PERFORMANCE OF ITALIAN COOPERATIVE CREDIT BANKS

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ABSTRACT:

This paper investigates the performance of different types of Italian banks before and during the recent credit crisis. Specifically, it attempts to assess whether cooperative banks performed differently from commercial banks during 2005-2012 in terms of return on average assets (ROAA), cost efficiency and loan quality, which are used as indicators of banks' profitability, efficiency and soundness. Theoretically, cooperative banks should follow more conservative business strategies and care more for stakeholders in comparison to commercial banks. These banks are customer-oriented, and are particularly efficient in maintaining long-lasting relationships with their members and customers. Such characteristics should mean that cooperative banks were less exposed to the shock of the crisis, but they would also likely have been less able to adjust to the shock. Using a sample of 594 banks, pooled OLS and a fixed effects estimator (when possible), it can be observed that, overall, cooperative banks perform better than other banks. Furthermore, the quality of loans deteriorated less in these banks than in others during the credit crisis, while no significant differences are observed in terms of ROAA and cost efficiency between these and other banks.

Key words: Italy; cooperative banks; bank performance; efficiency; differences in banking; financial crisis

JEL Codes: G21; G32.

1 INTRODUCTION

The aim of this paper is to investigate the performance of Italian banks before and during the recent financial crisis. Specifically, the paper centres on two types of banks: commercial banks, namely privately owned banks that provide services both to the general public and to private firms, and cooperative banks, namely those with a *per capita* voting mechanism that provide services mainly to cooperative members, households and small enterprises (SMEs). The last credit crisis reminded us that a sound banking system builds on profitable and well-capitalised banks that are able to operate efficiently while successfully managing their risk exposure. Recent scholarly research on commercial banks (Dewatripont & Freixas, 2012; Fahlenbrach et al., 2012; Vallascas & Hagendorff, 2013; Mohsni & Otchere, 2014) and the evidence from the credit crisis suggest that many commercial banks were not satisfying these criteria prior to the crisis. Since they are established with the purpose of maximising profits, commercial banks' primarily goal is the creation of profits or, more exactly, the maximisation of shareholder value. This goal, the small share of equity in banks' liabilities, the deposit insurance and the implicit state guarantee due to the systemic role of the banks, may motivate the commercial banks to assume larger risks, particularly in cases where they are owned by influential private institutional owners (e.g. Laeven & Levine, 2006).

On the other hand, pre-crisis scholarly evidence on both Italian and European cooperative banks indicates that cooperative banks are, on average, less profitable in "normal" periods but also more stable due to higher solvency ratios (Hesse & Cihak, 2007; Gutierrez, 2008). Cooperative banks tend to adopt conservative business strategies and stakeholder value maximisation policies. They are customer-oriented, and particularly efficient at maintaining long-lasting relationships with their members and customers. In other words, these banks are particularly strong at relationship banking, a strategy that enables banks to make informed decisions on the provision of loans and financial services as a result of in-depth knowledge of customers' business. Relationship banking generates a number of advantages, such as proximity to customers (Boot, 1999; Boot & Thakor, 2000; Cesarini, 2003; Di Salvo et al., 2004), which may contribute positively to the quality of these banks' loans. In Italy, cooperative banks can also rely on a well-developed commercial network with important historical roots and market advantages (Angelini & Cetorelli, 2003; Finocchiaro, 2007; Leonardi, 2009; Stefancic, 2010), which may help to ease their access to information about customers. These specifics may make cooperative banks less vulnerable to shocks to the system, as was the case in the last credit crisis.

In order to assess whether the behaviour of Italian cooperative banks differs significantly from that of commercial banks, a model is estimated in which return on average assets (ROAA), the cost-to-income ratio and a measure of loan quality are regressed on a number of indicator (dummy) variables indicating the bank type (cooperative bank, popular bank, savings bank, commercial banks) and a set of control variables, as suggested in the literature. The latter variables aim to account for bank size, asset quality and type of activity (e.g. non-interest income), capital ratios and liquidity. The analysis is based on an unbalanced panel of 594 Italian banks during 2005-2012. The focus is on the differences between the behaviour of cooperative banks and other banks, and on the differential impact of the credit crisis on these banks. Arguably, such differences would suggest that, regardless of the fact that they compete with other banks, cooperative banks are indeed different financial institutions. This would necessitate an adjustment in the regulatory rules that apply to banks. While the present paper may be viewed as a starting point into the discussion, more detailed data on banks' asset structures, and potentially on the incentive mechanisms of those taking the decisions in these banks, will be necessary if more robust evidence is to be provided on this issue.

The present analysis focuses on the Italian banking sector. As Angelini and Cetorelli (2003) observe, Italy is one of the most important European economies. Indeed, it is the third-largest Euro zone economy after Germany and France. According to a recent assessment by the IMF (2013, p.

9), 'banks account for almost 85% of total financial sector assets. At end-2012, there were 706 banks with total assets of about 220% of GDP, of which 169 were part of 75 banking groups'. Although the Italian banking system underwent a process of restructuring and significant consolidation in the 1990s, both commercial and cooperative banks still play an important role today. For example, in 1999 there were a total of 580 cooperative banks operating in Italy; these banks employed 70,636 employees in 7,067 branches, and held approximately EUR 287,000 million in assets. By the year 2009, this number had fallen to 459 cooperative banks, employing 62,755 employees in a slightly larger number of branches (7,311). The value of cooperative banks' assets had nearly doubled during the same period (to EUR 512,000 million). For comparison, in 1999 the number of commercial banks (at 296) was much lower than the number of cooperative banks and had increased slightly by 2009 (to 329 banks). Commercial banks are bigger institutions; in 1999, they operated in 20,067 branches, employing 270,675 employees and holding EUR 1,432,994 million in assets. These numbers are larger than those for the cooperative banks, and increased during the 1999-2009 period (to 26,724 branches, 259,820 employees and EUR 2,942,195 million in assets).

This paper is structured as follows. Section 2 provides a discussion on the specifics of Italian cooperative banks based on the literature review. Building on these specifics and on the existing evidence on bank performance during the last credit crisis, the main hypotheses to be tested in this paper are derived. Section 3 provides an outline of the sample and methodology used for the analysis. The main empirical analysis and results are discussed in Section 4. Section 5 concludes by commenting on the results and deriving implications for financial policy.

2 LITERATURE REVIEW AND HYPOTHESES

Empirical evidence on bank performance in relation to different ownership types, in particular the results for the Italian market, and the European market as a whole, is mixed. Nevertheless, based on the papers surveyed below, it can safely be argued that, in most cases, cooperative banks do *not* lag behind their commercial counterparts (by way of exception, a few studies show the superiority of commercial over cooperative banks in terms of profitability). To start with, Ianotta et al. (2007) compare the behaviour of large banks from 15 European countries during the 1994-2004 period, and find that mutual and government-owned banks have lower levels of profitability. Nonetheless, they also find that mutual banks better manage their loan portfolios and have lower asset risk than commercial banks. Goddard et al. (2004) focus on the profitability of 665 banks from Denmark, France, Germany, Italy, Spain and the UK. On the basis of their results there appears to be no convincing relationship between ownership type, size and bank performance, except in Germany: German savings banks and cooperative banks appear to have been less profitable than German commercial banks during the 1990s. Ferri et al. (2010) use a panel of more than 300 banks from several European countries to study different types of banks in the period 1994-2008. They find no significant differences in the profitability of different bank types, whereas, in terms of cost efficiency, cooperative banks slightly outperform commercial banks.

Another set of papers focus on Italian banks alone. With reference to the loan-granting process of Italian banks for the period 2000-2006, Mattarocci and Gibilaro (2008) show that, from an operational point of view, small financial intermediaries such as the Italian cooperative credit banks have a better-quality loan-granting process. At the same time, these banks are able to implement more efficient recovery processes. Girardone et al. (2004) investigate the determinants of Italian banks' cost efficiency during the 1993-1996 period. They show that inefficiencies are inversely correlated with capital strength; on the other hand, they are positively related to the level of non-performing loans in the balance sheet. With reference to estimates of the Bank of Italy and some pre-crisis research, Gutierrez (2008) argues that cooperative banks are more cost efficient yet their profitability is lower in comparison to commercial banks despite the fact that they seem to enjoy a higher degree of monopoly power (as showed by the estimated H-statistic for different types of institutions).

Bonanno (2012) evaluates the efficiency of Italian banks by means of a stochastic frontier approach. With reference to a sample for the 2006-2010 period, the study shows that a sharp reduction in bank efficiency occurred in the year 2008. Despite that, cooperative credit banks performed better than non-cooperative counterparts over the 2006-2010 period. Using a similar analytical method, Aiello and Bonanno (2013) evaluate the cost and profit efficiency of Italian banks over the 2006-2011 period. Their results indicate that Italian banks generally perform well in terms of cost efficiency and profitability, and that banks are also quite stable over time. However, they acknowledge high heterogeneity in their results – something that is relevant to our discussion: differences are significant when banks are classified either by size (efficiency tends to decrease with size) or legal type (cooperatives tend to outperform other types of banks). Manetti and Bagnoli (2013) focus on the concept of efficiency in cooperative banks from Tuscany, with reference to the mutuality and sustainability of their business. By re-elaborating indicators such as the Value Added and the Cost to Income ratio, the authors show that the performance of such banks for the years 2009 and 2010 is close to the average performance of standard commercial Italian banks, and that the *banche di credito cooperativo* are both efficient and mission-oriented.

