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AUTHOR

MATTEO ALESSI
Federcasse and University of Rome Tor Vergata
malessi@federcasse.bcc.it

STEFANO DI COLLI
Federcasse and John Cabot University
sdicolli@federcasse.bcc.it

JUAN SERGIO LOPEZ
Federcasse, Rome
jlopez@federcasse.bcc.it

Loan Loss Provisioning and Relationship Banking in Italy: Practices and Empirical Evidence

ABSTRACT

A panel of Italian banks for the period 2006-2012 is used in this paper to examine LLP main determinants. Our analysis also focuses on the determinants of the sub-components of LLP, i.e. provisions associated to Bad Loans and Impaired Loans and Bad Loans and Impaired Loans Coverage Ratio. A specific analysis for cooperative credit banks is provided. We find that Loan Loss provisioning for Italian banks seems to be driven principally by non-discretionary behavior. Economic fluctuations, according to our results, do not play a significant role, nor do signaling and income smoothing. Provisioning strategies for cooperative credit banks also seem to be affected by collateralized loans.

KEY-WORDS

LOAN LOSS PROVISIONS; BANK LENDING; FINANCIAL SYSTEM CYCLICALITY

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1. Introduction

During the past five years, the Italian economy has fallen into one of the deepest recessions of the post-war period. The Italian banking system was obviously affected by this crisis. Bad loans have started to pile up. Increasing bad loans have a double effect: they reduce revenues and increase provisions (which further reduce revenues). As pointed out by Balla *et al*. (2012) "loan loss provisions have a significant effect on earnings and regulatory capital. Because loan loss provisions are at the discretion of bank managers, there is the potential for banks to provision more or less than necessary as a way to smooth their income".

In principle, loan loss provisions (LLP) must be used to cover expected losses; however, due to the discretionary behavior of bank managers, they can become an important tool to pursue goals that are different from a fair representation of the expected evolution of a bank's loan losses. In a situation characterized by an ample fluctuation of the business cycle, provisioning policy can be used to stabilize earnings and dividends.

For example, just recently the Bank of Italy has put pressure on the banking industry to correctly evaluate the viability of loans and to adequately provide for the increasing credit risk[1]. Indeed, data on credit provisioning show a non-homogeneous picture. The coverage ratio (the ratio of loan loss reserves to total bad loans - Table 1) appears quite different between types of banks.

Table 1. Loan quality: ratio of performing loans and non-performing loans to total lending and coverage ratios - December 2012

	Top 5 groups		***Large banks***		***Small banks***		***Minor banks***		***Financial companies***		***Total banking industry***	
	Compos. (%)	***Cover Ratio***	***Compos. (%)***	***Cover Ratio***	***Compos (%)***	***Cover Ratio***	***Compos. (%)***	***Cover Ratio***	***Compos. (%)***	***Cover Ratio***	***Compos. (%)***	***Cover Ratio***
Customer loans	100	6,3	100	4,7	100	5,9	100	4,1	100	6,6	100	5,7
of which												
- performing	86,0	0,6	88,5	0,5	85,6	0,6	86,2	0,5	86,2	1,3	86,6	0,6
- non performing	14,0	41,1	11,5	36,7	14,4	37,8	13,8	27,2	13,8	40,2	13,4	38,8
- bad debts	7,7	56,1	6,1	52,2	7,4	56,0	6,1	46,1	8,1	55,1	7,2	54,6
- substandard	4,1	25,2	3,7	23,1	4,7	22,7	5,8	14,1	3,8	22,2	4,2	23,2
- restructured	1,2	24,0	0,6	17,0	0,5	15,7	0,4	16,1	0,2	10,0	1,0	22,4
- past due	1,0	10,8	1,1	7,5	1,9	10,1	1,6	4,1	1,7	13,4	1,1	9,4
Memorandum item: customer loans	1.344.548		487.923		137.323		186.948		71.286		2.218.028	

Source: Bank of Italy: "Financial Stability Report n. 5"

Prior theoretical and empirical research suggests three central reasons to explain managerial discretionary behavior: income smoothing, signaling and capital regulation. These motives, together with non-discretionary components and economic fluctuation, contribute to explaining provisioning policy.

A further aspect that may affect provisioning policy is the transactional or relationship approach to clients. As pointed out by Dewenter and Hess (2003), these two approaches may yield different outcomes

[1] "*Il ciclo economico impone alle banche rischi creditizi elevati, da fronteggiare con riserve patrimoniali. La Banca d'Italia sta conducendo verifiche sull'adeguatezza delle rettifiche di valore effettuate da un ampio numero di gruppi bancari grandi e medi. Ove necessarie, sono richieste azioni correttive*". Speech given by F. Panetta Vice General Manager of Bank of Italy, Perugia, March 23rd 2013.

when banks evaluate doubtful loans: relationship banks may have better information on customers than transactional banks and therefore less risky loans (or higher recovery rates); on the other hand relationship banks may have a stronger incentive to "evergreen" loans compared to transactional banks. In both cases a relationship bank would show a lower LLP even though in the first case it is a correct evaluation of the expected loss, while in the second case it is a managerial discretionary behavior.

Based on a panel of more than 400 Italian banks for the period 2006-2012, we examine LLP main determinants. Our analysis also focuses on the determinants of the sub-components of LLP, i.e. provisions associated to Bad Loans and Impaired Loans. Along with the standard explanatory variables commonly used in empirical literature, we also analyze the effect of guaranteed loans on the non-discretionary component. A bank with a higher stock of collateralized loans can, in principle, reduce expected future losses and consequently affect LLP decision-making process. In this paper we also try to model two particular indicators: Bad Loans and Impaired Loans Coverage Ratios. We extend our analysis to these two indicators due to their crucial significance on bank's report activity and strategic planning.

The main findings of this analysis are as follows. First, Loan Loss provisioning for Italian banks seems to be driven principally by non-discretionary behavior. Expectations about future losses and credit risk perception appear to be relevant components for determining LLP. According to our results, neither the economic fluctuations nor signaling or income smoothing hypothesis play a significant role. The non-discretionary component is also significant for cooperative banks. Provisioning strategies for this particular category of banks seem to be affected by collateralized loans as well. We find a negative relationship between provisions and total guaranteed loans. This factor could explain the lower level of provisions and Coverage Ratios experienced during the past years by Cooperative Credit Banks (CCBs) with respect to other categories of banks[2].

The paper is organized as follows. Section 2 reviews the literature on bank's Loan Loss Provisions determinants. Section 3 reports the empirical methodology. Section 4 presents data and empirical estimates for the Italian banking system and for the sub sample of cooperative credit banks. Concluding remarks are presented in the final section.

