

# Is the the gay coat that makes the gentlemen?

An analysis of Italian banks' risky attitude through alternative classification

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The Italian banking system is under the attention of both the monitoring authority and the public opinion after bankruptcy of four banks. Ten more financial intermediaries are under commissioner imposed by the Banca d'Italia in order to find a possible solution to save the bank. One of the main reasons for this situation is related with the riskier attitude of banks. Cooperative banks represent the largest proportion of banks under commissioner. The other banks involved are Banche Popolari and commercial banks. However, looking at their features, the lists of intermediaries facing financial distress is characterized by local banks, cooperatively owned and with small dimension.

This paper aims to analyse whether banks with a riskier behaviour are adequately classified in the institutional grouping way—i.e. Banche di Credito Cooperativo, Popolari, commercial or saving banks. It could be the case that the same group includes banks of different actual behaviour. For this reason, alternative classifications are proposed to check they could better describe similarly behaviours. Our main finding is that more than the institutional classification; it is the ownership and the *de facto* operating pattern that characterised the risky behaviour of banks.

Keywords: G20, G21, G28

JEL Classification: financial stability, z-index, cooperative banks

## 1. Introduction

The term *financial stability* refers to the ability of a financial system to (i) efficiently allocate the economic resources and processes, (ii) to manage risk in terms of price, allocation, evaluation and assessment, and (iii) to maintain a high performance level within the function functions described above, mainly through self-correcting mechanisms (Schinasi, 2004). The financial stability is mainly related with three characteristic of the financial environment—i.e. the regulatory frame, the size of the banking system and its degree of concentration and competition.

Even though it has always been a strategic goal for the banking system, financial stability has become a hot issue especially after the financial turmoil started in 2007. At the beginning of the 90s the banking sector has gone through a phase of liberalization aimed at increasing the competition and the efficiency of the banks. However, once the financial crisis emerged, one of the priorities of governments was to increase the regulation of the financial market and of the banking industries. In

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particular, the supervisory bodies have increased their power, new centralized bodies have been born, such as in Europe, and increased capital requirements have been included in the Basel agreements. A minimum threshold for the capital requirement is one among the three “legs” of the macroprudential regulation. The larger capital should reduce bank’s vulnerability and so the risk of contagion (Gale, 2010). The ratio behind the Basel Accords is to make banks more aware of their risks by investing their own equity (Behr et al., 2009). Basel II, in particular, has put rigorous boundaries on the capital requirements in line with what the “more sophisticated banks would have adopted on their own” (Goodhart, 2005: 119). Following this approach, the expected result would have been a trickledown effect for the less sophisticated banks. However, the effectiveness of the regulatory measurements is controversial (Gale, 2010). One of the reasons why it is not easy to assess the impact of capital regulation on bank’s risk is that there are other elements involved, related with bank’s features and its business strategy.

Competition and market concentration are elements that impact on financial stability. Two opposite views describe the relation between competition and financial stability: (i) the “competition-fragility” underlines how a higher level of competition among banks erode their margins and moves towards a more risk taking behavior; (ii) the “competitive-stability” approach considers how the higher interest rates applied whenever the number of intermediaries is low it strengthens the moral hazard and the adverse selection issues (Berger et al., 2009). During the liberalization process the leading idea was to enhance the competition among banks in order to increase the overall efficiency and to avoid the risky behavior by reducing the possible role of the state and by giving more responsibility to shareholders. The increase in competition is related with a higher number of intermediaries with a non-prominent dimension. No other hints on banks’ features related with their stability emerged.

A third element related with the financial stability is the dimension of banks. Bank’s size on the one hand is linked with competition: the bigger the bank the more likely is for this bank to gain over others. Once again the pro and contra arguments about the relationship between competition and financial stability applies. On the other hand, larger banks have (i) a more complex structure with more sophisticated tools to manage risks and (ii) economies of scale to be more efficient on the market. They manage their risks thanks to the so-called hard information. However, they lack in tools that allow to collect information for the opaque borrowers and to analyze the creditworthiness of small and young enterprises. Small and local banks are more likely to exploit relationship-banking technology to lend credit to the economy. They reduce the asymmetry of information but suffer from limited diversification of risk.

The nature of the bank—i.e., its institutional classification, plays a role in studying the risky profile. In their paper, Hesse and Cihak (2007) conclude that cooperative banks are more stable than commercial banks thanks to use of customer surplus in weaker periods. Furthermore, Chiaramonte et al. (2015: 494) find that banking systems with a high presence of cooperative banks better face phases of financial distress and keep confidence in the banking industries.

The institutional classification of a bank could be seen as a label not relevant to analyze common pattern of business. Financial intermediaries could own to the same group but behave differently. In other words, there could be a disconnection between the *de jure* classification and the *de facto* behavior. It is possible to have banks owing to national banking group supporting local development and local banks showing a more speculative and risky attitude—e.g. Banca Etruria for the Italian case.

This paper aims to analyze the elements that contribute to the financial stability of banks starting from banks' peculiarities. The focus is on the Italian case for three main reasons: (i) Italian banking system is an interesting mix of various intermediaries; (ii) the turmoil started in 2007 deeply affect the banking market first and the economy after more than in other European countries; (iii) as a reaction, the Italian government has started a process of reforms for cooperatives banks (both *Banche Popolari* and Credit Cooperative Banks, hereafter CCBs). The paper is structured as follows: section 2 investigates the main literature concerning financial stability, Section 3 introduces the data, Section 4 discusses the methodological approach, Section 5 reports the main results while Section 6 concludes.

## **2. Literature review**

The literature on bank stability is wide and it includes various perspectives. However, results are contradictory and it is difficult to formalize standard behavior mechanisms. A first strand of the literature focuses on the role of legal requirements on the risk taking behavior of banks. In order to guarantee financial stability, rules and norms have been introduced especially regarding the capital requirements. Basel II Accords, signed before the start of the financial crisis in 2008, set standards on the capital required to guard against financial and operation risks. Many scholars have criticized the effectiveness of Basel II, defining inadequate the capital requirements and have stressed the need to revise regulations on banking supervision.

Basel III was negotiated and agreed in 2013. It further sharpens the capital adequacy by increasing bank liquidity and by reducing the leverage while it underlines the need for the stress testing and the risks of market liquidity as a reply to the ongoing financial turmoil. The study by Cioli and Giannozzi (2013) measures the degree of adequacy of the Italian banks to the new requirements

imposed by Basel 3 and the relationship between financial stability and the size of banks. In light of their results, the two scholars have shown that Italian banks are in general adequately capitalized. However, differentiating the sample by size, it emerges how the medium and small banks are more stable than bigger ones. According to Keeley (1990), on the contrary, banks with more market power hold more capital relatively to assets and they have lower default risks. Gale (2010) shows that an increase in the capital assets above the laissez-faire threshold will reduce the welfare. Higher requirements increase the cost of funding and might lead to riskier loans. The net effect, after considering direct and indirect impact on the charter value, will be a raise in the riskiness of the bank's portfolio. However, in his conclusion Gale (2010) discusses the contradiction in the results and underlines the need for more tools in addition to the capital requirements in order to avoid banks bankruptcy and financial crises.

A second branch of the literature takes into consideration the competition level and the related issue of the bank's size. These are focal points in the discussion on the stability of both banks and banking industries. The processes of globalization and deregulation have weakened the boundaries among nations and enhanced cross-border and interstate banks (Boot and Thakor, 2000). Theoretical and empirical studies carried out find contradictory results on the effect of competition and concentration on bank's stability. Boot and Thakor (2000), analyzing the impact of an increased competition on the lending technology chosen by each bank, conclude that a higher concentration tend to result in credit rationing. According to their arguments, banks will move toward less relationship lending favoring fewer high-quality investments that increase the returns of each individual investment, promoting financial stability. In the analysis proposed by Boyd, De Nicolò, and Smith (2004), the authors argue that bank mergers might increase profits and reduce financial fragility thanks to a high capital equipment that protect them from exogenous macroeconomic and liquidity shock. Bikker, Shaffer and Spierdijk (2009) and Corvoisier and Gropp (2006) underline the greater capacity of larger banks to absorb negative shocks thanks to a lower profitability and a higher volatility of economic returns.

