<i>F</i> -value	4.960	0.670	0.190	0.810	<i>F</i> -value	17.280	4.040	0.660	0.040
<i>F</i> -test: <i>MGT</i> + <i>MGT*NONTRAD</i> =0					<i>F</i> -test: <i>MGT%</i> + <i>MGT%*NONTRAD</i> =0				
Sum of coefficients	0.063***	0.009	0.004	-0.004	Sum of coefficients	0.385***	0.051**	-0.011	-0.007
<i>F</i> -value	15.230	2.530	0.070	1.110	<i>F</i> -value	50.360	3.970	0.190	1.070
Panel B Board ownership									
	I	II	III	IV		V	VI	VII	VIII
Observations	314	314	587	587	Observations	300	300	528	528
Sample	<i>LISTED</i>		<i>UNLISTED</i>		Sample	<i>LISTED</i>		<i>UNLISTED</i>	
Dependent variable	<i>ROE</i>	<i>ROA</i>	<i>ROE</i>	<i>ROA</i>	Dependent variable	<i>ROE</i>	<i>ROA</i>	<i>ROE</i>	<i>ROA</i>
<i>BOARD</i>	0.024 [0.019]	0.006** [0.002]	0.053** [0.021]	0.004 [0.002]	<i>BOARD%</i>	0.004 [0.029]	0.004 [0.003]	0.064* [0.034]	0.005 [0.006]
<i>BOARD*DIV</i>	-0.015 [0.024]	-0.007** [0.003]	-0.063** [0.026]	-0.005 [0.004]	<i>BOARD%*DIV</i>	-0.380*** [0.104]	-0.057*** [0.014]	-0.093** [0.042]	-0.016* [0.008]
<i>BOARD*NONTRAD</i>	-0.055* [0.031]	-0.013* [0.007]	-0.025 [0.032]	0.001 [0.005]	<i>BOARD%*NONTRAD</i>	-0.247* [0.138]	-0.067* [0.040]	-0.015 [0.050]	0.003 [0.008]
R-squared	0.389	0.713	0.193	0.374	R-squared	0.410	0.702	0.191	0.382
Adjusted R-squared	0.313	0.677	0.144	0.336	Adjusted R-squared	0.332	0.662	0.135	0.340
<i>F</i> -test: <i>BOARD</i> + <i>BOARD*DIV</i> =0					<i>F</i> -test: <i>BOARD%</i> + <i>BOARD%*DIV</i> =0				
Sum of coefficients	0.009	-0.001	-0.010	-0.001	Sum of coefficients	-0.376***	-0.053***	-0.029	-0.011*
<i>F</i> -value	0.300	0.310	0.410	0.250	<i>F</i> -value	13.230	16.460	2.060	3.840
<i>F</i> -test: <i>BOARD</i> + <i>BOARD*NONTRAD</i> =0					<i>F</i> -test: <i>BOARD%</i> + <i>BOARD%*NONTRAD</i> =0				
Sum of coefficients	-0.031	-0.007	0.028	0.005	Sum of coefficients	-0.243*	-0.063	0.049	0.008*
<i>F</i> -value	1.620	1.770	1.310	1.140	<i>F</i> -value	3.320	2.560	1.610	3.840

This table shows results of the regressions for the impact of management ownership (Panel A) and board ownership (Panel B) on profitability in the sub-sample of *LISTED* and *UNLISTED* banks. The latter includes the delisted banks. Profitability is measured as return on equity (*ROE*) or return on assets (*ROA*). The ownership variables *MGT*, *MGT%*, *BOARD* and *BOARD%* pick up the impact in the reference group of traditional banks, whereas the interaction terms with the strategy variables *DIV* and *NONTRAD* pick up the additional effect of management or board ownership in diversified and non-traditional banks compared to banks in the reference group of traditional banks. The bank specific control variables *SIZE*, *DEPOSITS* and *EQUITYYASS* as defined in Table 2, a constant, year and country variables are included in the model specification. The standard errors are corrected for clusters of observations from the same bank. The results of the *F*-tests of the impact of management ownership in diversified and non-traditional banks are presented at the bottom of the panel. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

5.3. Robustness test

The main objective with the robustness tests is to address the endogeneity and sample selection issue. First, I address the endogeneity of the ownership variables *MGT* and *BOARD* by applying Heckman (1979)'s two-step model⁹. I base the selection of variables used as determinants of ownership on Demsetz & Lehn (1985) and studies which have developed their seminal work. Demsetz & Villalonga (2001) argue that previous profitability is expected to have an impact on current ownership structure due to access to insider information and performance based compensation. Himmelberg *et al.* (1999), on the other hand, account for managerial discretion proxied by company size, capital intensity, cash flow, R&D intensity, advertising intensity and gross investment rates. Hence, both the previous year's profitability (*PROF(t-1)*) and size (*SIZE(t-1)*) are included in the first stage probit estimation of Heckman's two-step model (due to limited data availability, the other variables presented in Himmelberg *et al.* (1999) are not included). I am hesitant to include a traditional risk measure as proposed by Demsetz & Lehn (1985) in the model specification, as it would reduce the sample size drastically due to the limited access to historical data. Guided by the finding presented in DeYoung & Roland (2001) and Stiroh (2006b) that non-traditional banking operations are riskier than traditional banking operations, I include the continuous variable underlying the strategy variables in the first stage probit estimation. This ratio, denoted as *RISK*, is the average of the non interest income to total operating income ratio and other earning assets than loans to total earning assets ratio taking into account off-balance sheet items. Moreover, I include the legal rights index (*RIGHTS*) in the model specification as ownership structure is expected to vary across countries with different legal system (Shleifer & Vishny, 1997, Shleifer & Wolfenzon, 2002). A similar approach is used in Maury (2006). Finally, I account for the fact that ownership characteristics may be rather stable over time and that management and board ownership preferences may have an impact on the ownership structure. Note also that e.g. de Andres & Vallelado (2008) use lagged board characteristics as instruments for current board characteristic. Hence, the lagged management and board ownership variables *MGT(t-1)* and *BOARD(t-1)* are included in the model specification. The first stage probit estimation model is presented in Equation (4). The second step equation is as in the original model specification as defined in Equation (2).

$$\begin{aligned} OWN_{i,t} = & \alpha + \beta_1 * PROF(t-1)_{i,t} + \beta_2 * SIZE(t-1)_{i,t} + \beta_3 * RISK_{i,t} \\ & + \beta_4 * RIGHTS_{i,t} + \beta_5 * MGT(t-1)_{i,t} + \beta_6 * BOARD(t-1)_{i,t} + u_{i,t} \end{aligned} \quad (4)$$

Second, I follow Laeven & Levine (2007) and apply Heckman's two step model to control for sample selection bias in the strategy of the bank, i.e. whether the bank is diversified or not. Hence, the first step probit estimation includes previous year's profitability (*PROF(t-1)*) and size (*SIZE(t-1)*) and a dummy variable taking the value one if the bank is listed or not (*LISTED*)¹⁰. Once more, I account for ownership preferences by including the lagged management and board ownership variables *MGT(t-1)* and *BOARD(t-1)* in the first stage probit estimation model (see Equation (5)).

⁹ Similar results are achieved when a two stage least square simultaneous equation model is applied where the same model specification is used to examine the determinants of management and board ownership, respectively, and whether the bank is diversified or not.

¹⁰ Laeven & Levine (2007) distinguish between whether the bank is included in the S&P financial index and whether the bank is listed on the NYSE. They also include the share of diversified banks in the economy.

The second step equation is as in the original model specification as defined in Equation (2).

$$\begin{aligned}
 DIV_{i,t} = & \alpha + \beta_1 * PROF(t-1)_{i,t} + \beta_2 * SIZE(t-1)_{i,t} + \beta_3 * LISTED_{i,t} \\
 & + \beta_4 * MGT(t-1)_{i,t} + \beta_5 * BOARD(t-1)_{i,t} + v_{i,t}
 \end{aligned}
 \tag{5}$$

Third, I apply a simultaneous equation system where the challenge with the ownership and strategy variables is addressed simultaneously¹¹. Hence, both Equation (4) and (5) are included in the equation. The third equation in the system is as in the original model specification as defined in Equation (2). Note that the simultaneous equation system fails to correct for clusters in observations.

The general finding when the endogeneity and sample selection bias is accounted for when examining the impact of management ownership on profitability is that the positive impact in the sub-sample of non-traditional banks is robust (see *F*-test of $MGT+MGT*NONTRAD=0$ in Panel A of Table 8). Moreover, management ownership appear to have a positive impact on *ROE* in diversified banks when some model specifications are used (see *F*-test of $MGT+MGT*DIV=0$ in Column VIII and XIV). The findings when profitability is measured by *ROA* is less robust; the positive impact of management ownership in diversified banks remain significant only when the simultaneous equation system is applied (see *F*-test of $MGT+MGT*DIV=0$ in Column XI and XIV in Panel B). On the determinants of management owners, I do not find that the previous year's profitability would have a significant impact on whether a bank has management ownership or not (see Column I, III, IX and XII). There is a significant relation between the other variables included in the model specification and management ownership; larger banks are less likely to have management ownership, whereas banks focusing on riskier non-traditional banking operations are more likely to have management ownership. Furthermore, management ownership is more frequent in countries with high legal protection of shareholders. When the previous year's ownership structure is included in the model specification, lagged management ownership drives the results. The results with respect to the determinants of diversification strategy are less encouraging; none of the variables are statistically significant with the exception of a negative impact of lagged management ownership on *ROE* in the simultaneous equation model (see Column XIII in Panel A).

The positive and significant impact of board ownership on profitability whether it is measured by *ROE* or *ROA* among traditional banks is robust across model specifications (see Panel A and B of Table 9). The impact of board ownership on the profitability of non-traditional banks is negative and significant in some model specifications (see *F*-test of $BOARD+BOARD*NONTRAD=0$ in Column IV in Panel A and Column XIII in Panel B). Finally, I note that only the size of the bank appear to have a significant impact on whether the bank has board ownership or not, i.e. larger banks are less likely to have board ownership (see Columns I and IX in Panel A and B). Moreover, this connection is sensitive to the inclusion of the lagged ownership variables. There is a positive and significant relation between the previous year's profitability and board ownership only in one model specification (see Column IX in Panel A).

¹¹ For example Loderer & Martin (1997) use a simultaneous equations system to examine the relation between ownership characteristics and acquisition performance.

Table 8 Impact of management on profitability when applying Heckman two-step models and a simultaneous equation system

	Heckman (MGT in 1 st step)				Heckman (DIV in 1 st step)				Simultaneous equation system					
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Observations	728	728	438	438	739	739	444	444	728	728	728	438	438	438
Dependent variable		ROE	MGT	ROE	DIV	ROE	DIV	ROE	MGT	DIV	ROE	MGT	DIV	ROE
Constant	-1.246*** [0.345]	0.192*** [0.043]	-1.589** [0.646]	0.098*** [0.036]	-0.088 [0.178]	0.447*** [0.143]	-0.236 [0.249]	0.317*** [0.079]	0.098 [0.060]	0.477*** [0.070]	0.084*** [0.024]	0.060 [0.048]	0.424*** [0.096]	0.082*** [0.028]
ROE(<i>t-1</i>)	0.592 [0.403]		0.357 [0.710]	0.518 [0.360]	0.677 [0.533]		0.677 [0.533]		0.166** [0.071]	0.165 [0.107]	0.054 [0.049]	0.054 [0.049]	0.196 [0.125]	0.196 [0.125]
SIZE(<i>t-1</i>)	-0.133*** [0.032]		-0.066 [0.062]	0.021 [0.023]	0.039 [0.030]		0.039 [0.030]		-0.027*** [0.006]	0.007 [0.009]	-0.005 [0.005]	-0.005 [0.005]	0.014 [0.012]	0.014 [0.012]
RISK	1.040*** [0.311]		-0.591 [0.636]						0.240*** [0.064]	-0.043 [0.049]	-0.043 [0.049]	0.000 [0.000]	0.000 [0.000]	
RGHTS	0.007** [0.003]		0.005 [0.006]						0.002*** [0.001]	0.000 [0.001]	0.000 [0.001]	0.000 [0.000]	0.000 [0.000]	
LISTED					-0.020 [0.107]		-0.043 [0.134]			-0.013 [0.042]			-0.022 [0.053]	
MGT(<i>t-1</i>)			2.921*** [0.279]				-0.311 [0.193]					0.778*** [0.030]	-0.125* [0.075]	
BOARD(<i>t-1</i>)			-0.273 [0.351]				-0.014 [0.214]					-0.041 [0.033]	-0.009 [0.084]	
MGT	0.004 [0.020]			-0.005 [0.021]		0.005 [0.017]		0.044** [0.021]			0.008 [0.018]			0.011 [0.021]
MGT*DIV	0.002 [0.023]			0.016 [0.023]		0.000 [0.021]		0.010 [0.021]			0.009 [0.021]			0.018 [0.024]
MGT*NONTRAD	0.027 [0.024]			0.040 [0.028]		0.023 [0.022]		0.048* [0.025]			0.029 [0.022]			0.043 [0.026]
DIV	-0.020** [0.041***]			0.001 [0.009]		0.003 [0.007]		0.000 [0.009]			0.004 [0.007]			0.001 [0.008]
NONTRAD	-0.041*** [0.015]			0.017 [0.011]		0.010 [0.009]		0.013 [0.010]			0.009 [0.009]			0.016 [0.010]
Mill's Lambda	-0.119*** [0.032]			-0.009 [0.007]		-0.437*** [0.167]		-0.250*** [0.078]						
R-squared		0.240		0.283		0.265		0.322	0.065	0.004	0.208	0.635	0.016	0.280
<i>F</i> -test: MGT+MGT*DIV=0														
Sum of coefficients		0.006		0.011		0.005		0.054***			0.017			0.029**
<i>F</i> -value		0.240		0.440		0.140		8.620			2.530			4.500
<i>F</i> -test: MGT+MGT*NONTRAD=0														
Sum of coefficients		0.031**		0.035		0.028**		0.092***			0.037***			0.054***
<i>F</i> -value		5.300		2.420		4.620		18.370			8.900			10.510

Panel B Profitability: ROA	Heckman (MGT in 1 st step)				Heckman (DIV in 1 st step)				Simultaneous equation system					
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Observations	728	728	438	438	739	739	444	444	728	728	438	438	438	438
Dependent variable	MGT	ROA	MGT	ROA	DIV	ROA	DIV	ROA	MGT	DIV	ROA	MGT	DIV	ROA
Constant	-1.261*** [0.320]	0.035*** [0.010]	-1.538** [0.656]	0.016** [0.008]	0.002 [0.187]	-0.206*** [0.069]	-0.127 [0.263]	-0.080*** [0.025]	0.091 [0.062]	0.511*** [0.074]	0.008* [0.005]	0.063 [0.050]	0.469*** [0.104]	0.012** [0.006]
ROA(<i>t-1</i>)	2.554 [2.571]		-0.980 [4.594]	-1.448 [2.250]			-1.346 [2.800]		0.883 [0.592]	-0.678 [0.894]		0.079 [0.434]	-0.795 [1.119]	
SIZE(<i>t-1</i>)			-0.124*** [0.033]	0.017 [0.024]			0.035 [0.031]		-0.025*** [0.006]	0.006 [0.009]		-0.005 [0.005]	0.012 [0.012]	
RISK	1.037*** [0.311]		-0.577 [0.637]						0.237*** [0.065]		-0.042 [0.049]			
RIGHTS	0.007** [0.003]		0.005 [0.006]						0.002*** [0.001]		0.000 [0.000]			
LISTED					0.010 [0.107]					-0.003 [0.042]			-0.011 [0.053]	
MGT(<i>t-1</i>)			2.934*** [0.280]				-0.002 [0.134]					0.782*** [0.030]	-0.109 [0.076]	
BOARD(<i>t-1</i>)			-0.233 [0.346]				0.008 [0.213]					-0.039 [0.033]	0.003 [0.084]	
MGT		0.002 [0.004]		-0.002 [0.004]		0.001 [0.003]		-0.011** [0.005]		0.003 [0.003]				0.003 [0.004]
MGT*DIV		0.000 [0.005]		0.003 [0.004]		0.001 [0.004]		0.001 [0.005]		0.001 [0.004]				0.003 [0.005]
MGT*NONTRAD		-0.001 [0.006]		0.001 [0.007]		0.001 [0.005]		-0.002 [0.007]		-0.001 [0.004]				0.001 [0.005]
DIV		-0.005*** [0.002]		0.001 [0.002]		0.001 [0.001]		0.001 [0.001]		0.000 [0.001]				0.000 [0.002]
NONTRAD		-0.010*** [0.003]		0.004 [0.002]		0.002 [0.001]		0.003 [0.002]		0.002 [0.002]				0.002 [0.002]
Mill's Lambda		-0.028*** [0.008]		-0.002 [0.002]		0.263*** [0.086]		0.101*** [0.027]						0.003* [0.002]
R-squared		0.484		0.486		0.535		0.536		0.002	0.459	0.634	0.011	0.482
F-test: MGT+MGT*DIV=0														
Sum of coefficients		0.002		0.001		0.002		-0.010**			0.004**			0.006**
F-value		1.180		0.010		1.000		4.320			4.550			4.420
F-test: MGT+MGT*NONTRAD=0														
Sum of coefficients		0.001		-0.001		0.002		-0.013			0.002			0.004
F-value		0.070		0.040		0.270		2.210			0.590			1.580

This table shows results of 1) the Heckman two-step regression where the endogeneity of MGT is addressed, 2) the Heckman two-step regression where the selection bias of DIV is addressed and 3) the simultaneous equation system where both MGT and DIV are modelled before applying the original model specification to examine the impact of management ownership on profitability. In Panel A the profitability variable is return on equity (ROE), whereas in Panel B it is return on assets (ROA). Bank specific control variables, as defined in Table 2, are included only in the final equation as are the year and country variables. The results of the F-tests of the impact of management ownership in diversified and non-traditional banks are presented at the bottom of the panel. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Table 9 Impact of board on profitability when applying Heckman two-step models and a simultaneous equation system