2. Literature review

A recent strand of literature has focused on how provisions contribute to the procyclicality of financial systems by being lower when output and credit are expanding and higher in periods of contraction. Bank lending behavior is generally affected by a strong relationship with the economic cycle. There is a large body of literature which provides evidence in favor of this phenomenon. Asea and Blomberg (1998), using U.S. data from 1977 to 1993, show that bank lending evolves cyclically, affecting aggregate economic activity. The same conclusions are reached by Gambacorta and Mistrulli (2004), Gambacorta (2005), Di Giulio (2009), Di Colli and Girardi (2010) for the Italian banking system. Bikker (2004), considering a panel dataset with 26 OECD countries over the period 1979-1999, finds that lending is strongly dependent on demand factors, measured by cyclical variables such as real GDP growth, inflation, unemployment and real money supply. In addition, Peek *et al.* (2003) and Lown and Morgan (2006) clearly identify the effects of loan supply on fluctuations in credit and GDP which supports the existence of the bank lending

[2] The higher level of collateralized loans may be due to the fact that CCB clients are mainly small and micro enterprises, typically riskier borrowers than large enterprises, households and the public sector.

channel. These studies are in line with empirical findings related to the 1990-1992 "credit crunch" in the United States. Bernanke and Lown (1991) find a positive correlation between loan growth and changes in bank capital during 1990-1991 while Hancock and Wilcox (1998) and Peek and Rosengren (1995) detect a positive effect of bank capital requirement on credit growth during the same period. Brinkmann and Horvitz (1995) also find a positive effect on loan growth, but only for large banks. Wagster (1999) shows that stricter supervision, which occurred during the period 1990-1992 in Canada, UK and the USA, implies that less credits were extended to lower-risk investments such as government bonds.

Focusing on the impact of monetary policy, the point is that banks could react to changes in monetary policy in a different way. As a consequence, changes in the money market rate affect the cost of funding but this has a limited effect on lending when banks can easily raise non-deposit funding or when banks own a buffer of liquid assets. Kashyap and Stein (1995) findings are consistent with the bank lending channel view showing that loan growth of large banks and small banks respond differently to a monetary policy shock. Other studies in this field demonstrate that the impact of the bank lending channel in the US banking system is also greater for banks with less liquid assets and less capital (Kashyap and Stein, 2000; Kishan and Opiela, 2000). The bank lending view is also relevant for European banks (Altunbas *et al.*, 2002; Ehrmann *et al.*, 2003) but with less conclusive results. Theoretical investigations (Chami and Cosimano, 2001; Zicchino, 2005; Furfine, 2001) also emphasize the role of macroeconomic conditions and changes in banking regulation to explain the impact of capital requirements on bank lending.

Fluctuations in bank lending over the business cycle could also be explained by misevaluation of credit risk phenomena. In phases of economic boom, banks are inclined to take on greater risks. By contrast, banks are excessively pessimistic during cyclical downturns if they overstate credit risk. Disaster myopia (Guttentag and Herring, 1984, 1986), herd behavior (Rajan, 1994) and the institutional memory hypothesis (Berger and Udell, 2002) account for misevaluation of credit risk. Caporale *et al.* (2013) demonstrate that a bad loans surplus (more bad loans than could be explained by macroeconomic and financial determinants) occurred during the 2008-2009 and 2011-2012 recessions in Italy. They also determine that bad loans surplus during the crisis is partially due to the lending policy adopted during economic good times.

Another issue in analyzing the relationship between loan behavior, economic cycle and the problem of misevaluation of credit risk is backward-looking provisioning systems. Beaver and Engel (1996) identify a non-discretionary component in loan loss provisions related to contemporaneous loans, while Laeven and Majnoni (2003) and Bikker and Metzemakers (2005) show that provisioning behavior, in particular the ratio of loan loss provisions to total loans, is related to the business cycle. Additional empirical evidence can be found for France (Clerc *et al.*, 2001), Austria (Arpa *et al.*, 2001), Spain (Fernandez de Lis *et al.*, 2001) and the United Kingdom (Pain, 2003). A time-lag can notably be stressed between riskier loans which are granted during the peak of the business cycle (Keeton, 1999; Jiménez and Saurina, 2006) and loan loss provisions which are built up only during the next downturn according to backward-looking rules (Caporale *et al.*, 2013). In particular, Jordan *et al.* (2002) emphasize that the cyclicality of loan loss provisions is also reflected in bank capital.

Loan loss provisions could also be affected by discretionary components. In this way, income smoothing is a specific way to manage earnings in firms and in banks. Income smoothing could be defined as a practice aiming at the reduction of variability of net profit over time. In other words, managers will increase (decrease) loan-loss provisions when earnings are high (low) in order to stabilize net-profit. In the banking field, bank managers might have significant incentives to adopt income smoothing procedures: adjusting a bank's current performance to a firm-specific mean (Collins *et al.*, 1995) or to the average performance of other benchmark-banks (Kanagaretnam *et al.*, 2005), allowing managers to grant a steady flow of dividends to bank stockholders, improving the risk perception that regulators have about the bank, maintaining the

stability of the bank's stock price by reducing earnings volatility. Other motivations behind adopting an income smoothing approach are to exploit the signaling power of a stable income (Ronen and Sadan, 1981) and reducing the perceived bankruptcy probability of the firm (Trueman and Titman, 1988). Managerial self-interest incentives could also lead to income smoothing, as well as stabilizing managers' compensation over time, and minimizing the probability of being fired (Fudenberg and Tirole, 1995). Furthermore, from the supervisory authority's point of view, regulators are interested in reducing banks' pro-cyclical behavior. In other words, banks are asked to increase loan loss reserves during good times, and to draw resources from these reserves when the economy slows down.

Finally, transactional and relationship banks may behave differently when facing the decision to make provisions for bad loans. Due to the strict relationship with their clients, relationship banks may have a stronger incentive to renegotiate or roll-over doubtful loans compared to transactional banks.

Remaining in the field of banking, there is a vast literature regarding the use of loan-loss provisions for income smoothing purposes. Greenwalt and Sinkey (1988) find that regional banks are more likely to be involved in income smoothing behavior, while Ma (1988) shows that U.S. commercial banks used loan-loss provisions to smooth earnings, finding no relationship between loan portfolio quality and loan-loss provisions. Collins *et al*. (1995) also find a positive relationship between earnings management and LLPs, thus supporting the notion that banks smooth income over time to a firm-specific mean. Bhat (1996) demonstrates that banks are more likely to be involved in income smoothing practices if they are small and in poor financial condition. More recently, Anandarajan *et al*. (2007) show that Australian commercial banks are engaged in earnings management practices, especially if they are publicly traded. Fonseca and González (2008), considering a cross-country dataset, find that the incentive to smooth earnings is positively related with developed and market-oriented financial systems but negatively related with banking systems characterized by higher levels of accounting disclosure, the existence of a supervisory framework, and by stricter restrictions on banking activities. Dewenter and Hess (2003) find that transactional and relationship banks differ in their loan loss provisioning and write off due to different incentives.