Consequently, based on the specifics of the cooperative banks' operations and business strategies, the following hypothesis is developed:

H1: *To achieve their institutional goal of long-term financial stability and economic development of their reference territory, cooperative banks pursue more conservative policies than commercial banks, resulting in lower riskiness of bank operations, yet also in at least equal levels of profitability.*

As argued above, in normal times cooperative banks tend to apply safer business strategies and take on lower risks than commercial banks, and may as a result be less exposed to the effects of a financial crisis. In line with this theoretical expectation, the European Association of Cooperative Banks (EACB) notes that 'more than 95% of write downs registered worldwide were due to commercial banks and some public banks; the cost in terms of loan loss provisions seems more equally distributed. Recapitalisation (in particular state aid) was also massively directed towards commercial banks and some public banks. Cooperative banks have therefore had little responsibility for the direct costs of the crisis, despite their heavy weight in the economy, with about 20% in terms of market share' (2010, p. 8). The last credit crisis reminded us that a sound banking system builds on profitable and well-capitalised banks that are able to operate efficiently while successfully managing (controlling) their risk exposure. Several recent papers on commercial banks and the evidence from the crisis (Dewatripont and Freixas, 2012; Fahlenbrach et al., 2012; Vallascas and Hagendorff, 2013; Mohsni and Otchere, 2014) suggests that many commercial banks, often under pressure for high profitability, were not satisfying these criteria prior to the crisis[1].

Moreover, the last credit crisis demonstrated the degree of interconnectedness among financial intermediaries worldwide, and has been matched by a decrease in trust towards banking intermediaries and among banks themselves. This, in turn, stresses the importance of trustworthy relations between banks and between them and their customers, particularly in the event of shocks such as the last crisis. Since trust is a distinctive feature of many cooperative banks, such banks should have a competitive advantage over commercial and other banks in developing and maintaining long-lasting relationships with their borrowers and, most importantly, their depositors. All of the above should imply that cooperative banks will perform better than other banks during crisis periods. However, cooperative banks are, in a way, "forced" to maintain close relationships with local communities and economic agents, as shown by the association between these banks and the local economy (Gallo et al., 2011), which often prevents them from reaching other markets. A careful review of the arguments developed in the mentioned paper suggests that cooperative banks in Italy are still heavily dependent on the relationship with the local economic systems.

Consequently, while being able to preserve their sources of financing, these banks might be also inclined to support their customers even when it will reduce their profits in the short run to do so. Moreover, the state aid provided during the crisis was directed primarily at commercial banks and, in some countries, at some large public banks. As in other parts of Europe, cooperative credit banks in Italy were largely excluded from such aid (EACB, 2010). Furthermore, communitarian frameworks aimed at helping banks have been designed with medium-sized and large commercial banks in mind. According to a report by Morgan Stanley Europe (2012), Italian banks benefitted substantially from operations such as the long term refinancing operations (LTRO), but it was mainly commercial banks and large *banche popolari* that received help. These last few factors may imply that—while less exposed to the crisis in the first place—the cooperative banks would have

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[1] For example, Fahlenbrach et al. (2012) find that a bank's risk culture influences the outcomes of its operations and business. In particular, commercial banks that performed poorly in the past (i.e. during the 1998 crisis), rely more on short-term funding and had low risk management, appear to have been also less resilient to the recent financial crisis, facing a higher probability of failure. Vallascas and Hagendorff (2013) evaluate risk sensitivity and capital requirements of banks by considering a sample of large international banks for the period 2000-2010. They find that low-risk sensitivity of banks may prevent them from adequately withstanding adverse shocks. A review of the above and other relevant studies is present in Stefancic (2014).

been less able to react to the crisis shock. However, one could expect that this latter effect will have been smaller than the former (positive) effect and, consequently, suggest:

H2: *The credit crisis led to a significant decrease in profitability, cost efficiency and loan quality in all types of banks.*

H3: *Given the greater stability of their operations, the effects of the financial crisis were less severe for cooperative banks than for commercial banks.*

3 DATA AND METHODOLOGY

3.1 Data

The empirical analysis in this paper is based on the on-balance-sheet data from a sample of 594 banks operating in Italy during 2005-2012. This sample represents a large share of the entire Italian banking system (more than 80% of all banks). In 2012, for example, a total of 724 banks were operating in the Italian market (Tidona Comunicazione, 2013). The banks included in the sample are of different types, comprising 355 cooperative banks, 49 popular banks, 35 savings banks and 155 commercial banks. The for-profit banks (commercial and savings banks)[2] represent slightly less than 32% of the sample, while the non-profit banks (cooperative and popular banks) represent the majority of the banks in the sample (see Figure 1 below).

Figure 1: Banks in sample (by type)
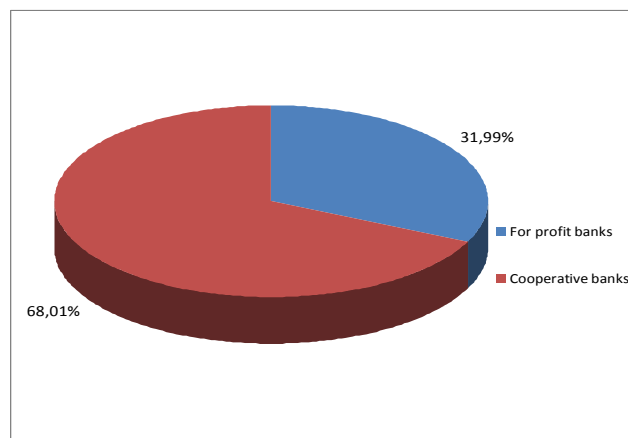
Financial information on the banks was obtained from the BankScope database, provided by Bureau van Dyke. The data refer to the eight-year period 2005-2012, which includes a period of severe financial distress (particularly the year 2008 onwards), and the Euro crisis of 2011. Thus, the data include periods of severe shocks to the banking system (e.g. Quagliariello, 2008; Bank of England, 2009; Freixas, 2009).

A major problem in the sample selection relates to the definition of cooperative banks. The definition is not straightforward. Some studies classify all banks with a *per capita* voting mechanism, for example mutual and rural banks, as cooperative banks (Battistin et al., 2006 and 2012). If taken together, these banks account for approximately 30% of both loans and deposits in the Italian banking system. However, significant differences exist between such categories of banks.

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[2] As a result of the banking reforms and consolidation process in Italy, current savings banks de facto operate as commercial banks or very similarly.

In the construction of the database, the classification from the Italian Banking Act (*Testo unico delle leggi in materia bancaria e creditizia*) and insights from Gutierrez (2008) were followed, differentiating between the cooperative banks (*banche di credito cooperativo*) and the popular banks (*banche popolari*).

3.2   Empirical model

The evaluation of the performance of cooperative and other Italian banks is based on three dependent variables: (i) a variable measuring bank profitability, namely the return on average assets (*ROAA*); (ii) a variable measuring cost efficiency (*COST_EFFICIENCY*); (iii) a variable measuring the soundness of bank loans (*LOAN_PROVISIONS*). As noted by Ferri et al. (2010) among others, it is important to consider other measures than profitability in order to account for the distinct objective function cooperative banks have in comparison to other banks. The *ROAA* is defined as net income divided by total average assets, and is useful for assessing profitability. *COST_EFFICIENCY* is defined as the ratio of a bank's costs to its total revenues (income), i.e. the cost-to-income ratio, measured in percentage terms. It is commonly used in studies on bank efficiency. *LOAN_PROVISIONS* stands for a bank's loan loss provisions as a share of the total amount of gross loans. These definitions follow the literature and the definitions suggested by the BankScope database. In relation to bank profitability, other measures could be considered, such as the return on equity (ROE) [3].

The main explanatory variables are dummy variables capturing the type of bank: *COOP* takes the value 1 for cooperative banks, and 0 otherwise; *POP* takes the value 1 for popular banks, and 0 otherwise; finally, in selected specifications, *SAVING* takes the value 1 for savings banks, and 0 otherwise. As an alternative, in robustness checks the variable *NON-PROFIT*, which denotes both cooperative and popular banks (with commercial and savings banks being the reference group), is used (see Appendices). In order to test *H3* which relates to differences in the banks' behaviour during the crisis, the interaction term *COOP*CRISIS* is introduced, in which the variable *CRISIS* is a dummy taking the value 1 in years 2009 onwards, and 0 otherwise, with *COOP* defined as above. The choice of 2009 as the starting year for the crisis period allows for the fact that the US crisis probably hit the Italian market with some delay; this is also supported by the analysis of the time dummy variables, where the first significant declines in bank performance can be seen in the year 2009. For robustness, the main regressions are re-estimated using the year 2008 as the starting year for the crisis period.

The choice of control variables was guided mostly by the existing studies in the field (in particular Ferri et al., 2010) and by data availability. A set of controls is introduced, capturing differences in bank size, asset quality, activity type, capital ratios, etc. Following Ferri et al. (2010) and other studies, bank size is controlled for by means of the logarithm of total bank assets (*lnTOTALASSETS*). Bank capitalisation is measured by the share of equity in total bank assets (*EQUITY_ASSETS*) and, alternatively, by a regulatory measure of banks' capitalisation (*TOTALCAPITAL_RATIO*). To capture different types of bank activity and the structure of bank assets, further control is posed on the share of customer (non-bank) deposits in assets (*CUSTOMERDEP_ASSETS*), the share of loans in total bank assets (*NETLOANS_ASSETS*), the share of liquid assets in total assets (*LIQUID_ASSETS*), and the share of non-interest income in

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[3] While some studies and policy makers view this ratio as the most reliable indicator of profitability, others have criticised its extensive use and prefer to rely on other indicators (Karr, 2005; Tumpel-Gugerell, 2005; De Bonis, 2008, pp. 114-116), such as the ROAA. As observed by Dietrich and Wanzenried (2009, 2011), the ROAA provides a good approximation of bank profitability, and reflects the ability of a bank's management to generate profits from the bank's assets. This measure should be preferred to ROE as the latter does not capture financial leverage and the risks associated with it. Moreover, Ferri et al. (2010) note that the ROE cannot be used when comparing banks of different types, due to the different valuations of equity across different ownership structures.

total bank revenues (*NONINTEREST*). These variables are measured in percentage terms. All of the regressions include time dummies and, when specified, bank fixed effects.