	Heckman (BOARD in 1 st step)				Heckman (DIV in 1 st step)				Simultaneous equation system					
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Observations	728	728	438	438	739	739	444	444	728	728	438	438	438	438
Dependent variable	BOARD	ROE	BOARD	ROE	DIV	ROE	DIV	ROE	BOARD	DIV	BOARD	DIV	DIV	ROE
Constant	-0.923*** [0.332]	0.343*** [0.099]	-1.398** [0.629]	0.134*** [0.041]	-0.088 [0.178]	0.455*** [0.140]	-0.236 [0.249]	0.190*** [0.054]	0.142*** [0.052]	0.476*** [0.070]	0.085*** [0.024]	0.076* [0.044]	0.424*** [0.096]	0.094*** [0.028]
ROE(<i>t-1</i>)	0.492 [0.341]		0.288 [0.602]		0.518 [0.360]		0.677 [0.533]		0.139** [0.062]	0.167 [0.107]		0.050 [0.045]	0.190 [0.125]	
SIZE(<i>t-1</i>)	-0.105*** [0.035]		0.011 [0.065]		0.021 [0.023]		0.039 [0.030]		-0.016*** [0.005]	0.008 [0.009]		-0.001 [0.004]	0.015 [0.012]	
RISK	-0.021 [0.338]		-0.884 [0.708]						0.012 [0.056]			-0.052 [0.045]		
RGHTS	0.005 [0.003]		-0.007 [0.006]						0.001 [0.000]			0.000 [0.000]		
LISTED					-0.020 [0.107]		-0.043 [0.134]			-0.016 [0.042]			-0.023 [0.053]	
MGT(<i>t-1</i>)			0.128 [0.358]				-0.311 [0.193]					0.003 [0.028]		
BOARD(<i>t-1</i>)			2.972*** [0.298]				-0.014 [0.214]					0.765*** [0.030]		
BOARD		0.059*** [0.016]		0.024 [0.021]		0.055*** [0.016]		0.045*** [0.018]			0.065*** [0.018]			0.057*** [0.019]
BOARD*DIV		-0.066*** [0.022]		-0.057** [0.027]		-0.066*** [0.021]		-0.045* [0.025]			-0.060*** [0.021]			-0.051** [0.024]
BOARD*NONTRAD		-0.057** [0.025]		-0.089*** [0.029]		-0.047* [0.025]		-0.061* [0.031]			-0.064** [0.026]			-0.078*** [0.030]
DIV		0.011 [0.007]		0.012 [0.009]		0.010 [0.007]		0.009 [0.009]			0.012* [0.007]			0.010 [0.008]
NONTRAD		0.022*** [0.009]		0.036*** [0.011]		0.019** [0.009]		0.028** [0.011]			0.021** [0.008]			0.030*** [0.010]
Mill's Lambda		-0.247*** [0.089]		-0.018** [0.008]		-0.446*** [0.164]		-0.096** [0.049]						
R-squared		0.271		0.281		0.271		0.276		0.019		0.619	0.016	0.271
F-test: BOARD+BOARD*DIV=0														
Sum of coefficients		-0.007		-0.033		-0.011		0.000						0.006
F-value		0.270		1.950		0.700		0.000						0.180
F-test: BOARD+BOARD*NONTRAD=0														
Sum of coefficients		0.002		-0.065**		0.008		-0.016						-0.021
F-value		0.010		5.650		0.150		0.410						0.840

	Heckman (BOARD in I^st step)				Heckman (DIV in I^st step)				Simultaneous equation system					
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
Observations	728	728	438	438	739	739	444	444	728	728	438	438	438	
Dependent variable	BOARD	ROA	BOARD	ROA	DIV	ROA	DIV	ROA	BOARD	DIV	ROA	BOARD	DIV	ROA
Constant	-0.920*** [0.339]	0.103*** [0.024]	-1.391** [0.644]	0.019** [0.009]	0.002 [0.187]	-0.208*** [0.068]	-0.127 [0.263]	-0.046*** [0.014]	0.144*** [0.054]	0.510*** [0.074]	0.009** [0.005]	0.078* [0.046]	0.471*** [0.104]	0.014** [0.006]
ROA($t-1$)	1.623 [2.781]	0.738 [5.143]	0.738 [5.143]	-1.448 [2.250]	-1.448 [2.250]		-1.346 [2.800]	0.425 [0.518]	0.425 [0.518]	-0.671 [0.894]	0.077 [0.398]	0.077 [0.398]	-0.841 [1.119]	
SIZE($t-1$)	-0.099*** [0.035]	0.014 [0.066]	0.014 [0.066]	0.017 [0.024]	0.017 [0.024]		0.035 [0.031]	-0.015*** [0.005]	-0.015*** [0.005]	0.006 [0.009]	0.006 [0.009]	-0.001 [0.004]	0.012 [0.012]	
RISK	-0.018 [0.337]	-0.884 [0.707]	-0.884 [0.707]					0.010 [0.057]	0.010 [0.057]			-0.051 [0.045]		
RIGHTS	0.005 [0.003]	-0.007 [0.006]	-0.007 [0.006]					0.001 [0.000]	0.001 [0.000]			0.000 [0.000]		
LISTED					0.010 [0.107]		-0.002 [0.134]			-0.006 [0.042]			-0.011 [0.053]	
MGT($t-1$)			0.143 [0.364]				-0.274 [0.193]					0.003 [0.028]		
BOARD($t-1$)			2.979*** [0.298]				0.008 [0.213]					0.768*** [0.030]		
BOARD		0.007*** [0.002]		0.002 [0.004]		0.006*** [0.002]		0.005** [0.002]		0.008** [0.003]			0.006 [0.004]	
BOARD*DIV		-0.009*** [0.003]		-0.007 [0.005]		-0.009*** [0.003]		-0.010** [0.004]		-0.008** [0.004]			-0.007 [0.005]	
BOARD*NONTRAD		-0.008** [0.004]		-0.011** [0.005]		-0.005 [0.004]		-0.013*** [0.004]		-0.009* [0.005]			-0.010* [0.006]	
DIV		0.002* [0.001]		0.002 [0.002]		0.002** [0.001]		0.002 [0.002]		0.001 [0.001]			0.001 [0.002]	
NONTRAD		0.004** [0.002]		0.005** [0.003]		0.003* [0.002]		0.004* [0.002]		0.003* [0.002]			0.005** [0.002]	
Mill's Lambda		-0.089*** [0.022]		-0.002 [0.002]		0.266*** [0.084]		0.062*** [0.014]						
R-squared		0.516		0.485		0.538		0.526	0.014	0.002	0.460	0.619	0.011	0.482
F -test: BOARD+BOARD*DIV=0														
Sum of coefficients		-0.002		-0.005		-0.003		-0.005			0.000			-0.001
F -value		0.360		0.570		1.450		1.860			0.000			0.010
F -test: BOARD+BOARD*NONTRAD=0														
Sum of coefficients		-0.001		-0.009		0.001		-0.008***		-0.001	-0.001			-0.004
F -value		0.020		2.200		0.090		7.940		0.070	0.070			0.650

This table shows results of 1) the Heckman two-step regression where the endogeneity of BOARD is addressed, 2) the Heckman two-step regression where the selection bias of DIV is addressed and 3) the simultaneous equation system where both BOARD and DIV are modelled before applying the original model specification used to examine the impact of board ownership on profitability. In Panel A the profitability variable is return on equity (ROE), whereas in Panel B it is return on assets (ROA). Bank specific control variables, as defined in Table 2, are included only in the final equation as are the year and country variables. The results of the F -tests of the impact of management ownership in diversified and non-traditional banks are presented at the bottom of the panel. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Apart from endogeneity and sample selection bias, the main methodological challenge in this study lies in the definition of the strategy variables. The financial ratio used as basis for the categorisation has an impact on which banks are categorised as being traditional, diversified or non-traditional. As a result the sub-sample sizes vary with the definition used (see Table 10). I rerun the regressions for the main profitability variables *ROE* and *ROE_RA* with the four alternative definitions of the strategy variables. The results of the regressions indicate that the results are sensitive to the way the strategy variables are defined (see Panel A of Table 11). The positive impact of management ownership on *ROE* in non-traditional banks remains significant when the first two alternative strategy variable definitions are applied. When the third definition is used management ownership has a positive impact on *ROE* in diversified banks rather than in non-traditional banks. Recall from Table 10 that the number of banks categorised as non-traditional in this specification is lower than when the other definitions are used, which indicate that some of the profitable banks with management ownership have been moved to the sub-sample of diversified banks in this categorisation. Moreover, the impact on *ROE_RA* remain insignificant, giving further support to the notion that management with ownership increases bank profitability by increasing the risk of the operations. The negative relation between the level of direct management ownership and *ROE* in traditional banks remains (see Panel B). The connection is significant when the first two alternative strategy variable definitions are applied. The main finding with respect to board ownership, i.e. that there is a positive relation to profitability in traditional banks is also sensitive to the strategy variable definitions; it only remain significant when the other average ratio of non interest income to total income and other earning assets to total earning assets excluding the impact of off balance sheet items is used (see Panel C). Finally, note that unexpected negative impact of level of direct ownership on the profitability of diversified banks remains significant only when the first alternative definition is used (see Panel D). To conclude, it appears as the results of the impact of ownership characteristics on risk-adjusted profitability is most sensitive to the strategy variable definitions and that the results diverge the most when the fourth definition which is based on other earning assets to total assets while accounting for the impact of off balance sheet.

Table 10 Number and share of observations in the sub-sample of traditional, diversified and non-traditional banks

	<i>TRAD</i>	<i>DIV</i>	<i>NONTRAD</i>
Average of <i>NONINTINC</i> and <i>OTHEARNASS</i> incl. <i>OFFBALANCE</i> .	200 (22%)	485 (54%)	216 (24%)
1) Average of <i>NONINTINC</i> and <i>OTHEARNASS</i> excl. <i>OFFBALANCE</i>	288 (32%)	422 (47%)	191 (21%)
2) <i>NONINTINC</i>	226 (25%)	441 (49%)	234 (26%)
3) <i>OTHEARNASS</i> excl. <i>OFFBALANCE</i>	317 (35%)	403 (45%)	179 (20%)
4) <i>OTHEARNASS</i> incl. <i>OFFBALANCE</i>	201 (22%)	385 (43%)	313 (35%)

This table shows how the bank-year observations are allocated to the sub-samples of traditional (*TRAD*), diversified (*DIV*) and non-traditional (*NONTRAD*) banks as different financial ratios are used in the categorisation. The shaded ratio is the one applied in the analysis and the numbered ratios are the ones applied in robustness checks. *NONINTINC* stand for non interest income to total operating income, *OTHEARNASS* for other earning assets than loans to total earning assets, and *OFFBALANCE* for off balance sheet items to total earning assets plus off balance sheet items. The cut-off points are maintained at 1/3 and 2/3.

Table 11 Robustness tests with alternative strategy variable definitions

Panel A Existence of management ownership (<i>MGT</i>)								
Dependent variable	<i>ROE</i>				<i>ROE_RA</i>			
	1)	2)	3)	4)	1)	2)	3)	4)
Strategy variable definition	1)	2)	3)	4)	1)	2)	3)	4)
Impact in <i>TRAD</i>	0.001	-0.004	0.013	0.006	0.559	0.852	1.332	2.199
Impact in <i>DIV</i>	0.018	0.002	0.018*	0.021	-0.487	-0.674	0.107	-0.872
Impact in <i>NONTRAD</i>	0.027**	0.035***	0.020	0.019	0.021	0.115	-1.247	-0.205
Panel B Level of management ownership (<i>MGT%</i>)								
Dependent variable	<i>ROE</i>				<i>ROE_RA</i>			
	1)	2)	3)	4)	1)	2)	3)	4)
Strategy variable definition	1)	2)	3)	4)	1)	2)	3)	4)
Impact in <i>TRAD</i>	-0.071***	-0.108**	-0.051	-0.070	-3.410	0.437	-3.781	-3.322
Impact in <i>DIV</i>	0.020	-0.049**	0.002	0.008	-1.079	-1.466	0.081	-1.274
Impact in <i>NONTRAD</i>	0.003	0.032	0.003	-0.019	-0.769	-0.293	-2.803	-0.805
Panel C Existence of board ownership (<i>BOARD</i>)								
Dependent variable	<i>ROE</i>				<i>ROE_RA</i>			
	1)	2)	3)	4)	1)	2)	3)	4)
Strategy variable definition	1)	2)	3)	4)	1)	2)	3)	4)
Impact in <i>TRAD</i>	0.035**	0.015	0.015	0.021	1.731	0.735	0.533	-3.932**
Impact in <i>DIV</i>	0.002	0.020	0.020	0.021	-1.133	-1.318	0.851	1.180
Impact in <i>NONTRAD</i>	0.011	0.002	-0.004	-0.004	0.858	0.487	-0.960	-0.128
Panel D Level of board ownership (<i>BOARD%</i>)								
Dependent variable	<i>ROE</i>				<i>ROE_RA</i>			
	1)	2)	3)	4)	1)	2)	3)	4)
Strategy variable definition	1)	2)	3)	4)	1)	2)	3)	4)
Impact in <i>TRAD</i>	-0.009	-0.003	-0.032*	-0.017	3.287	3.225	3.420	-3.262***
Impact in <i>DIV</i>	-0.035**	-0.020	-0.030	-0.041	-1.232	-1.169	1.031	5.576***
Impact in <i>NONTRAD</i>	-0.014	-0.052***	-0.009	-0.024	11.460	10.564	-3.122	0.090

This table presents a summary of the regressions run with alternative strategy variable definitions as defined in Table 10, i.e. 1) the average of *NONINTINC* and *OTHEARNASS* excl. *OFFBALANCE*, 2) *NONINTINC*, 3) *OTHEARNASS* excl. *OFFBALANCE* and 4) *OTHEARNASS* incl. *OFFBALANCE*. The results for *MGT*, *MGT%*, *BOARD* and *BOARD%* are presented in Panel A, B, C and D, respectively. The original model specification defined in Equation (2) is applied. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Finally, a number of refinements to the model specifications are done and the regressions are rerun for the main profitability variables *ROE* and *ROE_RA*. First, I address the empirical finding of performance persistence presented in Berger *et al.* (2000), Cebenoyan *et al.* (2004) and Goddard *et al.* (2004) by including the lagged dependent variable in the model specification. The main findings that management ownership has a positive impact on profitability in non-traditional banks, that the level of direct management ownership has a negative impact on the profitability of traditional banks, that board ownership has a positive impact on the profitability of traditional banks, and that the level of direct board ownership has a negative impact on the profitability of diversified banks remain. Second, the management ownership variables are refined by accounting for employee ownership thus creating a variable for insider ownership (*INSIDE*). This refinement does not alter the previously presented result; *INSIDE* has a positive and significant impact on the profitability of non-traditional banks, whereas *INSIDE%* has a negative and significant impact on the

profitability of traditional banks. In addition, *INSIDE* has a positive and significant impact on the profitability of diversified banks. Third, the bank specific control variable *DEPOSITS* is refined so that the deposit insurance limit per person in the home country of the bank is accounted for following Demirguc-Kunt & Detragiache (2002) and Barth *et al.* (2007). Apart for the positive impact of *BOARD%* on the risk-adjusted profitability of diversified banks, the main findings remain intact in this model specification. Forth, I use loan loss provisions to total loans as an alternative bank specific control variable for risk. This risk measure gives an indication of the quality of the loans (Valnek, 1999), but also of the opacity in the operations (Flannery *et al.*, 2004). The main results remain intact in this model specification. However, *BOARD* appears to have a negative impact on the risk-adjusted profitability of non-traditional banks. Finally, the impact of M&A activity is controlled for by including a dummy variable taking the value one if the annual change in assets during the past two years is less than -5% or greater than 30%, and zero otherwise. Once more, the main results remain intact. Moreover, the impact of *MGT* on the risk-adjusted profitability remains insignificant in all specifications.

6 CONCLUSION

In this study I combine the ownership and diversification literature and define expectations on the impact of management and board ownership on the profitability of traditional, diversified and non-traditional banks. I argue that the agency problem varies with the strategy of the bank as does the efficiency of ownership characteristics used as corporate governance mechanisms.

I present new insights on the impact of ownership characteristics on the profitability of banks with different strategy. I find that management ownership has a positive impact on the profitability of non-traditional banks. The results also suggest that management ownership has a positive impact on the profitability of diversified banks. Management ownership does, however, not have a positive and significant impact on risk-adjusted profitability, a finding which suggests that greater profitability is achieved by increasing the risk of the operations. The positive impact of management ownership on the profitability of non-traditional banks, and to some extent of diversified banks, indicates that banks which are difficult to monitor due to complexity in products and business model and/or high volatility in income streams benefit the most from management ownership. Hence it appears as if it is not the lack of incentives to monitor, but rather the too difficult to monitor aspect of the agency problem, which prevail in diversified banks. The greater complexity in the business model of diversified banks does not, however, seem to result in risk-averse behaviour among managers, or in extraction of private benefits; the inverted U-shape is not found among diversified banks. Finally, the finding that board ownership has a positive impact on the profitability of traditional banks indicates that increasing the monitoring incentives for the board is of greatest importance in banks where the government guarantees reduce the monitoring incentives of the depositors, but the business model is still not too complex for an outside monitor to grasp. Hence, I conclude the efficiency of ownership characteristics as corporate governance mechanisms are not the same across banks with different strategy. These findings have policy implications in they indicate that agency problem of traditional, diversified and non-traditional varies and that this should be accounted for in regulation as well guiding principles for good corporate governance in order to make these policies as efficient as possible.

Apart from the new insights on the efficiency of ownership characteristics as corporate governance mechanisms in banks with different strategy, the study contributes to the ownership literature with some empirical findings on the impact of management and board ownership on profitability on an aggregate level, i.e. where the strategy of the bank is not accounted for. First, it appears as if management ownership has a positive impact on profitability, which is inline with the finding presented in DeYoung *et al.* (2001). Moreover, management ownership does not appear to have a significant impact on risk-adjusted profitability. This finding suggests that management ownership also induce risk-taking behaviour, a finding previously reported by Saunders *et al.* (1990) and Sullivan & Spong (2007). With respect to the inverted U-shape relation between direct management ownership and profitability reported for banks by DeYoung *et al.* (2001), the results presented in this study do indicate that the relation is nonlinear. However, I do not find support for the finding presented in DeYoung *et al.* (2001) that board ownership would have a positive impact on bank profitability. Moreover, it appears as the impact of management ownership on profitability is greater in listed than in unlisted banks, which is in conflict with the notion that internal corporate governance mechanisms are of lesser importance in listed banks as they are under stricter control by external corporate governance mechanisms.

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Essay III

Comparison of profitability and risk in commercial, savings and cooperative banks

Abstract

Commercial banks are seen as shareholder value maximising banks, whereas savings banks may have a social or regional agenda and cooperative banks focus on providing value for their customer-owners. Hence, it is generally thought that savings and cooperative banks are less profitable than commercial banks. On the other hand, the risk-taking incentives are also lower. But is this really due to differences in objectives or rather due to differences in operational and ownership structure? The objective of this study is to answer this question. Using a sample of banks from 14 European countries, I find that the profitability and risk of savings and cooperative banks do differ from the one of commercial banks, but that the profitability and risk differences depend on the characteristics of the comparison group. Hence, it appears as if it is distinct operational and ownership characteristics rather than the mere fact that a bank is a savings or cooperative banks, which explain the differences in profitability and risk. Moreover, the profitability differences are smaller in countries with a competitive banking sector. These findings suggest that savings and cooperative banks are not to be treated as two homogenous groups of banks.

Keywords: savings banks, cooperative banks, profitability, risk, operational characteristics, ownership

JEL classification: G21, G32, L25

1 INTRODUCTION

Alongside commercial banks, savings and cooperative banks have an important role in the financial system¹. This is particularly true, in Austria, Germany, France, Portugal and Spain. In Austria the market shares of savings and cooperative banks are 19% and 32%, whereas they in Germany are 36% and 16%. In France almost half of the French citizens are savings bank customers, whereas cooperative banks account for 40% of the market share. In Portugal and Spain the market share of savings banks are 27% and 39%, respectively. The savings bank network is also wide in Finland, Norway and Sweden. The objectives of savings and cooperative banks are different from the shareholder maximisation objective of commercial banks. The main objectives of savings banks have traditionally been to enable savings opportunities to the general public, to carry out social or beneficiary work and to support the regional development projects (Gardener *et al.*, 1997, Bergendahl & Lindblom, 2008). The main objective of cooperative banks, on the other hand, has traditionally been to offer favourable deposits and loan prices to representatives of a particular profession or other group of retail customers (O'Hara, 1981, Altunbas *et al.*, 2001). Hence, savings and cooperative banks have had a crucial role in ensuring that all layers of the economy benefit from financial development.

