Loan loss provisioning by Italian banks:
managerial discretion, relationship banking, functional distance and bank risk

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Abstract

This paper investigates the loan loss provisioning behaviour of Italian banks during the period 2006–2013. We examine the main discretionary and non-discretionary determinants of loan loss provisions (LLPs) and explicitly investigate the role of bank's functional distance, geographic diversification and risk.
Empirical results suggest that LLPs by Italian banks are mainly driven by non-discretionary factors related to expected credit risk. Moreover, we find that distantly managed banks adopt a more prudent provisioning approach, whereas small local cooperative credit banks have a lower level of LLPs. We also show that LLPs are higher in regional banking systems with higher loan concentration and lower degree of competition. Finally, we find that banks facing increasing levels of risk are not only characterized by higher LLPs, but also have a higher tendency to engage in earnings management practices to stabilize their income flows over time.

Keywords: loan loss provisions; income smoothing; bank regulation; functional distance; earnings volatility; Italian banks

JEL Classification: G21, G28, M41, C33

1. Introduction

Loan loss provisions (LLPs) are important banks' accruals, defined with the aim of covering losses arising from lending activity (Norden and Stoian, 2013; Elnahass et al, 2016). LLPs play a key role within banks' financial statements, as they convey valuable information on loan portfolio quality, and have significant effects on reported earnings and regulatory capital (Curcio and Hasan, 2015).

Loan loss provisioning behaviour by banks is significantly influenced by both prudential bank regulation, emphasising the importance of provisions to protect banks' stability, and accounting standard setting, which aims at improving the transparency of financial statements (Balla and Rose, 2015). In this respect, the International Accounting Standard (IAS) 39 "*Financial Instruments: Recognition and Measurement*" prescribed that provisions had to be calculated based on a so called "incurred" loan loss model, which allowed provisioning for credit risk only when there was objective evidence that the loss event occurred before the balance sheet date (Camfferman, 2015). The incurred-loss approach of IAS 39 was aimed at improving transparency and comparability of financial statements and reducing discretion and opportunistic earnings management, but it substantially limited banks' ability to provide for loan losses that were reasonably expected to occur in future periods.

Since the onset of the global financial crisis, this accounting rule has been heavily criticized for allowing a less timely recognition of credit losses and for exacerbating pro-cyclical effects (Bushman and Willams, 2012). In fact, a backward-looking approach to loan losses does not enable banks to create adequate provisions during economic booms (Soedarmono et al., 2017), while during cyclical downturns banks are forced to increase LLPs as a consequence of credit deterioration and curtail lending, increasing pro-cyclicality and deepening the impact of economic recessions (Elnahass et al, 2014). Moreover, many observers have argued that the incurred-loss model to provisioning reduces the amount of unallocated LLPs, preventing banks from adequately capturing subjective and judgmental aspects of credit risk assessment and compromising their ability to face unexpected losses (Curcio and Hasan 2015). As a consequence of these recognized weaknesses of the IAS 39, the International Accounting Standard Board (IASB) has acknowledged the necessity of a more forward-looking approach for earlier recognition of loan losses. The shift towards an expected-loss model is confirmed by the definition of the accounting standard IFRS 9, which has replaced the IAS 39 from the 1st of January 2018, introducing an "expected" loan loss approach to banks' provisioning behaviour.

On the other hand, bank capital requirements regulation, that use accounting statement information to calculate regulatory capital numbers, highlights the importance of the regulatory capital to cover unexpected-losses only and stresses the necessity that LLPs actually cover expected losses.[1] In particular, insufficient loss provisioning impairs the ability of banks' capital to absorb unexpected losses and reduce its prudential role. Given their focus on financial stability, bank regulators favour forward-looking provisioning, which allows to account for loss events that are expected but have not yet occurred and to build a buffer against future losses and to enhance the stability of the bank capital base (Camfferman, 2015; Cummings and Durrani, 2016). Therefore, the incurred loss approach of IAS 39, preventing an appropriate level of prudence in recognizing credit losses, results in conflict with regulatory objectives as it generally understates expected losses (Gebhardt and Novotny-Farkas, 2011; Novotny-Farkas, 2016).

Even if the definition of an appropriate level of LLPs is significantly influenced by both prudential banking regulation and accounting standard setting, in practice there could be still room for discretionary or opportunistic accounting behaviours by managers in the estimation of loss provisions, as pointed out by Bushman and Williams (2012) and Elnahass et al. (2014). Although the main function of LLPs is to cover anticipated credit losses, they can be in fact manipulated to pursue other managerial objectives, such as income smoothing (see e.g. Beatty et al., 1995; Ahmed et al., 1999; Fonseca and Gonzalez, 2008), capital management (see e.g. Moyer, 1990; Anandarajan et al., 2003;

[1] The expected losses on a portfolio of credit exposures are the average level of credit losses that a bank can reasonably expect to experience, so they represent a cost component of lending activity. Conversely, losses above expected levels are usually referred to as unexpected losses, the severity and timing of which are unknown in advance; the coverage of these losses must be ensured by means of bank capital that therefore assumes a loss-absorbing function (Basel Committee on Banking Supervision, 2005).

Leventis et al., 2011) and signalling of bank's financial strength (Beaver et al., 1989: Wahlen, 1994; Beaver and Engel, 1996).

The ability to manipulate loan loss provisions derives mainly from the existence of judgmental components of provisioning, related to the identification of impaired assets and to the overall assessment of possible future credit losses. The use of LLPs with the aim of manipulating banks' reported earnings has been widely debated in the literature, however the results of the empirical analysis are often mixed (Bouvatier et al., 2014). Nevertheless, it is important for regulators to understand if and how LLPs are used as a tool to manage capital and earnings. Such knowledge can help them to understand if the reported numbers are truly meaningful or are subject to manipulation (Anandarajan et al. 2007).

This paper investigates loan loss provisioning behaviour by Italian banks during the period 2006–2013. Using an unbalanced panel dataset, we examine the main discretionary and non-discretionary determinants of LLPs considered in the literature. Moreover, differently from previous studies, we explicitly investigate the role functional distance, geographic diversification and risk on bank's provisioning behaviour. Several studies emphasise the importance of bank size and geographic diffusion on credit allocation, loan contract requirements and lending technologies (see Alessandrini et al., 2009). However, to the best of our knowledge, the role of functional distance and geographic concentration on banks' provisioning behaviour has not yet been explicitly analysed. We believe that lower functional distance between headquarters and branches and less geographically diversified banking activity increase lending capacity and allow a more accurate credit assessment and a lower loss given default rate, improving the loan loss provisioning process. In particular, the distance of the borrower from the bank's ''decision-making'' centre is very important in the lending process (Cenni et al. 2015), because the deterioration of soft information transmission within an organization increase with the functional distance between hierarchical levels (Ferri and Murro, 2015). According to Alessandrini et al. (2009, 2010), the degree of functional distance also reflects cultural and social distances between bank's decision-making centre and borrowers. Greater physical and cultural distance thus makes it difficult to collect and communicate soft information (Degryse and Ongena, 2005; Alessandrini et al., 2009) and may induce a bank to establish transactional-type relationships, with a relative loss of soft information in the credit monitoring processes (Cotugno e Monferrà 2011) and with consequent effects on loss provisioning behaviour.

In this respect, Italy provides an ideal setting to assess the role of bank organizational forms in shaping loan loss provisioning policies. The Italian financial system is, in fact, bank-based and banks have always been the main source of funding for firms (Fiordelisi et al., 2014). Furthermore, the Italian banking system is characterized by a strong presence of local intermediaries, adopting a traditional business model (mainly focused on loan intermediation and other retail services) and a close firm-bank relationship approach. All these elements significantly affect banks' screening and monitoring ability and thus may influence their loan loss provisioning behaviour.