Other studies put the light on contra arguments to support the hypothesis that larger banks lead to lower stability in the market. Banks of bigger dimension and with expected higher profits might lead managers to adopt riskier behaviors (Keeley, 1990). Uhde and Heimeshoff (2009) find that the M&A process which took place in Europe from 1997 until 2005 impact negatively on the European banking stability. Using the Z-index as a proxy for the bank's bankruptcy, they define a negative relationship between the concentration and the stability mainly due to the higher volatility of the ROAA of larger banks. Schaeck & Čihák (2007) carry on a similar exercise using data on European banks in the period 1999 – 2004. In particular, they do not find a significant relation between the

banking competition and their risky behaviour. They underline the tendency of banks to keep high the level of capital when they operate in a more competitive environment. De Nicolò, Bartholomew, Zaman and Zephirin (2004) empirically test the link between bank's concentration and the systemic risks. Their conclusions show a positive relation due to the fact that a raise in the market concentration lowers the capital hold by shareholders and increases the leverage. Moreover, the increase in size and the raise of banking groups might lead to the spread of financial conglomerates which are too complex and too difficult to manage. They face high agency costs and conflict of interests, while they level of transparency is lower. The financial crisis strengthens the importance of the bank's dimension and of the complexity of the banking groups, adding at the problem of the *"too big to fail"* that of the *"too big to save"* (Bronzetti, 2011).

A third part of the literature includes bank's peculiarities to the list of features impacting on their risky behavior. In fact, the new rules on capital requirements do not take into account the heterogeneity in the nature of banks. In particular, banks might differ on their mission. While commercial banks aim at maximizing profits, other type of banks, such as cooperative banks, focus on the welfare of their members. Barth et al. (1999) underlines how crisis are more frequent where the banking system is characterized by a larger share of publicly owned banks. In particular, the role played by cooperative banks in the banking industry is still under discussion since contradictory results have been found. According to Goodhart (2004), cooperative banks cause an increase in the fragility of the system due to their non-for profit mission that reduces their profitability level. As a proof, the risk assumed by the cooperative banks increases with their capital, leading to the deterioration of the solvency indicators. Moreover, some authors claim that cooperative banks have more difficulties to react in adverse turmoil or in case of high variability of risks. Brunner, Decressin, Hardy, and Kudela (2004), studying the Swedish crisis of the early 90s, report a high mortality rate of cooperative banks due to the high cost of capital and to their scarce flexibility in adjusting to adverse economic phases, contradicting the anti-cyclic behavior hypothesis. Fonteyne (2007) suggests that European cooperative banks may be very vulnerable to sudden changes in the credit quality and in the interest rates. This is mainly due to the fact that they are more focused towards the traditional financial intermediation which profitability is related to the interest margins. Cooperative banks are then more expose to the credit and the interest rate risks.

While it seems that cooperative banks are structurally riskier, according to some other authors they show a prudential behavior being less willing to take risks. It is for instance the case of US mutualistic financial institutions studied by Hansmann (1996) and Chaddad and Cook (2004). According to their results, these banks tend to adopt less risky strategies and are more stable. Furthermore, Hesse and Čihák (2007), analyzing both developed countries and emerging

economies, empirically demonstrate that cooperative banks report Z-index values greater than those of commercial banks, confirming the financial stability hypothesis. This result can be explained with the lower volatility on returns of cooperative banks that acts as a countervailing factor for the lower levels of profitability and capitalization of cooperative banks. Analyzing the behavior of cooperative banks during periods of severe financial and economic turbulence, Groeneveld and de Vries (2009) show greater stability of financial system where cooperative banks are present, thanks to their higher Tier1 ratio, the more stable profit growth and the more solid balance sheet structure in the pre crisis period, and a gain in efficiency during the crisis. Similar results have been achieved by Lang and Welzel (1996), Garcia-Marco and Roblez-Fernandez (2008), Beck, Hesse, Kick, and von Westernhagen (2009), and by the European Association of Co-operative Banks (2010). Innotta, Nocera, and Sironi (2007) also validate the hypothesis of a higher banking stability thanks to cooperative banks, observing the impact of different ownership models in 15 European countries. Their analysis shows how cooperative banks take lower risks compared to the private sector banks. Finally, focusing on the Italian case, Filotto (2013) and Chiaramonte, Poles, and Oriani (2015) empirically analyze the relationship between cooperative banks and financial stability obtaining results in favor of the stability hypothesis.

Using the institutional classification of banks—i.e., limited company banks vs cooperative bank, small vs big size banks, etc..., studies do not lead to conclusive results. Banks might be more similarly when grouping based on their actual behavior is taken into account. Transversal classification through traditional group might has a more significant impact in assessing risky attitude. The hypothesis that will be tested in this paper is whether the institutional classification, normally used in the literature to behavior of banks is a good indicator to explain the bank's stability. Alternative grouping will be introduced to check whether similar patterns can be shared throughout "traditional" groups. Moreover, in order to have a broader view on the risk of insolvency, the analysis will add to the banking specific variables, demand side elements to control for the local economic impact on bank's stability.

### **3. A first view on data**

The Italian banking industry, evaluated in terms of financial assets, is small in size (2.6 times the GDP). The concentration of the banking sector is in line with that of other European countries with a 40% of the total assets belonging to the five largest banks in 2013. The crisis has impacted on the industry structure by reducing the number of banks and their operating costs. In particular, between 2008 and 2014 banks have reduced by 17%, branches by 9% and employees by 5.6%. The search for a reduction in the operating costs has been more relevant for the five major groups, which in

turn have significantly reduced their market share. As a result of the financial crisis, in 2014, the number of intermediaries under extraordinary administration procedures (7 cooperative banks and 5 joint-stock companies; for other 2 cooperative banks the liquidation procedure was initiated) becomes a signal of the difficulties faced by the Italian banking industries. To cope with the turmoil, efficiency and reduction of costs has been encouraged by the regulatory reforms towards a high level of equity and a reduction of profits together with a further diversification of the investments. Particular attention has been devoted to cooperative banks. In 2015, a new law has removed the democratic “one member one vote” mechanism for those *Banche Popolari* which assets overcome the 8 billion of euro, transforming these banks into limited companies. In 2016, the reform of the second level network of CCBs has been passed. The creation of a banking group made up by CCBs should promote the access to the capital market and a greater integration (Banca d’Italia, 2015).

Before the breaking out of the crisis, the Italian banking industry has bestowed credit principally in the North and in Centre, with a liquidity indicator particularly high in Alto Adige and in Emilia Romagna (respectively 176,42% and 131,03%). This is true also for the credit risk exposure. With the emergence of the financial crisis it has been experienced an increase in loans rather than deposits. This dynamic has been at work in particular CCBs, especially in Trentino with a ratio of 173,85, while in Alto Adige the entire industry raises the ratio until 195,84%. The counterpart of this politic is a weakening of efficiency, since it increases the costs. In particular, CCBs finance the economy by lending to the local market even though the costs for the liquidity raises and the efficiency worsens.

