Organizational Structure and Performance in European Banks: A Reassessment

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Abstract

Using a large panel of over 300 banks for 15 years from 19 countries, we study the impact of ownership structure on performance in European banking. The specific measures we use are profitability, loan losses and cost efficiency. Our specific contribution is to use finer classifications in ownership structures than previous literature on ownership and performance has used. The results are contrary to the widely held belief that shareholder ownership is superior to stakeholder ownership in banking. There are no significant differences in profitability across ownership classes. Co-operatives and publicly owned savings banks outperform commercial retail banks in terms of cost efficiency and loan losses. There is some heterogeneity within the stakeholder-owned banks.

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1. Introduction

The diversity of ownership structure is a pervasive feature of the European banking industry. Alongside with profit-maximizing commercial banks, most European countries host a significant sector of stakeholder banks, namely customer-owned co-operative banks and or non-profit savings banks. The latter are in some countries privately-owned and in others publicly-owned. However, the impact of such diversity remains underresearched.

In this paper, we utilize data from Bankscope to construct a long and wide panel of more than 300 banks for the years 1994–2008 from 19 European countries to make a long-term comparison of the performance of the banks across different organizational structures. As performance measures we use profitability, cost efficiency and loan losses. To fully capture the possible impact of the ownership diversity, we provide a finer classification of the banks' organizational structure by splitting each group into two more groups: the commercial banks into general vs. specialized banking institutions, the cooperative banks as tightly vs. loosely federated, and the savings banks as privately vs. publicly owned.

The key results of the paper are: 1) contrary to what might have been expected, there is no evidence of a significant lower profitability either for any co-operative or savings bank class; 2) in turn, the co-operatives and savings banks do somewhat better in terms of cost efficiency and loan losses: 2.1) both tightly and loosely federated co-operatives outperform commercial retail banks in terms of cost efficiency, with the former slightly prevailing over the latter; 2.2) only loosely federated co-operatives perform better in terms of loan losses; 2.3) state owned savings banks outperform commercial retail banks at cost efficiency; 3) specialized commercial banks are more profitable than other banks when only country and time effects are considered; however, this finding does not survive when bank-specific control variables are included.

The subprime crisis that started in 2007 led governments and markets to reassess the virtues of stakeholder banking, because stakeholder banks have weathered the crisis somewhat better than commercial banks and have required less government assistance (The Economist, Jan 21, 2010, Beck et al. 2009). However, our analysis suggests that already before the crisis there was no clear advantage to the benefit of profit-maximizing banks. If anything, our analysis suggests the other bank types outperforming the retail commercial banks. This provides a reason for reassessment of negative perceptions on co-operative and savings (particularly if state-owned) banks. However, there is also some heterogeneity among stakeholder-

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owned banks, private savings banks being closer to commercial retail banks than other types of stakeholder-owned banks.

In the rest of the paper, section 2 is devoted to outline the main views put forward in the theoretical and empirical literature. Thus, sub-section 2.1 sketches the theoretical framework behind differences in banks' organizational forms and the possible impact those differences have on bank performance, while in sub-section 2.2 we recap the extant empirical evidence on the relationship between organizational structure and performance in banking. We then introduce our classification refinements and, after implementing them, describe our large panel of European banks (section 3). In section 4 we present and comment the results of our empirical analysis. Finally, section 5 concludes and draws some policy implications from our findings.

2. Survey of the Background Literature

2.1 Theoretical Framework

Organizational form has important implications for economic behavior, performance, and business activities of financial firms (e.g. O'Hara 1981; Fama and Jensen 1983; Rasmusen 1988). One unusual characteristic of the financial sector is that a significant part of the industry output is provided by entities that do not aim to maximize profits; that is, by co-operatives and non-profit savings banks. The different organizational structures suggest that the conduct and performance may also differ across organizational structures. The main objective of a commercial bank is to maximize shareholder value (profits), whereas a cooperative or a savings bank aims at maximizing the value for a larger set of stakeholders; that is to provide the best products and services to its clients. Because of the different ultimate goals and the fact that stakeholder-owned banks do not maximize profits, profitability should not be the only performance measure, but performance should also measured by other indicators, such as cost efficiency and loan quality.

The main difference between profit-maximizing banks and co-operative banks lies in the control of the bank and profit distribution (Rasmusen 1988). A stock company is owned by its stockholders, who control (at least in theory) the managers, decide how to distribute profits, and are free to sell their stocks at any time. In co-operative banks, members, who are the customers of the bank, also control the management in principle, but there are important differences: although co-operative banks may pay dividends based on profitability, the distribution is of profits is more limited.[2] Moreover, membership in co-operatives is not tradable.

Savings banks have many commonalities with co-operative banks, but there are also important differences. Like co-operative banks, they are non-profit-oriented institutions with a social mission, a commitment to contribute to the prosperity of the region where they are located, and a mandate to contribute to the "general good". Furthermore, like co-operative banks, they can be decentralized elements of some larger system, network or nexus (Ayadi et al. 2009; Schmidt 2009). One important feature that distinguishes savings banks from cooperatives is that savings banks are in certain countries either publicly owned or link to public ownership structures (such as the German *Landesbanken*), whereas co-operatives are always in private ownership. In some countries, saving banks are owned by private foundations. Co-operatives, in turn, are always owned by their own customers. Also the ownership rights of the customers of savings banks are less extensive than the rights of the owner-members in the case of cooperative banks. For instance, the boards of savings banks are self-perpetuating and the voting rights of the customers of savings banks are either limited or do not exist.

Because the financial stakes of members are limited, ownership is dispersed, and shares are not tradable, many observers have concluded that members in co-operative banks are probably not sufficiently incentivized to monitor the management. Thus, the principal-agent conflict between owners and management is arguably more severe in co-operative banks than in joint-stock banks (Cuevas and Fischer 2006). This problem may even be more severe in savings banks that do not have owners at all. This type of inefficiency in the ownership structures has led some observers to conclude that the existence of stakeholder-owned financial institutions could be explained aby protective regulation, which prevented stock companies from competing against mutuals in particular markets (O'Hara 1981). One further issue against the stakeholder-owned banks is the public ownership in some savings banks systems.

However, the fact that stakeholder-owned financial institutions not only survive but increase their markets shares in many markets suggest that there may be other factors than regulation that enhance their

[2] The division of surplus is not necessarily tied to profits only, as many co-operative banks divide the surplus at least partly based on member involvement in operations (loans, deposits, mutual fund stakes etc.). In some countries, members cannot freely decide on the surplus division as the law requires mandatory outlays to reserves. The Italian BCC credit co-operatives are probably the most extreme case as the law governing them requires that at least 70% of profits are allocated to non-divisible reserves (Lolli 2010).

competitiveness. They may well be doing better in terms of two other principal-agent connections, namely between the bank and its borrowers, and the bank and its depositors (Coco and Ferri 2010). First, both co-operative and savings banks usually develop a relationship between the bank and its borrowers, which helps to lower the adverse selection problem (Amess 2002). Second, managers of co-operative banks have lower incentives to take excessive risks, which makes deposits safe (Rasmusen 1988). Although the now practically universal provisions of deposit insurance may have made this advantage relatively obsolete, the non-profit-maximizing structure of co-operative and savings banks may still give them an edge in signaling trustworthiness to the extent that customers may even be willing to pay a premium for their financial products (Fonteyne 2007).The higher accumulation of reserves can be used to smooth out fluctuations during the business cycle and therefore generate more certain returns for depositors, as well as reduce the bankruptcy risk (Amess 2002; Schmidt 2009). Allen et al. (2008) argue that stakeholder owners put more weight on firm survival than shareholder owners, and under certain circumstances this may even lead to higher firm value than pure profit maximization.