Our empirical results provide no support to the income smoothing and capital management hypotheses and suggest that LLPs by Italian banks during the crisis period are mainly driven by non-discretionary factors related to expected credit risk. Moreover, we find that distantly managed banks, characterised by a greater functional distance, have a more conservative approach to their provisioning decisions, whereas small local cooperative credit banks are characterised a lower level of LLPs than that of other bank types. Provisioning behaviour is also significantly affected by credit market factors, with higher LLPs in regional banking markets characterised by a higher concentration of credit exposures and a lower degree of competition. Finally, we find that banks facing increasing levels of risk are not only characterised by higher LLPs, but also have a higher tendency to engage in earnings management practices to stabilise their income flows over time.

The remainder of the paper is organised as follows. Section 2 provides an overview of the relevant literature and defines the main research hypotheses. Section 3 presents data and the baseline specification and discusses empirical findings on the discretionary and non-discretionary determinant of LLPs. In Section 4, we focus our analysis on the role of bank's spatial distribution and credit market characteristics; while in Section 5 we present the provisioning behaviour of Cooperative

Credit Banks. Section 6 is dedicated to further issues and robustness analysis. Finally, Section 7 offers some concluding remarks.

2. Literature review and hypotheses development

In the literature, provisions for bank credit risk are commonly distinguished in two components: a discretionary component and a non-discretionary component.

The non-discretionary component is mainly due to problem loans and to the default risk of bank's credit portfolio. It is made to cover expected credit risks and it is thus expected to increase with bank lending activity, and its growth over time, and with indicators (like the ratio of non-performing loans to total loans) capturing expected credit risk (Ahmed et al., 1999; Bouvatier and Lepetit, 2008). Soedarmono et al. (2012) show that bank size is an important dimension of bank credit risk management: larger banks may be more prone to the "too big to fail" problem that creates moral hazard incentives to take on too much risk, trusting in the intervention of governments in the event of failure (Mishkin, 2006). This may entail the adoption of a less cautious provisioning policy, leading to a negative relationship between LLPs and bank size. Pérez et al. (2008) and Leventis et al. (2011) also point out that, although the relationship between LLPs and size is non monotonic, higher credit portfolio diversification for big banks will result in a negative sign. Non-discretionary provisioning shows a strong cyclicality (Laeven and Majnoni, 2003; Bikker and Metzemakers, 2005), being lower when output and credit are expanding during a cyclical upturn and higher in periods of contraction, when loan defaults rate is expected to be higher (Asea and Blomberg, 1998; Gambacorta and Mistrulli, 2004). The non-discretionary component determines the cyclicality of LLPs and may lead to a misevaluation of expected credit losses, which may be under-provisioned during economic upturns, while provisions may be become less timely and charged too late during downturn periods (Laeven and Majnoni, 2003). In this respect, the cyclicality of LLPs directly affects bank profits and capital (Jordan et al., 2002): according to the "capital crunch" theory (Peek and Rosengren, 1995), the erosion of bank capital, induced by growing loan losses during recessions, influences bank's ability to supply new loans and increases the cyclicality of its lending activity (Bouvatier and Lepetit, 2008).

The discretionary component is instead used to achieve managerial purposes. In a situation characterised by ample fluctuations of the business cycle, provisioning policy can be used to stabilise earnings and dividends (Alessi et al., 2014). Theoretical and empirical studies suggest three main reasons to explain bank's discretionary behaviour, other than purely providing a realistic evaluation of the risks associated to outstanding loans (Bikker and Metzemakers, 2005): income smoothing, capital management and signalling.

The practice of income smoothing aims at reducing the variability of net profits over time by means of loan loss provisions. Banks may increase loan loss provisions when earnings are high and decrease them when earnings are low, with the purpose of presenting fairly constant profits over time (Ronen and Sadan, 1981; Ma, 1988; Leventis et al., 2011), reducing the perception of default probability (Trueman and Titman, 1988), stabilising managers' compensation (Fudenberg and Tirole, 1995) and granting a steady flow of dividends to bank stockholders (Alessi et al., 2014). Since earnings variability is a measure of risk, reporting a less variable income flow could be seen as a way of reducing perceived risk (Greenawalt and Sinkey, 1988; Anandarajan et al., 2007). Onali (2014) shows that bank risk-taking positively affects dividend payout ratios, with banks paying dividends to shift default risk to their creditors. Banks facing increased levels of solvency risk could also have an incentive to manage earnings, in order to avoid costs related to regulatory intervention (Leventis et al., 2011). Some studies also provide evidence that these banks may have greater incentives for using LLPs to engage in earnings management practices (Yasuda et al., 2004; Bhat, 1996). However, Leventis et al. (2011) and Gebhardt and Novotny-Farkas (2011) show that the introduction of the restrictive IFRS rules for impairment (i.e., the incurred loss approach to provisions of the IAS 39) has significantly limited the ability of bank managers to engage in earnings management. Moreover, Agarwal et al. (2007) point out that banks' earnings management behaviour differs considerably in different macroeconomic environments, becoming weaker during periods of financial distress and recession. In this respect, El Sood (2013) also shows that, in recessionary periods, income management is less strong and the association between loan loss provisions and earnings may even become negative. Earnings smoothing behaviour may be thus less pronounced during the financial crisis, since the incentives of improving buffers to absorb shocks become more important in periods of financial turmoil (Norden and Stoian, 2013). We therefore hypothesize that:

H1a*: In normal market conditions LLPs are positively associated with earnings. During crisis periods, the incentives to use LLPs for income smoothing purposes decrease and the relationship between LLPs and earnings may even become negative.*

H1b*: In both normal market conditions and crisis periods, banks with higher earnings volatility have greater incentives for using LLPs to manipulate reported accounting numbers.*

A large number of papers have examined the hypothesis of capital management, asserting that loan loss provisions are used by banks to reduce the regulatory costs resulting from non-compliance to capital adequacy regulations (Moyer, 1990; Collins et al., 1995; Anandarajan et al., 2007; Leventis et al., 2011). When capital is low a higher level of provisions can be used to build up a strong reserve buffer (Gombola et al., 2016; Caporale et al., 2018). Such behaviours are made possible by the inclusion of loan loss reserves in defining regulatory capital. Early studies (Beatty et al., 1995; Scholes et al., 1990; Kim and Kross, 1998; Ahmed et al., 1999; Wall and Koch, 2000) provide evidence on the existence of capital management behaviours. However, bank capital requirements regulation has progressively reduced banks' incentives to adopt capital management strategies (Bouvatier et al., 2014). Not surprisingly, most of the recent literature provides support to the limited role of capital management on loan loss provisions (Anandarajan et al., 2007; Perez et al., 2008). In line with these studies, a non-significant relationship between provisions and bank's capital is expected in our analysis.

A further aspect in literature is the use of LLPs as a tool for managing risk and signalling future changes in earnings by banks. According to the signalling hypothesis, LLPs are used as a signalling tool for clients and investors regarding bank's expected cash flow (Anandarajan et al., 2007). Moreover, a signalling of good performance and stock price stability allow containing funding costs and positive rating evaluation (Greenawalt and Sinkey, 1988; Fudenberg and Tirole, 1995). Beaver et al. (1989) suggest that managers can use loss provisions to signal bank's financial strength, while Wahlen (1994) documents a positive relationship between provisions and bank stock returns. Similarly, Beaver and Engel (1996) demonstrate that this discretionary component has a positive effect on market value, confirming the hypothesis that increases in LLPs are used to signal good news about future earnings. However, some studies demonstrate that the desire to signal private information to outsiders is not an important determinant of LLPs (Ahmed et al., 1999).