Finally, Curcio and Hasan (2013) explicitly examine the impact of loan loss provisions on bank lending. Shrieves and Dahl (2002) - analyzing the utilization of the discretionary accounting practice of Japanese banks during 1989-1996 - find a negative and significant relationship between loan loss provisions and year-on-year change in total loans. This result is consistent with the hypothesis that loan loss provisions influence credit cycles. However, to explicitly test the impact of loan loss provisions on the fluctuations of bank lending, the discretionary component and the non-discretionary component need to be distinguished. Indeed, the cyclical behavior of non-discretionary provisions should reinforce the cyclical nature of bank lending. On the contrary, the discretionary component, through the income smoothing behavior, may reduce the procyclicality of bank lending.

3. Methodology

The key objective of this analysis is to investigate the determinants of LLP and Coverage Ratios for the Italian banking system. Regarding LLPs, both empirical and theoretical literature suggest three main classes of factors which may explain loan loss provisioning: non-discretionary behavior, discretionary behavior and economic cycle. The non-discretionary component is related to expected losses and credit risk of a bank's portfolio. This factor, together with economic fluctuation, could be strongly cyclical. In order

to capture the effect of non-discretionary behaviors, we estimate five different models, each one with a different dependent variable. The first one is the ratio of Non-Performing Loans over Total Loans at the end of the period t ($NPLtot_{it}$). Our analysis aims to estimate not only the determinants of total LLP, but also the sub component (provisions on Bad Loans and Impaired Loans). So we also use the ratio of Bad Loans over Total Loans (BL_{it}) and Impaired Loans over Total Loans (IL_{it}) as dependent variables.

Together with these indicators, we also consider their first differences in a forward looking prospective ($\Delta_{t+1,t}\, NPLtot_{it} = NPLtot_{it+1} - NPLtot_{it}$; $\Delta_{t+1,t}\, IL_{it} = IL_{it+1} - IL_{it}$). In addition, we include the ratio of loans to total assets ($Loan_{it}$). The coefficients associated with these three sets of variables are expected to be positive, as these factors could be considered as proxies of expected potential losses and overall default risk. Another important feature that could influence credit risk (and future losses) is represented by guarantees on loans. Banks with a higher level of collateralized assets are expected to totally or partially recover the value of the investment in case of insolvency. According to this, a bank should exhibit a lower level of provisioning if there is a high percentage of collateralized loans in its credit portfolio. As indicators, we choose two different variables. The first one is the ratio of totally guaranteed loans to total loans($GUA1_{it}$). The second one is the ratio of guaranteed loans to total loans ($GUA2_{it}$)[3].

The second component of LLP, i.e. the discretionary one, is related to different management objectives. According to the "income smoothing theory", banks tend to decrease (increase) LLP when earnings are expected to be low (high). Following this approach, the sign associated to earnings could be positive or negative. If banks use provisions to smooth earnings, there should be a positive relationship. On the other hand, a negative sign should indicate pro-cyclicality. We use the ratio of earnings before interest, taxes and loan loss provision over total assets (ER_{it}) as a variable to test the income smoothing hypothesis.

Loan Loss provisions could also be used for "capital management" purposes. Banks with a lower level of capital can use provisions to build up a greater reserve buffer. To measure the effect of managing regulatory capital we compute the deviation of the Total Capital Ratio with respect to 8 per cent, divided by 8 per cent (CAP_{it}). A higher value of this indicator indicates a well-capitalized bank.

Banks can also use LLP to signal financial strength. We use the one-year-ahead percentage change of ER_{it} to test "signaling hypothesis" ($SIGN_{it} = \frac{ER_{it+1} - ER_{it}}{ER_{it}}$). We expect a positive correlation between $SIGN_{it}$ and our set of dependent variables.

Finally, the business cycle could affect borrower's ability to repay loans. Several empirical studies have found a negative and significant correlation between provisioning and (real) GDP growth. As a consequence of this, the percentage GDP growth is included in our analysis.

3.1. Model specification

We specify a set of equations in order to estimate the determinants of several endogenous variables related to provisioning. Equations (1) and (2) model the relationship between total LLP and the explanatory variables:

$$LLP_{it} = \alpha_0 + \beta_1 LLP_{it-1} + \beta_2 NPLtot_{it} + \beta_3 \Delta_{t+1,t}\, NPLtot_{it} + \beta_4 LOAN_{it} + \beta_5 GUA1_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (1)$$

$$LLP_{it} = \alpha_0 + \beta_1 LLP_{it-1} + \beta_2 NPLtot_{it} + \beta_3 \Delta_{t+1,t}\, NPLtot_{it} + \beta_4 LOAN_{it} + \beta_5 GUA2_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (2)$$

Since our analysis is interested in the impact of the collateralized loans on provisioning behavior, two equations with the two different variables are estimated separately.

To obtain a more comprehensive assessment, it can also be useful to model the sub components of loan

loss provisions, i.e. Loan Loss Provisions on Bad Loans (LLP_{it}^{BL}) and on Impaired Loans (LLP_{it}^{IL}) and their relative determinants:

$$LLP_{it}^{BL} = \alpha_0 + \beta_1 LLP_{it-1}^{BL} + \beta_2 BL_{it} + \beta_3 \Delta_{t+1,t} BL_{it} + \beta_4 LOAN_{it} + \beta_5 GUA1_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (3)$$

$$LLP_{it}^{BL} = \alpha_0 + \beta_1 LLP_{it-1}^{BL} + \beta_2 BL_{it} + \beta_3 \Delta_{t+1,t} BL_{it} + \beta_4 LOAN_{it} + \beta_5 GUA2_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (4)$$

where LLP_{it}^{BL} is the ratio of loan loss provisions on Bad Loans over Total Assets. We consider in the non-discretionary behavior part only the explanatory variables associated with the related provisions sub components, i.e BL_{it} and $\Delta_{t+1,t} BL_{it}$ in equations (3) and (4); IL_{it} and $\Delta_{t+1,t} IL_{it}$ in equations (5) and (6).

$$LLP_{it}^{IL} = \alpha_0 + \beta_1 LLP_{it-1}^{IL} + \beta_2 IL_{it} + \beta_3 \Delta_{t+1,t} IL_{it} + \beta_4 LOAN_{it} + \beta_5 GUA1_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (5)$$

$$LLP_{it}^{IL} = \alpha_0 + \beta_1 LLP_{it-1}^{IL} + \beta_2 IL_{it} + \beta_3 \Delta_{t+1,t} IL_{it} + \beta_4 LOAN_{it} + \beta_5 GUA2_{it} + \beta_6 ER_{it} + \beta_7 CAP_{it} + \beta_8 SIGN_{it} + \beta_9 dGDP_t + \varepsilon_{it} \quad (6)$$

Where LLP_{it}^{IL} is the ratio of loss provisions on Impaired Loans over Total Assets.