Due to the other than profit maximisation objectives and lack of disciplinary measures in the form of concentrated ownership and market discipline, it is generally thought that savings and cooperative banks are less profitable than commercial banks. There are also elements of the savings and cooperative bank organisational form which restrains risk-taking incentives. The question is whether profitability and risk is in balance, or if the differing goals of savings and cooperative banks materialise in weaker performance measures. Garcia-Cestona & Surroca (2008) find that the main goal among savings banks controlled by the Public Administration, i.e. city halls and local and regional governments, is to contribute to the regional development, whereas savings banks which are controlled by insiders are more profit-maximisation oriented. The latter group does also have higher profitability. This finding indicates that differences in profitability and risk in comparison to commercial banks may not be a result of the mere fact that a bank is a savings or a cooperative bank, but rather a result of differences in ownership structure. In other words, the non-profit maximising objective may dominate only in savings and cooperative banks with a particular ownership structure. Moreover, differences in operational characteristics have an impact on the fairness of the profitability and risk comparison. If the size, focus and funding of the banking operations is not accounted for, the comparison will be bias in favour of banks operating in more profitable segments. Hence, the objective of this study is to examine the profitability and risk differences in European commercial, savings and cooperative banks, while accounting for differences in operational and ownership characteristics.

This study combines two approaches to examine the performance of savings and cooperative banks, i.e. the one where the performance of different types of banks are compared while controlling for operational characteristics and the one where the performance of banks of a particular type is examined while separating between differences in ownership structure. Valnek (1999), Altunbas *et al.* (2001) and Iannotta *et al.* (2007) represent the first approach. Valnek (1999) examine the profitability difference of mutual building societies and private retail banks. Using a sample of

¹ The data on savings banks is from Key ESBG Member statistics 2006 and ESBC (2006), whereas the data on cooperative banks is from McKillop (2005).

German banks, Altunbas *et al.* (2001) examine the difference in profit efficiency of private commercial banks, public savings banks and mutual cooperative banks, whereas Iannotta *et al.* (2007) examine the differences in profit and risk ratios of private commercial banks, government owned banks and mutual cooperative banks. Garcia-Cestona & Surroca (2008) compare the objectives and profitability of Spanish savings banks controlled by government authorities to the ones controlled by insiders and they represent hence the second approach. The concept of ownership is somewhat strange in a savings and cooperative bank setting as there in many instances is no ownership. Hence, the knowledge of differences in ownership structure across commercial, savings and cooperative banks is rather limited. This study presents some new insights on differences in the ownership structure of commercial, savings and cooperative banks by using a broad set of ownership variables accounting for state and management ownership as well as the ownership concentration and type of blockholder owner. Moreover, this study proposes an alternative approach to controlling for differences in operational characteristics, i.e. rather than controlling for individual operational characteristics, operational classes where operational variables are accounted for simultaneously are controlled for². Similarly, I control for ownership classes rather than individual ownership variables. Finally, as in Iannotta *et al.* (2007), where banks from 15 western European countries are examined, this study has a broader geographical coverage than Valnek (1999), Altunbas *et al.* (2001) and Garcia-Cestona & Surroca (2008). A broader coverage with respect to the geographical coverage, but also with respect to the type of banks included, operational and ownership characteristics accounted for, is of particular value in regulatory settings, where a comprehensive picture of the interactions across the different operational and ownership characteristics is of interest.

Using a sample of 411 bank-year observations from 232 European banks, I do find the differences in performance of commercial, savings and cooperative banks vary with the operational and ownership characteristics of the comparison group. The savings and cooperative banks are less profitable than commercial banks in some of the comparison groups, but the lower profitability is frequently associated with lower risk. In some comparison groups, the profitability and risk differences are insignificant. Finally, I find that the risk-adjusted profitability of cooperative banks is significantly lower than the one of commercial banks when the comparison is done across small traditional or diversified banks with low deposits to funding or listed banks with bank or fund blockholder owner. These findings suggest that among banks with some particular operational or ownership characteristics, the savings and cooperative bank organisational form is competitive with the one of commercial banks. It appears as if savings and cooperative banks with particular operational or ownership characteristics operate more like commercial banks than savings and cooperative banks, whereas other than profit-maximising objectives, which materialise in lower profitability and even higher risk, dominate in savings and cooperative banks without these characteristics.

² Differences in focus of operations have traditionally been accounted for by the input and output structures included in efficiency estimates, but this approach is very challenging to implement in a multi-country setting due to detailed data requirements. Altunbas *et al.* (2001) and Garcia-Cestona & Surroca (2008) apply data envelopment analysis (DEA) to define the profit efficiency to account for differences in input and output structures, i.e. operational characteristics of the banks. Iannotta *et al.* (2007) add bank specific control variables to the profit and risk regressions, whereas Valnek (1999) do not account for difference in operational characteristics.

2 SAVINGS AND COOPERATIVE BANKS

2.1. Objectives

Savings banks have traditionally been organised as mutual companies or private foundations established to support a particular social or regional cause. Hence, the main objectives of the savings banks have been, and still are, to enable saving opportunities for the general public, to carry out social or beneficiary work and to support regional development projects (Gardener *et al.*, 1997, Bergendahl & Lindblom, 2008). The profits of savings banks are allocated to the beneficiaries as stipulated by the controlling foundation. Hence, it is generally thought that savings banks are inclined to support regional projects rather than maximising shareholder wealth. Note, however, that a traditional savings bank, established and managed by a foundation, does not have access to outside funding in the same way as commercial and cooperative banks have, where the source for additional capital is either existing or new shareholders and cooperative members, respectively. Therefore, traditional savings banks are obliged to finance any growth strategies from retained earnings, which most probably will have a restraining impact on the distribution of profits to beneficiaries (Bergendahl & Lindblom, 2008).

The objectives of European savings banks do, however, vary in that they are organised in different ways (Garcia-Marco & Robles-Fernandez, 2008). The Norwegian and Spanish savings banks are private foundations. Note, however that there is no real ownership in the Spanish savings banks, as the composition of the governing bodies are determined by the regulator and allocated to depositors, employees, founder foundations and Public Administrations, such as city halls and local and regional governments (Garcia-Cestona & Surroca, 2008). The savings banks in Austria, Germany, Greece, Luxemburg, Portugal and Switzerland are public entities dominated by government authorities. In Belgium, Denmark, Finland, Ireland, Italy, the Netherlands and Sweden the savings banks are joint stock companies or private entities, but foundations or government authorities may still have shareholdings and influence on the operations (Garcia-Marco & Robles-Fernandez, 2008). Mutual building societies, which can be seen as savings banks, have a very strong position in UK (Valnek, 1999). In France, the savings banks are organised as mutual companies and hence close to the cooperative bank organisational form.

Historically, cooperative banks were established to offer lower interest rates on loans than the ones charged by private banks (O'Hara, 1981). To this end cooperative banks were structured as mutual companies owned by their customers. Contrary to the situation of savings banks, cooperative banks do have access to external funding in the form of voluntary capital injections by customers. However, in practice cooperative banks have to rely on retained earnings to finance investments. The wealth transfer to the customer-owners is also less flexible than the dividend mechanism available in commercial banks; the only way a cooperative bank can channel wealth to customer-owners are by increasing the net gain on loans and/or savings (Bauer, 2008). Therefore, the main objective of cooperative banks is to maximise customer-owner benefits by offering favourable interest rates on loans and deposits and lower transaction costs rather than maximising profits.

The customer-owners of cooperative banks frequently belong to a particular profession (Altunbas *et al.*, 2001). Kolari & Zardkoohi (1990) report that, in Finland, the greater majority of the outstanding credit of the cooperative banks, is devoted to the

agriculture sector. These findings support the prediction of the Hart & Moore (1996) model, which shows that the efficiency of cooperatives is higher if the customer-owners are homogenous. The government involvement in cooperative banks is usually limited as the credit cooperatives have been promoted by idealistic individuals with the view that help should only be sought and received within the cooperation (McKillop, 2005).

2.2. Agency problem

From a corporate governance perspective, there are a number of limitations to the cooperative bank organisational form³. First, as the customers of the cooperative banks are its owners, the ownership cannot be concentrated and hence the monitoring of management is limited (O'Hara, 1981). On the other hand, large depositors can be a substitute corporate governance mechanism, as they can threaten to withdraw the deposits in case of mismanagement (Rasmusen, 1988). Fama & Jensen (1983) argue that managers of mutual companies are more accountable to their owners than privately owned companies, as the withdrawal of deposits does real harm to the operations, whereas the disposal of shares only changes the ownership while the funds remain in the company. Note, however, that many cooperative banks focus on small retail customers thus reducing the threat of noticeable withdrawals. Hence, the ability of depositors to control managers is limited (Mester, 1991). Second, as payouts to depositors is their only obligation and as management cannot have ownership, there is no proper incentive mechanism to motivate management in cooperative banks (Rasmusen, 1988). Furthermore, management of cooperative banks are not restrained by the takeover threat as cooperative banks cannot be sold (O'Hara, 1981). The lack of monitoring and incentives can for example result in sub-optimisation, i.e. management are focused on the benefits of their own local or regional cooperative rather than on the benefits of the whole cooperation (O'Hara, 1981). The level of managerial discretion in cooperative banks is, however, reduced with increased focus in the operations. Mayers & Smith (1988) argue that the managerial discretion in a mutual insurance company can be limited if the operations are concentrated to a few lines of businesses rather than many.

There is also a number of positive attributes to cooperative banks. First, as cooperative banks are owned by their customers, the depositors, the conflict between shareholders and depositors is eliminated (Rasmusen, 1988). In other banks, the deposit insurance system induces risk-shifting as the explicit government guarantee that deposits will be covered in case of bank failure can be seen as a put option (Merton, 1977). As this risk-shifting incentive is missing in cooperative banks, they are expected to be less risky than other banks. Fama & Jensen (1983) argue that cooperative organisations prevail due to this unique approach to manage the agency problems. Second, as the management does not hold shares in the cooperative bank they do not have the incentives to take on risky investments as they will not benefit from the potential upside. Hence, this aspect also reduces the level of risk in cooperative banks in comparison to commercial banks, where management compensation is frequently linked to share performance (Rasmusen, 1988). The risk averse behaviour of management does, on the other hand, entail that high risk, high profit investments are not taken, hence reducing the overall profitability of cooperative banks (O'Hara, 1981). Third, Rasmusen (1988) shows that the fact that cooperative banks is expected to focus on low risk banking operations, results in a situation where cooperative banks will be the only alternative for ill-informed and unsophisticated depositors, which are

³ The limitations and benefits of the cooperative bank organisational form also apply to the mutual savings bank organisational form.

unprotected by the deposit insurance in that they are the last one in line in case of a bank run, hence reducing the probability that these customers will run.

2.3. Performance

The distinct preferences of the customer-owners in cooperative banks create pressure on profitability. Customer-owners with large deposits favour high interest rates, whereas customer-owners with large loans favour low lending rates, hence creating a margin squeeze, which potentially leads to a situation where one customer-owner group expropriates wealth from the other (Fried *et al.*, 1993, Hart & Moore, 1996). Moreover, there are restrictions on the scope of the activities savings and cooperative banks can operate in. E.g., small savings banks are generally allowed to operate only in a restricted geographical area and are obliged to service less fortunate customers (Altunbas *et al.*, 2001). Hence, the focus of the operations is on retail and small business customers rather than on corporate and institutional customers (Kolari & Zardkoohi, 1990, Altunbas *et al.*, 2001). Goddard *et al.* (2004) present empirical findings that the growth pace in savings and cooperative banks is slower in commercial banks, a finding which suggests that growth opportunities are limited due to regulatory restrictions on activities. On the other hand, differences in regulation may have a positive impact on the performance of savings and cooperative banks. Public sector cooperative and savings banks are AAA rated due to the government guarantees, which gives them a competitive advantage in purchasing money in the wholesale markets. However, Chakravarty & Williams (2006) show that the performance difference of public and private German banks cannot be explained by the relatively cheaper funding of public banks. Finally, the customer focus of cooperative banks may have positive implications for profitability. Shleifer & Vishny (1997) argue that companies which focus on customer value in the form of competitive prices and higher quality may achieve a higher shareholder value than companies strictly focusing on profit maximisation. Especially in combination with a short-term horizon, the latter strategy may result in overemphasis on cost-cutting, which jeopardises the service quality and customer satisfaction, which eventually, has an impact on profitability (Gardener *et al.*, 1997).

The empirical findings on differences in profitability and risk are inconclusive. O'Hara (1981) examines the profitability and risk of US savings and loans (S&L) in the 1970s. He finds that stock S&Ls are more profitable and cost efficient, but are also more risky than mutual S&Ls. When applying more sophisticated efficiency estimation techniques, Cebenoyan *et al.* (1993) find no difference in the efficiency of stock and mutual S&Ls, whereas Mester (1993) reports that mutual S&Ls are more efficient than stock S&Ls. On the other hand, Chen *et al.* (1998) find that that S&Ls are riskier than commercial banks, a finding which is inline with the findings presented in O'Hara. Looking at the empirical findings in a European context, Altunbas *et al.* (2001) apply a similar technique to the one used in Cebenoyan *et al.* (1993) and Mester (1993) to examine the efficiency of German banks. They find no evidence that privately owned commercial banks would be more efficient than publicly, i.e. government owned savings or mutually owned cooperative banks. They argue that the comparable performance of cooperative banks may be due to greater homogeneity across the customer-owners. Furthermore, they note that the higher cost and profit efficiency of savings and cooperative banks in comparison to commercial banks may be a result of lower funding costs. Recall that Chakravarty & Williams (2006) find conflicting evidence to the latter argument. Valnek (1999) and Iannotta *et al.* (2007) opt to use traditional accounting ratios rather than efficiency estimates when comparing bank performance. Valnek

(1999) report that UK mutual building societies have outperformed privately owned retail banks, both measured as unadjusted and risk-adjusted profitability. Note, however, that Valnek (1999) does not control for bank specific characteristics such as size and focus of the operations. This most probably have had an impact on the results, as mutual building societies are very focused, in that they only provide mortgage loans. In a sample of 15 European countries, Iannotta *et al.* (2007) find that mutual banks exhibit lower profitability than privately owned banks, even though the costs to income ratio is lower. Furthermore, they report that the mutual banks have better asset quality measured as loan loss provisions to total loans and that listed mutual banks are less risky than listed commercial banks measured as market return volatility. Similarly, Garcia-Marco & Robles-Fernandez (2008) report that in Spain, commercial banks are more risk-inclined than savings banks. The latter two findings confirm the hypothesis that the organisational structure of cooperative banks does restrain risk-taking.

Due to differences in objectives and regulatory restrictions, savings and cooperative banks have different operational characteristics than commercial banks. These differences, rather than differences in managerial efficiency, may explain differences in the profitability and risk of commercial, savings and cooperative banks. First, the size of the bank matters as large banks tend to be more efficient than small banks. Lang & Welzel (1996) find that there are moderate scale and scope economies in small German cooperative banks. The German cooperative banks do, however, not appear to be different from German commercial or savings banks in this respect; Altunbas *et al.* (2001) report economies of scale in both private commercial, public savings and mutual cooperative banks. Furthermore, size has an impact on the opacity of bank operations, which on the other hand has an impact on the level of agency costs (Flannery *et al.*, 2004, Iannotta, 2006). Furthermore, the implicit government guarantee that large banks will be bailed-out before they fail, i.e. are too-big-to-fail, will induce the management to increase risk (O'Hara & Shaw, 1990). Second, even though many savings and cooperative banks have added non-traditional banking operations to their portfolio thus reducing the operational differences in comparison to commercial banks, there is still a great variety in the operational models used in European banks (Gardener *et al.*, 1997)⁴. Tortosa-Ausina (2003) analyses the importance of accounting for non-traditional banking operations when estimating the cost efficiency of a bank. He finds that the exclusion of non-traditional banking operations affects the efficiency measures of commercial more than the ones of savings banks. Third, Goddard *et al.* (2008) report a joint impact of size and focus of operations on bank risk. They conclude that small credit unions should avoid diversification as it would increase the risk disproportionately, whereas large banks benefit from increasing the focus on non-traditional banking operations. Forth, the funding of operations has an impact on the profitability and risk of a bank. Banks with a high deposits to total funding ratio have access to low cost funding that can be seen as subsidised funding due to the deposit insurance (Iannotta *et al.*, 2007). A well capitalised bank is associated with less risk as the probability for financial distress and bankruptcy is smaller (Berger, 1995) and as the risk-taking incentives induced by the deposit insurance is lower (Brewer & Mondschean, 1994). As a result there is a positive connection between bank capitalisation and funding costs. Moreover, due to limited access to external capital, savings and cooperative banks may be inclined to hold more capital than regulatory requirements stipulate (O'Hara, 1981).

⁴ Note that differences in operational mix may be a sign of non-profit maximisation focus of the management; Mester (1991) examines the output mix of US mutual and stock S&Ls and find that mutual S&Ls do not optimise the scope of the operations, whereas stock S&Ls do have an efficient output mix.

The explanations for performance differences can also be sought in differences in the corporate governance of banks. A number of studies have examined the risk-taking behaviour in US S&Ls. Chen *et al.* (1998) find that the risk aversion of managers with increasing ownership is higher in S&Ls than commercial banks. When accounting for non-linearity in the relation between management ownership and risk-taking when examining US S&Ls, Cebenoyan *et al.* (1999) find that S&Ls with management ownership have higher risk provided that the level of ownership is higher than 23-28%. Hence, it appears as if the non-linearity is more accentuated in savings banks than in commercial banks. Furthermore, it appears as if the risk-taking can be restrained with regulatory mechanisms. Cebenoyan *et al.* (1999) find a connection between risk-taking and regulatory stringency; in S&Ls with substantial management ownership, risk-taking appears to have been unprofitable in the mid-1980s when banks were relatively less regulated, whereas it was profitable in the mid-1990s when bank regulation was stricter. Two European studies examine the impact of the “public well-being” objective of Spanish savings banks and whether this objective is equally strong in all savings banks regardless of their ownership structure. Garcia-Cestona & Surroca (2008) determine the goal priorities and profitability of Spanish savings banks and assess whether they differ with the controlling stakeholder. They distinguish between savings banks controlled by the Public Administration, i.e. city halls and local and regional governments and by insiders, i.e. managers and employees. The differences in goal priorities are accounted for in the data envelopment analysis (DEA) by including the voting distribution among stakeholders in the general meeting, which are determined by the legislator, in the model specification. Garcia-Cestona & Surroca (2008) find that for savings banks controlled by the Public Administration the main goal is to contribute to the regional development. Savings banks controlled by insiders, on the other hand, are focused on profit-maximization. The latter group does also have higher profitability than savings banks controlled by the Public Administration. Garcia-Marco & Robles-Fernandez (2008) examine the risk behaviour of Spanish savings banks. They report that the risk of savings banks controlled by the Public Administration is not significantly different from the risk of other banks⁵.