One relatively understudied issue in the banking literature has been the role of integration in understanding the performance of stakeholder oriented financial organizations. As mentioned above, both co-operative banks and savings banks tend to collaborate with each other and they form second-tier organizations (centres) that serve the primary level organizations.[3] This collaboration takes most extensive form in co-operative banks that form either strategic networks or consensual networks (Desrochers and Fischer 2005; Cuevas and Fischer 2006). There are common elements in both networks, such as joint development of resources (e.g. payment systems, IT solutions, employee training, product development, joint marketing, no competition of banks within the same network, and, in many cases, liquidity provision). However, strategic networks do also include features not typically in consensual networks: a high degree of cross-insurance or joint liability, joint governance structures, and strategic guidance and even direct intervention from the centre in the case of non-performance of primary-level organization. The second-tier body is owned by primary-level organizations and its supervisory body consists of representatives of primary level organizations. It is a closed system where the primary level organization have the customary ownership rights on secondary level organizations, but the secondary level organizations have also some well-specified control rights towards the primary level organizations (that otherwise are controlled by their member-customers). As Desrochers and Fischer (2005) and Cuevas and Fischer (2006) note, the integrated structure helps to control the principal-agency problem that is generated in the primary level due to the dispersed ownership structure. Moreover, Desrochers and Fischer (2005) find that higher degree of integration also reduces the variability of financial efficiency indicators of co-operative banks. However, their analysis seems to beg the question of what insures that the secondary level has the right incentives to monitor the primary level co-operatives.

Similarly to co-operative banks, savings banks in many countries tend to have multi-level governance structures. For instance, the German savings banks form at the local level municipally-owned savings banks (*Sparkassen*). They are served at the regional (state) level by state banks (*Landesbanken*), which are owned by local savings banks and regional government. Finally, at the national level they operate one financial institution (Deka Bank) and an association (DSGV). Similar degree of integration characterizes also Austrian and Swiss savings banks. This degree of integration can in the case of savings banks also be regarded as solving the principal-agent problem. However, differently from co-operative banks, the various governance organizations in integrated savings banks systems have an ownership stake by local governments. Governmental ownership has often been argued to lead into further separation of control and financial incentives, and therefore to underperformance (La Porta et al. 2002; Sapienza 2004),[4] so the overall effect of integrated structure in solving the governance problems in public savings banks system is unclear.

In the discussion above, we have mentioned that there are various conflicting effects that complicate the predictions of the links between ownership structures and performance. We now turn to empirical literature to learn from findings so far and identify the remaining gaps in the literature.

2.2 Empirical Background

[3] Often there are three levels of organizations: local co-operative banks form regional associations, which in turn are associated at the national level.
[4] However, Micco et al. (2004), on the basis of a large cross-country survey, find that there are no significant efficiency differences between privately-owned and publicly-owned banks in developed countries, whereas in developing countries privately-owned banks have an efficiency advantage.

Previous empirical work focusing on the relationship between different ownership types and banks' performance has been surprisingly inconclusive. The performance of financial intermediaries has usually been estimated in utilizing one of the two approaches: one, by performing regressions on financial efficiency using data on banks' financial statements and controlling for bank (and country) specific variables. Second, estimating banks' production and cost functions employing either non-parametric (such as the Data Envelopment Analysis) or parametric approaches (such as the Stochastic Frontier Approach). Cost or technical efficiency is then evaluated by measuring a bank's distance from the best practice production frontier.

Of the large set of empirical papers comparing the performance of financial intermediaries, the most interesting and relevant for our purposes are the ones conducting international comparisons. Iannotta et al. (2007) compare 181 large banks from 15 European countries over the 1999-2004 period and find that mutual and government-owned banks exhibit lower profitability than private banks, in spite of their lower costs. Public sector banks tend to have poorer loan quality and higher insolvency risk than other types of banks while mutuals have better loan quality and lower asset risk than both private and public sector banks. By and large, this divergence in the results indicates that the financial intermediation model differs across the three bank ownership forms. Goddard et al. (2004) focus on six European countries and find little evidence of any systematic relationship between ownership type and profitability outside Germany (where savings and cooperative banks underperformed relative to commercial banks). Only in the all-countries cross-sectional estimation, cooperative banks are less profitable than commercial and savings banks, albeit the effect is only significant at the 10% level. Girardone et al. (2009) find that cooperative banks operating in the EU-15 countries are significantly more cost efficient than the commercial banks included in the sample (covering the years 1998 to 2003). The differences in cost efficiency across bank types can often be explained by the prevailing financial system in each economy, and the authors did find that in bank-based countries savings banks have significant cost efficiency advantages over those operating in market-based ones and over commercial banks. However, Kontolaimou and Tsekouras (2010) arrive in a rather different conclusions by introducing a new methodology (metafrontier approach). They conclude that there is a significant technology gap for European cooperative banks relative to other ownership types, which they attribute mostly to the level and/or the composition of outputs, rather than inputs. Finally, Hesse and Čihák (2007) take a rather different perspective and investigate cooperative banks' soundness and resilience to stress and their impact on other institutions in financial markets with a data covering OECD countries during an eleven-year period (1994-2004). They report that cooperative banks' z-scores (measure for reduced insolvency risk) are on average significantly higher than for commercial banks (and slightly higher than for savings banks too).

Even in country-level studies, there have been no consistent patterns across studies on the relationship between ownership and patterns. The most studied cases have been the German and Spanish banking markets. Altunbas et al. (2001) focus on Germany during 1989-1996 and find that public banks and mutuals are more cost and profit efficient than their private counterparts, which possibly reflects their relatively lower funding costs. Consistently with their findings, Brunner et al. (2004) also report that German co-operative and savings banks are slightly more profitable than commercial banks. Beck et al. (2009) report that in Germany private banks are less stable than savings or cooperative banks using three different measures of bank stability; the z-score (distance from insolvency), nonperforming loans, and distress probabilities. Moving to the Spanish case, Hasan and Lorenzo-Vivas (2002) compare mutual and stock types of institutions in the Spanish depository industry during 1986-1995 and find that mutual institutions are more non-interest cost inefficient than commercial banks. However, when they perform a further series of OLS estimations, they find that despite higher expense preferences, mutual institutions apparently record higher return on assets and increasing market share relative to commercial banks. Crespí et al. (2004) find that savings banks are smaller in size, but more profitable than commercial banks, especially when considering profits from regular banking operations. Garcia-Marco and Robles-Fernandez (2008) reveal major differences in the patterns of risk-taking of Spanish commercial and savings banks. In general, commercial banks are more risk-inclined than savings banks, and small sized institutions appear to assume lower risks. The degree of concentration in commercial banks has a negative impact on the level of banks' risk-taking, reflecting stricter shareholder control over managers.