According to the Banking Law, Italian banks can be divided into four legal forms: (1) *Banche spa* (Limited company banks, which includes commercial and saving banks - CBs); (2) *Banche popolari* (BPs); (3) *Banche di credito cooperative* (CCBs), Credit cooperative banks, also called Mutual Banks; and (4) *Filiali di banche estere* (Branches of foreign banks). According to ownership characteristics, it is possible to group the intermediaries in two sets: the privately owned banks, which correspond to the limited company banks, and the member’s owned banks—i.e. *Banche Popolari*<sup>2</sup> and CCBs. However, given their increase in size and in complexity of their operational structure, some *Banche Popolari*, particularly those included in banking group, behave in a way closer to limited company banks than to cooperative banks. On the contrary, independent and smaller commercial banks follow a business model based on the relational banking, typical of the

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<sup>2</sup> Since the data used for this paper ends in 2013, the classification is not affected by the reform passed in 2015 for the *Banche Popolari*, according to which they can become a limited company bank if their assets reaches a threshold.

local and cooperative banks. Moreover, in the set of banks owned by banking groups, differences can be found between the five largest groups vs smaller banking groups.

In order to verify the impact of the bank's type on its stability, data will be taken from Bankscope. The dataset<sup>3</sup> is composed by 375 CCBs, 55 Commercial Banks, 43 *Banche Popolari*, 36 Saving Banks<sup>4</sup> for a total of 509 banks. CCBs are the most common type of bank and the most widespread among Italian regions (Table 1).

### 3.1. The Z-score Index

The measure introduced to assess the insolvency risk is the Z-score (Boyd and Graham, 1986; Hannan and Hanweck, 1988 and Boyd et al. 1993). The Z-score is taken as an indicator for the banking and the financial stability thanks to the relatively simplicity of its computation based on accountability data (Hesse and Čihák, 2007; Groeneveld, 2011 and Strobel, 2011). It links the size of the bank with the risk of incurring in a bank failure using bank's assets (see Appendix for more details).

$$Z - score = \frac{ROAA + E/A}{\delta ROAA}$$

The index increases with the growth of ROAA and the capital asset ratio, while it decreases with the raise of the volatility of returns. The highest the Z-score index the higher is the bank's stability and the lower is the probability of insolvency.

Comparing this value among banks typologies, it emerges how cooperative banks, both CCBs and *Banche Popolari* show a Z-score value higher than other types of banks. Considering values in 2005

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<sup>3</sup> The Bankscope database defines commercial banks as those banks that are mainly active in a combination of retail banking, wholesale banking and private banking, neither belonging to cooperative banks nor to saving banks. Cooperative banks are defined as banks with cooperative ownership. Saving banks are defined as those banks mainly active in the retail banking, both profit or non-profit oriented and with a shared ownership model (Chiaramonte et al. 2015). Since the analysis of this paper refers to the Italian case only, branches of foreign banks have not been included in the analysis, so as online banks. Saving banks have been considered by their owned and *Banche Popolari* have been detached by CCBs.

<sup>4</sup>After the Ciampi-Amato reform (1998-1999), saving banks can be considered as commercial banks either owned by a foundation or as member of a banking group. To the purpose of the descriptive analysis, saving banks have been considered separately since among banks under commissioners it is interesting to underline their behavior. However, the result from a t-test on the Z-score mean shows no statistically significant difference from commercial banks as shown bellow. For this reason, saving banks have been included into the group of commercial banks for the econometric analysis.

Group	Obs	Mean	Std. Err.
Commercial banks	402	2.895478	.0465563
<u>Saving Banks</u>	308	2.88995	0343326
diff = mean(0) - mean(1)		t = 0.0905	
Ho: diff = 0		degrees of freedom = 708	
Ha: diff < 0	Ha: diff != 0	Ha: diff > 0	
Pr(T < t) = 0.5360	Pr( T  >  t ) = 0.9279	Pr(T > t) = 0.4640	



and in 2013, CCBs decrease their Z-score by 6.4 percentage points, while *Banche Popolari* only by 2.7. Dividing the overall period into three phases—i.e., pre-crisis (2005-2007), the financial crisis (2008-2010), and the economic crisis (2011-2013), *Banche popolari* were able to improve this indicator during the financial crisis, while during the economic crisis phase all banks weaken their Z-scores. The lower value is registered for commercial banks during the economic crisis.

These trends could be better understood by separately analyzing the Z-score components: (i) the ROAA<sup>5</sup> and (ii) the capital assets ratio (see Table 2). First, the return on average assets describes the profitability of the bank's assets and the performance and the operational efficiency of a bank. Due to the lower profits, all banks reported a contraction in the ROAA value. While at the beginning of the crisis commercial banks show the highest ROAA, at the end on 2013 they lose more than 151 percent of their value. Savings banks manage to better contain the loss of profit, particularly in the first phase of the crisis, while CCBs reduce their ROAA less during the second phase of the crisis. Considering the variation of the ROAA, CCBs and *Banche Popolari* show the highest value during the period analyzed. The coefficient of variation increases for both type of banks in the first part of the crisis and even further in the second. While before the turmoil these banks could have been considered less risky compared to commercial banks thanks to the higher quality of their credits, during the crisis the higher impact of the non-performing loans and the lower margins on the intermediation affected their profitability. Second, the capital asset ratio describes the financial independency of a bank, computing a ratio between the internal financing sources over the external. Looking at data, CCBs show the highest value for the capital ratio on the overall period. A possible explanation is related to their obligation of devoting the 70 percent of their profits to reserves, while for other banks this bond is reduced to 5 percent. In general, all banks suffer during the economic crisis' phase when the capital ratio reaches the lowest values.

To sum up, the risk of insolvency for CCBs during the turmoil is related with the volatility of their profits: while in the first phase the decrease of the volatility has mitigated the Z-score reduction, in the second part the instability increases following the growth of the volatility. For *Banche Popolari*, the good performance in term of stability in the first phase of the crisis has been mainly due to the increase in the equity ratio and the lower volatility. Both these measures have worsened from 2011 to 2013. Commercial banks report an increase in their probability to be insolvent during the economic crisis period because of a reduction in their profitability and their capital ratio, while volatility reduces. When banks are grouped according to belong or not to a banking group—i.e., local banks vs non-local banks, it emerges how the Z-scores reduces over time, even though the distance between the two groups remains mostly unchanged. Independent banks show a higher level

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<sup>5</sup> The ROAA is used instead of ROA since the ratio between the net Income and the average assets takes into account the fluctuations of the period, and it results in a better measure to evaluate the bank's performance.

of Z-score compared to banks in a group. Moreover, considering only banks member of banking groups, those joining the five major banking groups showed a lower Z-score compared to banks in smaller groups<sup>6</sup>.

The goodness of the Z-score as a forecasting measure can be verified by comparing its trend for those banks that are now under the control of commissioners by the Bank of Italy. The highest is the Z-score value, the lower should be the probability of bankruptcy. The dataset includes 12 banks either under the commissioner's control or saved by the Italian government (2 commercial banks, 2 saving banks, 2 *Banche Popolari* and 6 CCBs). Most of them show Z-score values below the dataset average. The worsening process of this indicator has been faster for commercial banks and for saving banks. It has to be noted how, starting from 2010, CCBs register a smoother negative dynamic (Figure 1 and 2). Even though the Z-score is a good measure to forecast bank's instability, other elements can play a role and can influence this index.

#### **4. The model**

The hypotheses tested in this paper are mainly two: (i) alternative classification of a bank's group can better explain the risky attitude of banks compared to the institutional classification; (ii) according to the types of banks, the elements that characterise the probability of insolvency are different. In order to verify the first hypothesis a POLS estimator is used, while for the second a GMM Arellano Bond regression will be run. The dependent variable is in both cases the Z-score index. The model will include both bank specific variables, which summarise the strategic choices of each intermediary, and demand side variables at the province level, to control for the demand side. The various classification banks are included in the POLS regression as bank specific elements, coherently with the method adopted by other authors (see Filotto, 2013; Chiaramonte et al., 2015). The Arellano Bond estimation is performed for each group of bank in order to underline their peculiarities.