We are also interested in the determinants of the coverage ratio of Bad Loans (CR_{it}^{BL}) and Impaired Loans (CR_{it}^{IL}). These two indicators are an important source of information for the bank's reporting activity. We decide to model these alternative endogenous variables as follows:

$$CR_{it}^{BL} = \alpha_0 + \beta_1 CR_{it-1}^{BL} + \beta_2 LOAN_{it} + \beta_3 GUA1_{it} + \beta_4 ER_{it} + \beta_5 CAP_{it} + \beta_6 SIGN_{it} + \beta_7 dGDP_t + \varepsilon_{it} \quad (7)$$

$$CR_{it}^{BL} = \alpha_0 + \beta_1 CR_{it-1}^{BL} + \beta_2 LOAN_{it} + \beta_3 GUA2_{it} + \beta_4 ER_{it} + \beta_5 CAP_{it} + \beta_6 SIGN_{it} + \beta_7 dGDP_t + \varepsilon_{it} \quad (8)$$

As in the LLP equations, the lagged dependent variable is included as an explanatory variable in the regression. Of course, due to the particular construction of the Coverage Ratios, we decided not to include respectively BL_{it} and $\Delta_{t+1,t} IL_{it}$ in the equations.

$$CR_{it}^{IL} = \alpha_0 + \beta_1 CR_{it-1}^{IL} + \beta_2 LOAN_{it} + \beta_3 GUA1_{it} + \beta_4 ER_{it} + \beta_5 CAP_{it} + \beta_6 SIGN_{it} + \beta_7 dGDP_t + \varepsilon_{it} \quad (9)$$

$$CR_{it}^{IL} = \alpha_0 + \beta_1 CR_{it-1}^{IL} + \beta_2 LOAN_{it} + \beta_3 GUA2_{it} + \beta_4 ER_{it} + \beta_5 CAP_{it} + \beta_6 SIGN_{it} + \beta_7 dGDP_t + \varepsilon_{it} \quad (10)$$

Therefore, ten sets of equations are estimated for two samples: the full sample, containing all banks and the restricted sample, focusing only on cooperative credit banks.

4. Estimation of loan loss provisioning and coverage ratios determinants

In order to investigate the determinants of the loan loss provision and Coverage Ratios behavior in the Italian banking system, we use an approach similar to the one used by Bouvatier and Lepetit (2008) and Packer and Zhu (2012).

4.1. Data and descriptive analysis

The sample consists of an unbalanced panel of Italian banks' balance sheets and income statements from 2006 to 2012. Data are provided by the Italian Banking Association (ABI) balance sheets database. We preferred to exclude balance sheets prior to 2006 due to changes in accounting standards implemented that year. In order to focus our attention only on commercial banks, we do not consider any other categories other than those (investment and trust corporations, consumer credit and finance companies). We also delete banks with less than four consecutive time series observations, in order to explore in a robust way the phenomena from not only a cross-sectional, but also a dynamic point of view. Outliers were excluded by eliminating the bank's observations for that year. Table 2 shows the number of banks present in the final sample, divided by year and by category (shareholders/cooperative credit banks). However, the final sample covers a significant part of the Italian banking system. CCBs represent a significant part of our sample. On average, 80 per cent of banks in our dataset are cooperative banks.

Table 2. Italian banking system sample

Year	*CCB*	*Other banks*	*Full sample*
2006	363	133	496
2007	318	140	458
2008	367	141	508
2009	367	141	508
2010	360	132	492
2011	360	122	482
2012	325	115	440
Total Obs.			3386

Source: Italian Banking Association Balance sheets and Financial Statement database

Descriptive statistics for the key variables are presented in Table 3.

Table 3. Summary statistics of main variables

	Full Sample				*CCB*			
	Mean	*Standard Error*	*95% Confidence Interval*		*Mean*	*Standard Error*	*95% Confidence Interval*	
LLPtot	0.01955	0.00032	0.01891	0.02019	0.01776	0.00033	0.01710	0.01841
LLP^{BL}	0.01613	0.00028	0.01557	0.01669	0.01473	0.00029	0.01414	0.01531
LLP^{IL}	0.00304	0.00006	0.00291	0.00316	0.00270	0.00007	0.00256	0.00284
CR_t^{BL}	0.51899	0.00279	0.51350	0.52448	0.50261	0.00347	0.49580	0.50943
CR_t^{IL}	0.11764	0.00162	0.11445	0.12084	0.09193	0.00165	0.08869	0.09518
NPLtot	0.10029	0.00114	0.09804	0.10254	0.10339	0.00131	0.10081	0.10597
BL	0.04653	0.00072	0.04511	0.04795	0.04592	0.00083	0.04427	0.04756
IL	0.04203	0.00054	0.04095	0.04311	0.04618	0.00065	0.04489	0.04747
GUA1	0.72745	0.00268	0.72219	0.73271	0.76076	0.00279	0.75528	0.76625
GUA2	0.76373	0.00262	0.75859	0.76887	0.79555	0.00272	0.79020	0.80090
LOAN	0.69049	0.00225	0.68606	0.69491	0.67841	0.00246	0.67358	0.68324
CAP	-0.00410	0.00321	-0.03102	0.00922	3.15813	1.33322	0.53320	5.75250
ER	0.00647	0.00014	0.00618	0.00676	0.00682	0.00014	0.00653	0.00710
SIGN	-0.36025	0.13904	-0.63288	-0.08761	-0.36103	0.15825	-0.67139	-0.05066

Note: Mean and standard errors are calculated over the sample period 2006-2012

Total Loan Loss Provisions averages 1.95 per cent of the Total Assets, while LLP on Bad Loans (BL) and on Impaired Loans (IL) are respectively 1.61 per cent and 0.30 per cent of the Total Assets. On

average, the coverage ratio of BL is 51.89 per cent, while that of IL is 11.76 per cent. CCBs have lower coverage ratios, respectively 50.26 per cent and 9.19 per cent. The Bad Loans ratio averages 4.6 per cent for the whole sample and 4.59 per cent if we restrict our attention to CCBs, the IL ratio is lower (4.20%).

Loans represent the bank's main assets (69.04% of Total Assets). A substantial part of bank Loans is guaranteed. Approximately 76.37 per cent of Loans are guaranteed, 72.74 per cent of which are totally guaranteed. These percentages increase in the case of CCBs. Cooperatives banks tend to collateralize their assets more and subsequently reduce credit risk.