Other relevant studies include Bøhren and Josefsen (2007), who study the Norwegian banking industry and find that, compared to owner-controlled commercial banks, ownerless savings banks are less risky, smaller, and price their products less aggressively (and hence smooth competition). However, commercial banks do not outperform ownerless savings banks in economic terms. They conclude that neither the one-dimensional objective of profit-maximization nor the stockholders' monitoring of management seems critical

for banks' value creation. Bichsel (2006) addresses the role of state-ownership in the banking sector and compares the state-owned banks against privately owned banks in Switzerland. He finds no systematic differences between the two.

In the light of widely held view that co-operative and savings banks are less efficient than commercial banks,[5] it is surprising how little unanimity in the empirical literature as to whether commercial banks actually outperform their savings or cooperative counterparts.[6] However, the above-mentioned comparisons also face important limitations. One shortcoming is the way ownership types are categorized. Most of the studies using the BankScope database utilize the ownership classification provided in the database and compare cooperatives, commercial banks, and savings banks (as in Hesse and Čihák 2007, Kontolaimou and Tsekouras (2010), Girardone et al. (2009), and Goddard et al. (2004)). Iannotta et al. (2007) instead divide the sample in mutual, government owned, and privately owned banks. Altunbas et al. (2001) compare private, mutual, and public financial institutions. When using national databases, the division is usually made between mutual and stock institutions (Hasan and Lorenzo-Vivas (2002), Hermalin and Wallace (1994), and Bongini et al. (2000)), or commercial banks and savings banks (Bøhren and Josefsen (2007), Garcia-Marco and Robles-Fernandez (2008), and Crespí et al. (2004)). In this paper, we aim to provide a more comprehensive classification of ownership structures.

3. Data and Refinements

We will now start describing the raw data we extracted from BankScope. Then, we will outline the refinements we introduced to upgrade our database to make it more focused at capturing ownership/organizational structure diversity. At the end of this section the database that we will actually use in our empirical analysis will be presented.

3.1 Data

Our sample is based on the BankScope database, provided by the Bureau Van Dijk. It is a standard database used especially in cross-country research (e.g. Goddard et al. (2004); Iannotta et al. (2007); Girardone et al. (2009)).

For our sample, we use data for 19 European countries. It includes all EU15 countries (i.e. EU members countries before the 2004 enlargement) plus Cyprus, Iceland, Norway and Switzerland. In other words, we exclude mainly the former communist countries.

To start with, we avail ourselves of the BankScope's classification between ownership types and first include all financial intermediaries that were classified as cooperative banks, commercial banks, savings banks, real estate / mortgage banks, bank holding and holding companies, and governmental credit institutions.

We use consolidated data for the years 1994-2008. Unlike some research, we do not match unconsolidated accounts to boost up the number of observations, because it is unclear how comparable consolidated and unconsolidated accounts are. We opted for this conservative approach to avoid the possible distortions that might derive from group belonging. To avoid double counting, we exclude banks owned by other banks. Banks that merged in the 2000s are included until the year before the merger.

We select to the sample mostly banks that are classified as commercial banks, savings banks or co-operative banks, although we modify these classifications as explained below. In addition, we include UK and Irish building societies, although we otherwise exclude mortgage banks.[7] Some large commercial banks are not found under the heading "commercial banks" but under "bank holdings & holding companies". We use this source when appropriate. We also include banks from the category "specialized governmental credit institutions" if these are savings banks (see the discussion below).

We also exclude banks that are owned by non-(Western) European banks (typically by Arab, Japanese, Russian or US banks). Thus, we focus on comparing the performance of European-owned companies, most of them focusing on national markets, but including a number of Pan-European banks. We also exclude government owned commercial banks (we find 13 such banks). Finally, we remove all banks that have less than five-year observations. To deal with outliers, we remove observations for which any of the dependent or

[5] See e.g. O'Hara (1981) and Rasmusen (1988) for particularly strong statements.

[6] Similar conclusion applies also to studies that have used data from outside Europe. See e.g. Hermalin and Wallace (1994), Bongini and Ferri (2000) and Fuentes and Vergara (2007).

[7] Building societies and mortgage banks from continental Europe differ in several respects. Building societies nowadays a broader range financial services, while continental mortgage banks are very specialized. The latter are also usually owned by other banks or owned by government (Brunner et al. 2004), both of which are arguments for excluding them from the analysis.

independent variables is below 1% or 99% cutoff.[8] Some experiments showed that the results are sensitive to exceptional values, and some observations take really implausible values.

3.2 Refinements

We made two types of refinements. First, we re-coded some of the banks whose ownership classification as featured in BankScope seemed inappropriate. Second, as mentioned, we split commercial banks, cooperative banks and savings banks into further binary categories.

3.2.1 Re-coding

Since cursory evidence left us unsatisfied with the classification of some of the banks in terms of their ownership class as reported by BankScope, we undertook the painstaking job of looking into this issue more in depth. Specifically, with the help of Internet searches and consulting banks' websites we looked one bank at a time and reclassified all banks into three ownership type groups: commercial banks, cooperative banks and savings banks. Some of the original banks were dropped from the sample due various reasons.

We do extensive modifications to the ownership classification. This applies especially to the savings banks. BankScope classifies as savings banks many converted banks that cannot reasonably be viewed as savings banks any longer (e.g. Lloyds TSB or Swedbank). Also we changed the classification for a number of Belgian and Italian banks where the non-profit foundation is no longer a dominant shareholder.[9] The French Caisse d'Espargne banks are still classified by BankScope as savings banks, although since the late 1990s their ownership structure has been co-operative. We changed their classification into co-operative banks.

Co-operative banks are mostly appropriately defined in Bankscope. A difficulty related to them is that they are present at different levels of aggregation. Especially all the French co-operative banks are heavily represented by their regional banks, but also for all the four co-operative bank groups there is information on the group level and subsidiaries. Same regional-level aggregation applies, for instance, to German and Austrian co-operative banks, whereas for the Netherlands and Finland – where both countries have important co-operative banks – only group level data are available. In the cases where regional data is available, we use the regional level. Since group-level banks are ultimately owned by regional and local banks, this is consistent with the principle of including the ultimate owner. Using regional data also increases comparability with savings banks that are similarly regionally defined (especially the government-owned ones).

Commercial banks make a relatively straightforward category. They needed no particular recoding, other than what implicit in the previously mentioned recodings.

3.2.2 Dichotomizing Bank Classes

The original three groups – commercial banks, cooperative banks and savings banks – were then further subdivided into six groups depending on their ownership type: 1) tightly federated co-operative banks (those belonging to a strategic network), 2) loosely federated cooperative banks (those belonging to a consensual network), 3) private savings banks, 4) publicly-owned savings banks, 5) general (retail) commercial banks, and 6) specialized commercial banks.

Starting with the savings banks, an important classification pertaining to these banks is that they can be under private or public ownership (e.g. Garcia-Marco and Roblez-Fernandez (2008); Ayadi et al. (2009)). The main examples of publicly owned savings banks are German, Austrian and Swiss saving banks. Our data also include some Portuguese savings banks (Table 1). Private savings banks, in turn, are present mostly in Spain and Norway (for Spanish savings banks, see Hasan and Lozano-Vivas (2002) and Garcia-Marco and Roblez-Fernandez (2008); for Norwegian savings banks, see Bøhren and Josefsen (2007)). They are also present in smaller numbers in Denmark, Iceland and Sweden, although in these countries the savings bank sector has also undergone demutualization.