4   EMPIRICAL ANALYSIS

4.1   Descriptive statistics

First are presented the descriptive statistics across the entire period of analysis, separately for each type of bank. For the purpose of the empirical analysis, outliers were transformed by winsorising the lower and highest 1% of values for the non-dummy variables used in the analysis. Winsorization is a way of transforming the outliers without discarding them and therefore without losing information[4]. Cooperative banks are much smaller than the commercial banks and even the other types of bank. Size differences between the cooperative and other banks do, of course, pose a problem for the analysis, as small and large banks may differ in many other characteristics that cannot be adequately control for in the model.

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[4] In the present case, a 98% winsorization has been applied, this is, for each variable, data smaller the first percentile have been set at the value of the first percentile and data larger than the 99th percentile have been set at the value of the 99th percentile. Such an approach is common in the finance literature.

Table 1: Descriptive statistics

	Commercial banks						**Savings banks**					
variables	*min*	*max*	*std dev*	*median*	*mean*	*nr obsv*	*min*	*max*	*std dev*	*median*	*mean*	*nr obsv*
roaa	-6.7	11.03	1.97	0.45	0.71	1006	-0.361	2.99	0.584	0.53	0.501	261
total assets	16300	1.52e+08	2.74e+07	2447450	1.23e+07	1008	571300	4.00e+07	5762776	2427100	4252343	261
customer deposits	0.118	84.93	26.48	40.31	37.377	917	28.263	74.485	9.609	50.569	50.948	261
liquidity	0.272	92.021	25.373	14.826	24.67	1008	1.29	45.39	8.761	9.164	11.917	261
Non interest income	-34.37	100.16	30.113	35.44	40.187	993	-8.25	55.55	7.732	32.13	31.006	261
cost-to-income ratio	17.88	181.17	28.613	62.23	63.472	983	47.47	96.5	8.317	63.7	64.641	216
loan loss	-0.41	6.568	0.949	0.612	0.882	870	-0.332	4.893	0.606	0.555	0.709	261
tot capital ratio	6.41	87.68	14.407	12.91	18.159	817	7.15	32.39	3.324	10.99	11.845	252
net loans	1.38	97.2	31.189	67.47	59.022	975	49.17	93.22	8.678	76.96	76.427	261
equity	2.049	82.521	15.947	8.017	13.564	1008	3.762	14.62	1.804	8.07	8.281	261
ln assets	9.698	18.838	2.065	14.71	14.619	1008	13.255	17.50	0.924	14.702	14.763	261

	Peoples' banks (banche popolari)						**Cooperative credit banks (banche di credito cooperativo)**					
variables	*min*	*max*	*std dev*	*median*	*mean*	*nr obsv*	*min*	*max*	*std dev*	*median*	*mean*	*nr obsv*
roaa	-2.47	2.76	0.583	0.505	0.449	342	-6.7	11.03	0.641	0.56	0.569	2741
total assets	28671	1.32e+08	2.78e+07	3973550	1.44e+07	342	16300	9367400	552283.7	284300	434771.9	2742
customer deposits	20.748	82.988	11.423	50.287	50.320	342	0.286	84.933	12.044	49.874	51.679	2732
liquidity	0.973	85.23	12.949	11.791	15.197	342	0.712	92.021	11.157	8.514	12.185	2742
Non interest income	6.31	94.86	12.249	32.12	32.60	342	-31.91	99.33	9.017	22.91	22.667	2739
cost-to-income ratio	37.71	129.6	12.061	64.495	65.085	342	20.06	181.17	13.695	66.67	68.353	2738
loan loss	0.041	4.515	0.632	0.66	0.824	339	-0.695	6.568	0.686	0.528	0.688	2716
tot capital ratio	6.41	54.74	6.488	13.08	14.972	330	6.9	87.68	8.019	15.615	17.915	2638
net loans	4.18	96.4	13.733	73.27	70.508	342	1.74	89.61	13.476	68.72	65.941	2733
equity	4.363	28.419	3.279	9.809	10.40	342	3.249	82.521	6.080	10.869	11.92	2742
ln assets	10.263	18.701	1.748	15.195	15.163	342	9.698	16.052	0.999	12.557	12.50	2742

Differences between banks are observable on the basis of their median values of the selected variables. All of them are expressed as percentages in the above table, except for the total assets, which are in thousands Euros. Most variables have a slightly asymmetric distribution at least for one bank type, therefore median values provide a better measure of central tendency to make comparisons than the mean ones.

The dependent variables are commented first. Cooperative credit banks have the highest return on average assets (0.56%), meaning that they are the most profitable bank type according to this metric, followed by savings banks (0.53%). Commercial banks are the least profitable according to ROAA (0.45%). With regards to loan losses, people's banks are those that perform worse (0.66%), followed by commercial banks (0.61%). Savings banks have lower levels of loan losses, while cooperative credit banks are those that show the best results for the considered period (0.52%). That is to say, they are the best type of banks when the soundness of bank loans is considered. Finally, cooperative credit banks exceed other banks in terms of the cost to income ratio with a median value of 66.67% compared to 62.23% of commercial banks (popular and savings banks are in between).

Next, the discussion centres on differences in the explanatory variables. In terms of total assets, people's banks are those with the highest median value (3,973,550,000 €), and are followed by commercial (2,447,450,000 €) and savings banks (2,427,100,000 €). Cooperative credit banks have the lowest median level of assets (284,300,000 €). Total assets have a very skewed distribution, therefore a logarithmical transformation has been used in the models. With regards to customer deposits, the highest values are registered for savings and people's banks (50.56% and 50.28%, respectively), followed by cooperative banks (49.87%) and, eventually, commercial banks (40.31%). Structural differences are observable also with respect to the share of net loans on total assets: the median values for the four bank types vary between the 76.96% of savings banks and 67.47% of commercial banks, with people's banks (73.27%) and cooperative credit banks (68.72%) in between.

Moving to liquidity, measured as the share of liquid assets on customer and short term funding, it can be observed that commercial banks (14.82%) are the most liquid type, whereas cooperative credit banks (8.51%) are the least liquid. Savings banks (9.16%) and people's banks (11.79%) are in between. With regards to non-interest income as a share of revenues, the share is the highest for commercial banks (35.44%), and the lowest for cooperative credit banks (22.91%) – differences in this respect are clear. Finally, in terms of bank capitalisation, cooperative credit banks are the most capitalised as showed by the highest values for equity as a share of total assets (10.86%), followed by people's banks (9.80%), commercial banks (8.01%) and savings banks (8.07%). Similarly, cooperative credit banks have the highest total capital ratio (15.61%), whereas savings banks are the least capitalised with a total capital ratio of 10.99%.

Next, the dynamics of the specific variables are discussed separately by bank type, over time. Due to the high variability of the indicators, and the varying degree of missing data, the median of the indicator is plotted for each year and each bank type. Starting with Figures 2 and 3, bank profitability is first considered, measured by the ROAA and the ROE, over 2005-2012. At the beginning of the period, one can observe that the median cooperative bank in the sample achieved a significantly higher return than its median commercial counterpart; savings banks and people's (popular) banks fall in between the cooperative and commercial banks. The ROE remains rather steady from the beginning of the crisis onwards, except for a small divergence in 2012, with cooperative banks and commercial banks performing better than the people's and savings banks.

*Figure 2 and figure 3: Profitability by bank type*
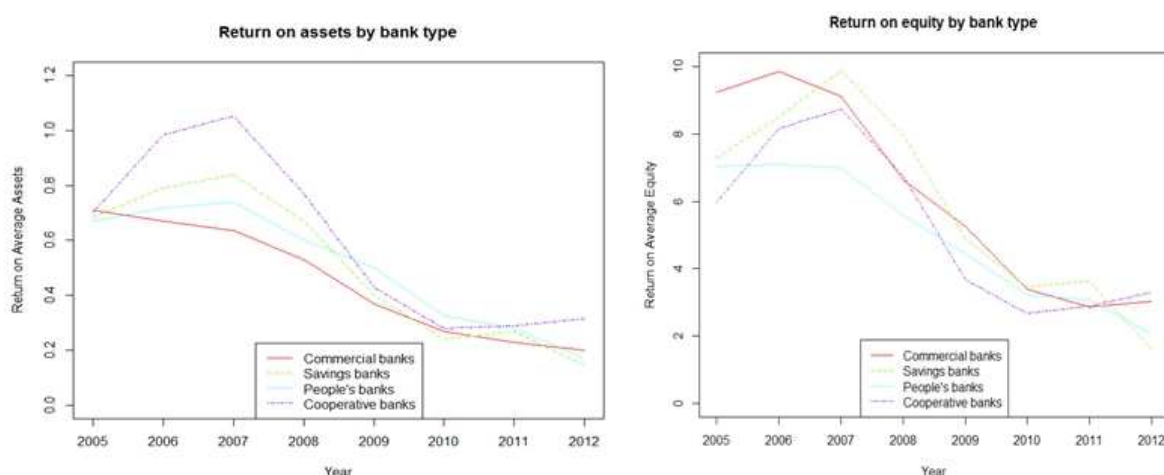
The cost-to-income ratio (Figure 4 below) is generally higher for cooperative banks than other banks (and also somewhat higher for savings banks and people's banks than commercial banks). However, one can observe a significant downward trend in the costs for all banks, the strongest being in the case of cooperative banks so that, in 2012, cooperative banks ended up with a smaller median cost-to-income ratio than the other banks. As expected, the quality of bank loans deteriorated with the financial crisis, which is reflected in the higher share of loan loss provisions in all banks. In cooperative banks, the crisis-related increase occurs later (i.e. 2011) than in the commercial banks, for which the quality of loans has been decreasing quite steeply since 2007.