In our analysis we consider several additional factors that may affect bank's provisioning policy. Specifically, we focus on the role of bank's functional distance, size and geographic scope, as well as of credit market concentration and competitiveness, and on the importance of a transactional/relationship approach to clients.

Bank's functional distance, that is the distance between banks' branches and headquarters, may be an important determinant of loan loss provisioning behaviour, despite it has not yet been taken into account in the empirical literature on LLPs. A growing functional distance is, in fact, associated with higher information asymmetries, poor knowledge of the customer and of the economic environment in which it operates, playing a significant role in determining bank's value and risk, as pointed out among others by Deng and Elyasiani (2008). In particular, impaired monitoring and distance-related agency problems, organizational diseconomies, and weakened manager's incentives to perform adversely affect bank's profitability and increase risk exposure. Alessandrini et al. (2009) show that the probability of credit rationing, especially for small firms, is higher in local banking systems characterised by a large presence of distantly managed banks. Moreover, Cotugno and Stefanelli (2011) provide evidence that in Italy the loss given default rate is positively related to the distance between bank's headquarters and borrower's location. Functional distance also plays a fundamental role on the type of relationships established between bank and customer: the availability of soft information and the closeness of the bank to the customer allow a more accurate credit assessment and monitoring and improve credit recovery capabilities (Alessandrini et al., 2009). In this respect, organizational diseconomies and difficulties in information exchange, that may arise when functional distance widens, contribute to increase information asymmetry and adverse selection issues. This generates distortions in the assessment of the quality of borrowers (Degryse and Ongena, 2005), worsening overall banks' loan portfolio and leading to higher loan loss provisioning to cover the increased exposure to credit risks.

The concept of "functional distance" also encompasses social and cultural factors that help to determine the distance between the banks and the local economy, playing a fundamental role on the type of relationships established with customers. It also represents a measure of bank organizational complexity, because growing functional distance affects the process of soft information-transmission within bank, with consequent diseconomies on the decision-sharing processes between headquarters and local loan officers（Cotugno and Monferrà, 2011).

We also investigate the role of bank's geographic concentration on its provisioning behaviour, beyond that captured by distance-related effects. Previous empirical analyses have provided mixed results on the role of geographic diversification on bank's performance. Morgan and Samolyk (2003) have documented that geographic diversification increases lending capacity of banks, but leaves banks' profits and loan performance unaffected. Acharya et al. (2006) find that geographic diversification is beneficial for the returns of low- and moderate-risk banks, but it is costly for high-risk banks. Deng and Elyasiani (2008) point out that geographically diversified bank holding companies can achieve a lower cost of funds by enlarging deposit bases, increasing investment opportunities, improving managerial and productive efficiency. On the other hand, geographic diversification may reduce bank profitability, increase risk and reduce value, due to intensified agency problems, more complex organization and product structure, and lack of information on new markets. More recently, Brighi and Venturelli (2016), based on a sample of Italian banks, point out that geographic diversification does not play a relevant role in affecting risk and returns, whereas greater functional distance negatively affects bank profitability.

We believe that factors related to functional distance and geographic diversification are important in explaining banks' lending decisions and so they may have a crucial role in defining their provisioning behaviour. Based on the discussion above, we thus posit the following hypotheses:

***H2**: Functional distance impacts bank's provisioning policy and LLPs are higher in banks with a greater distance between headquarters and branches.*

***H3**: Geographic diversification affects bank's provisions for loan losses and geographically concentrated banks are characterized by lower levels of LLPs.*

We also consider the effect on loan loss provisioning strategy of credit market characteristics, measured by the regional Herfindahl-Hirschman concentration index of bank loans and by the ratio of the number of bank branches on the resident population at the regional level. Supported by previous empirical studies on the impact of competitive dynamics of markets on the quality of banks' loan portfolio (Udell, 2008; Jiménez et al., 2010), we believe that these factors are important in defining bank's provisioning policy. Competition may increase risk-taking by banks and raise the aggregate risk of the banking sector (*competition-fragility view*) (Ogura, 2006), leading to underestimate bank credit risk and thus to under-provisioning for loan losses. However, recent studies (Boyd and De Nicolò, 2005) have provided support to the opposite view (*competition-stability view*), according to which competition among banks contributes to improve the stability of the entire banking system. We therefore hypothesize that:

***H4**: The competitiveness and concentration of local banking systems significantly affect banks provisioning behaviour.*

In analysing the main determinants of banks' loan loss provisioning behaviour we further assess the role of relationship lending. Dewenter and Hess (2003) point out that the transactional or relationship approach to clients may produce different effects when banks evaluate doubtful loans. If relationship banks have better information, their non-performing loans and write-offs will be smaller than those of comparably sized transactional banks and their loan loss provisions should thus be lower. Relationship banks, having better information on customers than transactional banks, manage less risky loans and may have higher recovery rates in case of loan default. Moreover, a strong relationship enables banks to minimize evaluation errors, with respect to borrowers' investment projects, and reduces information asymmetries; all these aspects translate into lower loan loss provisions (Alessi et al., 2014). In some studies, a particular focus is made on cooperative credit banks (CCBs), which are typically small local banks that have strong relationships with the local economy. These features make cooperative banks suitable for implementing long-term relationships with their customers. Berger and Black (2011) confirm that small banks have a comparative advantage in relationship lending. A stronger and long-lasting firm-bank relationship allows relationship banks to be more efficient in borrowers' monitoring process (Nakamura, 1993; McNulty, 2001), managing any difficult situations in a timely manner, before they turn into non-performing loans. Berger et al. (2005) support this result and find that small banks have a comparative advantage in granting loans to small firms, whose credit risk assessment requires a greater usage of soft information with respect to large businesses. However, this greater operational proximity of cooperative banks to the local economy may also adversely impact on lending process, because their loan portfolio is more concentrate and their customers are mainly small and micro enterprises with a higher risk profile; in this sense it is possible to explain the grant of a higher percentage of collateralised loans, with the aim to limit loss given default and increase recovery rate. In this respect, Alessi et al. (2014) and Caporale et al. (2018) show, in fact, that CCBs in Italy have a less cyclical provisioning strategy than that of other banks and their LLPs are significantly affected by collateralised loans. Moreover, Alessi et al. (2014) also find that the income smoothing hypothesis is not verified for Italian CCBs. According with the previous remarks our hypothesis is:

> ***H5****: Cooperative credit banks are characterised by lower LLPs and have a lower incentive to manipulate loss provisions for managerial objective than other bank types.*

3. Data and baseline specification

3.1 Data description

Our analysis is based on yearly bank-level data from the Italian Banking Association (ABI) balance sheet database *ABI Banking Data* over the period 2006–2013. To the aims of our study, this database provides homogeneous information on unconsolidated bank financial statements, based on IFRS/IAS standards.[2] We exclude banks with unreliable or missing information on basic accounting variables and define an unbalanced panel composed of 5,209 observations on 739 banks. The majority of these banks are cooperative credit banks ("*Banche di Credito Cooperativo*") (449), while the remaining are commercial (264), mutual ("*Banche Popolari*") (44) and foreign (5) banks. Furthermore, we are able to define a balanced panel of 490 banks observed for all the eight years of the period of analysis, which will be used to assess the robustness of the findings obtained from the whole sample.