Admittedly, the dichotomization of saving banks is somewhat problematic, because the savings banks sector is rather heterogeneous across countries and, furthermore, has experienced a large transformation within the past two decades (Ayadi et al. 2009). For instance, the Austrian savings bank sector has been

[8] Except for size (log of total assets), that is very neatly normally distributed. We think that especially removing the largest banks might give a distorted picture.

[9] It is difficult to give a solid criterion for savings banks because they can take various legal forms. The criterion we apply is that if a savings banks is majority controlled by a foundation and there are no other large owners, then it is classified as a savings bank, even if would be a joint-stock company.

partly privatized, whereas in the Spanish savings banks system, local politicians usually are in the boards of the banks and thereby the system characterized by a degree of political influence. Another potential demarcation line is the degree of integration of savings banks system. As noted earlier, publicly owned savings banks are more tightly integrated than the private ones, although even there are differences. The Swiss savings banks do not, in contrast to their German and Austrian counterparts, have local level banks, but the banks cover the entire region (*Kanton*).

Distinguishing private from publicly-owned savings banks is important as their corporate governance set up might differ in two substantial ways. On the one hand, government ownership might negatively impinge on performance as it could lead to inefficiencies due to political interference (La Porta et al. (2002); Sapienza (2004)). On the other hand, however, public ownership of savings banks may be beneficial if it leads into more concentrated monitoring.[10] It is hard to tell which of the two effects might prevail.

For co-operative banks, we distinguish between tightly federated and loosely federated or independent co-operative banks. Our division is largely based on the work of Desrochers and Fischer (2005), who make distinctions between atomized, consensual and strategic networks. The last category, to which Desrochers and Fischer (2005) include e.g. German co-operative banks and Italian Banche di Credito Cooperativo, corresponds with our "tightly federated" co-operative banks. In addition, we include in this category also all four French co-operative banking groups and their regional banks, both Austrian co-operative banking groups and their regional banks, and the co-operative banking groups from Finland, Luxembourg, Netherlands, Portugal and Switzerland. To the consensual network group Desrochers and Fischer (2005) include e.g. Italian Banche Popolari and Spanish co-operative banking groups, and we follow their classification by placing these into the category of loosely federated or independent co-operative banks. In addition, we include to this category UK and Irish building societies that make the most numerous group in this category, and a number of independent but mutually owned banks (such as Danish Nykredit). We also include commercial banks owned by co-operatives into this category (the Co-operative Bank of the UK, German Edekabank, Danish Arbejdernes Landesbank).

Also in this case, the governance set up of the tightly and the loosely federated cooperative banks might differ remarkably. Specifically, the governance of the tightly federated coop banks could be conditioned to a much larger extent by the directives issued by the central body of the federation vis-à-vis what experienced by the loosely federated coops. Thus, the tightly (loosely) federated units could benefit from (lack a) stronger group-level monitoring but this could be achieved at the cost of (could allow them) less (more) flexibility in their business choices. As such, there might be a trade-off between the two effects.

Finally, we make a further distinction separating the commercial banks into general banks (that have a broad focus) and specialized (private) banks that serve niche groups of clients by providing specialized services (investment banking, asset management etc.). We made this differentiation by visiting the websites of the banks and judging on the basis how the banks described their activities themselves. Schure et al. (2004) found that there is a significant heterogeneity among banks that are classified as commercial banks in Bankscope and conjecture that this might be due to the different business models of banks within this category. Therefore, we expect that there are significant differences between general and specialized commercial banks in terms of profitability, capitalization, revenue composition etc. In turn, all savings banks and co-operative banks (or the groups they form) we are focusing on have a retail focus.[11]

3.3 The Final Database

We may now briefly describe the data to be used in our empirical analysis. In all, we have 359 banks (Table 1). The largest national groups of banks come form France (62 banks) and Spain (60) followed at a considerable distance by the UK (38), Italy (34) and Germany (26), five countries (Austria, Denmark, Norway, Switzerland and the Netherlands) have between 10 and 20 banks each, while the other nine countries have fewer than 10 banks each, with Finland closing at only three banks. Our sample consists of 31% cooperative banks – respectively, 18% tightly federated and 13% loosely federated; 26% savings banks – respectively, 19% private owned and 7% publicly owned; 43% commercial banks – respectively, 26%

[10] Kose and Kedia (2000) conclude that the optimal governance mechanism is either: i) concentrated ownership (when bank monitoring is costly and takeovers are not a threat), ii) bank monitoring (when monitoring costs are low and takeovers are ineffective), or iii) dispersed ownership and hostile takeovers (when anti-takeover defenses are low and monitoring is costly). In turn, Prowse (1995) finds that banks in need of regulatory intervention have markedly lower ownership concentration: this suggests that higher ownership concentration at banks might improve performance by motivating greater oversight and monitoring by large shareholders and their representatives on the board of directors. Thus, in the words of Kose and Kedia (2000), the optimal governance for banks could be of their first type.

[11] Co-operative and savings banks often own specialized non-retail banks (e.g. Calyon, the investment banking arm of Credit Agricole Group). However, these are always owned by the banks in the group, and hence are not included in our analysis.

general and 17% specialized. Two thirds of the tightly federated coops are French. About half of the loosely federated co-operatives are from the UK and an additional quarter come from Italy. The private savings banks are typically a Spanish (above 60% of the total) and Norwegian (about a quarter) phenomenon. The state owned savings banks are instead concentrated in Switzerland (40% of the total), Germany (above 30%) and Austria (some 20%). Both the general and the specialized commercial banks in our sample are more uniformly distributed across the 19 European countries.

4. Empirical Approach and Results

4.1 Empirical Specification

Our key performance variables are return on assets (profitability), loan losses (loan quality), and cost-to-income ratio (efficiency). This is a fairly standard set of performance variables in banking. Profitability is probably the most widely used performance measure. It is appropriate to use the ROA rather than ROE in the sample that includes banks with different ownership structures, as the equity valuation differs along ownership structures. A fundamental question is whether it is appropriate to evaluate non-profit-maximizing banks on the basis of profitability. Therefore, we also include an alternative performance measure, namely cost-to-income (cost efficiency). Iannotta et al. (2007) find that mutual and government-owned banks have lower costs relative to assets but also lower income relative to assets than commercial banks. This does not yet indicate much about cost-to-income ratios, as these may go either way.

The third dependent variable is loan losses, an inverse measure of loan quality. Much of the previous literature indicates that because of informational advantages and lower risk appetite, stakeholder banks would have better loan quality than shareholder banks.

We start by estimating cross-sectional regressions where country and year dummies have been included. Then we move on estimating random effect panel data models that utilize both cross-sectional and intertemporal variation. A significant limitation for our analysis is that we do not observe changes in the key explanatory variables, namely ownership classifications. This precludes the use of fixed effects estimator. The fixed effects estimator allows the time-invariant bank-specific effect to be correlated with other explanatory variables, whereas the random effects estimator assumes that this correlation is zero. However, arguably this is not a problem if the coefficients remain stable across models that use in varying degree cross-sectional and longitudinal variation. We test this issue by estimating in addition to random effects model a quasi-fixed effects (or two-step) model, where we first regress the dependent variable on independent variables that vary over time, and in the second stage regress the residuals from the first model by using time-invariant variables, including ownership dummies.

An important question is what variables to include as explanatory variables. At the minimum, one should include year and country dummies to control for time- and country-specific variation. For instance, Llewellyn (2005) has argued that there are significant cross-country differences in profitability in Europe, and in countries with stronger presence of stakeholder banks (such as Germany) the level of profitability is lower. This means that if country dummies were omitted from performance regressions, the results for the dummies for stakeholder banks would be biased downwards (understating the performance of stakeholder banks).