Finally, savings and cooperative banks have to balance between fulfilling their idealistic objectives and addressing economic realities, i.e. in order to be able to compete with other financial intermediaries they also have to operate as economic entities (Fried *et al.*, 1993). This is expected to be particularly true if the competition on the banking market is fierce (Bhattacharya & Thakor, 1993). Estimates of performance persistence give some indications of the level of competition or opacity in the bank operations (Berger *et al.*, 2000). It appears as if competition has not to date driven savings and cooperative banks toward a greater focus on profit maximisation. Cebenoyan *et al.* (2004) find that there is performance persistence in US stock chartered thrifts. Goddard *et al.* (2004), on the other hand, find that the performance persistence of savings and cooperative banks in France, Italy, Germany, Spain and UK is higher than the one of commercial banks⁶. This line of argument does, however, conflict with the result of the Hart & Moore (1996) model, which indicate that the profitability differences would increase with the level of competition as competition does not have an impact on the efficiency of cooperative banks, whereas the efficiency of commercial banks improve with the level of competition.

⁵ While examining US S&Ls, Cebenoyan *et al.* (1999) find a connection between risk-taking and regulatory stringency; in S&Ls with substantial management ownership, risk-taking appears to have been unprofitable in the mid-1980s when banks were relatively less regulated and profitable in the mid-1990s when bank regulation was stricter.

⁶ Note, however, that the result is not stable for inclusion of a number of control variables in the model specification.

3 METHODOLOGY

3.1. Research question

The objectives and organisational structure of savings and cooperative banks differ from the ones of commercial banks and hence it is generally thought that the profitability and risk of savings and cooperative banks differ from that of commercial banks. Differences in operational characteristics have been addressed in a number of empirical studies by estimating the cost and profit efficiencies, where differences in inputs and outputs are accounted for. Garcia-Cestona & Surroca (2008) develop the performance comparison by distinguishing between different characteristics of the controlling stakeholder and objectives when comparing the efficiency of Spanish savings banks. A similar methodology has not been used when comparing the performance of different types of banks. Hence, the objective of this study is to examine differences in profitability and risk of commercial, savings and cooperative banks while accounting for both operational and ownership characteristics. The broader geographical scope does inevitably put some restrictions on data availability, hence making efficiency estimations challenging. Thus I rely on a simpler methodology.

3.2. Data

The sample includes commercial, savings and cooperative⁷ banks from 14 European countries. Only the countries where there is at least one savings or cooperative bank with financial and ownership data in the BankScope database are included in the study. Note that the availability of ownership data for savings and cooperative banks is restricted due to their organisational form. Hence, e.g. Spain, where the voting rights in the savings banks are allocated by the legislator, is not among the sample countries. Financial and ownership data is retrieved from the BankScope International Bank Database, which is provided by Fitch/Bureau Van Dijk. I restrict the financial data to consolidated financial statements in order to bring the perspective as close to the ultimate owners as possible. The use of consolidated data also brings the analysis closer to the real economic situation faced by owners and managers; Stiroh & Rumble (2006) argue that one can presume that strategic decisions are made with the entire operation in mind. Moreover, the use of a consolidated data rather than data on individual savings and cooperative bank entities adds to the comparability to commercial banks, which are structured as branches rather than individual legal entities. The use of consolidated financial statements does, however, impose a risk of multiple counting of entries of the same organisation at different level of consolidation⁸. Hence, I impose a cap on institutional ownership and exclude banks which are majority owned by another European bank assumed to be included in the database. I start with 672 bank-year observations for active banks with matched financial and direct ownership data for a particular year. 216 observations are dropped due to the restriction on majority ownership of another European bank, reducing the sample to 456 observations. Of these observations 45 are regarded as outliers, i.e. the *ROE* is outside the 5% and 95% percentile. The final sample includes 411 bank-year observations of matched financial and ownership data for 232 European banks. There are 156 commercial banks, 42 savings banks and 34 cooperative banks (see Table 1). Of the countries included in the sample, Austria, France, Italy and Norway are well represented. In Finland and Sweden

⁷ Mutual building societies, which are coded as real estate banks in the BankScope database, are not included in the sample as their operations are limited to provide only mortgage loans (Valnek, 1999).

⁸ This issue has been raised by e.g. Bonin *et al.* (2005) and Micco *et al.* (2007).

the separate legal savings banks entities are included in the consolidated data of Aktia Savings bank plc and Swedbank AB, respectively. Many of the German savings banks are organised as private associations or governed by local authorities and does not have explicit ownership and are therefore excluded from the sample. With a few exceptions the bank-year observations are from the years 2003 to 2006 (1.5% are dated 2001 or 2002).

Table 1 Number of commercial, savings and cooperative banks in the sample countries

	<i>COM</i>	<i>SAVE</i>	<i>COOP</i>	<i>Total</i>		<i>COM</i>	<i>SAVE</i>	<i>COOP</i>	<i>Total</i>
<i>Western Europe</i>	131	40	32	203	<i>Eastern Europe</i>	25	2	2	29
Austria	11	4	3	18	Poland	5	1	1	7
Belgium	3	1	0	4	Romania	3	1	0	4
Denmark	12	2	0	14	Turkey	17	0	1	18
Finland	2	1	0	3					
France	29	7	16	52					
Germany	18	1	2	21					
Italy	21	6	11	38					
Norway	1	14	0	15					
Portugal	6	2	0	8					
Schweiz	23	1	0	24					
Sweden	5	1	0	6					
				<i>Total</i>		156	42	34	232

This table presents the number of banks of each country included in the sub-samples of commercial (*COM*), savings (*SAVE*) and cooperative banks (*COOP*) and in the full sample.

3.3. Definition of variables and descriptive statistics

3.3.1. Profitability and risk variables

I do recognise that the differing objectives of commercial, savings and cooperative banks are difficult to account for in simple accounting ratios. While examining the performance of Australian credit unions, Worthington (1998) find that the total expenses to assets and total income to total expenses ratios are inline with profit efficiency estimations when only profit maximising objectives are accounted for, whereas these ratios are inappropriate when the member-oriented behavioural objectives are accounted for. Similarly, Bauer (2008) questions the use of the return on equity ratio for cooperative banks. He presents two methods for detecting abnormal profits in credit unions, where the decisions to tackle the threat of margin squeezes resulting from differing objectives of borrower customer-owners and depositor customer-owners are accounted for. Even so, I use traditional accounting ratios to assess whether the profitability and risk profiles of commercial, savings and cooperative banks with similar operational or ownership characteristics are the same.

The starting point when evaluating bank performance is frequently the efficiency of the operations. Hence, I include the efficiency measure frequently used in a banking setting, i.e. total operating costs to total operating income, in the analysis. This variable is denoted *COSTINC*. Following Iannotta *et al.* (2007), I include the pre-tax profits to total earnings assets ratio, denoted as *PROFIT*, as the first profitability variable. In addition, I include return on equity (*ROE*), which is the profitability variable of most interest to shareholders. When defining the risk variables, I again follow Iannotta *et al.* (2007) and include loan loss provisions to total loans and the z-score. These variables are denoted *LOANLOSS* and *Z-SCORE*. *LOANLOSS* can be seen as a proxy for asset

quality, but does also give an indication of the cost of the risk exposure of the bank (Valnek, 1999). The *Z-SCORE*, on the other hand, gives the number of standard deviations that a bank's return on asset (*ROA*) has to drop before the bank is insolvent, i.e. the equity is depleted. The average equity and asset figures are used rather than year end figures. Due to limited availability of historical data, the standard deviation in *ROA* is estimated only over three years. I take the natural logarithm of the *Z-SCORE* as it is highly skewed. Finally, I account for the impact on profitability and risk jointly, by adjusting *ROE* for the level of risk measured as the three year standard deviation in *ROE*. This variable is denoted *ROE_RA*. Table 2 summarises the definitions of the profitability and risk variables.

Table 2 Definition of profitability and risk variables

<i>COSTINC</i>	Total operating expenses to total operating income
<i>PROFIT</i>	Pre-tax profit to total earning assets
<i>ROE</i>	Return on average equity
<i>LOANLOSS</i>	Loan loss provisions to total loans
<i>Z-SCORE</i>	Return on average assets plus the equity to total assets ratio divided by the three year standard deviation in return on average assets
<i>ROE_RA</i>	<i>ROE</i> divided by the three year standard deviation in <i>ROE</i>

3.3.2. Operational variables

The operational variables included in the analysis are selected based on the findings of previous studies that the size, focus and funding of the bank operations have an impact on the profitability and risk of a bank (see section 2.3). First, *SIZE*, measured as the natural logarithm of total assets, account for differences in economies of scale, but also for differences in complexity of the operations. In order to examine whether there are differences in the recent changes in the size of the banks, I also include *GROWTH* defined as the three year annual growth in assets and two variables for M&A activity; *M&A_BUY* is a dummy variable taking the value one if *GROWTH* is greater than 30% and zero otherwise, whereas *M&A_SELL* is a dummy variable taking the value one if *GROWTH* is less than -5% and zero otherwise (I follow Baele *et al.* (2007) when selecting the cut-off points). Second, three sets of variables are used to examine differences in the focus of operations. The asset based variables are total loans to total earning assets and off-balance sheet items to total assets, denoted as *LOANS* and *OFFBALANCE*, respectively. The income based variables are interest income to total operating income, and the different categories of non interest income; net commission revenue to total operating income, net trading revenues to total operating income and other non interest income than commission and trading income to total operating income. These variables are denoted *INTINC*, *COMMISSION*, *TRADING* and *OTHINC*. Following the approach used in Laeven & Levine (2007) to distinguish between focused and highly diversified banks, I define three strategy dummy variables based on the average of non interest income to total operating income and other earning assets than loans to total assets taking into account off-balance sheet items. A bank is categorised as traditional if the average ratio is less than 1/3, as diversified if the average ratio is within the range of 1/3 and 2/3, and non-traditional if the average ratio is greater than 2/3. These strategy variables are denoted *TRAD*, *DIV* and *NONTRAD*. Third, I account for differences in the funding of operations by including the total deposits to total funding ratio, denoted as *DEPOSITS*, and the total equity to total assets ratio, denoted as *EQUITYASS*, in the model specification. Table 3 summarises the definitions of the operational variables.

Table 3 Definition of operational variables

<i>Size of operations</i>	
<i>SIZE</i>	Natural logarithm of total assets
<i>GROWTH</i>	Three year compounded growth in assets
<i>M&A_BUY</i>	Dummy variable taking the value 1 if <i>GROWTH</i> is greater than 30% and 0 otherwise
<i>M&A_SELL</i>	Dummy variable taking the value 1 if <i>GROWTH</i> is less than -5% and 0 otherwise
<i>Focus of operations – asset based variables</i>	
<i>LOANS</i>	Total loans to total earning assets
<i>OFFBALANCE</i>	Off-balance sheet items to total assets
<i>Focus of operations – income based variables</i>	
<i>INTINC</i>	Interest income to total operating income
<i>COMMISSION</i>	Net commission revenues to total operating income
<i>TRADING</i>	Net trading revenues to total operating income
<i>OTHINC</i>	Other non income than interest commission and trading revenues to total operating income
<i>Focus of operations – strategy variables</i>	
<i>TRAD</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total earnings assets taking into account off balance sheet items is below 1/3 and 0 otherwise
<i>DIV</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total earnings assets taking into account off balance sheet items is within the range of 1/3 and 2/3 and 0 otherwise
<i>NONTRAD</i>	Dummy variable taking the value 1 if the average of the non interest income to total operating income ratio and the other earning assets to total assets taking into account off balance sheet items is above 2/3 and 0 otherwise
<i>Funding of operations</i>	
<i>DEPOSIT</i>	Total deposits to total funding
<i>EQUITYASS</i>	Equity to total assets

In order to be able to assess the profitability and risk differences while accounting for the different operational characteristics simultaneously, I classify the banks into sub-samples of banks with similar operational characteristics⁹. The full range of operational variables is not included in the classification. First, *GROWTH* and *M&A* are excluded due to limited number of observations. Second, the strategy variables *TRAD*, *DIV* and *NONTRAD*, are based on *LOANS*, *OFFBALANCE* and *INITINC*, hence making the latter variables redundant. Third, as the classification is based on categorical variables, I define sub-samples of large vs. small banks and banks with high vs. low deposits to total funding ratio and high vs. low equity to asset ratio. The cut-off point is set at the sample median. These dummy variables are denoted *LARGE*, *SMALL*, *DEPOSITS_HIGH*, *DEPOSITS_LOW*, *EQUITYASS_HIGH* and *EQUITYASS_LOW*. I recognise that the classification is a simplification as the median cut-off point is very rough as it does for example not account for country differences in banking structure. It does however, enable me to distinguish sub-sample of banks which primarily include commercial banks based on several operational characteristics simultaneously rather than only on one operational characteristic at a time.

⁹ I apply the Two Way Indicator Species Analysis (TWINSPAN) classification (see Hill, 1979). The data set is divided from the top, i.e. first the whole data set is divided into two sub-samples, which in the second step are divided into two sub-samples each generating four sub-samples, which in the third step are split into two sub-samples each generating eight sub-samples, and so forth. The division is based on several variables (polythetic classification) and is done based on the scores along the first ordination axes of a PCA where the observations are weighted.

The classification generates eight classes of banks with similar operational characteristics (see Table 4 for the steps in the classification process). These can be described as traditional banks with high deposits to funding ratio (*OPER_1*), large banks with low deposits to funding ratio (*OPER_2*), large banks with high equity to asset ratio (*OPER_3*), diversified banks with low equity to asset ratio (*OPER_4*), small non-traditional banks with high deposits to funding ratio (*OPER_5*), small traditional or diversified banks with high deposits to funding ratio (*OPER_6*), small traditional or diversified banks with low deposits to funding (*OPER_7*), and small non-traditional banks with low deposits to funding (*OPER_8*). The number of commercial, savings and cooperative banks varies across these operational classes. There are no savings or cooperative banks in *OPER_5* and *OPER_8*. Hence, these operational classes are excluded from the analysis. Note that there are no cooperative banks in *OPER_1* or *OPER_6*, but as there are as many as twenty-five and seven bank-year observations for savings banks, these operational classes are included in the analysis.

3.3.3. Ownership variables

Following the finding of Garcia-Cestona & Surroca (2008) that the objectives and performance of Spanish savings banks depend on whether they are controlled by Public Administrations or insiders, I account for whether a bank has state ownership or not. Hence, *STATE* is defined as a dummy variable taking the value one if at least one of the eight owners or ownership groups included in the BankScope database is a government authority and zero otherwise. Furthermore, I account for the level of state ownership with dummy variables taking the value one if the direct ownership of government authorities is greater than 10% and 50%, respectively. These variables are denoted *STATE10* and *STATE50*. I account for the management ownership by including a dummy variable taking the value one if at least one of the eight owners or ownership groups included in the BankScope database is a member of the management team and zero otherwise¹⁰. This variable is denoted *MGT*. Following Iannotta *et al.* (2007), I include a dummy variable taking the value one if the bank is listed and zero otherwise. This variable is denoted *LISTED*. Moreover, I account for the level of ownership concentration by including a dummy variable taking the value one if the owner with the largest direct ownership has a direct ownership stake of at least 10% and is an institutional owner and zero otherwise. This variable is denoted *BL_INST*. I recognise that different blockholder owners may have different interests (Levine, 2004) and different ability to monitor banks (Rochet & Tirole, 1996, Adams & Mehran, 2003). Hence, institutional blockholder owners are categorised as banks (*BL_BANK*), financial companies (*BL_FINANCIAL*), industrial companies (*BL_INDUSTRY*), insurance companies (*BL_INSURANCE*), mutual or pension funds, trusts or nominees (*BL_FUND*), or foundations (*BL_FOUNDED*). In addition, *BL_FOREIGN* is defined as a dummy variable taking the value one if the home country of the blockholder owner is different from the one of the bank and zero otherwise. Table 5 summarises the definitions of the ownership variables.

¹⁰ In the BankScope database owners are categorised e.g. as “Management and employees” or “Individuals and families”. These owners have been checked and recoded as “Management”, “Board”, “Employees” and “Private” with the help of company home pages and annual reports.

Table 4 Classification of banks based on operational variables

Bank-year observations in the full sample: 411	
Step 1	<p>Eigenvalue: 0.413</p> <p>Obs: 245 LARGE (200,6), EQUITY_LOW (202,3) SMALL (45,160), NONTRAD (18,55), EQUITY_HIGH (43,168)</p> <p>Obs: 166 TRAD (86,31), DIV (141,80), DEPO_LOW (127,78), DEPO_HIGH (118,88)</p> <p>Eigenvalue: 0.286</p>
	<p>Eigenvalue: 0.331</p> <p>Obs: 148 TRAD (79,7), DEPO_LOW (122,5)</p> <p>Obs: 97 DIV (55,86), DEPO_HIGH (26,92), EQUITY_HIGH (8,35)</p> <p>Obs: 88 DEPO_HIGH (88,0)</p> <p>Obs: 78 DEPO_LOW (0,78)</p> <p>Eigenvalue: 0.257</p> <p>Obs: 41 SMALL (25,2), TRAD (41,38), DEPO_HIGH (26,0)</p> <p>Obs: 61 TRAD (0,13), DIV (0,48)</p> <p>Obs: 50 TRAD (18,0), DIV (32,0)</p> <p>Obs: 28 NONTRAD (0,28)</p>
Step 2	<p>Eigenvalue: 0.409</p> <p>Obs: 107 LARGE (16,105), DIV (0,55), DEPO_LOW (5,107)</p> <p>Obs: 35 EQUITY_HIGH (35,0)</p> <p>Obs: 62 SMALL (0,18), EQUITY_LOW (0,62)</p> <p>Obs: 27 NONTRAD (27,0)</p> <p>Obs: 279 SMALL (84,76), TRAD (13,18), DIV (48,32), NONTRAD (27,28), EQUITY_HIGH (85,78)</p> <p>Eigenvalue: 0.370</p> <p>Obs: 148 LARGE (121,79), EQUITY_LOW (140,62)</p> <p>Obs: 35 LARGE (35,44), DEPO_HIGH (30,62)</p> <p>Obs: 61 SMALL (23,61), DEPO_HIGH (27,61), EQUITY_HIGH (24,61)</p> <p>Obs: 50 SMALL (50,26), DEPO_LOW (50,28), EQUITY_HIGH (50,28)</p>
	<p>Eigenvalue: 0.409</p> <p>Obs: 107 LARGE (16,105), DIV (0,55), DEPO_LOW (5,107)</p> <p>Obs: 35 EQUITY_HIGH (35,0)</p> <p>Obs: 62 SMALL (0,18), EQUITY_LOW (0,62)</p> <p>Obs: 27 NONTRAD (27,0)</p> <p>Obs: 279 SMALL (84,76), TRAD (13,18), DIV (48,32), NONTRAD (27,28), EQUITY_HIGH (85,78)</p> <p>Eigenvalue: 0.370</p> <p>Obs: 148 LARGE (121,79), EQUITY_LOW (140,62)</p> <p>Obs: 35 LARGE (35,44), DEPO_HIGH (30,62)</p> <p>Obs: 61 SMALL (23,61), DEPO_HIGH (27,61), EQUITY_HIGH (24,61)</p> <p>Obs: 50 SMALL (50,26), DEPO_LOW (50,28), EQUITY_HIGH (50,28)</p>
Step 3	<p>Eigenvalue: 0.409</p> <p>Obs: 107 LARGE (16,105), DIV (0,55), DEPO_LOW (5,107)</p> <p>Obs: 35 EQUITY_HIGH (35,0)</p> <p>Obs: 62 SMALL (0,18), EQUITY_LOW (0,62)</p> <p>Obs: 27 NONTRAD (27,0)</p> <p>Obs: 279 SMALL (84,76), TRAD (13,18), DIV (48,32), NONTRAD (27,28), EQUITY_HIGH (85,78)</p> <p>Eigenvalue: 0.370</p> <p>Obs: 148 LARGE (121,79), EQUITY_LOW (140,62)</p> <p>Obs: 35 LARGE (35,44), DEPO_HIGH (30,62)</p> <p>Obs: 61 SMALL (23,61), DEPO_HIGH (27,61), EQUITY_HIGH (24,61)</p> <p>Obs: 50 SMALL (50,26), DEPO_LOW (50,28), EQUITY_HIGH (50,28)</p>
	<p>Eigenvalue: 0.409</p> <p>Obs: 107 LARGE (16,105), DIV (0,55), DEPO_LOW (5,107)</p> <p>Obs: 35 EQUITY_HIGH (35,0)</p> <p>Obs: 62 SMALL (0,18), EQUITY_LOW (0,62)</p> <p>Obs: 27 NONTRAD (27,0)</p> <p>Obs: 279 SMALL (84,76), TRAD (13,18), DIV (48,32), NONTRAD (27,28), EQUITY_HIGH (85,78)</p> <p>Eigenvalue: 0.370</p> <p>Obs: 148 LARGE (121,79), EQUITY_LOW (140,62)</p> <p>Obs: 35 LARGE (35,44), DEPO_HIGH (30,62)</p> <p>Obs: 61 SMALL (23,61), DEPO_HIGH (27,61), EQUITY_HIGH (24,61)</p> <p>Obs: 50 SMALL (50,26), DEPO_LOW (50,28), EQUITY_HIGH (50,28)</p>
	<p>39% / 61% / 0%</p> <p>OPER_1</p>
	<p>58% / 16% / 26%</p> <p>OPER_2</p>
	<p>49% / 9% / 43%</p> <p>OPER_3</p>
	<p>71% / 18% / 11%</p> <p>OPER_4</p>
	<p>100% / 0% / 0%</p> <p>OPER_5 (excl.)</p>
	<p>89% / 11% / 0%</p> <p>OPER_6</p>
	<p>80% / 8% / 12%</p> <p>OPER_7</p>
	<p>100% / 0% / 0%</p> <p>OPER_8 (excl.)</p>