3.2 Baseline model

In line with Leventis et al. (2011), Bouvatier et al. (2014) and Bryce et al. (2015), we base our analysis on a dynamic specification that differentiates between discretionary and non-discretionary components of bank's loan loss provisions; formally:

$$\begin{aligned} LLP_{i,t} &= \beta_1 + \beta_2 LLP_{i,t-1} + \beta_3 Earnings_{i,t} + \beta_4 Equity_{i,t-1} + \beta_5 Assets_{i,t} + \beta_6 Loans_{i,t} \\ &\quad + \beta_7 \Delta Loans_{i,t} + \beta_8 NPL_{i,t} + \beta_9 Commissions_{i,t} + \beta_{10} \Delta GDP_{j,t} + \sum_{r=1}^{4} MA_r + \delta_t + \varepsilon_{i,t} \end{aligned} \tag{1}$$

where the dependent variable ($LLP_{i,t}$) is equal to the ratio of loan loss provisions on total assets and subscripts refer to bank *i* in year *t*. In the baseline specification (1), we use several indicators to identify the non-discretionary component of provisioning, capturing loan loss provisions made to cover expected credit losses and exhibiting a cyclical pattern. In particular, we consider the loan to total assets ratio ($Loans_{i,t}$), its yearly change ($\Delta Loans_{i,t} = (Loans_{i,t} - Loans_{i,t-1})$) and the ratio of non-performing loans on bank's net loans ($NPL_{i,t}$), as measures of expected loan default risk of the

[2] Detailed information on the ABI Banking Data database can be found at www.abi.it.

overall bank's credit portfolio and bank's financial stability. We also include commission and fee income to total asset ($Commissions_{i,t}$), to account for the importance of non-depository activities (Leventis et al., 2011), and the logarithm of total assets ($Assets_{i,t}$) as a proxy for bank size. Moreover, the growth rate of per capita GDP at the regional level ($GDP_{j,t}$) allows to control for the effect of macroeconomic conditions and thus for the cyclical pattern of loan loss provisions (Pérez et al., 2008). In particular, as pointed out by Bouvatier et al. (2014), it captures the creditworthiness of banks' customers and thus should negatively affect LLPs. The discretionary component allows controlling for loan loss provisions made for managerial objectives, such as income smoothing and capital management (Ahmed et al., 1999; Hasan and Wall, 2004; Anandarajan et al., 2007). Specifically, according to the income-smoothing hypothesis banks may use loss provisions to smooth their income by overstating (understating) LLPs when incomes are expected to be high (low). In line with most of the empirical literature, we thus use the ratio of earnings before taxes and loan loss provisions to total assets ($Earnings_{i,t}$) to test for the positive relationship between LLPs and income implied by the income-smoothing hypothesis. Furthermore, in order to test whether banks also use LLPs to manage their regulatory capital (i.e., to make provisions to keep their capital ratio adequate when their capital is low) we use the lagged ratio of equity to total assets ($Equity_{i,t-1}$).[3] A negative relationship with LLPs is expected if capital management is present, even if the scope for such behaviour has been significantly reduced since Basel accords (Bouvatier et al., 2014). Model (1) also includes the lagged value of loan loss provisions ($LLP_{i,t-1}$) to take into account the existence of a dynamic adjustment, as provisioning decisions may be systematically related to each period leading to time persistency, and capture the speed of adjustment of LLPs to an equilibrium level.[4]

Macro regional dummies for banks located in the North-West, North-East, Centre and South of Italy (MA_r) and time fixed effects (δ_t) are also included to control for residual regional heterogeneity and for changes over time that might affect provisioning behaviour, respectively. Complete variable

[3] As in Bouvatier et al. (2014), we use the equity to total assets ratio since the regulatory capital ratio cannot be properly calculated for all the banks in the sample, due data availability issues.

[4] The inclusion of the lagged independent variable, together with other lagged explanatory variables, reduces the number of usable observations. Our estimation sample thus consists of an unbalanced panel composed of 4,414 bank-year observations over the period 2007-2013.

definitions and descriptive statistics are reported in Table A1 in the Appendix, while Table A2 presents the pairwise correlation matrix.

We use the Blundell and Bond (1998) system GMM estimator to consistently estimate the parameters of equation (1) and of all the dynamic panel models of loan loss provisioning presented in the next Sections. This estimator is based on a system of equations, defined by combining the original equation in levels and a transformed one. Following Roodman (2009), we apply the forward orthogonal deviations transformation of the original equation, instead of first differencing, as it allows maximizing sample size in panels with gaps. Moreover, we adopt a two-step estimation approach, applying the Windmeijer (2005) finite-sample correction to the covariance matrix. As in Bouvatier et al. (2014), we apply GMM instruments only to the lagged dependent variable ($LLP_{i,t-1}$), whereas the other variables are treated as strictly exogenous. In order to limit the issue of instruments proliferation (Roodman, 2009), we restrict the lag range at four and collapse the instrument matrix. We check the validity of the instruments considered by means of the AR(2) test, which verifies the absence of second-order serial correlation in the first-differenced residuals, and the Hansen test, which allows to assess the exogeneity of the entire set of instruments.

Results of our baseline specification are presented in the first column of Table 1. We find that, among the non-discretionary components, the amount of non-performing loans on bank's net loans is as expected positively linked to LLPs, suggesting that Italian banks increase LLPs when the share of bad loans grows, in order to cover higher levels of expected credit losses.[5] This result is stable across the different models reported in Table 1. As in Bouvatier et al. (2014), the variable *Loans* exerts a positive and significant effect on LLPs: loss provisions are larger for those banks that have greater amounts of net loans, capturing the increased risk of default for the overall credit portfolio. In line with the findings of Laeven and Majnoni (2003) and El Sood (2013), the coefficient of the loan growth rate is negative and statistically significant at the 1% level, showing that banks' provisioning behaviour is less prudent during periods of rapid credit growth. The impact of non-traditional

[5] It is worth remarking that, for all the estimated models, results from the AR(2) test for autocorrelation in the idiosyncratic disturbance terms and the Hansen test of overidentifying restrictions provide support to the validity of the set of system GMM instruments considered.

activities, measured trough the variable *Commission*, is not significant. The significant and negative coefficient of the growth rate of regional per capita GDP confirms the importance of macroeconomic conditions in influencing the cyclical behaviour of provisioning. Coherently with previous empirical literature (Bouvatier and Lepetit, 2008; Fonseca and Gonzalez, 2008; Leventis et al., 2011), we provide evidence on the strong pro-cyclical pattern of loss provisions. Italian banks thus tend to maintain increased provisions during and not before periods of economic recession. As pointed out by Soedarmono et al. (2017) this can be the result of the incurred loss approach to LLPs, which is a backward-looking model of risk management that does not enable banks to create adequate provisions during economic booms and in turn triggers pro-cyclical effects.

[Table 1 about here]

The analysis of the discretionary components allows testing the income smoothing and capital management hypotheses. In accordance with recent empirical literature focusing on banks' provisioning behaviour during the global financial crisis (El Sood, 2013; Gombola et al., 2016; Caporale et al., 2018), the coefficient of the variable *Earnings* is negative and statistical significant at the 1% level, a result which is inconsistent with the use of provisions to smooth earnings over time, which would have instead implied a positive sign. On the contrary, banks reduce LLPs when earnings before taxes and loan loss provisions increase (and vice versa), strengthening the cyclicality of banks' provisioning behaviour, already pointed out by the evidence obtained for the non-discretionary components of LLPs. These findings provide support to Hypothesis 1a and confirm that during recessionary periods (as the global financial crisis period to which our sample mainly refers) characterised by higher levels of risk and lower earnings, banks have lower incentives to use LLPs for earning management purposes and tend to adopt a more prudent approach to provisions.[6] Moreover, the sudden losses affecting banks during the financial crisis boost the amount of LLPs and hit bank's capital cushions. The pressure of capital reduction and the related costs of non-compliance

[6] Unfortunately, the lack of financial statement data for the pre-crisis period does not allow us to assess the impact of the global financial crisis on banks' earnings management practices. We are thus not able to directly test whether the association between earnings and LLPs has actually changed since the onset of the financial crisis.

with regulatory capital requirements may lead banks to tighten lending, by reducing bank's risk-weighted assets in order to limit the erosion of the capital base (El Sood, 2013). This further exacerbates pro-cyclicality issues and deepens the impact of economic recessions.