Ownership structures and bank performance are also likely to be correlated with several bank-specific variables. Regarding these, it is more difficult to say whether these should be included in the performance regression or not, as these other variables may be regarded as intrinsic features of the ownership category. For instance, if we compare universal banks and private banks, we are likely to find that the latter are on average more profitable and have higher risk, and therefore are likely to have higher equity (to compensate for the risk and also because of higher earnings). Further, private banks are also likely to have a higher share of non-interest income than universal banks, and the non-interest income share is likely to be positively related to profitability. Thus, one is likely to get markedly different results in a regression where only ownership dummies are included, and where also capitalization and the non-interest income share are controlled for. However, if capitalization and the non-interest income share should be regarded as intrinsic features of private banks, it may be argued that they should not belong to the regression equation.

We solve this dilemma by reporting the results both from more parsimonious regressions where only country- and year–effects are included, as well as from regressions where a set of control variables is included. We use as controls the size of the bank (measured as logarithm of total assets), capitalization (equity to total assets), customer (non-bank) loans over assets, customer (non-bank) deposits over assets,

liquid assets over total assets, non-interest income share, and status of listed firms.[12] This list of explanatory variables is very similar to the one used by Iannotta et al. (2007), with some modifications,[13] and also to other pertinent applied works (e.g. Hasan and Lozano-Vivas (2002); Hesse and Cihak (2007)).[14]

4.2 Descriptive statistics

We start our review of empirical findings from Table 3 where we present the summary statistics for the various dependent and independent variables. First, consistent with the results of Iannotta et al. (2007), shareholder value-maximizing banks are for the most part more profitable than stakeholder banks. Note however that, consistently with the findings of Hirtle and Stiroh (2006), general (retail) commercial banks are less profitable than commercial private banks, and that private savings banks are not much less profitable than retail commercial banks. This last finding is consistent with Crespi et al. (2004) and Bohren and Josefson (2007). Clearly the least profitable banks are publicly-owned savings banks, which is consistent with Iannotta et al. (2007). The descriptive results on profitability are well in line with expectations derived from prior literature.

Second, the results for loan losses indicate that stakeholder banks are doing significantly better than shareholder banks. Commercial retail banks have clearly the highest value of loan losses. All types of co-operative and savings banks have much lower levels of loan losses. In this respect, the loosely federated and independent co-operative banks have much lower levels of loan losses than other types of banks. Also these results are quite well in line with expectations, although the low level of loan losses publicly-owned savings banks incur, relative to commercial retail banks, contradict the findings of Iannotta et al. (2007).

Our third performance measure is cost-to-income ratio. Commercial retail banks do not appear very efficient by this measure: only publicly-owned savings banks have a higher cost-to-income ratio than them. The most efficient by this measure are loosely federated and independent co-operative banks. Specialized commercial banks are second lowest on average, but due to the high dispersion of this measure, the difference to retail commercial banks is not statistically significant. Private savings banks are more efficient than retail commercial banks at the 10% level of statistical significance. These results contradict the often held perception that stakeholder banks would be less efficient than shareholder banks, although they are not surprising in the light of earlier empirical research that has reached no conclusive findings on the relative efficiency between ownership types.

When then discuss briefly differences in explanatory variables. In terms of *size*, specialized commercial banks are by far the smallest. Independent and loosely federated cooperative banks and private savings banks are also much smaller than commercial retail banks (that also exhibit significant variation). Tightly federated cooperative banks are of similar size than commercial retail banks, and publicly owned savings banks maybe even larger. In terms of *loans* (over assets), independent cooperative banks and private savings banks have highest figures, while specialized commercial banks have clearly lowest. In *liquid assets* the two poles are specialized commercial banks (highest) and private savings banks (by far the lowest). In *customer deposits*, the tightly federated cooperative banks have (surprisingly) the smallest figures. This is probably because of strong interbank markets between the co-operative banks, and also a consequence that of the level of measurement. At the local level co-operatives, this figure would be likely to be much higher. In turn, the independent cooperative banks and private saving banks have the highest figures. In terms of *equity*, specialized commercial banks have clearly the highest figure and publicly-owned savings banks the lowest. This last result is consistent with Iannotta et al. (2007), who interpret it to be a consequence of the implicit government guarantees. Despite the widely held belief that co-operative banks would be overcapitalized, they do not have statistically higher rates of equity than commercial retail banks. In terms of the share of non-interest income, that can be perceived as an inverse measure of retail orientation, independent co-operative banks and private saving banks have lowest figures and thus are most retail-oriented, as could be expected. On the other opposite are specialized commercial banks that have over 50% of their revenues from non-interest sources.

[12] BankScope includes as listed also those companies that have investment certificates in the stock exchange This explains why a relatively high share of also stakeholder firms are classified as being "listed". Many (e.g. Bohren and Josefsen 2007) argue that issuing listed financial instruments changes the governance structure of also stakeholder firms. This is an argument for including the listed dummy also for stakeholder firms. We tried for a interaction term between listed and stakeholder status, but this was never significant and did not affect results.

[13] Compared to Iannotta et al. (2007), there are three modifications: 1) Unlike them, we include share of non-interest income as explanatory variable, as this is likely to be correlated both with ownership structures and outcome variables; 2) They use loan losses both as dependent variable and as explanatory variable in the profitability regressions. We prefer to use the same set of explanatory variables in all regressions; 3) We do not include a control for GDP since the effect of GDP is already picked up by year and country dummies. However, none of these modifications affects the reported results in any qualitative way.

[14] See Table 2 for further information on specifications that have been used in applied work.

In general, the descriptive analysis reveals significant differences between different groups. This indicates different strategies of financial intermediation. In particular, there are differences between tightly and loosely federated co-operative banks, and also between private and public savings banks. It is also interesting to note the empirical affinity between loosely federated co-operative banks and private savings banks.

4.3 Regression results

In Table 4 we provide the results from regression analysis applying the ordinary least squares (OLS) method by pooling the data. Thus, we only use the cross-sectional variation. We present the results for every dependent variable from two regressions: First including only country- and year-dummies, and second, including bank-specific controls. We correct the standard errors for heteroskedasticity and bank-level autocorrelation using cluster- and heteroskedasticity-robust standard errors.

For profitability, the differences between retail commercial banks and all co-operative and savings banks disappear after including country- and year-dummies. This indicates that stakeholder banks are not less profitable than shareholder banks, after we take the market characteristics into account. However, specialized commercial banks are more profitable than retail commercial banks (and all other ownership structures), and the difference has even increased to 0.7 percentage points. However, in column (2), when we include bank-specific controls, even this difference disappears. The higher profitability of specialized commercial banks is captured by their higher equity and share of non-interest income, both of which are positively related to bank profitability.

The second column gives the results in respect to loan losses. Again, the inclusion of country dummies removes most of the statistically significant coefficient. The result that loosely federated co-operative banks have lower level of loan losses remains. Compared to commercial retail banks, they have 0.25 percentage point less loan losses, controlling for country and year effects. The coefficient even increases somewhat (to 0.29 percentage points) when we control for the effect of bank-specific variables.