This table shows the steps of the classification of bank-year observations based on the operational variables SMALL vs. LARGE, DEPO_LOW vs. DEPO_HIGH and EQUITY_LOW vs. EQUITY_HIGH derived from SIZE, DEPOSITS or EQUITYASS with the cut-off point set at the median value and TRAD, DIV and NONTRAD, which are as defined in Table 3. The eigenvalue indicates the explanatory power of the split of bank-year observations into the two sub-samples on each step. The negative and positive preferentials are the variables dictating the split. The negative preferentials are listed to the left, the positive preferentials to the right. The non-preferentials listed below the left and right preferentials do not have an impact on the classification at that particular step. The figures in the parenthesis indicate the occurrence of the variable in the negative vs. positive preferential group. The share of bank-year observations from the sub-samples of COM, SAVE and COOP as well as the denotation of the class is shown at the bottom of the table. Excl. indicates that the operational class is excluded as there are no savings or commercial banks in the particular class.

Table 5 Definition of ownership variables

<i>Some selected ownership categories</i>	
<i>STATE</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database is a government authority and 0 otherwise
<i>STATE10</i>	Dummy variable taking the value 1 if the direct ownership by a government authority is greater than 10%
<i>STATE50</i>	Dummy variable taking the value 1 if the direct ownership by a government authority is greater than 50%
<i>MGT</i>	Dummy variable taking the value 1 if any of the eight owners included in the BankScope database is a management team member and 0 otherwise
<i>Dispersed vs. concentrated ownership</i>	
<i>LISTED</i>	Dummy variable taking the value 1 if the bank is listed and 0 otherwise
<i>BL_INST</i>	Dummy variable taking the value 1 if the direct ownership of the largest direct owner is at least 10% and the largest direct owner is an institution and 0 otherwise
<i>Type of institutional blockholder owner</i>	
<i>BL_BANK</i>	Dummy variable taking the value 1 if the institutional blockholder owner is a bank and 0 otherwise
<i>BL_FINANCIAL</i>	Dummy variable taking the value 1 if the institutional blockholder owner is a financial company and 0 otherwise
<i>BL_INSURANCE</i>	Dummy variable taking the value 1 if the institutional blockholder owner is an insurance company and 0 otherwise
<i>BL_FUND</i>	Dummy variable taking the value 1 if the institutional blockholder owner is a mutual or pension fund, a trust or nominee and 0 otherwise
<i>BL_FOUND</i>	Dummy variable taking the value 1 if the institutional blockholder owner is a foundation and 0 otherwise
<i>BL_INDUSTRY</i>	Dummy variable taking the value 1 if the institutional blockholder owner is an industrial company and 0 otherwise
<i>BL_FOREIGN</i>	Dummy variable taking the value 1 if the institutional blockholder owner is foreign, i.e. its home country is different from the one of the bank, and 0 otherwise

In order to account for simultaneity in the ownership characteristics, I classify the banks into sub-samples of banks with similar ownership structure. The classification, which is based on the full list of ownership variables as defined in Table 5, generates eight classes of banks (see Table 6 for the steps in the classification process). These can be described as unlisted state owned banks with bank blockholder owner (*OWN_1*), listed banks with bank or fund blockholder owner (*OWN_2*), unlisted banks with institutional blockholder owner (*OWN_3*), listed banks with industrial or financial company blockholder owner (*OWN_4*), unlisted banks with no management or institutional blockholder owner (*OWN_5*), unlisted banks with management ownership and no institutional blockholder owner (*OWN_6*), listed banks no institutional blockholder owner (*OWN_7*), and unlisted state owned banks with no institutional blockholder owner (*OWN_8*). As with the operational classes, the number of commercial, savings and cooperative banks varies across these ownership classes. There are no savings or cooperative banks in *OWN_6* and only very few savings and cooperative bank in *OWN_1* and *OWN_8*. Hence, these ownership classes including banks with state or management ownership are excluded from the analysis. Note that there are only two bank-year observations for savings banks in *OWN_4* and *OWN_5*, but as there are seven respectively eleven cooperative banks, these ownership classes are included in the analysis.

Table 6 Classification of the banks based on ownership variables

Bank-year observations in the full sample: 411		
Eigenvalue: 0.322		
Step 1	Obs: 299 <i>BL_INST_Y</i> (299,0), <i>BL_BANK_Y</i> (71,0), <i>BL_INDUSTRY_Y</i> (115,0) STATE_N (289,103), <i>MGT_N</i> (284,95), <i>LISTED_Y</i> (108,61), <i>LISTED_N</i> (191,51)	Obs: 112 <i>BL_INST_N</i> (0,112)
Step 2	Eigenvalue: 0.222 Obs: 60 <i>LISTED_Y</i> (55,53), <i>BL_BANK_Y</i> (34,37), <i>BL_FUND_Y</i> (15,11) STATE_N (50,239), <i>MGT_N</i> (58,226), <i>BL_INST_Y</i> (60,239), <i>BL_FOREIGN_Y</i> (15,38)	Eigenvalue: 0.343 Obs: 46 <i>MGT_Y</i> (17,0), <i>LISTED_N</i> (46,5) STATE_N (46,57), <i>MGT_N</i> (29,66), <i>BL_INST_N</i> (46,66)
Step 3	Eigenvalue: 0.279 Obs: 10 <i>STATE_Y</i> (10,0), <i>STATE10</i> (3,0), <i>LISTED_N</i> (5,0) <i>MGT_N</i> (10,48), <i>BL_INST_Y</i> (10,50), <i>BL_BANK_Y</i> (6,28), <i>BL_FUND_Y</i> (4,11), <i>BL_FOREIGN_Y</i> (4,11)	Eigenvalue: 0.250 Obs: 29 <i>MGT_N</i> (29,0) STATE_N (29,17), <i>LISTED_N</i> (29,17), <i>BL_INST_N</i> (29,17)
	Eigenvalue: 0.253 Obs: 186 <i>LISTED_N</i> (186,0) STATE_N (186,53), <i>MGT_N</i> (178,48), <i>BL_INST_Y</i> (186,53), <i>BL_FINANCIAL_Y</i> (34,13), <i>BL_INDUSTRY_Y</i> (75,40)	Eigenvalue: 0.429 Obs: 58 <i>STATE_N</i> (57,0), <i>LISTED_Y</i> (58,3) STATE_Y (1,8), <i>STATE10</i> (0,8), <i>STATE50</i> (0,5), <i>LISTED_N</i> (0,5)
	80% / 10% / 10% OWN_1 (excl.)	55% / 7% / 38% OWN_5
	66% / 8% / 26% OWN_2	100% / 0% / 0% OWN_6 (excl.)
	74% / 19% / 6% OWN_3	48% / 33% / 19% OWN_7
	85% / 4% / 11% OWN_4	38% / 37% / 25% OWN_8 (excl.)

This table shows the steps of the classification of bank-year observations based on the the ownership variables as defined in Table 5. The extensions *Y* and *N* indicate whether the dummy variable takes the value 1 or 0, respectively. The eigenvalue indicates the explanatory power of the split of bank-year observations into the two sub-samples on each step. The negative and positive preferentials are the variables dictating the split. The negative preferentials are listed to the left, the positive preferentials to the right. The non-preferentials listed below the left and right preferentials do not have an impact on the classification at that particular step. The figures in the parenthesis indicate the occurrence of the variable in the negative vs. positive preferential group. The share of bank-year observations from the sub-samples of *COM*, *SAVE* and *COOP* as well as the denotation of the class is shown at the bottom of the table. *Excl.* indicates that the ownership class is excluded as there are no savings or commercial banks in the particular class.

3.4. Model specification

The model specifications applied in this study are similar to the ones used in Valnek (1999) and Iannotta *et al.* (2007)¹¹. The starting point is a model specification where the dummy variables *SAVE* and *COOP*, which indicate whether the bank *i*, in a particular point in time *t*, is a savings or cooperative bank or not, are included (see Equation (1)). The dependent variable *PROF/RISK* is either *COSTINC*, *PROFIT*, *ROE*, *LOANLOSS*, *Z-SCORE* or *ROE_RA*. I control for time variation with the vector *YEAR*, which included dummy variables for each of the years included in the sample. Differences in the institutional and environmental factors such as the regulatory environment, the level of economic and technological development and the structure of the financial system are accounted for by including the vector *COUNTRY* with country dummy variables in the model specification¹².

$$PROF / RISK_{i,t} = \alpha + \beta_1 * SAVE_{i,t} + \beta_2 * COOP_{i,t} + \beta * [YEAR_{i,t}] + \beta * [COUNTRY_{i,t}] + \varepsilon_{i,t} \quad (1)$$

In a first attempt to control for differences in operational and ownership characteristics, I control for the operational and ownership classes that, with only a few exceptions, include commercial banks (see Table 4 and Table 6 for the definition of these operational and ownership classes).

$$\begin{aligned} PROF / RISK_{i,t} = & \alpha + \beta_1 * SAVE_{i,t} + \beta_2 * COOP_{i,t} + \beta_3 * OPER_5_{i,t} + \beta_4 * OPER_8_{i,t} \\ & + \beta_5 * OWN_1_{i,t} + \beta_6 * OWN_6_{i,t} + \beta_7 * OWN_8_{i,t} \\ & + \beta * [YEAR_{i,t}] + \beta * [COUNTRY_{i,t}] + \varepsilon_{i,t} \end{aligned} \quad (2)$$

Second, I compare the profitability and risk of commercial, savings and cooperative banks within the same operational class, while excluding commercial banks with ownership characteristics not found in savings and cooperative banks. To this end the operational classes are interacted with the dummy variables *SAVE* and *COOP* one at a time (see Equation (3)). Similarly, I compare the profitability and risk of commercial, savings and cooperative banks within the same ownership class, while excluding banks with operational characteristics not found in savings and cooperative banks (see Equation (4)).

$$\begin{aligned} PROF / RISK_{i,t} = & \alpha + \beta_1 * SAVE_{i,t} + \beta_2 * COOP_{i,t} + \beta_3 * OPER_X_{i,t} \\ & + \beta_4 * SAVE_{i,t} * OPER_X_{i,t} + \beta_5 * COOP_{i,t} * OPER_X_{i,t} + \beta_6 * OWN_1_{i,t} \\ & + \beta_7 * OWN_6_{i,t} + \beta_8 * OWN_8_{i,t} + \beta * [YEAR_{i,t}] + \beta * [COUNTRY_{i,t}] + \varepsilon_{i,t} \end{aligned} \quad (3)$$

$$\begin{aligned} PROF / RISK_{i,t} = & \alpha + \beta_1 * SAVE_{i,t} + \beta_2 * COOP_{i,t} + \beta_3 * OWN_X_{i,t} \\ & + \beta_4 * SAVE_{i,t} * OWN_X + \beta_5 * COOP_{i,t} * OWN_X_{i,t} + \beta_6 * OPER_5_{i,t} \\ & + \beta_7 * OPER_8_{i,t} + \beta * [OPER_{i,t}] + \beta * [YEAR_{i,t}] + \beta * [COUNTRY_{i,t}] + \varepsilon_i \end{aligned} \quad (4)$$

¹¹ Based on the previous empirical findings of performance persistence reported by for example Berger *et al.* (2000), Cebenoyan *et al.* (2004) and Goddard *et al.* (2004), lagged profitability variables could have been included in the model specification. This approach would, however, have reduced the already limited sample size substantially and is hence not implemented.

¹² A country is grouped with a neighbouring country if there are less than ten bank-year observations from the particular country.

4 EMPIRICAL EVIDENCE

4.1. Descriptive statistics

The profitability variables *COSTINC*, *PROFIT* and *ROE* is available for all 411 bank-year observations, whereas the number of bank-year observations for the risk variables is lower (see Table 7). The average *COSTINC* is 67%, whereas the profitability variables *PROFIT* and *ROE* have averages of 1.8% and 10.8% respectively. The average *LOANLOSS* is 0.5%, but ranges from -29% to 29%. There is also great variation in *Z-SCORE* and *ROE_RA*. There appear to be differences across different types of banks. *COSTINC* is highest in cooperative banks and lowest in savings banks. *PROFIT* is higher in commercial than savings and cooperative banks. When measured by *ROE*, the profitability of commercial and savings banks appear to be on the same level, whereas the *ROE* of cooperative banks is lower. The cooperative banks appear to be less risky as well; the average *Z-SCORE* and *ROE_RA* is higher in the sub-sample of cooperative banks than in the sub-samples of commercial and savings banks.

Table 7 Descriptive statistics of profitability and risk variables

	Full sample					Commercial banks (<i>COM</i>)				
	Obs	Mean	Std.	Min	Max	Obs	Mean	Std.	Min	Max
<i>COSTINC</i>	411	0.670	0.161	0.210	1.893	288	0.672	0.161	0.210	1.346
<i>PROFIT</i>	411	0.018	0.021	-0.005	0.222	288	0.021	0.021	-0.005	0.128
<i>ROE</i>	411	0.108	0.059	-0.045	0.263	288	0.111	0.063	-0.045	0.263
<i>LOANLOSS</i>	377	0.005	0.029	-0.294	0.289	262	0.006	0.030	-0.294	0.289
<i>Z-SCORE</i>	228	3.651	1.120	-0.084	6.474	181	3.546	1.126	-0.084	6.474
<i>ROE_RA</i>	223	4.128	3.254	-1.160	18.714	177	3.772	3.214	-1.160	18.714
	Savings banks (<i>SAVE</i>)					Cooperative banks (<i>COOP</i>)				
	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
	Obs	Mean	Std.	Min	Max	Obs	Mean	Std.	Min	Max
<i>COSTINC</i>	67	0.646	0.104	0.412	0.923	56	0.688	0.208	0.331	1.893
<i>PROFIT</i>	67	0.011	0.006	0.000	0.039	56	0.015	0.030	0.000	0.222
<i>ROE</i>	67	0.113	0.053	0.019	0.237	56	0.087	0.042	0.001	0.221
<i>LOANLOSS</i>	63	0.004	0.003	-0.001	0.017	52	-0.002	0.041	-0.288	0.033
<i>Z-SCORE</i>	27	3.913	1.093	1.032	5.717	20	4.240	0.882	1.783	5.731
<i>ROE_RA</i>	27	5.329	3.192	0.434	13.577	19	5.739	2.962	0.597	12.541

This table presents the summary statistics of the profitability and risk variables as defined in Table 2 for the full sample as well as the sub-samples of commercial, savings and cooperative banks.

The commercial, savings and cooperative banks differ substantially with respect to the operational characteristics (see Table 8). The cooperative banks in the sample are significantly larger than the commercial and savings banks (see *SIZE*), which indicates that the networks of cooperative banks are large (recall that consolidated data rather than data on individual legal bank entities is used). There is no significant difference in the *GROWTH* pace of commercial, savings and cooperative banks. The M&A activity on the sell side is, on the other hand, significantly greater among commercial banks than savings and cooperative banks. There are also differences with respect to the focus of the operations. *LOAN* is significantly higher in savings banks than in commercial and cooperative banks. Commercial banks have the greatest share of off-balance sheet items. *OFFBALANCE* is as high as 25% in commercial banks, whereas it is less than 10% in savings and cooperative banks. In savings banks a greater proportion of the operating income come from traditional interest income based banking operations than

in commercial and cooperative banks (see *INTINC*). At 21%, *COMMISSION* is significantly lower in savings banks than in commercial and cooperative banks. *TRADING* and *OTHINC* ranges from 5% to 8% and 8% to 12%, respectively, but there is no statistically significant difference in these ratios. The differences in the asset and income structure are reflected in the strategy variables, *TRAD*, *DIV* and *NONTRAD*. The majority of the commercial banks are diversified, two of three savings banks are focused on traditional banking operations, whereas as many as three of four cooperative banks are diversified. There are not many non-traditional banks in the sample and with only a few exceptions these are commercial banks. Finally, note that there are no significant differences in *DEPOSITS* across the three types of banks and that *EQUITYASS* is significantly higher in commercial banks than in savings banks. The mean *EQUITYASS* is as low as 7% in the latter group.