##### *4.1. Bank specific variables*

The bank specific variables are borrowed from Bankscope and they mainly include balance sheet data. A summary of their definition and of their predicted signs is reported in Table 4. The total assets value is interpreted as a proxy for bank's size. The direction of the relation is not predictable. The increase in size might lead to an increase in efficiency and to a diversification of the business, which should reduce the risk of insolvency (positive relationship). However, larger banks can have

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<sup>6</sup> Table 3 shows T-test performed on means. Each group has been first compared with all the other banks and it has been then compared with subgroups. As a result, the z-score of CCBs is not statistically different nor from other local banks neither from other cooperative banks. The others comparisons showed difference in means statistically significant.

incentives to increase their risks due to the *too big to fail* option (Chiaramonte et al., 2015). The large bank failures are feared because of their significant macroeconomic impact. Demirguc-Kunt and Huizinga (2010) prefer the expression *too big to save* according to which the larger banks are too large to be saved by the government (negative relationship).

The liquidity indicator is given by the ratio between the net loans and the deposits and short term funding. The higher is the rate the more risky is the bank since its portfolio consists of short-term resources. The sign of the impact on the Z-score should be negative, since an increase in the short-term resources not balanced by an increase in the liquidity might result in a financial contraction and in a higher possibility of bank's failure.

The net loan on total assets ratio is taken as a measure for the bank lending behaviour and the credit risk exposure. The ratio provides a measure of the financial position of a company, including its ability to meet financial requirements for outstanding loans. A high value describes a situation in which the bank has a low level of liquidity. Given the risky nature of the credit for the bank's business a negative relation is forecasted.

The cost to income ratio is commonly used as an operational efficiency measure. As for the total assets, also in this case the direction of the relationship is uncertain. The negative sign is related with the incentive that inefficient banks might taken more risks to improve profitability. It could be argued that it is linked with the Z-score through the mission of the bank. CCBs, for instance, are non-for profit intermediaries which might prefer to reduce profits in order to offer lower price services to their customers. In this case, the competing banks might worsen their profitability to react (Chiaramonte et al., 2015). However, it might also be the case that once the profitability margins are insufficient, banks could decide to follow low risky business model with less risky investments and a growing level of capital (Filotto, 2013).

Finally, the business model is described by the diversification of the bank's activities thanks to its dependency on the intermediation profits. The proxy is computed as the ratio between non-interest income and the gross revenues and it measures the proportion of total revenues generated by the bank's revenues net of interest activities—i.e. revenues from trading, service revenues, revenues from other financial transactions. The sign is once again uncertain. On the one hand, diversification should reduce the risks and the bank is less dependent from its lending activities. On the other hand, diversification could be risky if it concentrates on an area in which the bank does not have deeper and longer relationship (Chiaramonte et al., 2015). As an example, profitability for CCBs is usually related with the interest rates' margins. This is partly due to their stronger capacity of knowing the local area and partly due to their lower knowledge and resources in operating on the non traditional market—i.e. the intermediation market.

In order to determine the impact of the institutional form on the risky behaviour of a bank, the econometric model accounts for three dummies, each taking value one whether the bank is a CCB, a *Banca Popolare*, or a commercial bank and saving bank. Differently from a pure institutional approach, the idea of this paper is to underline the behaviour of the banks *de facto*, not only related with its *de jure* nature. For this reason, further classifications have been introduced in this study. First, the dummy named *Cooperative* describes banks owned by members—i.e., CCBs and *Banche Popolari*, following the traditional division of banks according to their ownership structure<sup>7</sup> (Figure 3). Second, the dummy named *Local* defines local independent bank. Under this label, the list includes all CCBs and those *Banche Popolari* and commercial banks or saving banks not part of a banking group<sup>8</sup>. Third, the *5 biggest group* dummy signals banks belonging to the five major Italian banking groups. This variable is used to differentiate among banking groups those who have a strongest relevance in both economic and politic terms. Finally, a dummy controls for banks under commissioners in order to clean the results from these anomalous situations.

#### 4.2. Demand side variables

To control for the demand side of the area, variables have been borrowed by the ISTAT and by the Bank of Italy datasets. On the one hand, the idea is to take into account the economic dynamic of the province in which the bank operates<sup>9</sup>. The added value pro-capite is one of the most common macroeconomic indicator of the economic activity. The sign of this variable is uncertain. In richer area banks should face less risks since the higher level of the demand lead productivity factors to be better utilised and firm's efficiency to increase. This should reduce the risk of insolvency and bankruptcy of banks. However, in a phase of expansion it is also possible to face over-optimism by banks on the borrower's ability to repay loans. Their lower attention in evaluating the effective risks of firms can increase the bank's insolvency probability.

To account for competition, the share of branches per type of bank is taken as a proxy. The higher is the share of branches the higher is the monopoly power of that bank in the province. The monopoly reduces the behaviour towards risks. According to Barth et al. (1999) and Goodhart (2004), the presence of cooperative banks has a negative impact on the financial system since they are non-profit maximising banks and their level of competition in the market is low. On the contrary, Rajan (1994) and Hansman (1996) underline the positive impact of cooperative banks since they usually adopt safer strategies. The impact on the Z-score is not clear, in particular for cooperative banks.

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<sup>7</sup> As reported in Table 3, CCBs showed no statistically significant difference in the Z-score mean compared to BPs.

<sup>8</sup> This dummy takes into account also changes over time—i.e., a previous independent bank that joined a banking group in the analyzed period.

<sup>9</sup> Here the province refers to the area where the headquarter of the bank is settled. Unfortunately, while this measure is quite appropriate for local banks, it might be biased for bank's groups, which operate in provinces others than those where they have their headquarters.

The financial turmoil started in 2007 has particularly affected real estate. The link between the real estate industry and the banking system seems to be at the base of the instability and of the increase in the insolvency ratio of many banks. Italian CCBs have suffered for the crisis in the real estate sector due to their investment in real estate before 2007. The share of real estate firms in the province can give an idea of the composition of the economic environment in which banks operate and it clarifies whether the higher relevance of real estate has affected the performance of banks. The share of cooperative enterprises has been introduced among demand side variables to check for a different behaviour of cooperative banks compared to others. Usually cooperative banks tend to finance cooperative firms more than other intermediaries. Cooperative firms are non profit maximising firms and they are expected to follow less risky strategies. Their presence might enrich the area. However, their growth follows an anti-cyclical trend and it could be argued that their higher share could be a signal of a non profitable and stable economic area. Finally, for the POLS estimation, dummies have been introduced to control for the five macro geographic areas, while in both models dummies are used to measure the crisis impact per phases (see Table 4).

The estimated equations are

POLS estimation

$$\ln\_z_{bt} = c + \sum_{b=1}^B \beta_n X_{b,t} + \sum_{b=1}^B \delta_n D_b + \sum_{p=1}^P \beta_z E_{p,t} + \sum_{a=1}^5 \delta_g D_a + \delta_6 crisisphase_1 + \delta_7 crisisphase_2 + \mu_{b,t}$$

GMM Arellano Bond

$$\ln\_z_{bt} = c + \ln\_z_{b,t-1} + \sum_{b=1}^B \beta_n X_{b,t} + \sum_{p=1}^P \beta_z E_{p,t} + \delta_6 crisisphase_1 + \delta_7 crisisphase_2 + \mu_{b,t}$$

Where  $\ln\_z_{it}$  is the measure of the each bank's stability at time t, with  $b=1 \dots B$  refers to each bank, c is the constant variable,  $X_{bt}$  are the bank specific variables while  $E_{pt}$  groups the province economic variables.  $D_b$ ,  $D_t$  and  $D_a$  are the dummies describing respectively the banks' classification, years and area where the banks' are located. In the Arellano Bond specification the lagged variable for the Z-score has been introduced, while the estimator omits time invariant variables. Finally,  $\mu_{bt}$  is the idiosyncratic error. The pair wise correlation among variables is shown in Table 5.