4.2. Empirical results

The empirical analysis is based on the estimation of generalized method of moments (GMM) using first differences (see Arellano and Bond, 1991) and orthogonal deviations (Arellano and Bover, 1995) regressions. Variables are in difference to control for unobservable bank's specific effects. Estimations are performed in order to obtain robust standard errors. Results for equations 1-6 are reported in Tables 4 and 5.

Table 4. Estimation of LLP determinant - full sample - Arellano - Bond

	Dependent variable					
	LLPtot		LLP^{BL}		LLP^{IL}	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Constant	-0.01326	-0.01308	-0.01153	-0.01162	-0.0008	-0.00078
	(-4.18)	-(4.14)	(-6.42)	(-6.48)	(-0.91)	(-0.88)
LLPtot (-1)	0.43177	0.43186				
	(5.55)	(5.54)				
LLP^{BL} *(-1)*			0.21649	0.21712		
			(1.38)	(1.39)		
LLP^{IL} *(-1)*					0.16758	0.16769
					(1.04)	(1.04)
NPLtot	0.10702	0.10707				
	(9.71)	(9.72)				
BL			0.26916	0.26857		
			(7.43)	(7.43)		
IL					0.04877	0.04875
					(9.35)	(9.37)
$\Delta_{t+1} NPLtot$	0.00501	0.00505				
	(1.03)	(1.04)				
$\Delta_{t+1} BL$			-0.00400	-0.00406		
			(-0.48)	(-0.48)		
$\Delta_{t+1} IL$					-0.00162	-0.00162
					(-0.60)	(-0.60)
GUA1	-0.00030		-0.00114		-0.00013	
	(-0.45)		(-2.01)		(-0.35)	
GUA2		-0.00053		-0.00097		-0.00016
		(-0.86)		(-2.03)		(-0.46)
LOAN	0.02258	0.02258	0.01886	0.01888	0.00240	0.00240
	(5.74)	(5.77)	(9.60)	(9.62)	(2.16)	(2.15)
CAP	-0.00000	-0.00000	-0.00000	-0.00000	0.00000	0.00000
	(-0.68)	(-0.68)	(-0.06)	(-0.07)	(6.01)	(5.99)
ER	-0.23474	-0.23478	-0.06059	-0.06048	-0.06219	-0.06226
	(-5.77)	(-5.76)	(-1.99)	(-1.99)	(-5.59)	(-5.59)
SIGN	0.00000	0.00000	0.00000	0.00000	-0.00000	-0.00000
	(-0.03)	(-0.03)	(0.96)	(0.99)	(-1.37)	(-1.36)
ΔGDP	0.00161	0.00160	-0.00341	-0.00340	-0.00012	-0.00011
	(0.58)	(0.57)	(-1.49)	(-1.49)	(-0.11)	(-0.11)

Note: t – statistics in brackets. Arellano and Bond GMM two-step estimation. Lagged explanatory variables have been used as instruments for differenced equations estimations

Concerning the estimation results for equations (1) and (2), we find that total LLP are significantly

correlated with the stock of NPL. As we expected, the coefficients are positive, and indicate that the cyclicality of Non Performing Loans influences provisioning via backward induction.

Table 5. Estimation of LLP determinants - full sample - Arellano - Bover

	Dependent variable					
	LLPtot		LLP^{BL}		LLP^{IL}	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Constant	-0.01736	-0.01726	-0.01369	-0.01389	0.00091	-0.00163
	(-5.82)	(-5.83)	(-8.34)	(-8.56)	(0.33)	(-1.81)
LLPtot (-1)	0.74947	.074960				
	(10.77)	(10.80)				
LLP^{BL} *(-1)*			0.44907	0.45019		
			(3.62)	(3.62)		
LLP^{IL} *(-1)*					0.41470	0.48788
					(5.08)	(8.83)
NPLtot	0.08212	0.08207				
	(7.32)	(7.35)				
BL			0.22182	0.22102		
			(6.73)	(6.73)		
IL					0.04904	0.04919
					(8.89)	(8.98)
$\Delta_{t+1} NPLtot$	0.00220	0.00219				
	(0.37)	(0.37)				
$\Delta_{t+1} BL$			-0.00885	-0.00903		
			(-0.99)	(-1.01)		
$\Delta_{t+1} IL$					-0.00317	-0.00326
					(-1.16)	(-1.17)
GUA1	-0.00032		-0.00112		-0.00032	
	(-0.36)		(-1.53)		(-0.77)	
GUA2		-0.00042		-0.00083		-0.00020
		(-0.52)		(-1.33)		(-0.47)
LOAN	0.02437	0.02437	0.02076	0.02080	0.00248	0.00256
	(6.11)	(6.12)	(10.59)	(10.64)	(2.19)	(2.30)
CAP	-9.22e-06	-9.22e-06	-5.25e-06	-5.24e-06	3.69e-06	3.72e-06
	(-1.93)	(-1.94)	(-1.45)	(-1.45)	(5.20)	(4.13)
ER	-0.21653	-0.21702	-0.09206	-0.09212	-0.06542	-0.05916
	(-4.56)	(-4.56)	(-2.58)	(-2.57)	(-4.73)	(-4.50)
SIGN	1.31e-06	1.31e-06	4.36e-06	4.63e-06	3.83e-06	-3.31e-06
	(0.12)	(0.12)	(0.64)	(0.69)	(-1.13)	(-0.91)
ΔGDP	-0.00395	-0.00394	-0.00650	-0.00651	-0.00038	-0.00063
	(-1.32)	(-1.32)	(-3.03)	(-3.03)	(-0.35)	(-0.58)

Note: t – statistics in brackets. Arellano and Bover two-step estimation with orthogonal deviations. Lagged explanatory variables have been used as instruments for differenced equations estimations

The coefficient associated to Loan to Assets ratio ($Loan_{it}$) is positive and significant at the 1 per cent level. This finding suggests that Italian banks make higher provisions when credit risk is higher, consistent with both the standard accounting principles and previous studies. Total LLP seems not to be affected by capital management purposes. In fact, the coefficient related to capital adequacy is not significant and very close to zero. As regards the income smoothing hypothesis, results appear to be inconsistent. Italian banks tend to reduce loan loss provisions when earnings before taxes and loan loss provisions increase, confirming the cyclicality suggested by the non-discretionary variables. Otherwise, economic fluctuation and business cycles seem to not affect total provisioning, together with the signaling hypothesis. Cyclicality of Total LLP appears to be driven primarily by the bank's specific microeconomic factors, while the macroeconomic situation does not seem to play a relevant role.