Figures 4 and 5: Cost to income ratio and Loan loss provisions on gross loans
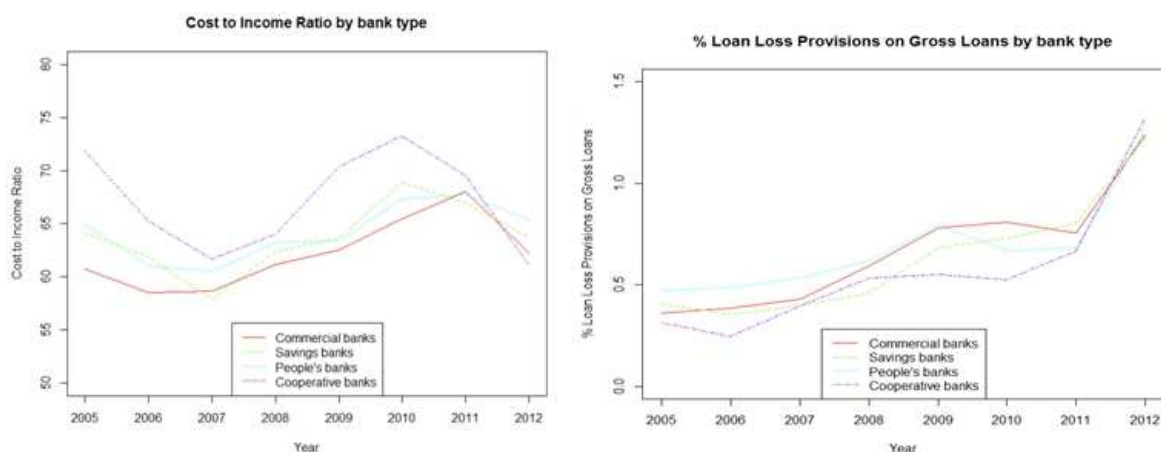
An increase in the total capital ratio is observed from 2007 onwards for all bank types other than the cooperative banks; while for the latter this ratio remains relatively stable. All in all, the share of capital in cooperatives is, however, much higher than in other banks. The capitalisation of the cooperative banks is also stronger when measured by the percentage of equity in total assets (Figure 7).

Figures 6 and 7: Bank capitalization
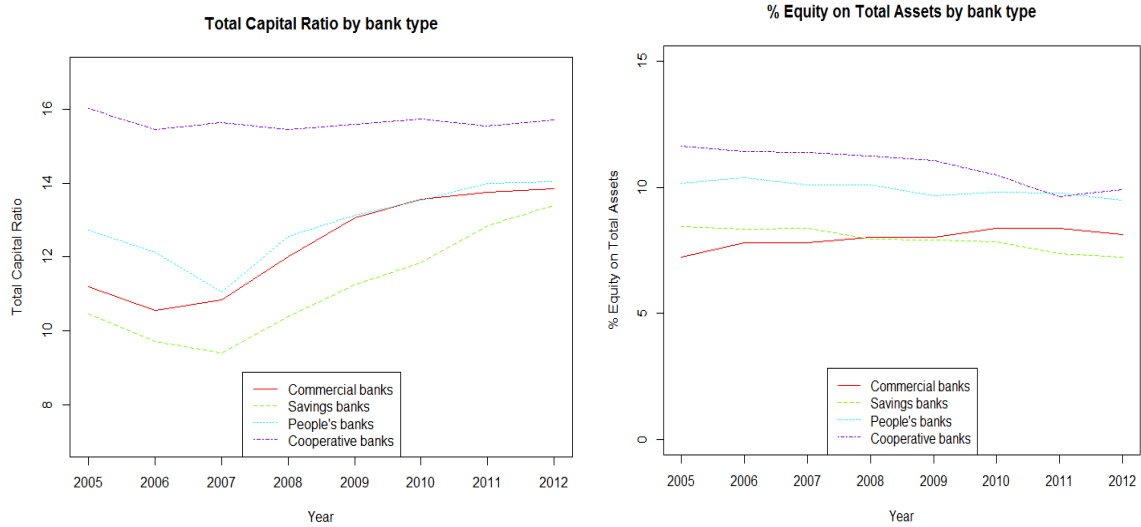
As was shown in the table below, cooperative banks are much smaller than the other types of banks (Figure 8). Savings banks and people's banks are actually very similar to commercial banks in terms of size. These differences seem to persist during the whole period of analysis; one only observes a slight decrease in the size of the commercial banks. The differences between the various types of banks also apply to the structure of their assets, which reflects their main activities (see Figure 9). As expected, savings banks have the highest share of their assets in loans, while commercial banks have the lowest. However, in 2012 quite a sharp decline in the share of net loans for cooperative banks is observed, placing them below commercial banks. The net loans to total assets ratios have been declining for cooperative, people's and savings banks since 2009-2010, while the decrease for commercial banks started only around 2011. As net loans are gross loans less loan loss provisions, the decrease in net loans is consistent with an increase in loan loss provisions to total assets that is faster than the increase in gross loans to total assets.

*Figure 8 and 9: Loans to Total Assets*
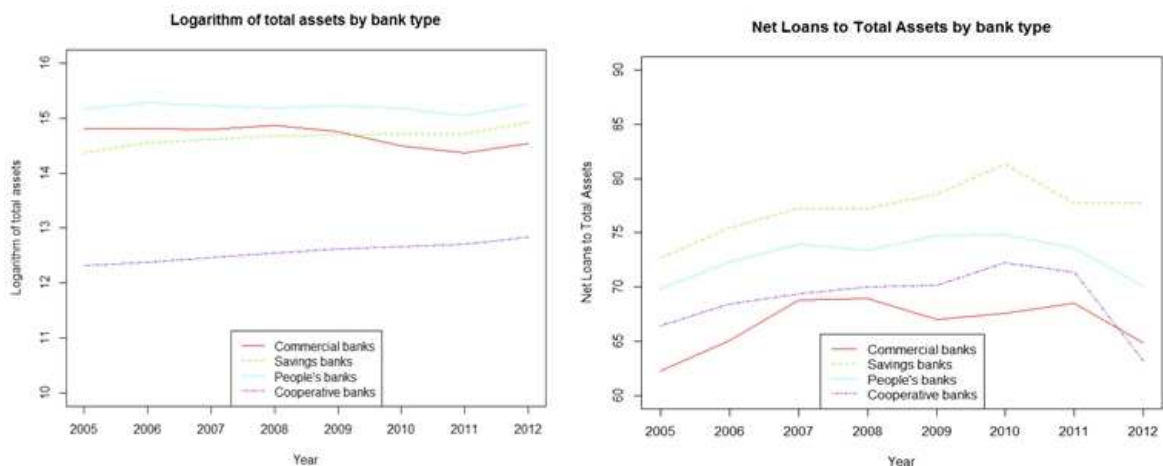
In terms of liquidity, the people's banks have been hit hardest by the crisis, with the median ratio of liquid assets to total deposits and borrowing falling from 23.79% in 2005 to 7.40% in 2012. Cooperative banks—the least liquid to start with—have seen a rise in liquidity since 2010, while during 2010-2012 the share of liquid assets in the other bank types

continued to fall. Liquidity can also be described using the share of liquid assets on customer and short-term funding: while the situation in 2005 for this indicator is much less diverse, the trends are very similar as for liquid assets on total deposits & borrowing, with a general decrease in liquidity over the whole period considered for all bank types and a stabilization in 2011-2012 for cooperative banks, contrarily to the other banks.

Figures 10 and 11: Liquidity
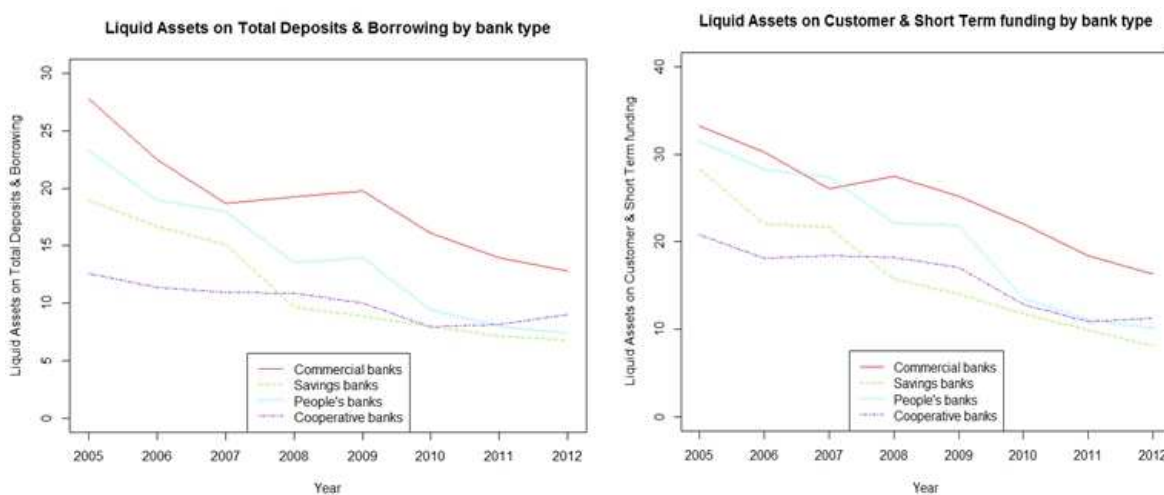
Next the liability side is considered, namely customers' deposits as a share of bank assets (and liabilities). Looking at the liability side gives us some information on the differences in sources of financing across the different bank types. Not surprisingly, the other bank types have a significantly higher share of customer deposits than do commercial banks (see Figure 12). The differences between the other three bank types are relatively small; in the savings, cooperative and people's banks, the depositors provide a substantial (nearly 50%) share of the banks' funding. This share has declined slightly during the period observed, while it has increased in the case of commercial banks.