## 5. Results

Table 6 summarizes the POLS results, while Table 7 reports the findings of the GMM models. In the first four columns of Table 5 (models (a) (b) (c) and (d)), the models include only the banks' specific variables, while the other specifications add the demand side controls ((e) (f) (g) and (h)). In order to verify the different behavior of banks, the four different classifications have been used: (i) institutional classification; (ii) the ownership division between cooperatives versus non-cooperatives; (iii) the *de facto* local versus non-local banks; (iv) the five biggest banking groups specification. The stability of banks is inversely related with their size in line with Cioli and Giannozzi (2013) findings; underlining how smaller banks take less risks than larger ones. Seen from an opposite point of view, larger banks have a more destabilizing impact on the banking industry, supporting the *too big to save* hypothesis (Bronzetti, 2011). The sign of the efficiency variable gives support to the hypothesis that less efficient banks take more risks worsening their Z-score indicator. A higher level of diversification increases the instability of the bank. This result could be related with the detachment of certain banks from their business core. The liberalization process might have given a boost in this direction. As underlined by Chiaramonte et al. (2015) the weak knowledge related with the geographical and economic area could be at the origins of a riskier behavior by managers who want to try to enlarge the business model of the bank.

The crisis has impacted negatively on the banking industry stability. While during the financial crisis the insolvency probability increases by 7 per cent, in the second phase, the so called economic crisis, the instability grows by 20 per cent. Not the breaking out of the crisis, but its persistence seems to be one of the most dangerous destabilizing elements for the Italian banking industry. Furthermore, the estimations run confirm the negative impact of banks under commissioners for the stability.

The previous results are robust to the inclusion of demand side variables. Once those variables are introduced, it is possible to add to the list of the stabilizing variables the share of cooperative firms in the province and the value added pro capite. In particular, the richness of the area remarkably helps in improving the stability of the banking industry. The same is true for the presence of cooperative firms, even though the magnitude is lower. Cooperative firms are non-for-profit firms, which might guarantee a less risky economic environment. On the contrary, a higher share of real estate firms is negatively linked with the stability of banks confirming how real estate has been a critical element in the spread over of the crisis causing troubles for the financial intermediaries because of their difficulties in paying back loans.

The core of the analysis is to investigate the effect of the bank's typology on the insolvency risk. Once the institutional classification is used, *Banche Popolari* are the only type of banks, classified according to their institutional nature, that show a significant coefficient. This is in line with the

findings described in Section 4 regarding the evolution of the Z-score during the overall period. *Banche Popolari* have a positive relation with the insolvency indicator, while CCBs' coefficients is not significant. However, since the t-test shows no relevant difference in the mean of CCBs and *Banche Popolari*, once the cooperative dummy is taken into account, the analysis reports a positive relation with stability. These results are partially in line with those of Filotto (2013) and Chiaramonte et al. (2015). Filotto reports a significant and positive coefficient for CCBs only in 2011, Chiaramonte et al. find that cooperative banks have a stabilizing power only during crisis and above a certain share of market power. A similar result occurs when local banks are considered even though the coefficient is never significant. Analyzing then the impact of the banks part of the five largest banking groups, the negative and statistically significant sign confirm how banks belonging to smaller banking group have a stabilizing impact on the economic environment. To sum up, localism and members' ownership seem to play an important role in the stabilization of the banking industry. Furthermore, the traditional classification might not be enough to disentangle peculiar behaviors that join banks usually set in different groups.

The POLS estimator allows dummies variables to control for banks' features. However, the econometric analysis might be improved thanks to the use of a GMM Arellano Bond estimator. Table 6 shows the results of the model, which includes the bank specific variable, the demand side regressor, and the lagged value of the Z-score to describe a time dependency pattern. Since the classification dummies would be omitted, the idea is to study the different behavior of banks running different regressions for each type of banks previously analyzed.

The GMM and the POLS estimators return similar results for the bank specific variables, once the analysis is performed on the overall dataset. However, the sign and the significance of coefficients are in some cases different among bank's types.

A common result is that the stability of banks increases with smaller dimensions, while it worsens for less efficient intermediaries. Regardless the nature of the bank and against the forecast, the higher is the credit risk taken the higher is the Z-score value. A higher share of net loans on total assets increases the profitability of banks. These profits are more related with the traditional banking activities in which financial intermediaries have a deeper know-how.

Comparing results related with the diversification coefficients, it emerges how for CCBs, for local banks and for cooperative banks values are significant and positive. For these banks it is important to diversify their business from the interest rate margins in order to increase their profitability and to reduce the insolvency risks.

While the first phase of the crisis is not relevant, banks have generally worsened their Z-score during the economic phase. This period has been more impacting for commercial and for banks part

of the largest groups, while for CCBs, cooperative banks and local bank even this second phase has relative low impact on their stability.

Analyzing the linkages with the demand side variables, many other differences emerge. A higher presence of cooperative banks' branches improves the stability of commercial banks. A higher presence of commercial banks' branches improves the stability of CCBs, cooperative and local banks. It could be argue that the presence of a more variegate system –i.e., the presence of branches of other type of banks, is healthier for the banking industry. Cooperative banks and local banks report a negative relation with the share of cooperative firms in the province, while banks in the five largest group have a positive coefficient. The presence of cooperative firms weaken the stability of banks which use the relationship lending as technique, possible because these intermediaries have less tools to assess the creditworthiness of cooperatives. Considering the share of real estate firms, only banks in the largest groups show a significant and negative coefficient. Finally, the economic performance of the area is important for those banks more rooted in the area than for banks which branches are spread over the entire country—i.e. commercial banks and banks in the five largest groups.

## 6. Conclusions

The paper aims to detach peculiarities in the risky attitude of Italian banks related with their nature and at understanding the impact of banks specific and demand side variables on their risky profiles. As a first result, while banks specific variables impact similarly towards banks' groups, more differences emerge once demand side variables are considered, related to local economy aspects. The insolvency raises with larger size of banks and with lower level of efficiency, regardless the type of banks considered. The diversification of the business is more powerful for local and cooperative banks usually not focused on the intermediation margins. In a period where loans are not so remunerative and deposits are costly, the search for more profitable business can be beneficial for these banks, at least until their resources are able to manage the risk taken. According to the analysis performed, in the second phase of the turmoil, banks have become riskier.

More differences emerge relatively to the demand side variables. *Banche Popolari* can be considered the most peculiar case. For them the level of insolvency is related with bank's specific elements, while the economic environment does not seem to play a role. The same is true for commercial banks. In this aspect, *Banche popolari* and commercial banks are similar and *Banche popolari* differs from CCBs, for which variables related with the local environment increase stability. Moreover, cooperative and local banks react differently compared to commercial banks to the external inputs, while they are quite similar in managing the internal variables. In particular, the



level of the competition impacts in the opposite direction for these banks. In a sense, it seems that the heterogeneity in a province, measured by the higher presence of the other type of bank's branches—i.e., cooperative branches for commercial banks and viceversa, has a stabilizing effect. Cooperative and local banks take an important benefice (measured by the magnitude of the coefficient) from an higher presence of commercial banks' branches, while the competition inside the same type of banks is not significant. This result gives support to the critiques move at the cooperative system related with the intra-group competition. It also underlines the importance of a non-homologation of the economic environment. Banks with different goals and strategy that work in the same area increase the health of the economic environment. Finally, CCBs, cooperative, and local banks are dependent on the economic performance of the area, while commercial banks and banks in the five largest group, having a larger structure and a network of branches more spread over are not related with local added value. In this sense, the reform of the CCBs and the creation of a larger group could help those banks suffering because their business area is poorer.