The results for equations (3) and (4) are quite similar, but differ in some key aspects. Bad Loans (BL_{it}) and forward looking differences ($\Delta_{t+1,t}\, BL_{it}$), together with the Loans to Assets ratio ($Loan_{it}$) have signs equal to the ones estimated for equations (1) and (2). The non-discretionary component seems to

also be affected by the amount of guarantees on loans. Banks with a higher percentage of collateralized loans (partially or totally) are willing to set lower provisions on Bad Loans, due to the fact that they are less exposed to credit default and to the higher (expected) recovery rate. The contribution of earnings before interest, taxes and loan loss provisions is not trivial. The coefficient associated to this variable is negative and significant for both Arellano-Bond and Arellano-Bover estimations. Also in this case, the variation of GDP is not significant, nor is the Signaling variable.

Regressions for equations (5) and (6) suggest that the non-discretionary behavior component is relevant for provisions associated to Impaired Loans. However, the forward looking indicator ($\Delta_{t+1,t}\, IL_{it}$) does not seem to affect the dependent variable, as is also the case with collateralized loans. Provisions appear to be counter cyclical, as indicated by the negative and significant coefficient associated to the earnings. The risk component, given by the loans to assets ratio, has a lower (if compared to the coefficients obtained in the other equations) but significant effect.

Table 6 contains the estimation related to the Coverage Ratios. For both CR_{it}^{BL} and CR_{it}^{IL} the respective order 1 autoregressive component has a significant effect. As regards the coverage ratio of Bad Loans, the coefficient associated to CAP_{it} is not significant. In this case, the signaling behavior variable ($SIGN_{it}$) has a positive but relative small impact.

Table 6. Estimation of Coverage Ratios determinants – full sample

	(Arellano – Bond)				***(Arellano – Bover)***			
	CR_t^{BL}		CR_t^{IL}		CR_t^{BL}		CR_t^{IL}	
	(7)	***(8)***	***(9)***	***(10)***	***(7)***	***(8)***	***(9)***	***(10)***
Constant	0.00428	-0.01385	0.14584	0.14011	0.15284	0.07729	0.13618	0.13039
	(0.05)	(-0.16)	(3.72)	(3.57)	(1.86)	(0.70)	(3.73)	(3.54)
CR_t^{BL} *(-1)*	0.95617	0.96328			0.72809	0.73766		
	(9.44)	(9.36)			(9.12)	(8.86)		
CR_t^{IL} *(-1)*			0.59376	0.60108			0.57099	0.57295
			(4.73)	(4.75)			(10.68)	(10.68)
GUA1	-0.01615		-0.03287		-0.01885		-0.02911	
	(-0.66)		(-1.82)		(-0.77)		(-1.79)	
GUA2		0.00217		-0.02535		-0.00018		-0.02131
		(0.09)		(-1.40)		(-0.01)		(-1.31)
LOAN	0.02361	0.02453	-0.09430	-0.09401	-0.02176	-0.02138	-0.08262	-0.08187
	(0.29)	(0.30)	(-2.04)	(-2.03)	(-0.25)	(-0.25)	(-1.89)	(-1.87)
CAP	0.00017	-0.00017	-0.00015	-0.00015	0.00018	0.00017	-0.00013	-0.00013
	(1.07)	(1.08)	(-0.84)	(-0.85)	(1.08)	(1.06)	(-0.84)	(-0.85)
ER	-0.27238	-0.23696	-1.2080	-1.1901	0.76295	0.83173	-1.09208	-1.07464
	(-0.38)	(-0.32)	(-3.61)	(-3.52)	(1.11)	(1.20)	(-3.55)	(-3.48)
SIGN	0.00068	0.00069	-0.00012	-0.00012	0.00055	0.00057	-0.00014	-0.00013
	(2.33)	(2.39)	(-0.99)	(-0.95)	(1.78)	(1.85)	(-1.12)	(-1.11)
ΔGDP	0.07382	0.07266	0.07571	0.07660	-0.01309	-0.02529	0.06536	0.06476
	(0.86)	(0.84)	(1.74)	(1.75)	(-0.17)	(-0.33)	(1.72)	(1.70)

Note: t – statistics in brackets. Arellano - Bond and Arellano - Bover GMM two-step estimation. Lagged explanatory variables have been used as instruments for differenced equations estimations

Both Arellano-Bond and Arellano-Bover estimation techniques confirm that Impaired Loans coverage ratio tends to be counter cyclical with respect to earnings.

Table 7a. Test for autocorrelation of first difference – full sample – Equation 1-6

	(Arellano – Bond)						***(Arellano – Bover)***					
	LLPtot		LLP^{BL}		LLP^{IL}		***LLPtot***		LLP^{BL}		LLP^{IL}	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Order 1	-3.4399	-3.4414	-0.9656	-0.9637	-1.8576	-1.8592	-4.9799	-4.983	-3.0183	-3.0123	-4.465	-5.4687
(p-value)	0.0006	0.0006	0.3342	0.3352	0.0632	0.0630	0.0000	0.0000	0.0025	0.0026	0.0000	0.0000
Order 2	-0.4665	-0.4880	0.5623	0.5540	-1.274	-1.2681	-1.1016	-1.1072	-0.9961	-1.0023	-0.7568	-0.6010
(p-value)	0.6408	0.6255	0.5739	0.5795	0.2027	0.2048	0.2706	0.2682	0.3192	0.3162	0.4492	0.5478

Note: Arellano - Bond test for zero autocorrelation on first differenced errors. H_0: no autocorrelation

Autocorrelation test results, contained in Tables 7a and 7b, confirm that autocorrelation in first differences could not be considered as a major issue.

Table 7b. Test for autocorrelation of first difference – full sample – Equation 7-10

	(Arellano – Bond)				***(Arellano – Bover)***			
	CR_t^{BL}		CR_t^{IL}		CR_t^{BL}		CR_t^{IL}	
	(7)	***(8)***	***(9)***	***(10)***	***(7)***	***(8)***	***(9)***	***(10)***
Order 1	-5.2988	-5.299	-5.6179	-5.6081	-5.4275	-5.4566	-7.3192	-7.2767
(p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Order 2	1.059	1.0588	1.5253	1.5531	0.9699	0.9898	1.4585	1.4815
(p-value)	0.2896	0.2897	0.1272	0.1204	0.3321	0.3223	0.1447	0.1385

Note: Arellano - Bond test for zero autocorrelation on first differenced errors. H_0: no autocorrelation

4.3. Focus on cooperative credit banks

In this section, we focus our attention on a restricted sample containing solely cooperative credit banks. All the ten equations are estimated using the same econometric technique applied in the previous section.

Regression results for LLP (Total LLP on Bad Loans and on Impaired Loans) are illustrated in Tables 8 and 9.