Figure 12: % Total Customer Deposits on Total Assets by bank type
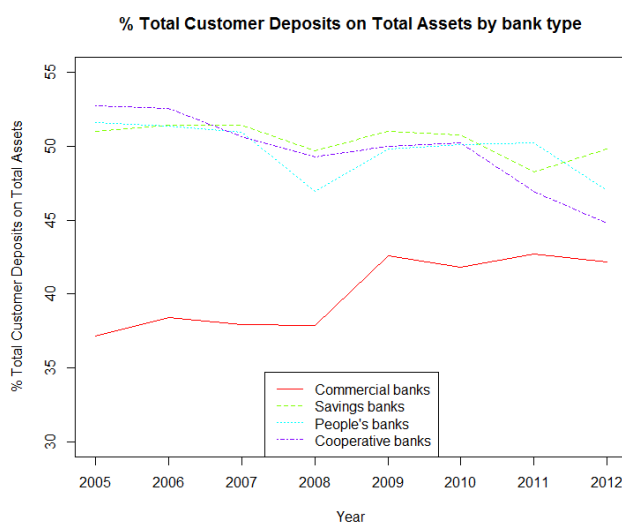
The majority of the cooperative banks report little or no gains/losses on trading and derivatives, making the median of these gains'/losses' share of their income zero. They are,

on the other hand, a small but positive component of total non-interest operating income for the commercial, savings and people's banks (except in 2008). Non-interest income as a share of gross revenues, declining until 2008, reversed its trend after that year for all bank types, returning to the 2005-2006 levels. Interest expenses on average customer deposits fell after the onset of the crisis due to rate cuts and refinancing operations by the ECB, with only modest increases in 2011-2012. The fall was greater for commercial banks that were more generous with deposits to begin with. The same can be said of interest paid on liabilities in general, although in this case the gap between commercial and non-commercial banks was lower (around 1%).

Figures 13 and 14: Net Gains/Losses on Trading and Non-interest Income
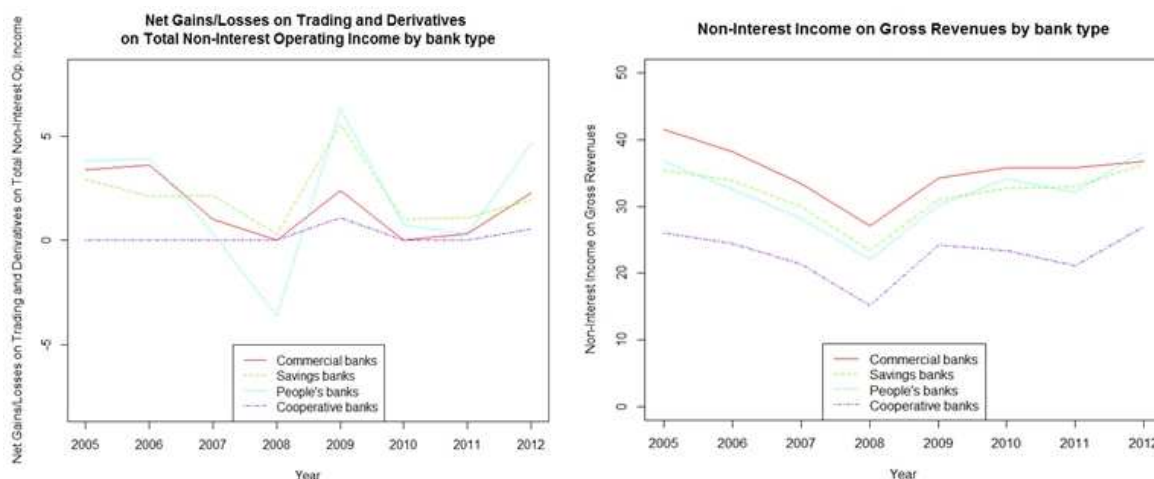
4.2   Statistical modelling

4.2.1   Methodology

The descriptive statistics presented above provide an idea of the differences between the cooperative and other banks, as well as an indication of how well each of these banks' groups reacted to the crisis in comparison to other banks. Making inferences based on the averages is not appropriate, however, as the differences between the different types of banks may be due to differences in other bank characteristics than bank type, such as size, capitalisation, etc. To address this, an empirical analysis is carried out in which selected measures of bank performance (in terms of profitability, cost efficiency and loan quality) are regressed on an indicator variable for the type of bank (cooperative, savings, popular or commercial) and a set of control variables. The choice of estimator is mainly influenced by the nature of our main explanatory variable, which does not vary over time. Therefore, in most of the cases the study relies on the pooled OLS estimator with standard errors clustered at the level of bank type, or alternatively at the level of the individual bank to correct for serial correlation and heteroscedasticity of the error term[5].

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[5] Unfortunately, the time-invariant nature of the explanatory variable prevents one from using panel data estimators that would allow to better control for reverse causality and, most importantly, the unobserved heterogeneity problem (i.e. endogeneity). In fact, a superior solution would be to rely on the fixed effects linear estimator, i.e. to control for the firm fixed effects in the regressions or, alternatively, to use a dynamic linear panel estimator, which would also account for the dynamic endogeneity of some of our variables (Wintoki et al., 2012). However, while addressing the endogeneity of some of the variables,

Heteroscedasticity issues and serial correlation are dealt with by clustering standard errors at the bank (bank type) level. To address multicollinearity concerns, the correlation coefficients are calculated and reported in Table 2 below. As indicated in the table, none of the coefficients are very high (none are above 0.50 for example, except net loans on assets and non interest income on revenues), which reduces possible concerns over multicollinearity. In addition, the variance inflation factors (VIFs; see Table 3 below) have been calculated to assess whether there is multicollinearity within the data[6]. The values are within the normal range (under 2) and thus indicate that there should be no major concerns over multicollinearity.

Table 2: Correlation coefficients for the main explanatory variables

| | correlation matrix | | | | | |
variables	[1]	[2]	[3]	[4]	[5]	[6]
[1] log total assets	1					
[2] customer deposits on assets	-0.348302	1				
[3] liquid assets on customer s.t. funding	-0.054354	0.03378	1			
[4] non interest income on revenues	0.1646632	-0.05749	0.4006	1		
[5] net loans on assets	0.2214717	-0.24772	-0.7245	-0.35991	1	
[6] equity on assets	-0.352166	-0.0234	0.4581	0.179078	-0.39339	1

The strongest correlations are between liquid assets on customer & short term funding and net loans on assets (-0.72), between non interest income on revenues and equity on assets (0.45) and between non interest income on revenues and liquid assets on customer & short term funding (0.40).

Table 3: VIF estimates

| Variance inflation factors | |
variables	VIF value
log total assets	1.476995791
customer deposits on assets	1.320341176
liquid assets on customer & short-term funding	1.997004493
non interest income on revenues	1.08075627
net loans on assets	1.703055281
equity on assets	1.710629854
cooperative banks	1.303943469
crisis year	1.020241787
savings banks	1.484342875
popular banks	1.501541947

Since VIF value are all below 2, there appears to be no multicollinearity in the data. The only value close to 2 is that of liquid assets on customer short term funding, nonetheless, being lower than 2, it appears to be acceptable.

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using firm fixed effects would prevent one from estimating the coefficients for all the time-invariant variables, such as the main variable of interest, the bank type.

[6] The VIF for a covariate is the reciprocal of 1 minus the multiple R-squared for the regression of the covariate on the other covariates. If the *j*th covariate is orthogonal to the other covariates, the multiple R-squared of the regression of the *j*th covariate on the other covariates will be equal to 0 and therefore the VIF will be equal to 1. On the other hand, if there is multicollinearity, the R-squared will be close to 1 and therefore the VIF will be high. In the case of the dummy variable representing bank type, McFadden's pseudo R-squared is used to calculate the VIF.

4.2.2 Regression results

The main results of the empirical analysis are presented in Tables 4 – 6 below. To start with, the basic model is discussed, which to some extent follows Ferri et al. (2010). Unlike their sample, the sample in the present study covers only Italian banks and includes the period of the financial crisis, which is defined as the years 2009-2012 (or alternatively as 2008-2012; see robustness section). In model (1), a pooled OLS is estimated using the *ROAA*, *COST_EFFICIENCY* and *LOAN_PROVISIONS* as the dependent variables with the standard errors clustered at the individual bank level. The main explanatory variables are dummies for the different bank types (the commercial banks being the reference group). Model (2) replicates model (1) with the exception that here the standard errors are clustered by bank type. Model (3) replicates model (1) and additionally includes an interaction term (*COOP*CRISIS*) that aims to capture differences in the eventual effects of the crisis for cooperative banks in comparison to other banks.