The hypothesis of a different behavior related with different grouping of banks is partially verified. In particular, *Banche popolari* seems to be closer to commercial banks in some aspect, while local banks are similar to CCBs. The classification based on the institutional features is not the only relevant one. More differences can be found when either the ownership classification or the *de facto* operating pattern of the banks is taken into account. Bank's diversity is a great resource for the banking industries. It is important to preserve the peculiarities of each typology since their behavior can compensate each other and enforce the entire industry. To conclude, it is not the gay coat that makes the gentlemen.

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## Appendix

### *The Z-score measure*

In this paper, the Z-score is directly related to the probability of bank's insolvency—i.e. the probability that the value of the assets is lower than the value of the debt. It describes the relation between the size and the risk of insolvency: an high value of the Z-score is associated to a low probability of insolvency.

In line with most of existing literature the Z-score is defined as

$$z \equiv \frac{k + \mu}{\sigma}$$

where  $k$  is capital asset ratio—i.e. the percent of equity used to finance the bank's assets, computed as  $k = E/A$ . If  $\pi$  are the profits,  $ROA = \pi/A$  indicates the return of assets.

Hannah and Hanweck (1988) and Boyd et al. (1993) pointed out that if  $ROA$  is a random variable with finite mean  $\mu_{ROA}$  and variance  $\sigma^2_{ROA}$  than is possible to apply the Chebyshev inequality according to which if the stochastic variable  $X$  has an expected value  $\mu$  and variance  $\sigma^2$ , with positive and real  $\lambda$ , than the probability that  $X$  assumes value between  $\mu - \lambda\sigma$  and  $\mu + \lambda\sigma$  is greater than  $1 - 1/\lambda^2$ :

$$Pr(\mu - \lambda\sigma \leq X \leq \mu + \lambda\sigma) \geq 1 - 1/\lambda^2$$

This allows to consider the risk of insolvency as the probability that the losses are greater than equity,  $P(\pi \leq -E)$ . However, the probability of insolvency can be express as  $P(ROA \leq -K)$ , where  $K = E/A$ . Thus:

$$P(\pi \leq -E) = P(r \leq -K)$$

In his paper A. D. Roy (1952) proved that if the expected value  $\mu$  and the variance  $\sigma^2$  exist, then the Chebyshev inequality implies:

$$P(r \leq -K) \leq \frac{\sigma^2}{(\mu + K)^2} = \frac{1}{z^2}$$

Therefore, it is possible to consider the Z-score as an indicator able to set profitability, leverage and average return volatility through this formula:

$$Z \equiv \frac{\mu + \frac{E}{A}}{\sigma} = \frac{ROAA + \frac{E}{A}}{\sigma_{ROAA}}$$

Under the assumption of normal return,  $z$  can be the estimator of the probability of insolvency if:

$$P(r \leq -K) = \int_{-\infty}^z N(0,1) dr$$

The Z-score index represents the number of standard deviation for bank profitability beyond which the bank assets are destroyed. It is positively affect by the growth of ROA and of the equity assets ratio, while it is negatively related with the volatility of returns. The Z-score is an index able to measure the bank financial stability level: the greater is the Z-score the lower is the probability of bank insolvency.

Table 1

## Geographical distribution of banks by types

	CCBs	Banche Popolari	Commercial banks	Saving banks	Total
<b>CENTRE</b>	<b>75</b>	<b>9</b>	<b>11</b>	<b>14</b>	<b>109</b>
LAZIO	23	4	4	3	34
MARCHE	20	1	2	4	27
TOSCANA	29	3	5	5	42
UMBRIA	3	1	0	2	6
<b>ISLANDS</b>	<b>25</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>33</b>
SARDEGNA	2	0	3	0	5
SICILIA	23	4	1	0	28
<b>NORTH-EAST</b>	<b>158</b>	<b>13</b>	<b>14</b>	<b>11</b>	<b>196</b>
ALTO ADIGE	47	1	0	1	49
EMILIA ROMAGNA	21	5	8	7	41
FRIULI V. G.	15	2	1	1	19
TRENTINO	43	0	2	0	45
VENETO	32	5	3	2	42
<b>NORTH-WEST</b>	<b>51</b>	<b>7</b>	<b>17</b>	<b>8</b>	<b>83</b>
LIGURIA	0	0	3	2	5
LOMBARDIA	42	7	10	0	59
PIEMONTE	8	0	4	6	18
VALLED'AOSTA	1	0	0	0	1
<b>SOUTH</b>	<b>66</b>	<b>10</b>	<b>9</b>	<b>3</b>	<b>88</b>
ABRUZZO	8	0	0	3	11
BASILICATA	4	0	0	0	4
CALABRIA	10	1	1	0	12
CAMPANIA	20	5	6	0	31
MOLISE	1	1	0	0	2
PUGLIA	23	3	2	0	28
<b>TOTAL</b>	<b>375</b>	<b>43</b>	<b>55</b>	<b>36</b>	<b>509</b>

Source: Bankscope

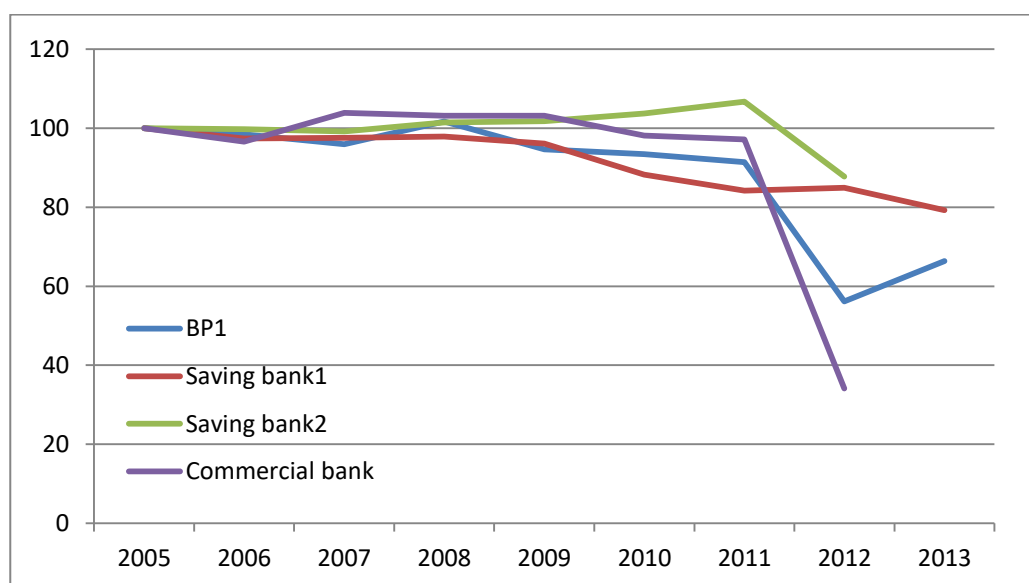
Table 2

Z-score (logaritm)	BCC	Banche Popolari	Commercial Banks	Saving banks
2005-2013	3,334	3,374	2,835	2,895
2005-2007	3,447	3,370	2,940	3,001
2008-2010	3,343	3,424	2,909	2,888
2011-2013	3,214	3,319	2,694	2,794
<b>ROAA</b>				
2005-2013	0,526	0,332	0,264	0,487
2005-2007	0,883	0,685	1,005	0,809
2008-2010	0,470	0,391	0,190	0,513
2011-2013	0,234	-0,019	-0,195	0,129
<b>ROAA (coefficient of variation)</b>				
2005-2013	1,806	0,966	0,253	0,064
2005-2007	0,676	0,663	1,410	0,384
2008-2010	1,341	1,346	0,378	1,016
2011-2013	3,400	4,906	1,791	1,208
<b>Capital asset ratio</b>				
2005-2013	11,963	10,251	11,459	8,346
2005-2007	12,783	10,463	10,642	8,813
2008-2010	12,138	10,694	13,643	8,238
2011-2013	10,992	9,611	9,992	7,985
<b>ST dev ROAA</b>				
2005-2013	0,673	0,639	1,968	0,633
2005-2007	0,603	0,455	1,550	0,309
2008-2010	0,492	0,428	1,961	0,456
2011-2013	0,661	0,727	1,628	0,736