The lagged ratio of equity to total assets is not a significant determinant of LLPs, confirming that, after the adoption of the new capital requirements, Italian banks have no incentive to manipulate capital via loan loss provisions. Finally, the lagged value of LLPs ($LLP_{i,t-1}$) has a positive and statistically significant coefficient, demonstrating the existence of a dynamic adjustment process in bank's use of loan loss provisions.

In the next Section, we extend the baseline model to assess the role of bank's functional distance and geographic concentration on its provisioning behaviour.

4. Bank's spatial distribution and credit market characteristics

4.1 The role of bank's functional distance and geographic diversification

We now extend the baseline specification to assess the role of banks' organizational distance and geographic distribution on their provisioning choices.

Following Alessandrini et al. (2009), we firstly consider bank's functional distance ($FDistance_{i,t}$), computed as the distance between the postal code of the municipality where bank headquarters are located and the postal code of each bank branch. This variable provides a proxy of the geographic and cultural distance between bank decision-making centres and local banking systems (Cotugno and Monferrà, 2011) and can be also interpreted as a measure of distance in lending technologies (Cotugno et al., 2013). The inclusion of this regressor allows us to contribute to the empirical literature on LLPs by testing whether growing functional distances, which have been shown to exert a significant role on screening and monitoring of borrowers, have also an impact on banks' loan loss provisioning behaviour. Accordingly, we test the role on loss provisions of banks' geographic diversification ($GeoConcentration_{i,t}$), measured by the Herfindahl–Hirschman index of bank's branches distribution over the Italian territory, considering the province as the reference market. In order to test whether bank's geographic diversification affects its income smoothing behaviour, we also include interaction terms between bank's earnings and both the indicators of functional distance and geographic diversification ($Earnings_{i,t} \cdot FDistance_{i,t}$ and $Earnings_{i,t} \cdot GeoConcentration_{i,t}$). Baseline specification (1) is thus extended as follows:

$$\begin{aligned} LLP_{i,t} &= \beta_1 + \beta_2 LLP_{i,t-1} + \beta_3 Earnings_{i,t} + \beta_4 Equity_{i,t-1} + \sum_{k=1}^{6} \beta_{4+k} NonDiscr_{i,j,t} \\ &+ \beta_{11} FDistance_{i,t} + \beta_{12} Earnings_{i,t} \times FDistance_{i,t} + \beta_{13} GeoConcentration_{i,t} \\ &+ \beta_{14} Earnings_{i,t} \times GeoConcentration_{i,t} + \sum_{r=1}^{4} MA_r + \delta_t + \varepsilon_{i,t} \end{aligned} \tag{2}$$

where $NonDiscr_{i,j,t}$ includes all the non-discretionary components considered in equation (1) (i.e., $Assets_{i,t}, Loans_{i,t}, \Delta Loans_{i,t}, NPL_{i,t}, Commissions_{i,t}, \Delta GDP_{j,t}$).

Columns from (2) to (7) of Table 1 report results from the augmented specifications defined by equation (2), where banks' functional distance and geographic diversification (and the related interaction terms) progressively enter the model. We find that functional distance has a positive and significant coefficient, confirming our Hypothesis 2 according to which a growing distance between headquarters and branches is associated to higher LLPs. Distantly managed banks seem to adopt a more prudent approach to loan loss provisioning: monitoring problems, information asymmetries and organizational diseconomies, that may arise when functional distance widens, contribute to worsen the quality of bank's loan portfolio and increase credit risk exposure, thus requiring higher levels of provisions. In this respect, weakened monitoring between senior managers and branch managers and other distance-related agency problems may impair lending decision processes, contributing to increase risk exposure (Brickley et al., 2003; Deng and Elyasiani, 2008). Similarly, organizational diseconomies and problems related to the opaqueness of soft information about local borrowers, that characterize more distantly managed banks, make the information transmission process to bank's headquarters very costly and difficult (Berger et al., 2005), weakening bank's ability to screening and monitoring borrowers.

Conversely, we do not find empirical support to Hypothesis 3: geographic concentration exerts a negative, but statistically insignificant effect on LLPs, both when it is considered alone and together with the functional distance indicator.[7]

In order to check if the effect of income on LLP behaviour differs depending on bank's geographic diversification, we have added the interaction terms $Earnings_{i,t} \times FDistance_{i,t}$ and $Earnings_{i,t} \times GeoConcentration_{i,t}$. However, both these interaction variables are not statistically significant suggesting that the relationship between LLPs and earnings does not change with bank's functional distance and geographic concentration, confirming the absence of income management practices. Based on these results, we will not consider the geographic concentration variable and the two interactions in the successive extended specifications, in order to avoid over-specifying the model by including non-significant variables that may affect the precision of the estimates.[8]

4.2 The role of local credit market factors

In order to control for the effect of regional credit market characteristics on LLPs, we include the Herfindahl-Hirschman concentration index of bank loans at the regional level (*$HHI_{j,t}$*) and the number of bank branches per 100,000 inhabitants in each region (*$BranchDens_{j,t}$*), as proxies for concentration of lending and spatial competition/diffusion of the regional banking system in which the bank operates, respectively. Formally:

$$\begin{aligned} LLP_{i,t} &= \beta_1 + \beta_2 LLP_{i,t-1} + \beta_3 Earnings_{i,t} + \beta_4 Equity_{i,t-1} + \sum_{k=1}^{6} \beta_{4+k} NonDiscr_{i,j,t} \\ &+ \beta_{11} FDistance_{i,t} + \beta_{12} HHI_{j,t} + \beta_{13} Earnings_{i,t} \times HHI_{j,t} \\ &+ \beta_{14} BranchDens_{j,t} + \beta_{15} Earnings_{i,t} \times BranchDens_{j,t} + \sum_{r=1}^{4} MA_r + \delta_t + \varepsilon_{i,t} \end{aligned} \tag{3}$$

[7] It is worth remarking that when both the functional distance and geographic diversification variables are included together (column (3) of Table 1), the statistically significance of *$FDistance_{i,t}$* slightly reduces, with the corresponding *p*-value increasing from 0.3530 to 0.5426. This result may be partly due to the correlation between the two indicators, which is equal to -0.6106 (as reported in Table A2). However, this correlation coefficient, despite being rather high, is not indicative of severe multicollinearity issues. Moreover, the absence of multicollinearity issues is further confirmed by the stability of the estimates of the *$FDistance_{i,t}$* coefficient, which remains positive and statically significant at the 10% level in all the subsequent specifications.

[8] Accordingly, in the remainder of the analysis, we will progressively extend the empirical model and drop those additional regressors and interaction terms that will turn out to be non-statistically significant, before further augmenting the specification.

Empirical results are presented in Table 2. Firstly, it is worth remarking that the main empirical findings obtained from the previous model specifications (1) and (2) remain unchanged. Focusing on the role of credit market factors, the Herfindahl-Hirschman concentration index of bank loans at the regional level displays a positive and statistically significant coefficient, indicating that as the loan concentration in the local credit market increases, the level of provisions grows. Coherently, the variable $BranchDens_{j,t}$ has a negative and statistically significant effect on LLPs, suggesting that banks operating in more competitive banking systems are characterised by lower levels of loan loss provisions. These findings are consistent with Hypothesis 4 and provide support to the "competition-stability view" (Boyd and De Nicolò, 2005), according to which a higher degree of bank competition is associated with greater banking system stability and lower loan losses, therefore requiring lower provisions to cover credit losses. Moreover, we show that local credit market characteristics do not affect banks' income smoothing behaviour as pointed out by the non-significant coefficients of the interaction terms reported in columns (4), (5) and (6) of Table 2.