Table 8 Descriptive statistics of operational variables

	Commercial banks (COM)			Savings banks (SAVE)			Cooperative banks (COOP)			COM - SAVE	COM - COOP	SAV- COOP
	I Obs	II Mean	III Std.	IV Obs	V Mean	VI Std.	VII Obs	VIII Mean	IX Std.	X Diff.	XI Diff.	XII Diff.
<i>Size of operations</i>												
<i>SIZE</i>	288	8.050	2.292	67	8.514	1.435	56	9.624	1.832	-0.464	-1.574***	-1.110***
<i>GROWTH</i>	242	0.085	0.205	46	0.164	0.231	40	0.128	0.209	-0.078	-0.042	0.036
<i>M&A_BUY</i>	242	0.099	0.300	46	0.130	0.341	40	0.050	0.221	-0.031	0.049	0.080
<i>M&A_SELL</i>	242	0.174	0.380	46	0.000	0.000	40	0.025	0.158	0.174***	0.149***	-0.025
<i>Focus of operations - asset based variables</i>												
<i>LOANS</i>	288	0.570	0.240	67	0.756	0.159	56	0.644	0.230	-0.187***	-0.074**	0.112***
<i>OFFBALANCE</i>	288	0.393	1.322	67	0.087	0.289	56	0.097	0.098	0.307*	0.297*	-0.010
<i>Focus of operations - income based variables</i>												
<i>INTINC</i>	288	0.505	0.245	67	0.653	0.126	56	0.573	0.120	-0.148***	-0.068**	0.080***
<i>COMMISSION</i>	288	0.347	0.237	67	0.212	0.127	56	0.259	0.127	0.135***	0.088***	-0.047**
<i>TRADING</i>	288	0.069	0.093	67	0.051	0.088	56	0.046	0.090	0.018	0.023*	0.004
<i>OTHINC</i>	288	0.078	0.156	67	0.084	0.122	56	0.121	0.144	-0.006	-0.043*	-0.037
<i>Focus of operations - strategy variables</i>												
<i>TRAD</i>	288	0.198	0.399	67	0.687	0.467	56	0.250	0.437	-0.489***	-0.052	0.437***
<i>DIV</i>	288	0.563	0.497	67	0.284	0.454	56	0.714	0.456	0.279***	-0.152**	-0.431***
<i>NONTRAD</i>	288	0.240	0.428	67	0.030	0.171	56	0.036	0.187	0.210***	0.204***	-0.006
<i>Funding of operations</i>												
<i>DEPOSITS</i>	288	0.655	0.205	67	0.680	0.154	56	0.639	0.177	-0.025	0.016	0.041
<i>EQUITYASS</i>	288	0.133	0.123	67	0.074	0.034	56	0.106	0.131	0.059***	0.027	-0.032

This table presents the summary statistics of the operational variables in the sub-samples of commercial, savings and cooperative banks as well as the difference in means tested with an unpaired *t*-test. The operational variables are as defined in Table 3. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

The descriptive statistics of the ownership variables confirm that there are differences in the ownership structure of commercial, savings and cooperative banks (see Table 9). State ownership is most frequent in savings banks at mean of 7.5%. The difference to commercial banks is, however, only statistically significant for *STATE50*. One could have expected an even higher level of state ownership, but it appears as if government authority involvement is frequently not formalised in ownership. Hence many of the savings banks where the state has a strong position is excluded from the sample. When it comes to management ownership, the average *MGT* of 11% in the sub-sample of commercial banks, indicate that every tenth commercial bank has management ownership. As expected there is no management ownership in the savings and cooperative banks. The ownership is more dispersed in cooperative banks than savings and, especially, commercial banks. About one third of the commercial banks, 40% of the savings banks and close to 60% of the cooperative banks are *LISTED*. It appears as

if cooperative banks on this level of consolidation do have access not only to customer-owner funds but also to equity funding. Only every second cooperative bank has an institutional blockholder owner, whereas three out of four commercial banks has one (see *BL_INST*). The type of the institutional blockholder owner also varies greatly across banks of different types. There is an industrial company blockholder owner in one third of the commercial banks and this blockholder owner is frequently foreign (see *BL_INDUSTRY* and *BL_FOREIGN* in Column II). Foundation blockholder ownership is a particularly frequent ownership characteristic in savings banks (see *BL_FOUND* in Column V), whereas bank blockholder ownership is very common in cooperative banks (see *BL_BANK* in Column VIII). Insurance company, fund and foreign blockholder owners are very rare in savings and cooperative banks (see *BL_INSURANCE*, *BL_FUND* and *BL_FOREIGN* in Columns V and VIII).

Table 9 Descriptive statistics of ownership variables

	Commercial banks (<i>COM</i>)			Savings banks (<i>SAVE</i>)			Cooperative banks (<i>COOP</i>)			<i>COM - SAVE</i>	<i>COM - COOP</i>	<i>SAV- COOP</i>
	I Obs	II Mean	III Std.	IV Obs	V Mean	VI Std.	VII Obs	VIII Mean	IX Std.	X Diff.	XI Diff.	XII Diff.
<i>State ownership</i>												
<i>STATE</i>	288	0.038	0.192	67	0.075	0.265	56	0.054	0.227	-0.036	-0.015	0.021
<i>STATE10</i>	288	0.021	0.143	67	0.045	0.208	56	0.036	0.187	-0.024	-0.015	0.009
<i>STATE50</i>	288	0.007	0.083	67	0.045	0.208	56	0.000	0.000	-0.038**	0.007	0.045
<i>Insider ownership</i>												
<i>MGT</i>	288	0.111	0.315	67	0.000	0.000	56	0.000	0.000	0.111***	0.111***	0.000
<i>Dispersed vs. concentrated ownership</i>												
<i>LISTED</i>	288	0.382	0.487	67	0.403	0.494	56	0.571	0.499	-0.021	-0.189**	-0.168*
<i>BL_INST</i>	288	0.778	0.416	67	0.642	0.483	56	0.571	0.499	0.136**	0.206***	0.070
<i>Type of institutional blockholder owner</i>												
<i>BL_BANK</i>	288	0.132	0.339	67	0.179	0.386	56	0.375	0.489	-0.047	-0.243***	-0.196**
<i>BL_FINANCIAL</i>	288	0.132	0.339	67	0.119	0.327	56	0.018	0.134	0.013	0.114**	0.102**
<i>BL_INSURANCE</i>	288	0.069	0.255	67	0.000	0.000	56	0.000	0.000	0.069**	0.069*	0.000
<i>BL_FUND</i>	288	0.087	0.282	67	0.015	0.122	56	0.000	0.000	0.072**	0.087**	0.015
<i>BL_FOUND</i>	288	0.031	0.174	67	0.164	0.373	56	0.000	0.000	-0.133***	0.031	0.164***
<i>BL_INDUSTRY</i>	288	0.326	0.470	67	0.164	0.373	56	0.179	0.386	0.162**	0.148**	-0.014
<i>BL_FOREIGN</i>	288	0.163	0.370	67	0.075	0.265	56	0.018	0.134	0.089*	0.145***	0.057

This table shows the summary statistics of the ownership variables in the sub-sample of commercial, savings and cooperative banks as well as the difference in means tested with Fisher's exact test. Fisher's exact tests is used to test for the significance in the difference in means as all ownership variables are dummy variables. The ownership variables are as defined in Table 5. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

4.2. Regression results

I start the regression analysis by running the baseline model specification defined in Equation (1). Savings banks appear to have lower *PROFIT* than commercial banks, whereas cooperative banks appear to have higher *ROE_RA* than commercial banks (see Panel A of Table 10). There are, however, no significant differences in *COSTINC*, *ROE* or *Z-SCORE*. When differences in operational characteristics are controlled for by including either operational variables (see Panel B) or operational classes (see Panel C) in the model specification, the profitability and risk differences are no longer significant. Note that there is a negative and significant connection between *SIZE* and *LOANLOSS* and that there is a positive and significant connection between *LOAN* and both *PROFIT* and *LOANLOSS*. Moreover, banks focusing on traditional interest income operations (*INTINC*) are more efficient measured as *COSTINC*. Still, there is a negative and significant connection between *INTINC* and *ROE*. On the other hand, the connection with *Z-SCORE* is positive and significant. Finally, the level of capitalisation

appears to have an impact on both profitability and risk; the connection between *EQUITYASS* and *PROFIT* is positive and significant, whereas the connection to *LOANLOSS* and *ROE_RA* are negative and significant. With respect to the operational classes, it appears as if small non-traditional banks with low deposits to funding (*OPER_8*) are more profitable than other banks, but that the higher profitability is achieved by increasing the risk of the operations (see Panel C). When differences in ownership characteristics are controlled for by including either ownership variables (see Panel D of Table 10) or ownership classes (see Panel E) in the model specification, savings and cooperative banks appear less profitability than commercial banks. This finding indicates that differences in ownership would not explain the differences in the profitability of savings and cooperative banks when compared to commercial banks. Note that *MGT* appear to have a positive impact on *PROFIT* and that *LISTED* banks have higher *ROE* than unlisted banks. Moreover, the impact of a blockholder owner on profitability depends on the type of blockholder owner; there is a negative and significant connection between *BL_BANK* and *COSTINC*, a positive and significant connection between *BL_INSURANCE* and *COSTINC* and a negative and significant connection between *BL_FUND* and *ROE*. Similarly, the impact on risk varies with the type of blockholder owner; there is a negative and significant connection between *BL_FINANCE* and *LOANLOSS* and between *BL_INSURANCE* and *Z-SCORE*. With respect to the ownership classes, it appears as if unlisted banks with management ownership and no institutional blockholder owner (*OWN_6*) and unlisted state owned banks with no institutional blockholder owner (*OWN_8*) are more profitable than other banks (see Panel E). In unreported regressions, I find no significant difference in profitability and risk when both operational and ownership classes are included in the model specification.

When examining the profitability and risk across banks with similar operational characteristics by interacting the operational classes with *SAVE* and *COOP* as defined in Equation (3), I find that the profitability and risk differences vary with how the comparison group of commercial, savings and cooperative banks are defined (see Table 11)¹³. More specifically, when comparing large banks with low deposit to total funding ratio (*OPER_2*) I find that cooperative banks are less risky than commercial banks; the *Z-SCORE* is significantly higher in cooperative banks than in commercial banks (see Columns III in Panel B). Moreover, *ROE_RA* is significantly higher in cooperative banks than in commercial banks, indicating that the lower risk has not been achieved through excessive risk-taking (see Column VI). Close to one third of the cooperative banks in the sample belong to this operational class, which gives an explanation to the aggregate findings presented in Table 10 that the risk-adjusted profitability of cooperative banks is significantly higher than the one in commercial banks. When comparing large banks with high equity to assets ratio (*OPER_3*), I find that cooperative banks are significantly less profitable than commercial banks (see Column II in Panel C). The signs of the coefficients indicate that the risk is higher and the risk-adjusted profitability is significantly lower in cooperative than commercial banks (see Column V and VI). Hence, it appears as the performance of cooperative banks is relatively weak in this sub-sample of banks. In the sub-sample of small traditional or diversified banks with low deposits to funding, I find that the performance of savings and cooperative banks is very different (see Panel F). The profitability of savings banks is significantly lower than the one of commercial banks measured as *ROE*, whereas the profitability of cooperative banks is not significantly different from the one of

¹³ The results of the regressions where the dependent variable is either *PROFIT* or *LOANLOSS* are not reported as the results are similar to the ones reported for *ROE* and *ROE_RA*, respectively.

Table 10 Differences in profitability and risk of commercial, savings and cooperative banks

Panel A Full sample						
	I	III	V	VII	IX	XI
Observations	411	411	411	377	228	223
Dependent variable	<i>COSTINC</i>	<i>PROFIT</i>	<i>ROE</i>	<i>LOANLOSS</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.614*** [0.030]	0.020*** [0.004]	0.109*** [0.009]	0.000 [0.007]	4.426*** [0.208]	5.432*** [0.620]
<i>SAVE</i>	-0.001 [0.024]	-0.005** [0.002]	-0.006 [0.009]	-0.001 [0.002]	0.220 [0.302]	0.975 [0.905]
<i>COOP</i>	0.028 [0.037]	-0.003 [0.006]	-0.012 [0.010]	-0.006 [0.008]	0.374 [0.264]	1.505* [0.885]
R-squared	0.123	0.151	0.202	0.043	0.285	0.156
Adj. R-squared	0.081	0.110	0.163	-0.008	0.219	0.077
Panel B Operational variables are controlled for						
	I	III	V	VII	IX	XI
Observations	411	411	411	377	228	223
Dependent variable	<i>COSTINC</i>	<i>PROFIT</i>	<i>ROE</i>	<i>LOANLOSS</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.806*** [0.102]	0.018* [0.011]	0.125*** [0.033]	0.028 [0.018]	4.641*** [0.735]	6.747*** [2.342]
<i>SAVE</i>	0.015 [0.026]	0.000 [0.002]	-0.002 [0.009]	-0.002 [0.002]	0.068 [0.310]	0.558 [0.995]
<i>COOP</i>	0.039 [0.039]	0.000 [0.003]	-0.015 [0.009]	-0.005 [0.005]	0.269 [0.222]	1.323 [0.804]
<i>SIZE</i>	-0.004 [0.007]	-0.001 [0.001]	0.003 [0.002]	-0.002* [0.001]	-0.032 [0.054]	-0.102 [0.169]
<i>LOANS</i>	0.063 [0.060]	0.010** [0.004]	0.022 [0.015]	0.020** [0.009]	-0.400 [0.456]	-0.362 [1.231]
<i>OFFBALANCE</i>	-0.017 [0.016]	0.000 [0.000]	0.000 [0.004]	0.000 [0.001]	0.009 [0.062]	-0.006 [0.218]
<i>INTINC</i>	-0.289*** [0.057]	-0.014*** [0.005]	-0.066*** [0.022]	-0.011 [0.011]	1.213** [0.495]	2.184 [1.530]
<i>DEPOSITS</i>	-0.021 [0.061]	-0.010** [0.004]	-0.027 [0.020]	-0.006 [0.007]	-0.382 [0.508]	-0.931 [1.642]
<i>EQUITYASS</i>	-0.207 [0.158]	0.108*** [0.025]	-0.048 [0.045]	-0.089* [0.051]	-1.261 [0.912]	-5.495*** [2.384]
R-squared	0.221	0.601	0.260	0.110	0.349	0.213
Adj. R-squared	0.171	0.575	0.212	0.046	0.269	0.113
Panel C Selected operational classes are controlled for						
	I	III	V	VII	IX	XI
Observations	411	411	411	377	228	223
Dependent variable	<i>COSTINC</i>	<i>PROFIT</i>	<i>ROE</i>	<i>LOANLOSS</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.605*** [0.031]	0.015*** [0.003]	0.111*** [0.009]	0.003 [0.005]	4.534*** [0.217]	5.767*** [0.633]
<i>SAVE</i>	0.006 [0.025]	-0.002 [0.002]	-0.006 [0.009]	-0.003 [0.002]	0.118 [0.309]	0.728 [0.919]
<i>COOP</i>	0.036 [0.038]	0.001 [0.006]	-0.013 [0.010]	-0.008 [0.008]	0.292 [0.269]	1.299 [0.915]
<i>OPER_5</i>	0.030 [0.040]	0.003 [0.004]	0.010 [0.018]	-0.005 [0.004]	-0.198 [0.306]	0.018 [0.769]
<i>OPER_8</i>	0.042 [0.055]	0.026*** [0.007]	-0.014 [0.010]	-0.014 [0.013]	-0.474 [0.299]	-1.626** [0.692]
R-squared	0.128	0.235	0.207	0.056	0.296	0.170
Adj. R-squared	0.081	0.194	0.165	0.000	0.224	0.083

Panel D Ownership variables are controlled for						
	I	III	V	VII	IX	XI
Observations	411	411	411	377	228	223
Dependent variable	<i>COSTINC</i>	<i>PROFIT</i>	<i>ROE</i>	<i>LOANLOSS</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.662*** [0.043]	0.018*** [0.005]	0.114*** [0.015]	0.001 [0.009]	4.444*** [0.350]	6.021*** [0.974]
<i>SAVE</i>	0.006 [0.029]	-0.004 [0.003]	-0.005 [0.010]	0.000 [0.003]	0.132 [0.292]	0.685 [0.961]
<i>COOP</i>	0.041 [0.041]	-0.002 [0.005]	-0.022** [0.011]	-0.010* [0.006]	0.319 [0.261]	1.232 [0.916]
<i>STATE</i>	0.035 [0.069]	0.014 [0.011]	0.010 [0.013]	-0.012 [0.015]	0.065 [0.410]	-0.106 [1.267]
<i>MGT</i>	0.005 [0.045]	0.016*** [0.006]	0.007 [0.012]	-0.007 [0.006]	-0.332 [0.363]	-0.694 [0.816]
<i>LISTED</i>	-0.028 [0.026]	0.002 [0.003]	0.020*** [0.007]	0.000 [0.003]	-0.208 [0.204]	-0.744 [0.742]
<i>BL_BANK</i>	-0.071* [0.037]	-0.002 [0.005]	-0.012 [0.013]	0.009 [0.006]	0.129 [0.359]	-0.024 [0.937]
<i>BL_FINANCIAL</i>	-0.055 [0.046]	0.002 [0.004]	-0.013 [0.013]	-0.012* [0.006]	-0.177 [0.360]	-1.028 [0.946]
<i>BL_INSURANCE</i>	0.099** [0.042]	0.009 [0.012]	-0.018 [0.017]	-0.004 [0.006]	-0.841* [0.458]	-1.969 [1.363]
<i>BL_FUND</i>	-0.028 [0.037]	-0.007 [0.005]	-0.038*** [0.012]	0.010 [0.008]	0.321 [0.346]	-0.138 [1.036]
<i>BL_FOUNDED</i>	-0.013 [0.038]	-0.003 [0.004]	-0.018 [0.012]	-0.004 [0.004]	0.587 [0.384]	1.554 [1.670]
<i>BL_INDUSTRIAL</i>	-0.041 [0.034]	0.001 [0.003]	-0.008 [0.011]	-0.003 [0.006]	-0.135 [0.272]	-0.763 [0.825]
<i>BL_FOREIGN</i>	0.030 [0.031]	-0.001 [0.004]	0.002 [0.011]	-0.009 [0.007]	0.150 [0.275]	-0.231 [0.730]
R-squared	0.179	0.212	0.245	0.089	0.329	0.185
Adj. R-squared	0.117	0.152	0.188	0.013	0.231	0.063

Panel E Selected ownership classes are controlled for						
	I	III	V	VII	IX	XI
Observations	411	411	411	377	228	223
Dependent variable	<i>COSTINC</i>	<i>PROFIT</i>	<i>ROE</i>	<i>LOANLOSS</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.614*** [0.030]	0.020*** [0.004]	0.109*** [0.009]	-0.001 [0.007]	4.426*** [0.212]	5.429*** [0.629]
<i>SAVE</i>	0.001 [0.025]	-0.006** [0.003]	-0.006 [0.009]	0.002 [0.002]	0.175 [0.312]	0.970 [0.933]
<i>COOP</i>	0.028 [0.036]	-0.004 [0.004]	-0.013 [0.009]	-0.004 [0.005]	0.335 [0.278]	1.389 [0.941]
<i>OWN_1</i>	0.112 [0.108]	0.000 [0.006]	-0.021 [0.016]	0.015 [0.010]	0.231 [0.335]	-0.212 [0.629]
<i>OWN_6</i>	-0.004 [0.059]	0.019** [0.008]	0.033** [0.015]	-0.004 [0.007]	-0.267 [0.396]	0.094 [0.939]
<i>OWN_8</i>	-0.024 [0.062]	0.029 [0.026]	0.030* [0.018]	-0.037 [0.030]	0.410 [0.817]	1.744 [2.984]
R-squared	0.135	0.210	0.220	0.080	0.291	0.160
Adj. R-squared	0.086	0.165	0.175	0.023	0.215	0.068

This table shows the result of the profit and risk regression. Panel A show the results of the baseline model specification $PROF/RISK = \alpha + \beta*SAVE + \beta*COOP + \beta*[YEAR] + \beta*[COUNTRY] + \varepsilon$, defined in Equation (1). In Panels B, C, D and E operational variables, operational classes, ownership variables and ownership classes, respectively, are included in the model specification. The profitability and risk variables are as defined in Table 2. *SAVE* and *COOP* are dummy variables taking the value 1 when the bank is a savings or cooperative bank, respectively. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Table 11 Profitability and risk differences in different operational classes