Models (4)- (7) are estimated using the fixed effects linear estimator, which means that one controls for any time-invariant unobserved bank characteristics. Due to this, one cannot estimate the coefficient of the main explanatory variable, i.e. the dummy for cooperative banks. Following Lins et al.'s (2013) study on family firms' performance during the crisis, the focus is therefore on the coefficient of the interaction term *COOP*CRISIS*, which should measure the differences between the cooperative banks' and other banks' crisis performance. Models (4) and (5) differ in relation to the clustering of standard errors (i.e. more conservative clustering by bank type in model (4), and clustering at the bank level in model (5)). Models (6) and (7) replicate models (4) and (5) but here the popular banks are excluded from the sample, with the purpose of comparing cooperative banks with profit-oriented banks only.

Table 4: ROAA and bank organizational form

Dependent variable: ROAA	*Pooled OLS*			*Fixed effects model*			
						Excluding *banche popolari*	
Clustering of standard errors	Bank	Bank type	Bank	Bank type	Bank	Bank type	Bank
	Model (1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	ROAA	ROAA	ROAA	ROAA	ROAA	ROAA	ROAA
log total assets	0.039	0.039**	0.041	-0.120	-0.120	-0.140	-0.140
	[1.539]	[5.486]	[1.601]	[-0.321]	[-0.414]	[-0.350]	[-0.467]
customer deposits on assets	-0.002	-0.002	-0.001	0.000	0.000	-0.000	-0.000
	[-1.042]	[-0.560]	[-0.783]	[0.203]	[0.029]	[-0.171]	[-0.027]
liquid assets on customer s.t. funding	-0.000	-0.000	0.001	-0.003	-0.003	-0.004	-0.004
	[-0.124]	[-0.165]	[0.154]	[-1.171]	[-0.978]	[-1.205]	[-1.031]
non interest income on revenues	**0.010***	**0.010***	**0.010***	**0.007**	**0.007****	**0.007**	**0.007****
	[4.119]	**[2.965]**	**[4.091]**	**[1.461]**	**[2.517]**	**[1.328]**	**[2.415]**
net loans on assets	-0.002	-0.002	-0.001	0.006	**0.006****	0.005	**0.005***
	[-0.896]	[-0.640]	[-0.570]	[0.939]	**[2.188]**	[0.754]	**[1.839]**
equity on assets	**0.023****	**0.023***	**0.024***	**0.021****	0.021	**0.018****	0.018
	[2.352]	**[14.482]**	**[2.450]**	**[4.164]**	[0.698]	**[4.704]**	[0.597]
savings banks	0.136	0.136	0.131				
	[1.621]	[1.436]	[1.565]				
popular banks	0.014	0.014	0.008				
	[0.167]	[0.191]	[0.088]				
COOP - cooperative banks dummy	**0.283***	**0.283***	**0.265***				
	[3.057]	**[3.351]**	**[2.565]**				
CRISIS			**-0.491***	**-0.532***	**-0.532***	**-0.552***	**-0.552****
			[-5.625]	**[-5.726]**	**[-7.311]**	**[-5.252]**	**[-6.147]**
interaction COOP*CRISIS			**0.041**	**0.064**	**0.064**	**0.083***	**0.083**
			[0.516]	**[2.121]**	**[0.748]**	**[3.752]**	**[0.779]**
Observations	4,240	4,240	4,240	4,240	4,240	3,898	3,898
R-squared	0.196	0.196	0.190	0.207	0.207	0.204	0.204

Note: Robust t-statistics reported in the brackets. *, **, *** denote the 10%, 5% and 1% significance respectively. All regressions include time dummies (for the entire period or up to the CRISIS dummy). Constant not reported.

With regards to the return on the banks' average assets (*ROAA*), a higher profitability is observed for the banks with a higher share of non-interest income and for banks with a higher share of equity. Moreover, cooperative banks on average associate with slightly higher return on assets than other banks (28 basis points over the entire period of analysis; see the positive coefficient for *COOP* in model (1) and model (2)), which is compatible with *Hypothesis 1*. Other types of banks do not seem to perform any different than commercial banks, which are the reference group of banks in the analysis. Here one must note that—despite controlling for a set of bank-specific characteristics, such as the share of equity and the share of non-interest income— the positive coefficient for cooperative banks should be interpreted with caution. In fact, it is quite likely that this coefficient still captures some unobserved characteristic that are more common in cooperative banks and that also influence bank profitability. Moreover, the superior performance of cooperative banks during the entire period may be primarily due to the (expected) better performance of these banks during the crisis. To account for this, in model (3) an interaction term *COOP*CRISIS* is introduced and, furthermore, a dummy for the entire crisis period (i.e. after 2009) included at the place of corresponding time dummies. As indicated in the table, the crisis period associates with a significant drop in banks' performance, i.e. the coefficient for the dummy CRISIS is negative and statistically significant, and thus confirms *Hypothesis 2*. Moreover, the positive coefficient for the interaction term *COOP*CRISIS* suggests that the effects of the crisis were lower for cooperative banks in comparison to other banks. While this is in line with the *Hypothesis 3*, the coefficient is not statistically significant across the various specifications (i.e. see model (3) - model (7) in Table 4).

Next, banks' efficiency is accounted for and measured by the cost-to-income ratio (*COST_EFFICIENCY*) in Table 5 below. The specifications of the various models follow the analysis of *ROAA* (see above). First, larger banks associate with higher efficiency, i.e. lower costs. The coefficient for total bank assets is negative and statistically significant also when one includes firm fixed effects in models (4)-(7). This result is in line with the expectations, as larger banks are more likely to realize economies of scale, which implies lower costs. On the other hand, a positive relationship between the share of customer deposits and bank costs is observed. This again makes sense as one could expect that the banks, which rely more on depositors as a source of financing, also have a higher number of branches and employees (and consequently, higher operation costs) in order to gain better access to current and new depositors.

As shown in Table 5, cooperative banks associate with lower operating costs (everything else equal, the cost/income ratio is about 4.7-4.8 percentage points lower), which is in line with *Hypothesis 1* above. Other banks also incurred a significant increase in their costs during the crisis period, i.e. by about 8.7 percentage points on average (see the coefficient for the *CRISIS* dummy in the fixed effects specification, for example). As for the effect of the crisis on cooperative credit banks specifically, the interaction term between the two dummies, one indicating cooperative credit banks and the other crisis years, is positive in fixed effect models and negative in model (3), but in all cases not significantly different from 0, so it does not fully contradict *Hypothesis 3*.

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Table 5: Cost-income ratio (COST_EFFICIENCY) and bank organizational form

	Pooled OLS			Fixed effects model			
						Excluding banche popolari	
Clustering of standard errors	Bank	Bank type	Bank	Bank type	Bank	Bank type	Bank
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
log total assets	**-2.851*****	**-2.851****	**-2.844*****	**-14.869****	**-14.869*****	**-15.658***	**-15.658*****
	[-5.659]	**[-3.679]**	**[-5.631]**	**[-3.566]**	**[-5.517]**	**[-3.299]**	**[-5.522]**
customer deposits on assets	**0.240*****	**0.240**	**0.260*****	**0.198*****	**0.198*****	**0.201****	**0.201*****
	[6.414]	**[2.265]**	**[6.888]**	**[6.789]**	**[3.848]**	**[5.805]**	**[3.669]**
liquid assets on customer s.t. funding	-0.023	-0.023	0.021	0.081	0.081	0.106**	0.106*
	[-0.364]	[-0.495]	[0.340]	[2.248]	[1.528]	[5.396]	[1.964]
non interest income on revenues	0.064	0.064	0.049	-0.282	**-0.282*****	**-0.287**	**-0.287*****
	[1.288]	[1.076]	[0.993]	[-2.343]	**[-5.063]**	**[-2.182]**	**[-5.002]**
net loans on assets	-0.079	-0.079	-0.030	**0.039****	0.039	0.043*	0.043
	[-1.473]	[-1.569]	[-0.586]	**[4.196]**	[0.784]	[3.130]	[0.879]
equity on assets	0.158	0.158	0.196*	-0.070	-0.070	-0.086	-0.086
	[1.387]	[0.812]	[1.717]	[-0.977]	[-0.273]	[-1.504]	[-0.324]
savings banks	-0.842	-0.842	-1.357				
	[-0.418]	[-0.592]	[-0.674]				
popular banks	-0.122	-0.122	-0.576				
	[-0.052]	[-0.068]	[-0.240]				
COOP - cooperative banks dummy	**-4.719****	**-4.719**	**-4.809****				
	[-2.218]	**[-1.873]**	**[-2.322]**				
CRISIS			**5.275*****	**8.744****	**8.744*****	**8.731****	**8.731*****
			[4.106]	**[4.754]**	**[6.401]**	**[4.898]**	**[5.475]**
interaction COOP*CRISIS			**-0.369**	**0.459**	**0.459**	**0.738**	**0.738**
			[-0.298]	**[1.597]**	**[0.389]**	**[1.911]**	**[0.517]**
Observations	4,233	4,233	4,233	4,233	4,233	3,891	3,891
R-squared	0.238	0.238	0.212	0.163	0.163	0.170	0.170

Note: Robust t-statistics reported in the brackets. *, **, *** denote the 10%, 5% and 1% significance respectively. All regressions include time dummies (for the full period or up to the crisis). Constant not reported.