[Table 2 about here]

5. The provisioning behaviour of Cooperative Credit Banks

We further extend our analysis to test for the existence of heterogeneous provisioning behaviour related to banks' size and geographic scope. In particular, we focus on Cooperative Credit Banks (CCBs), which are typically small local banks, with strong ties with the local economy, and represent more than 60 percent of the banks in our dataset, and investigate whether they behave differently from commercial, foreign and mutual banks[9]. Figure 1 shows that, on average, CCBs are

[9] The Italian cooperative credit sector is composed of two main categories, which have gradually increased their level of differentiation over time: Cooperative Credit Banks (*Banche di Credito Cooperativo*) and Mutual Banks (*Banche Popolari*). The *Banche Popolari,* originally oriented towards mutual credit activities and intended to provide their shareholders with financial support, have gradually changed their business characteristics and now they are similar to private commercial banks, both in term of intermediation activities, dimension and weight within the banking system (Cosma and Gualandri, 2012). In this respect, the Italian Parliament (with law n. 33/2015) mandated mutual banks with total assets exceeding 8 billion Euro, to convert into joint-stock companies, further confirming that the largest *Banche Popolari* have characteristics that make them more similar to commercial banks than to cooperative ones.

characterised by a lower loan loss provisions to total assets ratio than other bank types over the whole period of analysis and in particular from the outbreak of the global financial crisis. Moreover, both types of banks are characterised by increasing levels of provisioning over time, with a steep increase in LLPs from 2011 onwards.

[Figure 1 about here]

To account for these heterogeneous patterns of LLPs, we augment model (3) by including a dummy variable for cooperative credit banks (*CCBi*). Moreover, as in Caporale et al. (2018), we also include an interaction term between the CCB dummy and bank's earnings ($Earnings_{i,t} \times CCB_i$) to test whether different types of banks are characterised by different income smoothing behaviour. In fact, due to their cooperative structure, the incentives for managers to manipulate earnings may significantly differ from those of other banks. Formally, the augmented model can be written as:

$$
\begin{aligned}
LLP_{i,t} = {} & \beta_1 + \beta_2 LLP_{i,t-1} + \beta_3 Earnings_{i,t} + \beta_4 Equity_{i,t-1} + \sum_{k=1}^{6} \beta_{4+k} NonDiscr_{i,j,t} \\
& + \beta_{11} FDistance_{i,t} + \beta_{12} HHI_{j,t} + \beta_{13} BranchDens_{j,t} \\
& + \beta_{14} CCB_i + \beta_{15} Earnings_{i,t} \times CCB_i + \sum_{r=1}^{4} MA_r + \delta_t + \varepsilon_{i,t}
\end{aligned}
\tag{4}
$$

The empirical findings are presented in Table 3. In particular, coherently with Hypothesis 5, we find that local cooperative credit banks have a significantly lower level of LLPs. This evidence deserves a more in-depth comment. In fact, the greater operational proximity of cooperative banks to the local economy may improve information collection and risk assessment, limiting their overall credit risk exposure, with a consequent reduction of loss provisions. At the same time, the higher geographic concentration of CCBs loan portfolio, mainly towards small and micro enterprises with a higher risk profile, results in a higher percentage of loans backed by guarantees and collaterals, which contributes to reduce expected future losses and consequently to lower provisions for loan losses (Alessi et al., 2014).

The coefficient of the interaction term is instead not statistically significant, highlighting that all the different types of banks operating in Italy are characterised by the same relationship between earnings and provisions, which is inconsistent with the income smoothing hypothesis. It is worth remarking that, the variable *Assets*, accounting for bank's dimension, which was statistically insignificant in previous specifications, now assumes a negative coefficient (statistically significant at the 10 per cent level). This evidence confirms that, once we control for bank type, smaller banks are characterised by a higher level of provisions for loan losses, as in Pérez et al. (2008) and Leventis et al. (2011). Larger banks, *ceteris paribus,* thus tend to take excessive risks and reduce their level of LLPs as they may be more prone than small cooperative banks to the moral hazard incentives arising from the "too big to fail" problem.[10]

[Table 3 about here]

In order to verify whether the determinants of bank provisioning behaviour significantly differ between bank types and to assess the robustness of the results presented in Table 3, we separately estimate our empirical models on the subsamples of CCBs and non-CCBs. Results are presented in Table A3 in the Appendix. From this sub-sample analysis, we notice that the coefficient of the variable *Earnings* remains negative and statistically significant only for the sub-sample of non-CCBs, confirming that LLPs grow as bank's income decreases; conversely, no significant relationship between provisioning and earnings can be pointed out for cooperative banks. Moreover, while cyclicality is relevant only for CCBs (as indicated by the negative and significant relationship with GDP growth rate), bank's functional distance significantly increases LLPs only for non-CCBs, which

[10] In order to assess the appropriateness of our choice of distinguishing CCB from mutual banks (i.e., of including mutual banks into the benchmark category, together with commercial and foreign banks), we have re-estimated all the models presented in Section 5 by including an additional binary variable indicating mutual banks ($Mutual_i$) and its interaction with bank's earnings ($Earnings_{i,t} \times Mutual_i$) (i.e., including only commercial and foreign banks in the benchmark category). Results of this robustness analysis (presented in Table S1 of the Supplementary Appendix) indicate that the dummy *Mutual* is not statically significant, suggesting that the provisioning behaviour of mutual banks does not significantly differ from that of commercial and foreign banks. Conversely, the dummy CCB remains positive and significant, providing further support to the choice of treating these small local intermediaries separately from all the other types of banks.

are usually characterised by a higher distance between banks' branches and headquarters. Similarly, bank size exerts a negative and significant effect on the level of provisions only for the subsample of non-CCBs, confirming the findings obtained on the whole sample. Finally, the variable *HHI* maintains a positive coefficient in the sub-sample of CCBs. On the other hand, non-cooperative banks reduce their LLPs when loan concentration in the local credit market increases, suggesting that larger commercial and mutual banks tend to under-provision for the risks related to higher loan concentration.

6. The role of bank risk

Following Bouvatier et al. (2014), we also assess the role of bank activity risk on provisioning behaviour. Specifically, we augment the model by adding the standard deviation (computed using 3-year rolling windows) of a corrected measure of return on equity, i.e., the ratio of earnings before taxes and loan loss provisions to total equity ($Risk_{i,t}=std(ROE_{i,t})=std(Earnings_{i,t} / Equity_{i,t})$).[11] This variable provides a proxy for overall bank activity risk, as well as management's ability to control risk exposure and obtain steady earnings over time. Since several studies have pointed out that bank risk and earnings volatility may significantly impact on the way banks use LLPs to smooth their incomes (Bhat, 1996; Yasuda et al., 2004; Leventis et al., 2011), we also add an interaction term between the risk variable and bank's earnings ($Earnings_{i,t} \cdot Risk_{i,t}$) to empirically test the validity of Hypothesis 1b. The extended model, accounting for all the aforementioned additional factors and explicitly assessing the role of bank activity risk on LLPs, becomes:

$$\begin{aligned} LLP_{i,t} &= \beta_1 + \beta_2 LLP_{i,t-1} + \beta_3 Earnings_{i,t} + \beta_4 Equity_{i,t-1} + \sum_{k=1}^{6} \beta_{4+k} NonDiscr_{i,j,t} \\ &+ \beta_{11} FDistance_{i,t} + \beta_{12} HHI_{j,t} + \beta_{13} BranchDens_{j,t} + \beta_{14} CCB_i \\ &+ \beta_{15} Risk_{i,t} + \beta_{16} Earnings_{i,t} \times Risk_{i,t} + \sum_{r=1}^{4} MA_r + \delta_t + \varepsilon_{i,t} \end{aligned} \tag{5}$$