Panel A Traditional banks with high deposits to funding ratio (<i>OPER_1</i>)					Panel B Large banks with low deposits to funding ratio (<i>OPER_2</i>)				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>		<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.611*** [0.031]	0.111*** [0.009]	4.423*** [0.213]	5.247*** [0.619]	Constant	0.606*** [0.034]	0.105*** [0.010]	4.481*** [0.224]	5.577*** [0.682]
<i>SAVE</i>	0.010 [0.026]	-0.007 [0.010]	0.194 [0.315]	2.665** [1.123]	<i>SAVE</i>	0.014 [0.028]	-0.010 [0.010]	0.212 [0.317]	0.925 [0.975]
<i>COOP</i>	0.031 [0.037]	-0.014 [0.010]	0.365 [0.282]	1.421 [0.979]	<i>COOP</i>	0.060 [0.049]	-0.015 [0.013]	-0.124 [0.345]	-0.488 [1.169]
<i>OPER_1</i>	0.038 [0.050]	-0.019 [0.020]	0.557 [0.454]	4.513 [3.130]	<i>OPER_2</i>	0.014 [0.031]	0.016 [0.011]	-0.128 [0.299]	-0.454 [0.903]
<i>SAVE*OPER_1</i>	-0.048 [0.056]	0.013 [0.023]	-0.460 [0.648]	-7.214** [3.556]	<i>SAVE*OPER_2</i>	-0.057 [0.048]	0.020 [0.020]	-1.652 [1.104]	-2.385 [2.559]
<i>COOP*OPER_1</i>	n.a	n.a	n.a	n.a	<i>COOP*OPER_2</i>	-0.068 [0.056]	0.000 [0.017]	0.990** [0.459]	3.719** [1.616]
R-squared	0.137	0.223	0.296	0.204	R-squared	0.141	0.237	0.321	0.186
Adj. R-squared	0.083	0.175	0.212	0.107	Adj. R-squared	0.086	0.188	0.237	0.083
<i>Difference to COM when OPER_1=1</i>					<i>Difference to COM when OPER_2=1</i>				
<i>F</i> -test: <i>SAVE+SAVE*OPER_1=0</i>					<i>F</i> -test: <i>SAVE+SAVE*OPER_2=0</i>				
Sum of coeff.	-0.038	0.006	-0.266	-4.549	Sum of coeff.	-0.043	0.010	-1.440	-1.460
<i>F</i> -value	0.580	0.090	0.170	1.900	<i>F</i> -value	1.060	0.300	1.770	0.360
<i>F</i> -test: <i>COOP+COOP*OPER_1=0</i>					<i>F</i> -test: <i>COOP+COOP*OPER_2=0</i>				
Sum of coeff.					Sum of coeff.	-0.008	-0.015	0.866***	3.231***
<i>F</i> -value					<i>F</i> -value	0.040	1.850	7.290	7.390
Panel C Large banks with high equity to asset ratio (<i>OPER_3</i>)					Panel D Diversified bank with low equity to asset ratio (<i>OPER_4</i>)				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>		<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.618*** [0.032]	0.113*** [0.009]	4.442*** [0.214]	5.525*** [0.629]	Constant	0.614*** [0.031]	0.109*** [0.009]	4.380*** [0.219]	5.136*** [0.631]
<i>SAVE</i>	-0.005 [0.025]	-0.004 [0.010]	0.190 [0.316]	1.037 [0.945]	<i>SAVE</i>	-0.009 [0.029]	-0.006 [0.012]	0.134 [0.427]	0.250 [1.159]
<i>COOP</i>	0.033 [0.045]	-0.003 [0.011]	0.419 [0.281]	1.792* [0.912]	<i>COOP</i>	0.014 [0.030]	-0.016* [0.009]	0.518* [0.279]	1.978* [1.128]
<i>OPER_3</i>	-0.070 [0.071]	0.009 [0.021]	0.628* [0.368]	2.181 [1.414]	<i>OPER_4</i>	0.017 [0.024]	0.009 [0.011]	0.298 [0.218]	1.291** [0.527]
<i>SAVE*OPER_3</i>	0.123 [0.110]	-0.010 [0.036]	n.a	n.a	<i>SAVE*OPER_4</i>	0.043 [0.040]	-0.002 [0.023]	-0.070 [0.474]	1.194 [1.329]
<i>COOP*OPER_3</i>	0.039 [0.084]	-0.044* [0.024]	-1.103 [0.720]	-4.492 [2.804]	<i>COOP*OPER_4</i>	0.109 [0.143]	0.021 [0.032]	-0.710 [0.458]	-2.701** [1.219]
R-squared	0.143	0.228	0.300	0.176	R-squared	0.146	0.225	0.301	0.192
Adj. R-squared	0.087	0.178	0.217	0.076	Adj. R-squared	0.091	0.175	0.214	0.089
<i>Difference to COM when OPER_3=1</i>					<i>Difference to COM when OPER_4=1</i>				
<i>F</i> -test: <i>SAVE+SAVE*OPER_3=0</i>					<i>F</i> -test: <i>SAVE+SAVE*OPER_4=0</i>				
Sum of coeff.	0.118	-0.014	n.a	n.a	Sum of coeff.	0.034	-0.008	0.064	1.444
<i>F</i> -value	1.180	0.180			<i>F</i> -value	1.330	0.170	0.040	2.310
<i>F</i> -test: <i>COOP+COOP*OPER_3=0</i>					<i>F</i> -test: <i>COOP+COOP*OPER_4=0</i>				
Sum of coeff.	0.072	-0.047**	-0.684	-2.700	Sum of coeff.	0.123	0.005	-0.192	-0.723
<i>F</i> -value	0.800	4.290	1.000	0.990	<i>F</i> -value	0.690	0.030	0.190	0.730

Panel E Small traditional or diversified bank with high deposits to funding (<i>OPER_6</i>)					Panel F Small traditional or diversified bank with low deposits to funding (<i>OPER_7</i>)				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
	<i>COST- INC</i>	<i>ROE</i>	<i>Z- SCORE</i>	<i>ROE_RA</i>		<i>COST- INC</i>	<i>ROE</i>	<i>Z- SCORE</i>	<i>ROE_RA</i>
Constant	0.620*** [0.031]	0.109*** [0.009]	4.451*** [0.219]	5.570*** [0.657]	Constant	0.619*** [0.030]	0.110*** [0.009]	4.393*** [0.220]	5.389*** [0.630]
<i>SAVE</i>	-0.002 [0.026]	-0.004 [0.010]	0.149 [0.329]	0.657 [0.939]	<i>SAVE</i>	0.000 [0.025]	-0.005 [0.010]	0.181 [0.329]	0.998 [0.963]
<i>COOP</i>	0.022 [0.037]	-0.013 [0.009]	0.315 [0.287]	1.233 [0.972]	<i>COOP</i>	0.019 [0.038]	-0.014 [0.010]	0.451* [0.270]	1.752** [0.882]
<i>OPER_6</i>	-0.046 [0.030]	0.000 [0.013]	-0.104 [0.253]	-0.577 [0.696]	<i>OPER_7</i>	-0.011 [0.057]	-0.019 [0.012]	0.049 [0.306]	-0.842 [0.750]
<i>SAVE*OPER_6</i>	0.029 [0.059]	-0.016 [0.018]	0.201 [1.217]	2.563 [3.481]	<i>SAVE*OPER_7</i>	0.036 [0.075]	-0.060** [0.027]	0.806 [0.805]	1.662 [2.275]
<i>COOP*OPER_6</i>	n.a	n.a	n.a	n.a	<i>COOP*OPER_7</i>	0.093 [0.094]	0.018 [0.020]	-2.218*** [0.743]	-7.136*** [2.431]
R-squared	0.142	0.221	0.292	0.168	R-squared	0.138	0.240	0.303	0.185
Adj. R-squared	0.089	0.172	0.208	0.067	Adj. R-squared	0.082	0.191	0.217	0.082
<i>Difference to COM when OPER_6=1</i>					<i>Difference to COM when OPER_7=1</i>				
<i>F</i> -test: <i>SAVE+SAVE*OPER_6=0</i>					<i>F</i> -test: <i>SAVE+SAVE*OPER_7=0</i>				
Sum of coeff.	0.027	-0.020	0.350	3.220	Sum of coeff.	0.036	-0.060**	0.806	1.662
<i>F</i> -value	0.220	1.380	0.090	0.890	<i>F</i> -value	0.220	4.550	1.390	0.690
<i>F</i> -test: <i>COOP+COOP*OPER_7=0</i>					<i>F</i> -test: <i>COOP+COOP*OPER_7=0</i>				
Sum of coeff.	0.112	0.004	-1.767**	-5.384**	Sum of coeff.	0.112	0.004	-1.767**	-5.384**
<i>F</i> -value	1.560	0.050	6.680	5.650	<i>F</i> -value	1.560	0.050	6.680	5.650

This table shows the results of the regression $PROF/RISK = \alpha + \beta*SAVE + \beta*COOP + \beta*OPER_X + \beta*SAVE*OPER_X + \beta*COOP*OPER_X + \beta*OWN_1 + \beta*OWN_6 + \beta*OWN_8 + \beta*[YEAR] + \beta*[COUNTRY] + \epsilon$. The profit and risk variables are as defined in Table 2. *SAVE* and *COOP* are dummy variables taking the value 1 if the bank is a savings or cooperative bank, respectively, and 0 otherwise. The operational classes (*OPER_X*) are as defined in Table 4. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. N.a. indicates that the variable is dropped from the regression due to lack of observations. The *F*-tests at the bottom of the panels show the difference in profitability or risk when comparing commercial and savings banks and commercial and cooperative banks in the particular operational class. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

commercial banks (see Column II). On the other hand, in this operational class, cooperative banks appear to be more risky than commercial banks; the *Z_SCORE* is significantly lower than in commercial banks as is the risk-adjusted profitability *ROE_RA* (see Column III and VI). Finally, I note that the performance of savings banks is significantly different from the one of commercial banks only in one of the operational classes, i.e. small traditional or diversified banks with low deposits to funding (*OPER_7*), whereas the profitability and risk of cooperative banks are significantly different from the one of commercial banks in all but one operational class, i.e. in diversified banks with low equity to asset ratio (*OPER_4*).

There are greater variation in the profitability and risk differences when the comparison is made across banks with similar ownership characteristics by interacting the ownership classes with *SAVE* and *COOP* as defined in Equation (4), as was the case when the comparison was done across banks with similar operational characteristics. First, the performance of savings and cooperative banks among listed banks with bank or fund blockholder owner (*OWN_2*) is very different; the *ROE_RA* of savings banks is significantly higher than the one of commercial banks, whereas the *COSTINC* of cooperative banks is significantly higher and the *ROE_RA* significantly lower than the one of commercial banks. On the other hand, the *ROE_RA* of cooperative banks is significantly higher than the one of commercial banks in unlisted banks with institutional blockholder owner (*OWN_3*) and listed banks with industrial or financial

Table 12 Profitability and risk differences in different ownership classes

Panel A Listed banks with bank or fund blockholder owner (OWN ₂)					Panel B Unlisted banks with institutional blockholder owner (OWN ₃)				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>	Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.615*** [0.033]	0.114*** [0.010]	4.566*** [0.219]	5.937*** [0.633]	Constant	0.596*** [0.038]	0.126*** [0.011]	4.406*** [0.305]	5.502*** [0.820]
<i>SAVE</i>	0.000 [0.026]	-0.008 [0.010]	0.118 [0.323]	0.611 [0.912]	<i>SAVE</i>	-0.013 [0.044]	0.001 [0.016]	0.982** [0.459]	5.195*** [1.077]
<i>COOP</i>	0.042 [0.046]	-0.007 [0.011]	0.376 [0.264]	1.694* [0.868]	<i>COOP</i>	0.075 [0.045]	-0.030*** [0.011]	0.362 [0.381]	0.736 [1.211]
<i>OWN₂</i>	-0.039 [0.037]	0.003 [0.012]	0.236 [0.289]	-0.091 [1.178]	<i>OWN₃</i>	0.012 [0.031]	-0.023** [0.009]	0.166 [0.231]	0.318 [0.655]
<i>SAVE*OWN₂</i>	0.048 [0.066]	0.024 [0.033]	-0.006 [0.432]	2.517* [1.458]	<i>SAVE*OWN₃</i>	0.023 [0.055]	-0.004 [0.020]	-1.045* [0.580]	-5.289*** [1.252]
<i>COOP*OWN₂</i>	-0.011 [0.065]	-0.029 [0.019]	-1.504*** [0.412]	-5.502*** [1.467]	<i>COOP*OWN₃</i>	-0.156** [0.078]	0.039* [0.023]	-0.076 [0.454]	1.264 [1.517]
R-squared	0.134	0.213	0.303	0.186	R-squared	0.148	0.236	0.309	0.213
Adj. R-squared	0.080	0.165	0.220	0.088	Adj. R-squared	0.095	0.189	0.227	0.117
<i>Difference to COM when OWN₂=1</i>					<i>Difference to COM when OWN₃=1</i>				
F- test: <i>SAVE+SAVE*OWN₂=0</i>					F- test: <i>SAVE+SAVE*OWN₃=0</i>				
Sum of coeff.	0.048	0.016	0.112	3.128**	Sum of coeff.	0.010	-0.022	-0.063	-0.094
F-value	0.620	0.260	0.080	4.440	F-value	0.090	0.090	0.030	0.010
F- test: <i>COOP+COOP*OWN₂=0</i>					F- test: <i>COOP+COOP*OWN₃=0</i>				
Sum of coeff.	0.031	-0.036***	-1.128***	-3.808***	Sum of coeff.	-0.081	0.009	0.286	2.000*
F-value	0.340	4.860	9.730	9.000	F-value	1.490	0.160	0.760	3.060
Panel C Listed banks with industrial or financial company blockholder owner (OWN ₄)									
Observations	I 411	II 411	III 228	IV 223					
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>					
Constant	0.614*** [0.029]	0.109*** [0.010]	4.546*** [0.219]	5.818*** [0.636]					
<i>SAVE</i>	-0.009 [0.025]	-0.004 [0.010]	0.108 [0.318]	0.520 [0.882]					
<i>COOP</i>	0.017 [0.040]	-0.012 [0.011]	0.216 [0.285]	1.240 [0.994]					
<i>OWN₄</i>	-0.070* [0.037]	0.018 [0.011]	-0.307 [0.311]	-1.039 [1.003]					
<i>SAVE*OWN₄</i>	0.215*** [0.077]	0.002 [0.025]	0.835* [0.482]	6.259*** [1.247]					
<i>COOP*OWN₄</i>	0.137** [0.056]	0.001 [0.017]	0.642 [0.449]	1.005 [1.416]					
R-squared	0.149	0.216	0.303	0.188					
Adj. R-squared	0.097	0.167	0.220	0.089					
<i>Difference to COM when OWN₄=1</i>									
F- test: <i>SAVE+SAVE*OWN₄=0</i>									
Sum of coeff.	0.206***	-0.002	0.943**	6.779***					
F-value	8.110	0.010	4.280	26.670					
F- test: <i>COOP+COOP*OWN₄=0</i>									
Sum of coeff.	0.154***	-0.011	0.858**	2.245*					
F-value	10.520	0.700	4.010	3.300					

Panel D Unlisted banks with no management or institutional blockholder owner (<i>OWN_5</i>)					Panel E Listed banks no institutional blockholder owner (<i>OWN_7</i>)				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>	Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.592*** [0.032]	0.112*** [0.010]	4.549*** [0.212]	5.738*** [0.623]	Constant	0.602*** [0.032]	0.109*** [0.010]	4.545*** [0.220]	5.791*** [0.642]
<i>SAVE</i>	0.015 [0.025]	-0.007 [0.010]	0.098 [0.311]	0.701 [0.935]	<i>SAVE</i>	0.017 [0.025]	-0.004 [0.009]	0.009 [0.324]	0.321 [0.898]
<i>COOP</i>	0.039 [0.043]	-0.013 [0.011]	0.184 [0.307]	1.046 [1.095]	<i>COOP</i>	0.039 [0.043]	-0.012 [0.011]	0.244 [0.271]	1.140 [0.918]
<i>OWN_5</i>	0.147** [0.070]	-0.011 [0.025]	0.037 [0.314]	0.518 [1.074]	<i>OWN_7</i>	0.040 [0.031]	0.026* [0.014]	-0.413 [0.265]	-0.924 [0.786]
<i>SAVE*OWN_5</i>	-0.232*** [0.070]	0.018 [0.030]	n.a	n.a	<i>SAVE*OWN_7</i>	-0.146** [0.066]	-0.018 [0.039]	2.045*** [0.730]	7.477*** [1.316]
<i>COOP*OWN_5</i>	-0.117 [0.095]	0.006 [0.028]	0.553 [0.483]	0.929 [1.758]	<i>COOP*OWN_7</i>	-0.033 [0.065]	-0.024 [0.023]	n.a	n.a
R-squared	0.159	0.209	0.299	0.173	R-squared	0.136	0.217	0.315	0.199
Adj. R-squared	0.107	0.160	0.220	0.078	Adj. R-squared	0.082	0.168	0.238	0.106
<i>Difference to COM when OWN_5=1</i>					<i>Difference to COM when OWN_7=1</i>				
<i>F</i> -test: <i>SAVE+SAVE*OWN_5=0</i>					<i>F</i> -test: <i>SAVE+SAVE*OWN_7=0</i>				
Sum of coeff.	-0.217***	0.011	n.a	n.a	Sum of coeff.	-0.129**	-0.022	2.054***	7.798***
<i>F</i> -value	10.910	0.150			<i>F</i> -value	4.470	0.350	10.390	50.720
<i>F</i> -test: <i>COOP+COOP*OWN_5=0</i>					<i>F</i> -test: <i>COOP+COOP*OWN_7=0</i>				
Sum of coeff.	-0.078	-0.007	0.737*	1.975	Sum of coeff.	0.006	-0.036*	n.a	n.a
<i>F</i> -value	0.810	0.070	3.630	2.210	<i>F</i> -value	0.010	2.750		

This table shows the results of the regression $PROF/RISK = \alpha + \beta*SAVE + \beta*COOP + \beta*OWN_X + \beta*SAVE*OWN_X + \beta*COOP*OWN_X + \beta*OPER_5 + \beta*OPER_8 + \beta*[YEAR] + \beta*[COUNTRY] + \varepsilon$. The profit and risk variables are as defined in Table 2. *SAVE* and *COOP* are dummy variables taking the value 1 if the bank is a savings or cooperative bank, respectively, and 0 otherwise. The ownership classes (*OWN_X*) are as defined in Table 6. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. N.a. indicates that the variable is dropped from the regression due to lack of observations. The *F*-tests at the bottom of the panels show the difference in profitability or risk when comparing commercial and savings banks and commercial and cooperative banks in the particular ownership class. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

company blockholder owner (*OWN_4*). Finally, the *COSTINC* of savings banks is significantly lower and both *Z-SCORE* and *ROE_RA* are significantly higher than the ones of commercial banks when the comparison is done across listed banks with no institutional blockholder owner (*OWN_7*). These findings suggest that whether the bank is listed or not is of particular importance for savings banks, whereas the type of blockholder owner is of particular importance for cooperative banks. Listed savings banks appear to be less risky than listed commercial banks; the risk-adjusted profitability of savings banks is significantly higher than the one of commercial banks when the comparison is done among listed banks with bank or fund blockholder owner (*OWN_2*), listed banks with industrial or financial company blockholder owner (*OWN_4*) and listed banks with no institutional blockholder owner (*OWN_7*). On the other hand, listed cooperative banks are less profitable than listed commercial banks. The lower profitability is accompanied with less risk if the bank has an industrial or financial company blockholder (*OWN_4*), whereas the lower profitability is accompanied with higher risk, resulting in a significantly lower risk-adjusted profitability, if the bank has a bank or fund blockholder (*OWN_2*).