A better picture for cooperative credit banks emerges when looking at their loan quality during the entire period and the crisis (*LOAN_PROVISIONS*). As reported in Table 6, cooperative banks associate with better loan quality, which is captured in this case by the share of loan loss provisions in the value of gross bank loans (0,16-0,19 percentage points lower for cooperative credit banks compared to commercial banks). The other banks' loan quality deteriorated significantly during the crisis period, with loan loss provisions increasing 0.26 to 0.53 percentage points of gross loans. On the other hand, the cooperative credit banks associate with a lower increase in the loan loss provisions during the period of the crisis, which suggests that the quality of their loans did not deteriorate as much as for other banks (see the positive and statistically significant coefficient for the interaction term *COOP*CRISIS* in the fixed effects models). These results provide support to the hypotheses stated above (*Hypothesis 1-3*). Moreover, it seems that the loan quality overall positively associates with the soundness of bank operations and, somehow, with more traditional types of bank activities; loan loss provisions are smaller for the banks with a higher share of equity, stronger bank liquidity, a higher share of customer deposits and a smaller share of non-interest income (see the fixed effects results in model (4)-model (7)).

Table 6: Loan loss provisions (LOAN_PROVISIONS) and bank organizational form

	Pooled OLS			Fixed effects model			
						Excluding banche popolari	
Clustering of standard errors	Bank	Bank type	Bank	Bank type	Bank	Bank type	Bank
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
log total assets	-0.030*	-0.030	-0.032*	-0.040	-0.040	-0.027	-0.027
	[-1.771]	[-1.879]	[-1.843]	[-1.142]	[-0.498]	[-0.819]	[-0.324]
customer deposits on assets	-0.003	-0.003**	-0.004**	-0.009	-0.009***	-0.009	-0.009***
	[-1.565]	[-4.792]	[-2.555]	[-1.406]	[-2.992]	[-1.215]	[-2.832]
liquid assets on customer s.t. funding	-0.001	-0.001	-0.005**	**-0.007***	**-0.007*****	**-0.008**	**-0.008*****
	[-0.219]	[-0.399]	[-2.128]	**[-2.481]**	**[-3.263]**	**[-2.200]**	**[-3.187]**
non interest income on revenues	-0.002	-0.002**	-0.001	0.005	0.005***	0.005	0.005**
	[-1.279]	[-5.129]	[-0.495]	[1.807]	[2.686]	[1.639]	[2.499]
net loans on assets	-0.003	-0.003	-0.007***	**-0.024***	-0.024***	-0.024	-0.024***
	[-1.428]	[-0.546]	[-3.735]	**[-3.258]**	[-9.048]	[-2.833]	[-8.828]
equity on assets	-0.006	-0.006	-0.010	-0.041	**-0.041*****	**-0.039**	**-0.039*****
	[-0.878]	[-0.506]	[-1.400]	[-1.881]	**[-4.913]**	**[-1.664]**	**[-4.763]**
savings banks	-0.072	-0.072*	-0.028				
	[-0.880]	[-2.391]	[-0.343]				
popular banks	0.036	0.036	0.078				
	[0.439]	[1.291]	[0.932]				
COOP - cooperative banks dummy	-0.190**	-0.190**	-0.160**				
	[-2.551]	[-3.478]	[-2.254]				
CRISIS			0.533***	0.259***	0.259***	0.275***	0.275***
			[12.385]	[9.393]	[6.245]	[13.964]	[5.583]
interaction COOP*CRISIS			-0.019	-0.108	-0.108**	-0.126	-0.126**
			[-0.403]	[-2.344]	[-2.307]	[-2.034]	[-2.286]
Observations	4,154	4,154	4,154	4,154	4,154	3,815	3,815
R-squared	0.215	0.215	0.129	0.239	0.239	0.236	0.236

Note: Robust t-statistics reported in the brackets. *, **, *** denote the 10%, 5% and 1% significance respectively. Time dummies (for the full period or up to the crisis) included. Constant not reported

5 CONCLUSIONS

Through a comparative study on profitability and performance between different types of banks in Italy, this paper shows that Italian cooperative credit banks indeed operate differently than standard commercial banks. The paper has tested the hypothesis that cooperative banks offset their lower profitability with a more efficient asset allocation policy. Specifically, the main hypothesis that has been investigated is whether Italian cooperative banks have more conservative policies and lower riskiness of bank operations than commercial banks. The argument that such banks rely on a specific model of banking is thus confirmed by the present analysis.

The paper shows that different banking models have caused different reactions to the financial crisis and economic downturn. Everything else equal, cooperative banks in Italy seem to be relatively more efficient than commercial counterparts. This result appears to be aligned with that of Ferri et al. (2010) and depart from the argument stating that mutual/cooperative banks are less efficient than commercial banks (see e.g. Rasmusen 1988). The main findings of the paper are as follows:

- As a result of the crisis and the economic downturn, profitability has decreased in all types of banks.
- Cooperative credit banks tend to have a more efficient asset allocation policy, as shown by a higher ROAA.
- As to cost/income ratios, larger banks show economies of scale, yet cooperative banks show, in some models, a significantly lower cost/income ratio (around 4.8 percentage points lower) than comparable commercial banks. This preliminary result would suggest that cooperative banks are organizationally more efficient, although further research on the topic is needed before drawing definitive conclusions.
- Customer deposits appear to have an effect on the cost-to-income ratio. This result suggests a critical reassessment of cooperative banks' branch network policy, and, therefore, the following question should be posed: does a dense network of branches have unforeseen costs for the bank, particularly if it grows too large?
- With regards to credit quality, the crisis has significantly impacted on loan loss provisions as a share of gross loans, with a marked increase for all banks. The deterioration of credit has been less severe for cooperative credit banks, which confirms their more prudent lending policies.

One should acknowledge the fact that the results are valid for the Italian banking market only: additional research focusing on banks from other European countries is needed in order to extend the suggested policies to the EU level. Nonetheless, substantial business implications can be derived and applied to those EU countries where the cooperative banking sector is not yet fully developed (as for instance in former Yugoslavian countries or some countries in Eastern Europe). Based on both the results of the present paper, the following suggestions are made:

- Having assessed the differences between bank types, it seems reasonable to treat these different entities differently, avoiding applying a regulation tailored to commercial banks that carry a systemic risk to the Euro zone to cooperative banks as well, that are neither as risky as commercial banks, nor similar in their organisation and business practices.
- It can be therefore argued, based on the present results, that the specificity of cooperative banks should be preserved, and that regulation aimed at reducing systemic

risk[7] should not necessarily apply to them (at least not in its current format), as their business practices already prevent them from carrying systemic risks.

Finally, with reference to changes in the regulation particularly at the EU level, it can be suggested that the new regulations carrying increased compliance and personnel costs should be simplified for cooperative banks, or at least the burden of compliance costs should be eased. It may be advisable for small cooperative banks in Italy to strengthen and thus render more effective the mutual support mechanisms and resolution schemes that are already provided by the cooperative credit network. Conversely, it remains questionable whether these banks, which are already heavily regulated, should apply for bail-in tools as suggested by the new EU directives (that come into force on January 1st, 2015, with the bail-in system to take effect from January 1st, 2016). In fact, should cooperative credit banks be forced to limit their ability to support local communities and economic agents, this might have unintended consequences such as additional credit rationing, less credit being offered to local firms, and the hampering of new entrepreneurial activities. This should be avoided.

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[7] Basel 3 proposes a framework to reduce the risks posed by 'systemically important financial institutions'. For instance, the new framework contains measures addressing the reduction of the cyclical effects of Basel 2 together with the reduction of systemic risk. The recent financial crisis has shown the risks posed to the financial system from the failure of one large institution or the distress of counterparts. Yet, the new rules are not free from criticism. See the documents provided by the Bank of International Settlements (2010; http://www.bis.org/bcbs/basel3.htm); guidelines and comments by PWC, 2011; and insightful comments available online, such as http://www.risk.net/credit/analysis/1936514/basel-iii-tackles-systemic-risk-counterparty-risk

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APPENDICES

Robustness

In this section some additional results are provided in support of the conclusions presented above, to check whether they are influenced by different specifications of the variables. In Table 7, the fixed effects regressions are replicated for the entire sample (this including *banche popolari*) with two modifications: 1) the start of the crisis is now defined as the year 2008, meaning that the crisis dummy now identifies the 2008-2012 period (*CRISIS2008*) and the full set of time dummy variables is showed using year 2005 as the reference year; 2) the cooperative and popular banks are considered together, defined by a new dummy variable *COOPERATIVE*. The models differ with regards to the dependent variable and the method used to cluster our standard errors (either by bank type or at the bank level). Moreover, the last two models in Table 7 use the newly defined dummy for cooperative banks (*COOPERATIVE*). All in all, the results presented in Table 7 re-confirm the conclusions reached in the main analysis. For ROAA, the coefficient of the COOP*CRISIS2008 interaction term (0.077) are very close to the ones of the fixed effects models in the main analysis (0.064 including popular banks and 0.083 excluding them), the coefficient is not significant, therefore one can conclude that cooperative credit banks have not had lower ROAA than commercial banks. No noteworthy differences are observable in the coefficients for the other variables.

For cost/income ratio, the results presented in Table 7 show a higher, significant coefficient for the logarithm of total assets, a lower coefficient for customer deposits on total assets, which is significant only when errors are clustered at bank level, a lower and not significant, but still positive, coefficient for liquid assets on customer & short-term funding. Non interest income on revenues has a similar coefficient to the main analysis, but in Table 7 it is significant also when the errors are clustered at the bank type level. The coefficient for net loans on assets changes sign, becoming negative, but remains not significant. The same applies to the COOP*CRISIS2008 interaction term, so it can be concluded that there has been no significant difference between the impact of the crisis on the cost/income ratio of commercial and cooperative credit banks regardless of whether one sets the first crisis year to 2008 or 2009.