Results obtained from this extended specification are presented in Table 4.[12] The inclusion of the standard deviation of bank's corrected ROE leads to a significant reduction of our estimation

[11] This correction allows avoiding the potential risk measurement bias, occurring when standard ROE measures based on net income (i.e. earnings after taxes and loan loss provisions) are used (Bouvatier et al., 2014).
[12] As in Bouvatier et al. (2014), we use GMM instruments to deal with the potential endogeneity of bank activity risk.

sample, with the number of usable observations dropping to 3658. This analysis thus also serves as a check of the robustness of our findings to the composition of the estimation sample. From columns (1) to (4) of Table 4, we notice that the findings obtained from our core regressions remain unchanged. In particular, it is worth noticing that the coefficient of the CCB indicator remains negative and statistically significant (see columns (4) and (8) of Table 4). Even after controlling for bank activity risk, Italian cooperative banks are thus characterised by a significantly lower level of LLPs compared to other categories banks. Moreover, we find that LLPs significantly increase with earnings volatility. This empirical finding points out that banks characterised by higher income uncertainty tend to increase loan loss provisions to cope with their higher exposure to default risk and instability.

[Table 4 about here]

We further extend the model by interacting our measure of overall risk with bank's earnings ($Earnings_{i,t} \times Risk_{i,t}$), in order to test whether banks characterised by different levels of earnings volatility have different incentives to smooth their incomes through LLPs. Differently from Bouvatier et al. (2014), who find that bank risk has no significant impact on income smoothing behaviour, our results show that the coefficient of the interaction term is positive and statistically significant in all the specifications (columns (5) to (8) of Table 4). Coherently with Hypothesis 1b, this evidence clearly suggests that riskier banks have greater incentives for using LLPs to engage in earnings management practices, with the aim to stabilise income flows over time and to reduce perceived risk, confirming the findings of Bhat (1996), Yasuda et al. (2004), and Leventis et al. (2011).

In order to better assess the impact of bank risk on the relationship between LLPs and income, we compute the marginal effect of earnings on provisions, i.e., the partial derivative of equation (5) with respect to earnings ($\partial LLP_{i,t} / \partial Earnings_{i,t} = \beta_3 + \beta_{16} Risk_{i,t}$), evaluated at the minimum, median and maximum values of $Risk_{i,t}$ observed in the estimation sample. As it can be noticed, for banks characterised by low to medium levels of risk, the marginal effects are negative and statistically significant, showing that LLPs reduce as earnings increase. Conversely, as income volatility increases, the marginal effect becomes positive and statistically significant, suggesting the existence of an income smoothing behaviour by riskier banks. This result provides support to the findings of Leventis et al. (2011) and highlights that, despite the implementation of IFRS has significantly limited the ability of bank managers to engage in earnings management, riskier banks in our sample tend to manipulate reported earnings via LLPs in order to limit profits' variability over time and reduce perceived risk.

7. Robustness analysis

We carry out several robustness checks on the empirical results of our core regressions presented in Sections 3, 4 and 5.

Firstly, we estimate all the empirical specification defined in equations (1) to (4) on a balanced sample composed of the 490 banks observed in all the eight years of the period of analysis. Results obtained, presented in Table A4 in the Appendix, support the empirical evidence obtained from the unbalanced sample, confirming our findings on the main determinants of the provisioning behaviour of Italian banks.

Similarly, we further assess the robustness of our results to the composition of the estimation sample by rerunning our core regression models on the sub-samples of banks observed for at least five and six consecutive years, respectively. Results (reported in a not-for-publication Supplementary Appendix) provide further support to our main empirical evidence.

Moreover, we re-estimate our main regression models focusing only on the years following the outbreak of the global financial crisis (2009-2013). Our main results on banks' provisioning behaviour remain unchanged (see the Supplementary Appendix), confirming the importance of bank's functional distance, size and geographic scope, as well as of local credit market characteristics, in shaping the provisioning behaviour of Italian banks during the 2009-2013 period.

As a final robustness check, we consider an additional discretionary component of LLPs related to banks' use of loss provisions to signal their financial strength (Ahmed et al., 1999; Anandarajan et al., 2007; Caporale et al., 2018). This signalling behaviour is captured by the one-year-ahead change of earnings before taxes and loan loss provisions ($Signalling_{i,t} = (Earnings_{i,t+1} - Earnings_{i,t})$). As for the analysis of bank risk, the inclusion of this variable drastically reduces the size of the estimation sample and for this reason we have decided to drop it from our core regressions. This additional analysis thus not only allows testing for the existence of a signalling behaviour in banks' provisioning, but also serves as a robustness check of our main empirical findings. Results (presented in Table A5 in the Appendix) clearly indicate that Italian banks do not use LLPs to signal their financial strength and, coherently with the findings of Anandarajan et al (2007) and Caporale et al (2018), lead to a rejection of the signalling hypothesis. Moreover, the main results obtained in our core analysis are largely confirmed, providing further support to the robustness of our empirical findings.

7. Concluding remarks

Using an unbalanced panel data of 739 banks, this paper examines loan loss provisioning behaviour by Italian banks, during the period 2006-2013, investigating the main discretionary and non-discretionary determinants of provisions and the role played by bank's functional distance, geographic diversification and risk, with a specific focus on cooperative credit banks.

In line with most of the empirical literature, we use a dynamic model to empirically analyse banks' loan loss provisioning behaviour. Overall our results clearly indicate that non-discretionary factors, related to expected credit risk, are the main determinants of the provisioning behaviour of Italian banks during a period of increased financial distress. In particular, the level of bank's provisions for loan losses significantly increases as total net loans and the share of non-performing loans, capturing the risk of default for the overall credit portfolio, grows. Our results also point out that in recessionary times banks tend to provision more to cover credit losses, giving rise to pro-cyclicality concerns. Conversely, our empirical findings do not support the existence of managerial discretionary behaviour, rejecting both the income smoothing and capital management hypotheses.

One of the main contributions of our analysis to the existing literature is that we provide empirical evidence on the significant role of bank's functional distance (i.e., the distance between bank's headquarters and branches) on loan loss provisioning behaviour. In particular, distantly managed banks adopt a more prudent approach and are characterised by higher levels of provisions. The lower knowledge of the local economy of these banks significantly affects their ability of screening and monitoring borrowers. Distance-related agency problems, organizational diseconomies and growing information asymmetries, strongly influence bank's risk exposure and require higher level of provisions.

Furthermore, credit market factors, and in particular those related to the competitiveness of local banking systems, also play an important role on provisioning behaviour, with higher levels of LLPs in regions characterised by a higher loan concentration and a lower degree of competition.

Focusing on cooperative credit banks, our findings show that Italian CCBs do not use provisions for income management practices and present significantly lower levels of LLPs. This evidence can be explained by the lower loss given default rates and the higher recovery rates of these banks, due to the adoption of a relationship banking approach with borrowers and the higher use of collateralised loans.

Finally, our results point out that banks characterised by higher income uncertainty tend to increase loan loss provisions to cope with their higher exposure to default risk and instability. In particular, banks with higher earnings volatility have greater incentives to engage in earnings management practices through LLPs, with the aim of stabilising income flows over time and reducing perceived risk.