4.3. Robustness tests

It appears as if the profitability and risk differences on occasion could be explained by individual operational and ownership variables. For example, I find that the class in which cooperative banks are less risky than commercial banks include large banks (*OPER_2*) and the class in which cooperative banks are more risky than commercial banks include small banks (*OPER_7*), indicating that there may be a negative connection between size and risk. With respect to ownership variables, savings banks have higher risk-adjusted profitability in ownership classes with listed banks (*OWN_2* and *OWN_7*), whereas cooperative banks are less profitable in these ownership classes. Moreover, the type of blockholder owner appears to have an impact on the level of risk in cooperative banks. They are less risky in classes including banks with institutional blockholder owner (*OWN_3*), in particular industrial or financial company blockholder owner (*OWN_4*), and more risky in classes including banks with bank or fund blockholder owner (*OWN_1*). To assess whether any of these individual operational or ownership characteristics drive the results, I replace the operational and ownership classes in the model specification with the individual operational and ownership variables.

I find that some of the operational variables do drive the results. As expected, the size of the bank appears to be particularly important for cooperative banks; the interaction term *COOP*SIZE* has a negative and significant connection with *COSTINC* and a positive and significant connection with *ROE_RA* (see Panel A of Table 13). On the other hand, *DEPOSITS* do not appear to have an impact on the profitability and risk of cooperative banks (see Panel D). Hence, the positive difference in *ROE_RA* found in the sub-sample of large banks with low deposits to funding ratio (*OPER_2*) and the negative difference in *ROE_RA* found in the sub-sample of small traditional diversified banks with low deposits to funding (*OPER_7*) appear to be driven by *SIZE*. Furthermore, *EQUITYASS* appears to have an impact on the riskiness of, in particular, savings banks. There is a positive and significant connection between the interaction term *SAVE*EQUITYASS* and *Z_SCORE* and between *SAVE*EQUITYASS* and *ROE_RA* (see Panel E). On the other hand, there is a negative and significant connection between the interaction term *COOP*EQUITYASS* and *ROE_RA* indicating that cooperative banks with higher equity to asset ratios are riskier. Focus on traditional banking operations measured as *INTINC* appear to have a negative impact on the profitability of savings banks.

When it comes to the impact of the individual ownership variables, I find that they have a greater impact on the performance of savings banks than commercial and, in particular, than cooperative banks (see Table 14). Listed savings banks have a significantly higher *Z_SCORE* and *ROE_RA* than unlisted savings banks (see Panel A). On the other hand, savings banks with an institutional blockholder owner appear to be less profitable than savings banks without an institutional blockholder owner (see Panel B). The type of blockholder owner does, however, have an impact on the performance of savings banks; the connections between *SAVE*BL_BANK* and the profitability and risk variables are insignificant, whereas there is a negative and significant connection between *SAVE*BL_IND* and *ROE_RA*, indicating that savings banks with industrial blockholder ownership does not focus on profit maximisation (see Panel C and D). Savings banks with a bank blockholder owner are less efficient when measured with *COSTINC*, but the lower efficiency does not realise in lower profitability.

Table 13 Impact of operational variables on profitability and risk in commercial, savings and cooperative banks

Panel A Interaction with SIZE				Panel B Interaction with LOANS				Panel C Interaction with INTINC				
Observations	I 411	II 228	IV 223	Observations	I 411	II 228	IV 223	Observations	I 411	II 411	III 228	IV 223
Dependent var.	COSTINC	ROE	Z_SCORE	ROE_RA	COSTINC	ROE	Z_SCORE	ROE_RA	COSTINC	ROE	Z_SCORE	ROE_RA
SIZE	-0.003 [0.008]	0.003 [0.002]	-0.046 [0.056]	-0.130 [0.176]	0.060 [0.066]	0.032* [0.018]	-0.471 [0.517]	0.166 [1.355]	-0.295*** [0.060]	-0.055** [0.023]	1.055** [0.475]	2.219 [1.620]
SAVE*SIZE	0.016 [0.015]	0.005 [0.005]	-0.096 [0.204]	-0.068 [0.829]	-0.284** [0.125]	-0.058 [0.048]	1.927 [1.585]	1.134 [4.164]	0.180 [0.221]	-0.106* [0.060]	1.581 [2.295]	-2.494 [7.394]
COOP*SIZE	-0.027* [0.014]	0.003 [0.004]	0.144 [0.101]	0.612* [0.336]	0.089 [0.140]	-0.030 [0.029]	0.003 [0.861]	4.430 [3.586]	0.049 [0.281]	-0.019 [0.040]	-0.194 [1.395]	4.074 [4.742]
SAVE	-0.119 [0.134]	-0.052 [0.050]	0.871 [1.799]	1.167 [6.936]	0.224** [0.099]	0.037 [0.033]	-1.155 [0.994]	-0.203 [0.203]	-0.095 [0.136]	0.065 [0.039]	-0.975 [1.394]	2.177 [4.626]
COOP	0.298** [0.151]	-0.044 [0.036]	-1.211 [1.015]	-5.012 [3.524]	-0.015 [0.099]	0.003 [0.019]	0.261 [0.406]	3.326* [1.795]	0.012 [0.150]	-0.006 [0.026]	0.379 [0.925]	-1.211 [2.963]
R-squared	0.236	0.283	0.362	0.231	0.235	0.284	0.363	0.230	0.226	0.287	0.362	0.227
Adj. R-squared	0.178	0.228	0.268	0.116	0.177	0.230	0.270	0.114	0.167	0.233	0.269	0.111
Panel D Interaction with DEPOSIT				Panel E Interaction with EQUITYASS								
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223			
Dependent var.	COSTINC	ROE	Z_SCORE	ROE_RA	COSTINC	ROE	Z_SCORE	ROE_RA	ROE_RA			
DEPOSIT	-0.021 [0.072]	-0.014 [0.023]	-0.554 [0.530]	-0.907 [1.854]	-0.217 [0.184]	-0.052 [0.046]	-1.319 [0.000]	-5.332** [2.245]				
SAVE*DEPOSIT	0.168 [0.159]	-0.091 [0.057]	2.992 [2.544]	1.113 [8.117]	-0.435 [0.614]	-0.261 [0.165]	13.408** [6.544]	51.624** [20.580]				
COOP*DEPOSIT	-0.070 [0.159]	-0.032 [0.049]	-0.172 [0.991]	-0.994 [3.686]	0.222 [0.173]	0.028 [0.057]	-1.721 [1.041]	-7.120** [3.493]				
SAVE	-0.102 [0.110]	0.062 [0.043]	-2.306 [1.984]	-0.310 [6.434]	0.053 [0.058]	0.016 [0.016]	-0.846 [0.537]	-2.832 [1.956]				
COOP	0.085 [0.094]	0.003 [0.029]	0.359 [0.674]	1.821 [2.583]	0.017 [0.042]	-0.020* [0.011]	0.356 [0.261]	1.628* [0.920]				
R-squared	0.227	0.286	0.365	0.224	0.227	0.284	0.376	0.259				
Adj. R-squared	0.168	0.232	0.272	0.108	0.169	0.229	0.284	0.148				

This table shows the results of the profit and risk regression as defined in Equation (3) where operational variables as defined in Table 3 in turn are interacted with SAVE and COOP. The profit and risk variables are as defined in Table 2. SAVE and COOP are dummy variables taking the value 1 if the bank is a savings or cooperative bank, respectively, and 0 otherwise. The operational variables SIZE, LOANS, INTINC, DEPOSIT and EQUITYASS are included in the model specification as are the ownership classes OWN_1, OWN_6 and OWN_8 and a constant. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

Table 14 Impact of ownership variables on profitability and risk in commercial, savings and cooperative banks

Panel A Interaction with <i>LISTED</i>					Panel B Interaction with <i>BL_INST</i>				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 411	III 228	IV 223
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z_SCORE</i>	<i>ROE_RA</i>	Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z_SCORE</i>	<i>ROE_RA</i>
<i>LISTED</i>	-0.043 [0.032]	0.022** [0.009]	-0.168 [0.231]	-0.886 [0.778]	<i>BL_INST</i>	-0.056** [0.028]	-0.021* [0.011]	0.145 [0.242]	-0.307 [0.745]
<i>SAVE*LISTED</i>	-0.006 [0.062]	0.013 [0.023]	1.022* [0.559]	5.819*** [1.276]	<i>SAVE*BL_INST</i>	0.128** [0.060]	0.007 [0.024]	-1.787** [0.738]	-6.165*** [1.400]
<i>COOP*LISTED</i>	0.043 [0.071]	-0.023 [0.017]	-0.273 [0.573]	-1.809 [1.844]	<i>COOP*BL_INST</i>	0.022 [0.072]	0.015 [0.020]	-0.234 [0.606]	0.454 [2.042]
<i>SAVE</i>	0.001 [0.030]	-0.005 [0.010]	-0.032 [0.350]	-0.138 [0.852]	<i>SAVE</i>	-0.099* [0.054]	-0.012 [0.022]	1.773*** [0.624]	6.621*** [1.080]
<i>COOP</i>	0.021 [0.067]	-0.005 [0.015]	0.388 [0.285]	1.943** [0.918]	<i>COOP</i>	0.008 [0.045]	-0.028* [0.016]	0.453 [0.524]	0.844 [1.683]
R-squared	0.139	0.232	0.310	0.226	R-squared	0.146	0.221	0.311	0.196
Adj. R-squared	0.086	0.185	0.229	0.132	Adj. R-squared	0.093	0.173	0.230	0.099
Panel C Interaction with <i>BL_BANK</i>					Panel D Interaction with <i>BL_IND</i>				
Observations	I 411	II 411	III 228	IV 223	Observations	I 411	II 228	III 411	IV 223
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z_SCORE</i>	<i>ROE_RA</i>	Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z_SCORE</i>	<i>ROE_RA</i>
<i>BL_BANK</i>	-0.062* [0.032]	0.004 [0.014]	0.306 [0.309]	0.699 [0.794]	<i>BL_IND</i>	-0.036 [0.031]	-0.061 [0.225]	0.004 [0.009]	-0.125 [0.691]
<i>SAVE*BL_BANK</i>	0.117** [0.048]	-0.012 [0.021]	0.017 [0.692]	-0.879 [1.515]	<i>SAVE*BL_IND</i>	0.073 [0.049]	-0.419 [0.484]	-0.020 [0.019]	-2.913** [1.394]
<i>COOP*BL_BANK</i>	0.003 [0.083]	-0.029 [0.019]	-0.432 [0.488]	-1.645 [1.692]	<i>COOP*BL_IND</i>	0.072 [0.059]	0.144 [0.444]	0.023 [0.014]	1.102 [1.668]
<i>SAVE</i>	-0.015 [0.028]	-0.004 [0.011]	0.068 [0.304]	0.873 [1.147]	<i>SAVE</i>	-0.011 [0.025]	0.264 [0.389]	-0.001 [0.010]	1.763* [0.960]
<i>COOP</i>	0.045 [0.031]	-0.003 [0.010]	0.386 [0.289]	1.692* [1.014]	<i>COOP</i>	0.017 [0.044]	0.252 [0.320]	-0.017 [0.011]	0.977 [1.008]
R-squared	0.145	0.213	0.303	0.175	R-squared	0.137	0.301	0.213	0.193
Adj. R-squared	0.092	0.164	0.220	0.075	Adj. R-squared	0.084	0.218	0.164	0.095

This table shows the results of the profit and risk regression as defined in Equation (4) where ownership variables as defined in Table 5 in turn are interacted with *SAVE* and *COOP*. The profit and risk variables are as defined in Table 2. *SAVE* and *COOP* are dummy variables taking the value 1 if the bank is a savings or cooperative bank, respectively, and 0 otherwise. The operational classes *OPER_5* and *OPER_8*. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

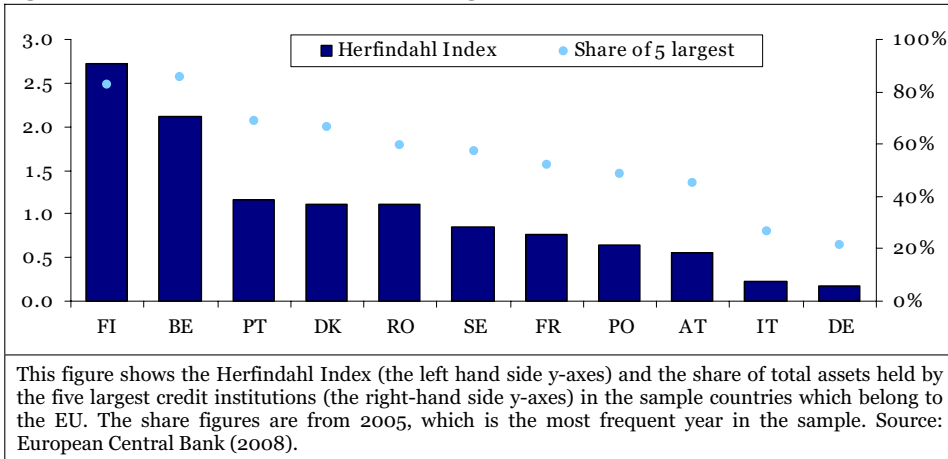
4.4. Impact of competition

Finally, I make a small note on the impact of competition on the profitability and risk of commercial, savings and commercial banks. Recall that savings and cooperative banks have to address the economic realities of competition and are hence expected to focus more on cost minimisation and profit maximisation in countries where banking competition is fierce (Fried *et al.*, 2009, Bhattacharya & Thakor, 1993).

The level of concentration in the banking sector differs substantially across the sample countries (see Figure 1). It is particularly high in Finland followed by Belgium, whereas the level of concentration is very low in Germany and Italy. To account for these differences and examine whether profitability and risk differences vary with level of concentration, I rerun the regressions in sub-samples of banks operating from a home country with below (above) median concentration measured either as the Herfindahl Index or the share of assets held by the five largest banks.

I do find that the level of competition has an impact on the profitability and risk differences (see Table 15)¹⁴. It appears as if the profitability of savings and cooperative banks is significantly lower than the one of commercial banks only in countries with low competition (see Column VI). This finding indicates that in countries with high competition, savings and cooperative banks have had to adjust to economic realities and hence operate more like commercial banks. Moreover, the risk-adjusted profitability of cooperative banks is significantly higher than the one of commercial banks in these high competition countries, indicating the organisational form work well in some settings.

Figure 1 Level of concentration in the banking sector



¹⁴ The results are the same as the ones reported when the share of five largest banks are used as bases for the categorisation in to low vs. high competition countries and are hence not reported separately.

Table 15 Profitability differences in countries with different level of competition

Sample	Low Herfindahl index				High Herfindahl index			
	I	II	III	IV	V	VI	VII	VIII
Observations	138	138	67	67	167	167	83	80
Dependent variable	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>	<i>COST-INC</i>	<i>ROE</i>	<i>Z-SCORE</i>	<i>ROE_RA</i>
Constant	0.645*** [0.033]	0.099*** [0.015]	4.629*** [0.377]	6.055*** [1.416]	0.611*** [0.046]	0.123*** [0.012]	4.413*** [0.286]	5.378*** [0.856]
<i>SAVE</i>	0.006 [0.036]	0.002 [0.013]	0.524 [0.487]	2.081 [1.377]	0.033 [0.036]	-0.025* [0.013]	-0.373 [0.456]	-1.059 [1.513]
<i>COOP</i>	0.045 [0.040]	0.005 [0.015]	0.381 [0.351]	2.133* [1.186]	0.007 [0.070]	-0.037*** [0.014]	0.338 [0.437]	0.704 [1.683]
<i>OPER_5</i>	0.084 [0.067]	0.043 [0.041]	-0.669* [0.364]	-1.186 [1.151]	-0.091 [0.126]	0.005 [0.046]	0.354 [0.317]	0.664 [1.163]
<i>OPER_8</i>	0.018 [0.111]	0.016 [0.025]	-1.554*** [0.383]	-3.735*** [0.964]	0.020 [0.092]	-0.029* [0.017]	-0.646* [0.381]	-2.097* [1.048]
<i>OWN_1</i>	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.314 [0.330]	-0.035 [0.025]	-0.301 [0.402]	-1.653** [0.687]
<i>OWN_6</i>	0.004 [0.072]	0.075* [0.043]	-0.517 [0.486]	-0.685 [1.385]	0.202** [0.080]	-0.012 [0.026]	-0.605** [0.295]	-1.188 [1.060]
<i>OWN_8</i>	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	0.000 [0.000]	-0.011 [0.070]	0.024 [0.030]	-0.857*** [0.269]	-2.136** [0.977]
R-squared	0.130	0.185	0.237	0.191	0.187	0.310	0.417	0.241
Adj. R-squared	0.054	0.114	0.084	0.030	0.088	0.227	0.265	0.033

This table shows the results of the profit and risk regressions for sub-samples of banks with a low vs. high Herfindahl index indicating high vs. low level of competition. The median index value is used as the cut-off point. The model specification applied is $PROF/RISK = \alpha + \beta*SAVE + \beta*COOP + \beta*OPER_5 + \beta*OPER_8 + \beta*OWN_1 + \beta*OWN_6 + \beta*OWN_8 + \beta*[YEAR] + \beta*[COUNTRY] + \varepsilon$. The profitability and risk variables are as defined in Table 2. *SAVE* and *COOP* are dummy variables taking the value 1 if the bank is a savings or cooperative bank, respectively. The standard errors are corrected for clusters of observations from the same bank. Robust standard errors are stated in brackets. ***, ** and * denote the significance at 1%, 5% and 10%, respectively.

5 CONCLUSION

The objective of this study is to compare the profitability and risk of European commercial, savings and cooperative banks, while accounting for differences in operational and ownership characteristics. I do find that the differences in profitability and risk vary with the operational and ownership characteristics of the comparison group. These findings support the initial notion that it may be the distinct operational and ownership characteristics rather than the mere fact that a bank is a savings and cooperative banks, which explains the differences in profitability and risk.

In some operational and ownership classes savings and cooperative banks have higher unadjusted or risk-adjusted profitability than commercial banks, which indicates that they have diverted from their traditional non profit-maximising objectives. This is particularly true in a competitive environment. Alternatively, the savings and cooperative organisational form is particularly suitable in these sub-samples of banks, indicating that there is room for these two organisational forms in some banking settings. On the other hand, the risk (risk-adjusted profitability) of cooperative banks is significantly lower (higher) than the one of commercial bank when the comparison is done among small traditional or diversified banks with low deposits to funding and among listed banks with bank or fund blockholder owner. Whether the lower profitability is due to the fact that utility of the owner-customer is the prime priority of cooperative banks, is a question which remains unanswered due to the difficulty in assessing customer value. What does, however, appear to be real and worrying is the higher risk that these banks have in comparison to peer commercial banks. These findings indicate that on occasion the cooperative bank organisational form is inappropriate as it endangers the stability of the financial system. Hence, I conclude that savings and cooperative banks are two very heterogenic groups of banks. These findings of the joint impact of the type of bank and operational as well as ownership characteristics have regulatory implications in that the appropriateness of the commercial, savings and cooperative bank organisational model in different settings have to be accounted for in the regulatory framework directing their operations.

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