Table 8. Estimation of LLP determinant – CCB sample - Arellano Bond

	Dependent variable					
	LLPtot		LLP^{BL}		LLP^{IL}	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Constant	0.00056	0.00073	-0.00716	-0.00738	-0.00028	-0.00016
	(0.16)	(0.22)	(-3.38)	(-3.47)	(-0.26)	(-0.14)
LLPtot (-1)	-0.04038	-0.03954				
	(-0.34)	(-0.34)				
LLP^{BL} *(-1)*			-0.12893	-0.13517		
			(-1.33)	(-1.38)		
LLP^{IL} *(-1)*					0.03842	0.03562
					(0.28)	(0.26)
NPLtot	0.12256	0.12264				
	(8.74)	(8.74)				
BL			0.30077	0.30084		
			(14.66)	(14.66)		
IL					0.04039	0.04049
					(7.05)	(7.05)
$\Delta_{t+1} NPLtot$	0.01250	0.01256				
	(2.23)	(2.24)				
$\Delta_{t+1} BL$			0.00306	0.00306		
			(0.40)	(0.40)		
$\Delta_{t+1} IL$					-0.00444	0.00171
					(-1.47)	(1.24)
GUA1	0.00004		-0.00146		0.00027	
	(0.06)		(-2.01)		(0.66)	
GUA2		-0.00023		-0.00106		0.00010
		(-0.34)		(-1.97)		(0.26
LOAN	0.00826	0.00830	0.01569	0.01570	0.00171	0.00171
	(2.12)	(2.13)	(6.20)	(6.18)	(1.24)	(1.24)
CAP	0.00000	0.00000	0.00000	0.00000	0.00000	0.00002
	(0.30)	(0.30)	(1.78)	(1.81)	(4.95)	(4.87)
ER	-0.23542	-0.23578	-0.04832	-0.04738	-0.08050	-0.08088
	(-6.06)	(-6.09)	(-1.60)	(-1.56)	(-5.32)	(-5.36)
SIGN	-0.00001	-0.00001	0.00000	0.0000	0.00000	-0.00000
	(-1.20)	(-1.20)	(0.32)	(0.34)	(-1.47)	(-1.49)
ΔGDP	0.00824	0.00823	0.00057	0.00062	0.00033	0.00032
	(2.91)	(2.91)	(0.31)	(0.33)	(0.26)	(0.25)

Note: t – statistics in brackets. Arellano and Bond GMM two-step estimation. Lagged explanatory variables have been used as instruments for differenced equations estimations

Results for equations (1) and (2) are similar to the ones obtained for the Italian banking system, with the exception of Expectations on future NLP dynamic which, in this case seem to affect Total LLP for cooperative credit banks (the coefficients in both the regressions are positive and significant). At the same time, the coefficient associated with the earnings suggests, as in the case of the full sample, that Total Provisions are pro-cyclical and that the income smoothing hypothesis is not verified for CCBs either.

Table 9. Estimation of LLP determinant – CCB sample- Arellano Bover

	Dependent variable					
	LLPtot		***LLPBL***		***LLPIL***	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Constant	-0.00882	-0.00874	-0.00796	-0.00837	-0.00121	-0.00110
	(-2.49)	(-2.45)	(-3.66)	(-3.81)	(-0.99)	(-0.91)
LLPtot (-1)	0.68214	0.68357				
	(7.44)	(7.46)				
LLP^{BL} *(-1)*			0.08012	0.07973		
			(0.43)	(0.43)		
LLP^{IL} *(-1)*					0.45907	0.45850
					(5.32)	(5.29)
NPLtot	0.07759	0.07720				
	(4.53)	(4.53)				
BL			0.28335	0.28214		
			(8.03)	(7.99)		
IL					0.04392	0.04407
					(7.65)	(7.69)
$\Delta_{t+1} NPLtot$	-0.00433	-0.00450				
	(-0.78)	(-0.82)				
$\Delta_{t+1} BL$			-0.00254	-0.00275		
			(-0.24)	(-0.25)		
$\Delta_{t+1} IL$					-0.00507	-0.00495
					(-1.61)	(-1.58)
GUA1	-0.00109		-0.0021		0.00032	
	(-1.01)		(-2.13)		(0.64)	
GUA2		-0.00118		-0.00140		0.00018
		(-1.21)		(-1.80)		(0.40)
LOAN	0.01475	0.01482	0.01522	0.01517	0.00151	0.00150
	(3.38)	(3.40)	(6.38)	(6.36)	(1.00)	(0.99)
CAP	-7.37e-06	-7.45e-06	9.84e-07	9.20e-07	3.83e-06	3.83e-06
	(-1.63)	(-1.66)	(0.23)	(0.22)	(5.53)	(5.57)
ER	-0.29556	-0.29588	-0.04279	-0.04207	-0.07845	-0.07872
	(-4.60)	(-4.57)	(-1.24)	(-1.22)	(-5.18)	(-5.21)
SIGN	-7.21e-07	-3.98e-07	8.41e-07	1.22e-06	-2.70e-06	-2.76e-06
	(-0.07)	(-0.04)	(0.08)	(0.12)	(-0.98)	(-1.00)
ΔGDP	0.00281	0.00286	-0.00110	-0.00111	0.00099	0.00010
	(0.93)	(0.94)	(-0.49)	(-0.50)	(0.81)	(0.82)

Note: t – statistics in brackets. Arellano and Bover two-step estimation with orthogonal deviations. Lagged explanatory variables have been used as instruments for differenced equations estimations

Concerning Loan Loss Provisions on Bad Loans, we find that for cooperative credit banks they are negatively correlated with (totally and partially) guaranteed loans and positively associated to the ratio of Bad Loans over total Loans (BL_{it} BL_{it}) and to the Loan to Assets ratio, while there is no significant impact of the earnings. In particular, the guaranteed loans (totally and partially) have a higher impact on CCB LLPs on bad loans than in the case of the full sample, confirming the fact that one reason for lower CCB provisioning is a higher level of loan collateralization. Furthermore, earnings coefficients are significant (and negative) in the estimation of equations (5) and (6).

Finally, the equations for Bad Loans and Impaired Loans Coverage Ratio are estimated for the restricted sample (Tables 10, 11a and 11b).