In the cost efficiency regressions, again the inclusion of country and year dummies strongly influence the results. Now both federated co-operative banks and specialized commercial banks appear more cost efficient than commercial retail banks. After the inclusion of bank-specific variables, the difference between co-operative banks and commercial banks increases even more (to the benefit of the former). Now both loosely and tightly federated co-operative banks appear more efficient than commercial retail banks.

In Table 5 we provide the results from random effect model. In general, the results from random effects model are very similar to the cross-sectional models, although the some results that were not significant in the OLS specification are now significant. First, the results concerning profitability are very similar to those presented earlier: when country and time dummies are included, the only significant difference is between retail and specialized commercial banks, and even that disappears when bank-specific controls are included. Regarding loan losses, loosely federated co-operative banks have significantly lower loan losses than commercial banks. In the regression including bank-level controls, also publicly-owned savings banks have significantly lower loan losses than commercial retail banks. This is very different from the results of Iannotta et al. (2007) who find that government-owned banks have higher loan losses than shareholder banks.

Finally, in the results of cost to income ratios, the results concerning co-operative banks reappear. However, a new result (compared to the OLS results) is that publicly-owned savings banks are also significantly more efficient than commercial banks. This finding is surprising in the light that in the descriptive statistics (presented in Table 2) this group has the highest cost-to-income ratio. Clearly, the high cost-to-income ratio is related to the characteristics of the markets where publicly-owned savings banks operate. Given the market characteristics, the disadvantage disappears and may even turn into an efficiency *advantage*. This result is also consistent with the results of Altunbas et al. (2001) for Germany.

Even though the discussion above is framed in terms of comparison between retail commercial banks and other structures, the results can be used also in comparing the stakeholder-owned banks, even though the levels of statistical significance of these comparisons are not indicated in the tables. The OLS and random effects results are very similar, so we make statements that apply to both results. First, there emerges very little differences in terms of profitability. There are marginally significant differences between tightly federated and loosely federated co-operative banks to the benefit of the former, when specification 1 is used; however, when specification 2 (with larger set of controls) are used, these effects disappear. In terms of loan losses, there are marginally statistically significant differences to the benefit of loosely federated co-operative banks over tightly federated co-operative banks, and more significant differences between loosely

federated co-operative banks and private savings banks, to the benefit of the former. There are no significant differences between either type of co-operative banks and publicly-owned savings banks. Finally, in terms of cost efficiency, the significant differences are between private savings banks and other stakeholder banks, to the detriment of the former. However, these results are statistically significant only when specification 1 is used.

In sum, these results indicate some heterogeneity among stakeholder-owned banks. Private savings banks are closer to commercial retail banks in the sense that they have higher loan losses and somewhat lower cost efficiency than other stakeholder banks. Tightly federated co-operative banks are somewhat more profitable, but also prone to higher loan losses, than loosely federated co-operative banks.

In Appendix 1 we present the results using two-step fixed effects model. The results are very similar to the random effects model and we omit the discussion of these results for brevity.

In sum, all the estimators we use provide very similar results. The similarity of random- and (quasi)-fixed-effects model results suggest that unobserved bank-level heterogeneity does not significantly influence the results and the random effects results may be viewed as reliable.

5. Conclusions

Over the 20 years prior to the Great Crisis of 2007-2010, the European banking industry underwent a major transformation. Once being an industry heavily regulated, granting stable but low returns and little prone to competition, deregulated banking became quite competitive and one of the most profitable sectors in the economy. Banks achieved that by streamlining the internal production process and, even more so, by gearing up more and more with the financial markets. The transformation of their business model from originate-to-hold– grant the loans and keep them to maturity – to the originate-to-distribute– grant the loans and sell them immediately via securitization on the financial markets – allowed so many banks to become profit powerhouses.

At the same time, the company model of the joint stock commercial bank – once one among several forms, all of them respectable – became the norm. The savings banks and the cooperative banks were looked upon as the odd guys and relics of the past, supported by regulatory framework rather than efficiency merits and thus destined to disappear in the context of financial liberalization. Public ownership was accused of introducing distortions at the savings banks, reflected e.g. in the discussion of the role of German savings bank (e.g. Brunner et al. 2004). Privately-owned savings banks often then transformed into joint stock. Also co-operative ownership was blamed because it was seen as an obstacle to pursuing efficiency and profit maximization.

The Great Crisis has provided a reason to modify those views. The banks that strode away the most from their traditional business – collecting deposits and making loans – into financial-market-related activities were the most severely hit, at least in the early stage of the crisis. Governments had to step in providing extensive support to those troubled banks, sometimes even nationalizing them. In all, it became clear that the high profitability of banking was not unspotted: Generally, it had been achieved via excessive leverage and undertaking undue risks. To be sure, with some notable exceptions, the co-operative banks and also the savings banks fared much better than their joint stock homologues through the crisis. Thus, the common wisdom of today is questioning the old tenets. But, where those tenets right even before the recent crisis?

In this paper, we utilized a large database of more than 300 banks for the years 1994–2008 from 19 European countries to make a long-term comparison of the performance of the banks across different organizational structures. As performance measures we used profitability, cost efficiency and loan losses. To fully capture the possible impact of the ownership diversity, we made some refinements re-coding several banks and providing a finer classification of the banks' organizational structure.

The key results of the paper are at odds with the negative views on stakeholder-owned financial institutions. There is no evidence of a significant lower profitability either for the coop or savings banks, which, in turn, outpaced somewhat the commercial banks in terms of cost efficiency and loan losses. These results are partly at odds with previous literature. For instance, when compared with cross-country results of Iannotta et al. (2007) for a shorter period and somewhat different sample, our results are more cautious on the profitability advantages of shareholder-owned banks. Especially our results on publicly-owned savings banks are more positive than those reached in Iannotta et al. (2010). However, our results on publicly-owned banks are closer to those of Micco et al. (2010), who find that in developed economies, public ownership does not lead to worse performance than private ownership in the banking sector. Finally, we provide some new results concerning the heterogeneity of stakeholder-owned banks. Our results indicate that private savings banks are closer to commercial retail banks than other stakeholder-owned banks, in the sense that

they have higher loan losses and lower cost efficiency (although also somewhat higher profitability than other stakeholder-owned banks have, although the difference is not statistically significant).

Thus, even before the reassessment of the merits of different ownership structures provoked by the crisis, there was no compelling evidence to support the claim that joint-stock ownership was superior to stakeholder banks. With respect of loan losses and cost efficiency, it appears that it was rather the shareholder-owned banks that held the advantage. These results may not be that surprising given that shareholder and stakeholder-owned banks have co-existed in most European countries for decades, including more than two decades of the era of financial liberalization. Thus it seems likely that the survival of the stakeholder model is due to the competitive advantages of the model, rather than alleged regulatory interference. These findings also provide support for those who argue that diversity of organizational structures in European banking is worth preserving (Ayadi et al. 2009; Schmidt 2009; Llewellyn 2010).