Source: Bankscope

Figure 1

The Z-score dynamic for banks under commissioners by banks' type  
(Growth rate, base year 2005)

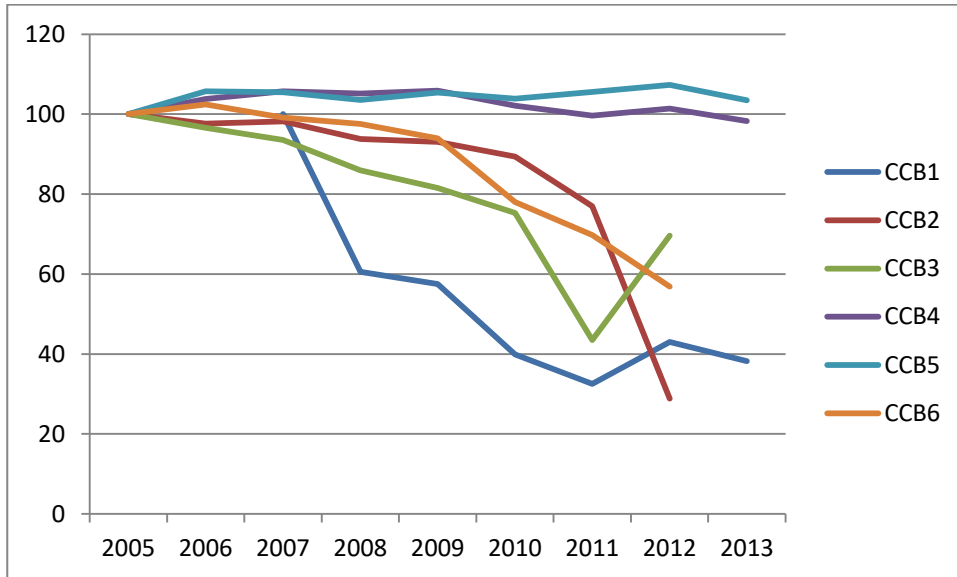


Source: Bankscope

Note: Banks with less than three years measures has been deleted.

Figure 2

The Z-score dynamic for banks under commissioners by banks' type  
(Growth rate, base year 2005)

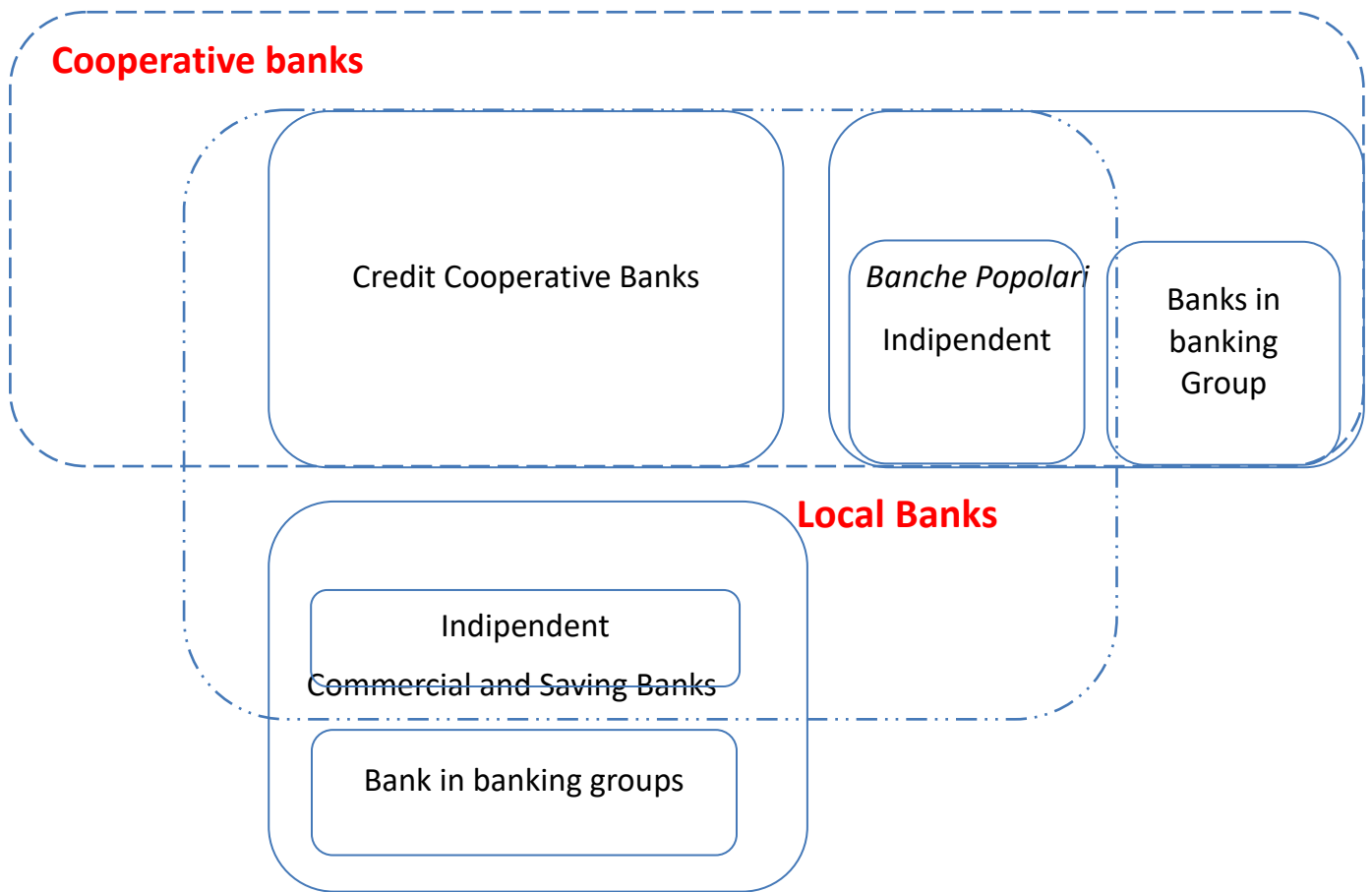


Source: Bankscope



Figure 3

Banks classification



	Number of banks			Cooperative Banks			Local Banks			Banks in the five largest groups		
	CBs	Bps	BCCs	CBs	Bps	CCBs	CBs	Bps	CCBs	CBs	Bps	CCBs
2005	91	43	375	0	43	375	56	26	375	17	1	0
2006	91	43	375	0	43	375	53	26	375	18	1	0
2007	91	43	375	0	43	375	48	24	375	22	2	0
2008	91	43	375	0	43	375	44	24	375	22	2	0
2009	91	43	375	0	43	375	43	23	375	22	2	0
2010	91	43	375	0	43	375	42	23	375	22	2	0
2011	91	43	375	0	43	375	42	23	375	21	2	0
2012	91	43	375	0	43	375	39	23	375	21	2	0
2013	91	43	375	0	43	375	39	23	375	21	2	0