Table 10. Estimation of Coverage Ratios determinants – CCB sample

	(Arellano – Bond)				***(Arellano – Bover)***			
	CR_t^{BL}		CR_t^{IL}		CR_t^{BL}		CR_t^{IL}	
	(7)	***(8)***	***(9)***	***(10)***	***(7)***	***(8)***	***(9)***	***(10)***
Constant	0.15445	0.13307	0.10447	0.09987	0.24425	0.22740	0.08881	0.08789
	(1.47)	(1.23)	(2.91)	(2.83)	(2.55)	(2.32)	(2.12)	(2.18)
CR_t^{BL} *(-1)*	0.82060	0.83115			0.63929	0.64485		
	(6.40)	(6.30)			(7.27)	(7.24)		
CR_t^{IL} *(-1)*			0.33895	0.34515			0.53341	0.53502
			(2.53)	(2.53)			(7.11)	(7.16)
GUA1	-0.05621		-0.03775		-0.05458		-0.02995	
	(-1.67)		(-1.90)		(-1.64)		(-1.33)	
GUA2		-0.03593		-0.03305		-0.03570		-0.02868
		(-1.14)		(-1.79)		(-1.16)		(-1.35)
LOAN	-0.04966	-0.04798	-0.00881	-0.00667	-0.05554	-0.05559	-0.01831	-0.01718
	(-0.44)	(-0.43)	(-0.21)	(-0.16)	(-0.53)	(-0.53)	(-0.39)	(-0.37)
CAP	0.00016	0.00016	-0.00011	-0.00011	0.00017	0.00017	-0.00014	-0.00014
	(1.10)	(1.10)	(-1.26)	(-1.26)	(1.15)	(1.16)	(-1.17)	(-1.19)
ER	-0.01155	0.06193	-1.70093	-1.67737	0.94656	1.05549	-1.6389	-1.62613
	(-0.01)	(0.06)	(-4.10)	-4.01)	(1.07)	(1.19)	(-3.81)	(-3.79)
SIGN	0.00061	0.00062	-0.00003	0.00800	0.00051	0.00051	-0.00003	-0.00003
	(1.51)	(1.57)	(-0.43)	(0.17)	(1.19)	(1.24)	(-0.28)	(-0.25)
ΔGDP	0.11299	0.10796	0.00738	0.00800	0.02209	0.01697	0.03490	0.03397
	(1.47)	(0.99)	(0.16)	(0.17)	(0.25)	(0.19)	(0.80)	(0.78)

Note: t – statistics in brackets. Arellano - Bond and Arellano - Bover GMM two-step estimation. Lagged explanatory variables have been used as instruments for differenced equations estimations

As in the case of the full sample, CR_{it}^{BL} has a strong and significant autoregressive of order 1 component. Well capitalized banks do not appear to have necessarily lower Bad Loans Coverage Ratio. With respect to the national case, the amount of totally guaranteed loans seems to negatively affect CR_{it}^{BL}. This negative relationship appears much clearer for CCBs. As in the full sample, the Signaling variable is positively correlated with the dependent variable, even if the size of the coefficient is close to zero.

Table 11a. Test for autocorrelation of first difference – CCB sample – Equation 1-6

	(Arellano – Bond)						***(Arellano – Bover)***					
	LLPtot		LLP^{BL}		LLP^{IL}		***LLPtot***		LLP^{BL}		LLP^{IL}	
	(1)	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***	***(1)***	***(2)***	***(3)***	***(4)***	***(5)***	***(6)***
Order 1	0.8553	0.84758	0.3869	0.4684	-1.1292	-1.1181	-4.5866	-4.5986	-1.1303	-1.0975	-3.6585	-3.6532
(p-value)	0.3923	0.3967	0.6988	0.6395	0.2588	0.2635	0.0000	0.0000	0.2583	0.2724	0.0003	0.0003
Order 2	-0.208	-0.2101	0.6619	0.7037	-1.6805	-1.6848	-0.3996	-0.4183	0.4123	0.4681	-0.9568	-.95513
(p-value)	0.8350	0.8336	0.5080	0.4816	0.0929	0.0920	0.6894	0.6757	0.6801	0.6397	0.3387	0.3395

Note: Arellano - Bond test for zero autocorrelation on first differenced errors. H_0: no autocorrelation

The negative relationship with $GUA1_{it}$ is confirmed for the Impaired Loans Coverage Ratio (CR_{it}^{IL}) as well. Given the similar result obtained for the Coverage Ratio of Bad Loans, it seems quite clear that cooperative banks which have a portfolio of loans with a higher level of collateralization tend to maintain a lower level of Coverage Ratios, due probably to the fact that credit default risk decreases in presence of loans that are totally guaranteed. This could (partially) explain the lower average Coverage Ratios experienced by CCBs with respect to the Italian banking system.

Estimation results also suggest that CR_{it}^{IL} seems to be pro-cyclical with respect to the earnings before taxes and loan loss provisions (over Total Assets).

Table 11b. Test for autocorrelation of first difference – CCB sample – Equation 7-10

	(Arellano – Bond)				***(Arellano – Bover)***			
	CR_t^{BL}		CR_t^{IL}		CR_t^{BL}		CR_t^{IL}	
	(7)	***(8)***	***(9)***	***(10)***	***(7)***	***(8)***	***(9)***	***(10)***
Order 1	-4.6168	-4.6186	-3.4581	-3.4762	-4.9193	-4.9333	-5.7568	-5.7734
(p-value)	0.0000	0.0000	0.0005	0.0005	0.0000	0.0000	0.0000	0.0000
Order 2	0.92156	0.93488	-0.23131	-0.1720	0.8038	0.8198	0.1087	0.1429
(p-value)	0.3568	0.3499	0.8171	0.8634	0.4215	0.4123	0.9134	0.8864

Note: Arellano - Bond test for zero autocorrelation on first differenced errors. H_0: no autocorrelation

5. Conclusions

This paper examines Loan Loss Provisions and Coverage Ratios determinants for the Italian banking system over a 7-year period (2006-2012), using financial statements and balance sheets from the Italian Banking Association database. We also provide an analysis for a sub sample of cooperative credit banks. We investigate not only the determinants of Total LLP, but we also try to model and detect the main explanatory variables for Bad Loans and Impaired Loans dynamics. Along with the standard explanatory variable commonly used in empirical literature, we test the impact of guaranteed loans, as an additional factor included in the non-discretionary component of provisioning strategies.

For the empirical analysis, we perform the estimation with generalized method of moments (GMM) using first differences (see Arellano and Bond, 1991) and orthogonal deviations (Arellano and Bover, 1995).

Empirical results suggest that the provisioning mechanism in Italian banks is mainly driven by non-discretionary behavior. Discretionary behavior of bank managers and the economic cycle do not appear to be relevant, as well as expectations about future potential losses and credit risk.

A specific analysis conducted on the sub sample of cooperative credit banks pointed out that their Loan Loss provisioning is less pro-cyclical than that of the full sample of banks; moreover, a higher level of collateralized loans, which can reduce credit risk and future losses, has a negative and greater (if compared with other banks) influence on the amount of provisions.

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