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Table 1. Number of firms with different ownership types, by country

	Coop1	Coop2	SavPriv	SavPubl	ComRet	ComSpec	Sum
Austria	6	0	0	5	5	2	18
Belgium	0	0	0	0	1	4	5
Cyprus	0	0	0	0	5	0	5
Denmark	0	2	4	0	13	0	19
Finland	1	0	0	0	1	1	3
France	44	0	0	0	4	14	62
Germany	8	1	0	8	3	6	26
Greece	0	0	0	0	7	0	7
Iceland	0	0	3	0	2	0	5
Ireland	0	2	0	0	3	1	6
Italy	2	13	0	0	16	3	34
Luxembourg	1	0	0	0	0	3	4
Netherlands	1	0	0	0	7	6	14
Norway	0	0	18	0	1	0	19
Portugal	1	0	0	2	2	2	7
Spain	0	3	43	0	12	2	60
Sweden	0	1	1	0	5	0	7
Switzerland	1	0	0	10	1	8	20
United Kingdom	0	25	0	0	6	7	38
Sum	65	47	69	25	94	59	359

Notes: Code to ownership classifications: Coop1: Tightly federated co-operative banks; Coop2: Other co-operative banks; SavPriv: Private savings banks; SavPubl: Public savings banks; ComRet: Commercial retail banks; ComSpec: Specialized commercial banks.

Table 2: Overview of previous related studies

Paper	Dependent variable	Size control	Ownership type	Loan propensity	Liquidity	Retail vocation	Loan losses	Capital	Other variables
Iannotta et al. 02	Profit	Log(TA)+**	Mutual-*** Gov-** List+	Loans/TA+**	Liquid A/TA 0	Ret Dep/T Fund 0	Loan Loss/T Loans+***	Equity/TA+***	GDP growth+***
	Income	Log(TA)+***	Mutual-*** Gov-*** List+*	Loans/TA+***	Liquid A/TA+***	Ret Dep/T Fund +***	Loan Loss/T Loans+***	Equity/TA+***	GDP growth+**
	Costs	Log(TA)+**	Mutual-*** Gov-*** List+**	Loans/TA+***	Liquid A/TA+***	Ret Dep/T Fund +***	Loan Loss/T Loans+***	Equity/TA+***	GDP growth+
	Loan loss	Log(TA) 0	Mutual+ Gov+***	Loans/TA 0	Liquid A/TA 0	Ret Dep/T Fund +**		Equity/TA+**	GDP growth 0
Hesse & Ĉihák 07	z-score	TA-***	Comm.-** Sav 0 (coop. omitted)	Loans/TA-***		Income diversity-***			Coop Bank share 0 GDP growth-** Inflation+*** Longterm rate-*** Exch. rate+*** Cost/Income-*** Herfindhal index-***
García-Marco & Robles-Fernández 08	z-score	Log(TA) Large 0 Medium +*** (small omitted)	Comm +** (sav omitted)	Total Net Lending/TA 0					ROE +*** Merger 0 Changes in governing bodies -*** Lag z-score +***
	Solvency margin	Log(TA) Large 0 Medium-** (small omitted)	Comm -*** (sav omitted)	Total Net Lending/TA-**					ROE 0 Merger 0 Changes in gov.bodies -*** Lag solv.margin-
Hasan & Lorenzo-Vivas 02	Noninterest cost inefficiency	Log(TA)+**	Mutual +*** (stock omitted)	Loans/TA-**		Ret Dep/TA+**	Loan Loss/TA+**	Equity/TA+**	Risky assets/TA-*** Log(branch)+** Log(ATMs)+**
	Interest cost inefficiency	Log(TA)+**	Mutual 0 (stock omitted)	Loans/TA-**		Ret Dep/TA-**	Loan Loss/TA+**	Equity/TA 0	Risky assets/TA-*** Log(branch)-** Log(ATMs) 0
	Employee cost inefficiency	Log(TA)+**	Mutual +*** (stock omitted)	Loans/TA 0		Ret Dep/TA-***	Loan Loss/TA+***	Equity/TA+**	Risky assets/TA-** Log(branch)+** Log(ATMs)+***
	Office cost inefficiency	Log(TA)+**	Mutual 0 (stock omitted)	Loans/TA-**		Ret Dep/TA 0	Loan Loss/TA+**	Equity/TA 0	Risky assets/TA-** Log(branch) 0 Log(ATMs) 0
Fuentes & Vergara 07	Cost inefficiency	Log(int.earning ass)-*** market share-***	List-*** For-***	Loans/investments-***			Loan Loss/Int.earning ass+***		Herfindhal +*** Log(GDP) -***
	Profit inefficiency	Log(int.earning ass)-*** market share-***	List-*** For+***	Loans/investments-***			Loan Loss/Int.earning ass+***		Herfindhal +*** Log(GDP)-***

Goddard et al. 04	Return on Equity	Log (TA)+*	Sav 0 Coop-* (comm. omitted)					Equity/TA+***	Off Balance Sheet business/TA-***
Beck et al. 09	z-score	Log(TA)+***	Sav+*** Coop+*** (comm. omitted)			Income diversity+***			Risky ass/TA-*** RWA growth-*** overhead costs/net revenue-** Herfindhal +*** Price Index growth+*** Real int.rate-*** Insolvency rate-***
	Capital to risk weighted assets ratio	Log(TA) 0	Sav-*** Coop-*** (comm. omitted)			Income diversity 0			Risky ass/TA-*** RWA growth-*** Oh costs/net rev+** Herfindhal -* PI growth +*** Real int.rate-*** Insolvency rate -***
	Return to risk weighted assets	Log(TA) 0	Sav-** Coop-** (comm. omitted)			Income diversity 0			Risky ass/TA-*** RWA growth 0 Oh costs/net rev-*** Herfindhal +** PI growth+** Real int.rate-*** Insolvency rate-***
	Non-performing loan ratio	Log(TA) 0	Sav-*** Coop-*** (comm. omitted)			Income diversity-***			Risky ass/TA+*** RWA growth –*** Oh costs/net rev 0 Herfindhal +*** PI growth-** Real int.rate-*** Insolvency rate+***
	Prob. of distress score	Log (TA)-***	Sav-*** Coop-*** (comm. omitted)			Income diversity-***			Risky ass/TA+*** oh costs/net rev+*** PI growth-*** Herfindhal index-**

*,**,*** indicate statistical significance at 10%, 5%, 1% levels, respectively.

Table 3. Means and standard deviations of dependent and independent variables

	Coop1	Coop2	SavPriv	SavPubl	ComRet	ComSpec
ROA	0.86%*	0.79%**	1.02%	0.50%***	1.06%	1.57%***
	(0.48%)	(0.49%)	(0.71%)	(0.54%)	(1.25%)	(1.61%)
LoanLoss	0.47%***	0.37%***	0.53%***	0.49%***	0.70%	0.56%*
	(0.48%)	(0.60%)	(0.56%)	(0.57%)	(0.77%)	(0.99%)
CostInc	74.45%	70.01%**	72.16%*	77.91%	74.94%	71.90%
	(0.12%)	(17.12%)	(14.90%)	(20.45%)	(18.42%)	(21.72%)
LnSize	15.95	15.09***	15.41***	16.99	16.39	14.11***
	(1.17)	(1.56)	(1.50)	(1.57)	(2.41)	(1.74)
Loans	66.04%***	71.19%***	69.09%***	64.32%	59.45%	41.72%***
	(15.11%)	(12.85%)	(14.90%)	(17.03%)	(17.08%)	(26.46%)
Liquid	18.03%**	15.99%***	8.99%***	19.57%	22.13%	34.34%***
	(13.29%)	(11.73%)	(6.53%)	(11.79%)	(16.15%)	(21.79%)
CustDep	43.36%***	68.08%***	59.12%***	46.43%*	52.50%	49.85%
	(23.55%)	(19.99%)	(14.18%)	(15.14%)	(19.07%)	(26.48%)
Equity	8.05%	7.31%	8.27%	5.53%***	7.37%	13.60%***
	(3.80%)	(2.58%)	(3.38%)	(2.48%)	(4.59%)	(11.39%)
NonIntInc	37.47%	24.96%***	26.49%***	32.21%*	36.30%	54.71%***
	(14.85%)	(15.94%)	(12.98%)	(9.62%)	(15.75%)	(26.68%)
Listed	21.54%***	10.64%***	17.39%***	36.00%	51.38%	7.91%***
	(42.13%)	(30.85%)	(37.92%)	(48.06%)	(50.00%)	(27.00%)

Notes: 1) Ownership classification see notes to Table 1; 2) Variable definitions see Appendix; 3) Significance levels: *10%; **5%; *** 1%; 4) Statistical significance refers to the results of t-test comparing the difference between the category in question and commercial retail banks.