Table 3

## T- test on Z-score means by Bank's typologies

		<b>Obs</b>	<b>Mean</b>		<b>Coefficient of variation (%)</b>	
Comparison between each bank's type and the full sample	Commercial	710	2.893	Ha: difference not equal to 0	27.9	
	Others	3606	3.337		19.3	
	CCBs	3274	3.334	Ha: difference not equal to 0	18.8	
	Others	1042	3.046		27.2	
	BPs	332	3.374	Ha: difference not equal to 0	23.2	
	Others	3984	3.255		21.0	
	Cooperatives	3606	3.338	Ha: difference not equal to 0	19.3	
	Others	710	2.893		27.9	
	Local	3767	3.316	Ha: difference not equal to 0	19.9	
	Others	549	2.908		27.4	
	Big groups	199	2.616	Ha: difference not equal to 0	23.7	
	Others	4117	3.296		20.7	
	Comparison between subgroups of banks	CCBs	3274	3.334	Ha: difference not equal to 0	
		Other local banks	628	3.047		
Local BPs		171	3.344	H0: difference not significant		
Other local banks		3731	3.285			
Local Commercial		322	3.123	Ha: difference not equal to 0		
Other local banks		3580	3.302			
CCBs		3274	3.334	H0: difference not significant		
Other cooperative banks		332	3.374			
Big groups	188	2.577	Ha: difference not equal to 0			
Other banks in banking groups	361	3.081				

Table 4

## Explanatory variables and predicted signs

	Variable	Measure	Expected Sign
Bank specific variables	Size	Natural Logarithm of Total assets	Positive/negative
	Liquidity	Net loans and deposits/short term funding	Negative
	Credit risk Exposure	Net loans/total assets	Negative
	Efficiency	Costs/Net income	Positive/negative
	Diversification	Non-interest income/gross revenues	Positive/negative
Demand side variables	Economic activity	Added value pro capite	Positive/negative
	Competition	Share of branches per type of banks	Positive/negative
	Composition of the local economy	Real estate firms' share	Negative
		Cooperative firms' share	Positive/negative
	Crisis Phase 1	Equal to 1 if years are in between 2008 and 2010	Negative
Crisis Phase 2	Equal to 1 if years are in between 2011 and 2013	Negative	

Table 5

Z_score	1															
Size	-0.2696*	1														
Liquidity	0.0227	0.1350*	1													
Credit risk	-0.0564*	0.2590*	0.7735*	1												
Efficiency	-0.0644*	-0.2293*	-0.0852*	-0.1286*	1											
Diversification	-0.2068*	0.3551*	-0.1326*	-0.0457*	-0.1093*	1										
Share of CCBs branches	0.2860*	-0.2510*	0.2462*	0.1981*	-0.0383*	-0.1697*	1									
Share of CBs branches	-0.1989*	0.1559*	-0.1342*	-0.1180*	0.0149	0.0704*	-0.7877*	1								
Banks under commisioners	-0.1651*	0.0360*	0.0106	0.0197	0.0262	-0.0090	-0.0631*	0.0596*	1							
Share of cooperative firms	0.1513*	-0.2899*	-0.4254*	-0.4298*	0.0594*	-0.1776*	0.0143	-0.0214	-0.0200	1						
Share of real estate firms	-0.1196*	0.3277*	0.1063*	0.1538*	-0.0195	0.2294*	-0.1379*	-0.0415*	-0.0572*	-0.3627*	1					
Pro-capite added value	0.0624*	0.2369*	0.3987*	0.4135*	-0.0710*	0.1170*	0.3909*	-0.4211*	-0.0948*	-0.4908*	0.6693*	1				
Crisis Phase1	0.0175	0.0034	0.2571*	0.1275*	0.0854*	-0.1674*	-0.0032	0.0959*	-0.0000	-0.0264	0.0220	0.0085	1			
Crisis Phase 2	-0.1202*	0.0749*	-0.3893*	-0.1086*	-0.0425*	0.1641*	0.0284	-0.2130*	-0.0000	0.1067*	0.0809*	0.0515*	-0.5000*	1		
CCBs	0.1776*	-0.6373*	0.0524*	-0.0900*	0.0369*	-0.3339*	0.3157*	-0.2614*	-0.0835*	0.0891*	-0.0938*	0.0053	0.0000	0.0000	1	
BPs	0.0456*	0.3218*	0.0229	0.0943*	-0.0307*	0.1286*	-0.1727*	0.0465*	0.0459*	-0.0182	-0.0517*	-0.0907*	-0.0000	-0.0000	-0.5082*	1
CBs	-0.2378*	0.5042*	-0.0769*	0.0362*	-0.0205	0.2930*	-0.2379*	0.2667*	0.0627*	-0.0892*	0.1453*	0.0598*	0.0000	0.0000	-0.7805*	-0.1417*

Significance level: .05\*

Table 6

	Insolvency Risk (ln_z-score)							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Size	-.115***	-.074***	-.091***	-.074***	-.102***	-.058**	-.064***	-.056***
Liquidity	-.0004	-.001	-.0004	-.001	-.001	-.001	-.001	-.001*
Credit risks	-.004	-.003	-.004	-.002	-.004	-.003	-.003	.002
Efficiency	-.004***	-.004***	-.004***	-.004***	-.004***	-.004***	-.004***	-.004***
Diversification	-.008***	-.007***	-.008***	-.008***	-.005*	-.003	-.004*	-.004*
Crisis Phase 1	-.061***	-.063***	-.065***	-.068***	-.061***	-.059***	-.059***	-.066***
Crisis Phase 2	-.176***	-.198***	-.181***	-.200***	-.211***	-.238***	-.238***	-.250***
Banks under commissioners	-.671***	-.661***	-.681***	-.711***	-.635***	-.627***	-.663***	-.689***
CCBs	.041				.083			
Banche Popolari	.485***				.562***			
Cooperative banks		.185**				.235***		
Local Banks			.029				.141	
5 biggest group				-.361***				-.416***
Geographic area dummies	yes	yes	yes	yes	yes	yes	yes	yes
Share of CCBs branches					.568**	.323	.252	.390
Share of commercial banks' branches					.231	.070	-.062	.014
Share of cooperative firms					.172***	.182***	.173**	.185***
Share of real estate firms					-.020*	-.028***	-.027**	-.024**
Pro-capite added value					.674***	.708***	.675***	.608**
Constant	5.575	4.896	5.339	5.034	7.809	7.533	7.679	7.242
R-squared	.193	.171	.165	.174	.247	.223	.214	.225
Observation	4307	4307	4307	4307	3800	3800	3800	3800

Significance level: .01 \*\*\*, .05\*\*, .1\*  
Error terms have been clustered by banks

Table 7

	All (a)	CCBs (b)	Banche popolari (c)	Commercial Banks (d)	Cooperative Banks (e)	Local Banks (f)	Big Groups (g)
<b>Insolvency Risks</b>							
Lag of insolvency risk	.170**	.262***	-.116	.158	.229***	.151	.153
Size	-.346***	-.302***	-.219*	-.378***	-.305***	-.398***	-.117
Liquidity	.0001	.0003	-.0005	.001	.0002	.0001	.001
Credit risks	.003***	.002**	.009**	.005**	.002***	.003***	.005
Efficiency	-.002***	-.002***	-.006***	-.004***	-.002***	-.002***	-.006***
Diversification	.001***	.002***	-.002	-.0002	.002***	.002***	.004
Crisis Phase 1	-.001	-.006	-.015	-.034	-.003	.010	-.032
Crisis Phase 2	-.038***	-.027*	-.090*	-.131***	-.026*	-.013	-.173**
Share of CCBs branches	-.111	-.351	-1.141	2.517*	-.549	-.403	2.287
Share of commercial banks' branches	.137**	.161***	.077	-.131	.173***	.195***	-.530
Share of cooperative firms	-.039	-.076**	.206	.167	-.080**	-.060	.452*
Share of real estate firms	-.009*	-.003	-.004	-.021	-.004	-.011*	-.042**
Pro-capite added value	.182**	.254***	-.253	-.051	.203***	.232***	.129
Observations	2789	2160	207	422	2367	2510	139

Significance level: .01 \*\*\*, .05\*\*, .1\*  
Error terms robust for heteroskedasticity