Merging popular banks into cooperative banks has little or no effect on the estimates. The only noticeable change is in the coefficient of the interaction term COOPERATIVE*CRISIS2008 with regards to cost/income ratio, that changes sign and becomes positive again (as in the main analysis). It should be noted, though, that it is still small and not significantly different from zero. Finally, the variable capturing the structure of banks' assets, i.e. the net value of loans in total bank assets (in percentage) is replaced with an alternative measure, namely the gross value of bank loans in the total bank assets. Again, the conclusions related to the main variable of interest remain unchanged. No significant changes in other coefficients can be reported. Gross loans on total assets have a significant negative effect on both cost/income ratio and loan quality. The results for fixed effects regression using the *COOP* dummy and new definition of the crisis (*CRISIS2008*) are presented in Table 8.

Table 7: Fixed effects regression for bank performance, cost efficiency and loan quality

VARIABLES	Bank type	Bank	Bank type	Bank	Bank type	Bank	Bank type/new definition of cooperative		
	ROAA (v1)		COST_EFFICIENCY (v2)		LOAN_PROVISIONS (v3)		v1	v2	v3
log total assets	-0.080	-0.080	-12.672**	-12.672***	-0.331*	-0.331***	-0.080	-12.656***	-0.331***
	[-0.203]	[-0.265]	[-4.157]	[-4.648]	[-2.396]	[-3.555]	[-0.265]	[-4.641]	[-3.580]
customer deposits on assets	-0.001	-0.001	0.138	0.138***	-0.003	-0.003	-0.001	0.140***	-0.003
	[-0.543]	[-0.158]	[1.858]	[2.629]	[-1.098]	[-1.064]	[-0.133]	[2.670]	[-1.133]
liquid assets on customer s.t. funding	-0.005	-0.005	0.019	0.019	-0.000	-0.000	-0.005	0.018	-0.000
	[-1.577]	[-1.449]	[0.761]	[0.343]	[-0.044]	[-0.057]	[-1.446]	[0.330]	[-0.062]
non interest income on revenues	0.007	0.007**	-0.242*	-0.242***	0.001	0.001	0.007**	-0.243***	0.001
	[1.639]	[2.377]	[-2.411]	[-4.408]	[0.838]	[0.627]	[2.310]	[-4.430]	[0.683]
net loans on assets	0.006	0.006*	-0.081	-0.081	-0.013*	-0.013***	0.006*	-0.081	-0.012***
	[0.786]	[1.916]	[-1.461]	[-1.543]	[-2.890]	[-4.915]	[1.885]	[-1.548]	[-4.872]
equity on assets	0.020**	0.020	-0.072	-0.072	-0.041	-0.041***	0.020	-0.070	-0.040***
	[4.512]	[0.675]	[-1.204]	[-0.287]	[-1.754]	[-4.418]	[0.672]	[-0.279]	[-4.428]
COOP*CRISIS2008	**0.077**	**0.077**	**-0.163**	**-0.163**	**-0.076***	**-0.076***			
	[1.293]	**[0.973]**	**[-0.738]**	**[-0.158]**	**[-2.757]**	**[-1.721]**			
COOPERATIVE*CRISIS2008							**0.102**	**0.148**	**-0.104****
							[1.025]	**[0.117]**	**[-2.021]**
2006	0.182**	0.182***	-4.008*	-4.008***	0.053*	0.053*	0.182***	-4.015***	0.053*
	[4.311]	[6.238]	[-2.900]	[-8.503]	[2.421]	[1.814]	[6.259]	[-8.509]	[1.830]
2007	0.239**	0.239***	-5.657*	-5.657***	0.203**	0.203***	0.238***	-5.667***	0.203***
	[4.933]	[4.155]	[-2.863]	[-8.311]	[5.765]	[6.379]	[4.169]	[-8.318]	[6.401]
2008	-0.007	-0.007	-3.965*	-3.965***	0.434***	0.434***	-0.033	-4.194***	0.462***
	[-0.176]	[-0.084]	[-2.421]	[-3.275]	[7.679]	[8.259]	[-0.319]	[-2.978]	[7.737]
2009	-0.358**	-0.358***	4.041***	4.041***	0.517***	0.517***	-0.383***	3.813**	0.544***
	[-4.849]	[-3.784]	[5.890]	[2.685]	[43.415]	[9.688]	[-3.615]	[2.236]	[9.001]
2010	-0.574***	-0.574***	7.946***	7.946***	0.555***	0.555***	-0.599***	7.717***	0.582***
	[-6.433]	[-5.870]	[9.910]	[5.024]	[20.424]	[9.699]	[-5.525]	[4.346]	[9.156]
2011	-0.566***	-0.566***	5.040**	5.040***	0.625***	0.625***	-0.591***	4.816***	0.652***

continued	Bank type	Bank	Bank type	Bank	Bank type	Bank	Bank type/new definition of cooperative		
VARIABLES	ROAA (v1)		COST_EFFICIENCY (v2)		LOAN_PROVISIONS (v3)		v1	v2	v3
	[-12.664]	[-5.620]	[5.382]	[3.359]	[18.162]	[10.511]	[-5.191]	[2.819]	[9.931]
2012	-0.540***	-0.540***	-0.633	-0.633	1.239***	1.239***	-0.564***	-0.853	1.266***
	[-8.281]	[-4.682]	[-0.803]	[-0.375]	[32.463]	[16.421]	[-4.666]	[-0.457]	
Observations	4,240	4,240	4,233	4,233	4,154	4,154	4,240	4,233	4,154
R-squared	0.216	0.216	0.198	0.198	0.334	0.334	0.216	0.198	0.334

Note: Robust t-statistics reported in the brackets. *, **, *** denote the 10%, 5% and 1% significance respectively. All regressions include bank fixed effects. Constant not reported.

Table 8: Fixed effects regression for bank performance, cost efficiency and loan quality

Dependent variable	bank level clustering			bank type clustering		
	ROAA	COST_EFFICIENCY	LOAN_PROVISIONS	ROAA	COST_EFFICIENCY	LOAN_PROVISIONS
log total assets	-0.091	-12.736***	-0.310***	-0.091	-12.736**	-0.310*
	[-0.302]	[-4.643]	[-3.300]	[-0.238]	[-4.038]	[-2.637]
customer deposits on assets	-0.001	0.140***	-0.003	-0.001	0.140	-0.003
	[-0.126]	[2.657]	[-1.087]	[-0.459]	[1.916]	[-1.114]
liquid assets on customer s.t. funding	-0.007**	0.013	0.004*	-0.007	0.013	0.004
	[-2.141]	[0.230]	[1.826]	[-2.294]	[0.516]	[1.401]
non interest income on revenues	0.006**	-0.243***	0.001	0.006	-0.243*	0.001
	[2.295]	[-4.415]	[0.811]	[1.607]	[-2.419]	[0.994]
gross loans on assets	0.001	-0.091*	-0.005*	0.001	-0.091	-0.005
	[0.308]	[-1.864]	[-1.904]	[0.141]	[-1.509]	[-1.573]
equity on assets	0.019	-0.073	-0.040***	0.019**	-0.073	-0.040
	[0.650]	[-0.289]	[-4.320]	[4.669]	[-1.277]	[-1.733]
COOP*CRISIS2008	**0.079**	**-0.181**	**-0.079***	**0.079**	**-0.181**	**-0.079***
	[0.990]	**[-0.175]**	**[-1.772]**	**[1.259]**	**[-0.766]**	**[-2.470]**
2006	0.188***	-3.888***	0.045	0.188**	-3.888*	0.045*
	[6.019]	[-8.023]	[1.543]	[4.761]	[-3.073]	[2.434]
2007	0.250***	-5.515***	0.186***	0.250**	-5.515*	0.186***
	[4.225]	[-7.885]	[5.809]	[5.324]	[-2.989]	[6.829]
2008	0.002	-3.789***	0.420***	0.002	-3.789*	0.420***

continued	bank level clustering			bank type clustering		
Dependent variable	ROAA	COST_EFFICIENCY	LOAN_PROVISIONS	ROAA	COST_EFFICIENCY	LOAN_PROVISIONS
	[0.027]	[-3.075]	[8.125]	[0.055]	[-2.584]	[8.347]
2009	-0.349***	4.238***	0.503***	-0.349**	4.238**	0.503***
	[-3.632]	[2.778]	[9.508]	[-4.571]	[5.412]	[2.⁹ continues
2010	-0.561***	8.176***	0.536***	-0.561***	8.176***	0.5_ _
	[-5.653]	[5.105]	[9.352]	[-6.246]	[8.218]	[21.318]
2011	-0.561***	5.295***	0.619***	-0.561***	5.295***	0.619***
	[-5.508]	[3.482]	[10.673]	[-11.431]	[7.261]	[23.168]
2012	-0.557***	-0.375	1.273***	-0.557***	-0.375	1.273***
	[-4.796]	[-0.220]	[16.615]	[-7.647]	[-0.533]	[28.845]
Observations	4,240	4,233	4,154	4,240	4,233	4,154
R-squared	0.214	0.198	0.325	0.214	0.198	0.325

Note: Robust t-statistics reported in the brackets. *, **, *** denote the 10%, 5% and 1% significance respectively. All regressions include bank fixed effects. Constant not reported