Table 4. OLS results

	(1) ROA	(2) ROA	(3) Loanloss	(4) Loanloss	(5) CostInc	(6) CostInc
coop1	0.000632	-0.00149	-0.000608	-0.00142	-0.0583**	-0.0608**
	(0.0017)	(0.0018)	(0.00074)	(0.00094)	(0.024)	(0.025)
coop2	-0.00385	-0.00341	-0.00248**	-0.00292***	-0.0329	-0.0552**
	(0.0027)	(0.0021)	(0.0011)	(0.0011)	(0.021)	(0.023)
savpriv	-0.000484	-0.0000362	-0.000261	-0.000665	0.0170	-0.00106
	(0.0013)	(0.0014)	(0.00053)	(0.00061)	(0.023)	(0.025)
savpubl	-0.00128	-0.00174	-0.00148	-0.00171	-0.0464	-0.0321
	(0.0019)	(0.0019)	(0.00093)	(0.0010)	(0.030)	(0.030)
ComSpec	0.00742***	-0.00138	0.000320	-0.00166	-0.0535**	-0.0581*
	(0.0021)	(0.0033)	(0.00090)	(0.0017)	(0.027)	(0.034)
LnSize		-0.000345		-0.000612***		-0.0127***
		(0.00038)		(0.00022)		(0.0040)
Loans		0.000353		-0.00353		-0.0181
		(0.0032)		(0.0022)		(0.058)
Liquid		-0.00502		-0.00316		0.0119
		(0.0039)		(0.0024)		(0.062)
CustDep		-0.00386		-0.00346		0.0299
		(0.0046)		(0.0026)		(0.039)
Equity		0.0884***		0.000820		-0.607***
		(0.015)		(0.0074)		(0.14)
NonIntSha		0.00790***		-0.00109		0.0651
		(0.0025)		(0.0016)		(0.044)
Listed		0.00112		0.000298		-0.0322**
		(0.00079)		(0.00045)		(0.014)
# obs.	4132	3947	4027	3859	4119	3948
R2	0.16	0.39	0.16	0.18	0.14	0.18

Notes: 1) Cluster- and heteroskedasticity-robust standard errors in parentheses; 2) Significance levels: ***<0.01, ** p<0.05, * p<0.1; 3) For variable names, refer to the notes of Table 1; 4) All models include country- and year-dummies.

Table 5. Random effects model results

	(1) ROA	(2) ROA	(3) Loanloss	(4) Loanloss	(5) CostInc	(6) CostInc
Coop1	0.000479	-0.000845	-0.000505	-0.00120	-0.0657**	-0.0760***
	(0.0019)	(0.0018)	(0.00073)	(0.00092)	(0.027)	(0.029)
Coop2	-0.00392	-0.00282	-0.00233**	-0.00291***	-0.0308	-0.0668**
	(0.0027)	(0.0025)	(0.0011)	(0.0011)	(0.023)	(0.027)
SavPriv	-0.000436	0.000933	-0.000155	-0.000673	0.0184	-0.0150
	(0.0013)	(0.0016)	(0.00053)	(0.00059)	(0.026)	(0.029)
SavPubl	-0.000759	-0.000172	-0.00152	-0.00197*	-0.0594**	-0.0656**
	(0.0019)	(0.0018)	(0.00093)	(0.0011)	(0.030)	(0.031)
ComSpec	0.00739***	-0.00126	0.000234	-0.00161	-0.0512*	-0.0478
	(0.0021)	(0.0025)	(0.00089)	(0.0017)	(0.028)	(0.035)
LnSize		-0.000112		-0.000716***		-0.0206***
		(0.00034)		(0.00022)		(0.0041)
Loans		-0.00240		-0.00376		-0.0332
		(0.0024)		(0.0028)		(0.050)
Liquid		-0.00104		-0.00366		-0.0306
		(0.0031)		(0.0024)		(0.050)
CustDep		0.00396**		-0.00480*		-0.0884***
		(0.0020)		(0.0025)		(0.034)
Equity		0.0847***		-0.00644		-0.806***
		(0.0093)		(0.0068)		(0.14)
NonIntSha		0.00850***		-0.00138		-0.0434
		(0.0020)		(0.0017)		(0.040)
Listed		0.00248**		0.00000526		-0.0402**
		(0.0010)		(0.00045)		(0.016)
# obs.	4132	3947	4027	3859	4119	3948

Notes: 1) Cluster- and heteroskedasticity-robust standard errors in parentheses. 2) Significance levels: ***<0.01, ** p<0.05, * p<0.1. 3) For variable names, refer to the notes of Table 1. 4) All models include country- and year-dummies.

Table A.1 Results from two-step fixed effects model

	(1) ROA	(2) Loanloss	(3) CostInc
Coop1	-0.000276	-0.00113	-0.0900***
	(0.0016)	(0.00076)	(0.030)
Coop2	-0.00310	-0.00280**	-0.0849***
	(0.0024)	(0.0011)	(0.025)
SavPriv	-0.0000274	-0.000548	-0.0151
	(0.0015)	(0.00064)	(0.026)
SavPubl	0.0000416	-0.00179*	-0.0639*
	(0.0018)	(0.00099)	(0.034)
ComSpec	-0.00116	-0.00137	-0.0588*
	(0.0022)	(0.00098)	(0.032)

Notes: 1) Cluster- and heteroskedasticity-robust standard errors in parentheses. 2) Significance levels: ***<0.01, ** p<0.05, * p<0.1. 3) For variable names, refer to the notes of Table 1. 4) All models include country- and year-dummies, and the full set bank-specific covariates.

Table Appendix 2. Variable definitions

Dependent variables	
ROA	The ratio of operating profits to total assets
Loanloss	Loan loss provision relative to loans outstanding
CostInc	The ratio of operational costs to operational income
Ownership classifications	
Coop1	Tightly federated co-operative banks
Coop2	Independent or loosely federated co-operative banks
SavPriv	Savings banks in private ownership
SavPubl	Savings banks in public ownership
ComRet	Commercial banks with retail focus (omitted category in regressions)
ComSpec	Commercial banks, specialized
Other explanatory variables	
LnSize	Log of total assets
Loans	Ratio of loans to total assets
Liquid	Ratio of liquid assets to total assets
CustDep	Ratio of customer (i.e. non-bank) deposits to total assets
Equity	Ratio of equity to total assets
NonIntSha	Ratio of non-interest income to total operating income
Listed	Shares or other securities listed in a stock exchange