A main message of our paper is that incentives to use loan loss provisions for managerial purposes, and in particular for income smoothing and capital management, are significantly reduced. On the one hand, this result may support the effectiveness of banking capital regulation and accounting discipline in limiting discretionary behaviour by banks. On the other, this evidence may be indicative of the increased pro-cyclicality of provisioning behaviour during the financial crisis period, which have induced banks to increase provisions for impaired loans and tighten lending conditions, amplifying the effects of economic recession. In this respect, the shift from the IAS 39 incurred loss approach towards the IFRS 9 expected loss model and the introduction of the Basel III framework provide an ideal testing ground to assess the impact of accounting and banking regulation on banks' provisioning behaviour. Future research should therefore attempt to evaluate whether the implementation of the new IFRS 9 accounting rules, and their interactions with capital requirements regulation, would be effective in mitigating pro-cyclicality concerns and enhancing financial stability.

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Tables

Table 1 –The role of bank's functional distance and geographic diversification on loan loss provisions

	Baseline model (*Equation (1)*)	Extended specifications (*Equation (2)*)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$LLP_{i,t-1}$	0.3914***	0.4006***	0.3925***	0.4003***	0.4075***	0.3970***	0.4041***
	(0.1228)	(0.1235)	(0.1242)	(0.1247)	(0.1269)	(0.1251)	(0.1320)
$Earnings_{i,t}$	-0.0379***	-0.0374***	-0.0375***	-0.0372***	-0.0392***	-0.0373***	-0.0362***
	(0.0101)	(0.0101)	(0.0102)	(0.0102)	(0.0098)	(0.0101)	(0.0098)
$Earnings_{i,t} \cdot FDistance_{i,t}$					0.0017		-0.0002
					(0.0019)		(0.0036)
$Earnings_{i,t} \cdot GeoConcentration_{i,t}$						-0.0310	-0.0330
						(0.0248)	(0.0469)
$Equity_{i,t-1}$	0.0003	0.0004	0.0003	0.0004	0.0004	0.0003	0.0004
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
$Assets_{i,t}$	0.0002**	0.0000	0.0001	0.0000	0.0000	0.0001	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Loans_{i,t}$	0.0063***	0.0060***	0.0063***	0.0060***	0.0060***	0.0062***	0.0060***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
ΔLoans	-0.0073***	-0.0073***	-0.0074***	-0.0073***	-0.0071***	-0.0071***	-0.0071***
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
$NPL_{i,t}$	0.0334***	0.0331***	0.0334***	0.0331***	0.0329***	0.0334***	0.0331***
	(0.0044)	(0.0044)	(0.0045)	(0.0045)	(0.0045)	(0.0045)	(0.0046)
$Commissions_{i,t}$	-0.0023	-0.0030	-0.0028	-0.0031	-0.0037	-0.0030	-0.0034
	(0.0054)	(0.0057)	(0.0056)	(0.0057)	(0.0063)	(0.0057)	(0.0068)
$\Delta GDP_{j,t}$	-0.0264***	-0.0250***	-0.0262***	-0.0250***	-0.0249***	-0.0261***	-0.0249***
	(0.0069)	(0.0070)	(0.0070)	(0.0070)	(0.0070)	(0.0070)	(0.0070)
$FDistance_{i,t}$		0.0001**		0.0001*	0.0001*		0.0001*
		(0.0000)		(0.0000)	(0.0000)		(0.0000)
$GeoConcentration_{i,t}$			-0.0006	-0.0003		-0.0003	-0.0001
			(0.0004)	(0.0004)		(0.0005)	(0.0007)
Macro-region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value AR(2) test	0.5042	0.4922	0.5035	0.4932	0.4693	0.4911	0.4852
P-value Hansen test	0.2695	0.2650	0.2673	0.2644	0.2683	0.2652	0.2595
Number of banks	739	739	739	739	739	739	739
Number of observations	4414	4414	4414	4414	4414	4414	4414

Notes: the Table reports the estimated coefficients of the baseline model and of the augmented specifications defined by equations (1) and (2), respectively. Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Table 2 – The role of credit market factors on banks' provisioning behaviour

	(1)	(2)	(3)	(4)	(5)	(6)
$LLP_{i,t-1}$	0.4025***	0.4030***	0.4038***	0.3711***	0.4099***	0.3564***
	(0.1242)	(0.1266)	(0.1266)	(0.1287)	(0.1273)	(0.1261)
$Earnings_{i,t}$	-0.0371***	-0.0372***	-0.0371***	-0.0307***	-0.0314***	-0.0333***
	(0.0102)	(0.0103)	(0.0103)	(0.0100)	(0.0110)	(0.0136)
$Earnings_{i,t} \cdot HHI_{j,t}$				0.0002		0.0002
				(0.0002)		(0.0001)
$Earnings_{i,t} \cdot BranchDens_{j,t}$					-0.0007	-0.0014
					(0.0006)	(0.0012)
$Equity_{i,t-1}$	0.0004	0.0002	0.0002	0.0006	0.0003	0.0004
	(0.0016)	(0.0016)	(0.0016)	(0.0014)	(0.0016)	(0.0015)
$Assets_{i,t}$	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Loans_{i,t}$	0.0059***	0.0064***	0.0063***	0.0063***	0.0063***	0.0062***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
$\Delta Loans$	-0.0072***	-0.0076***	-0.0075***	-0.0073***	-0.0076***	-0.0072***
	(0.0020)	(0.0021)	(0.0021)	(0.0026)	(0.0022)	(0.0025)
$NPL_{i,t}$	0.0329***	0.0330***	0.0329***	0.0342***	0.0329***	0.0341***
	(0.0044)	(0.0046)	(0.0046)	(0.0050)	(0.0046)	(0.0050)
$Commissions_{i,t}$	-0.0036	-0.0028	-0.0032	-0.0015	0.0004	-0.0084
	(0.0057)	(0.0058)	(0.0058)	(0.0065)	(0.0074)	(0.0079)
$\Delta GDP_{j,t}$	-0.0205***	-0.0154**	-0.0140**	-0.0154**	-0.0147**	-0.0141*
	(0.0070)	(0.0067)	(0.0067)	(0.0070)	(0.0068)	(0.0073)
$FDistance_{i,t}$	0.0001*	0.0001*	0.0001*	0.0001*	0.0001*	0.0001*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$HHI_{j,t}$	0.0178***		0.0112*	0.0115*		0.0113*
	(0.0066)		(0.0061)	(0.0061)		(0.0064)
$BranchDens_{j,t}$		-0.0001***	-0.0001***		-0.0001***	-0.0001***
		(0.0000)	(0.0000)		(0.0000)	(0.0000)
Macro-region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
P-value AR(2) test	0.4915	0.4927	0.4923	0.5897	0.4865	0.6394
P-value Hansen test	0.2566	0.2474	0.2446	0.2065	0.2298	0.2021
Number of banks	739	739	739	739	739	739
Number of observations	4414	4414	4414	4414	4414	4414

Notes: the Table reports the estimated coefficients of the augmented specifications defined by equation (3). Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Table 3 – The provisioning behaviour of Cooperative Credit Banks

	a) Without interaction effects			b) With interaction effects		
	(1)	(2)	(3)	(4)	(5)	(6)
$LLP_{i,t-1}$	0.3972***	0.4049***	0.4153***	0.4002***	0.4079***	0.4176***
	(0.1340)	(0.1347)	(0.1405)	(0.1356)	(0.1363)	(0.1421)
$Earnings_{i,t}$	-0.0339***	-0.0336***	-0.0331***	-0.0348***	-0.0344***	-0.0338***
	(0.0102)	(0.0102)	(0.0105)	(0.0105)	(0.0105)	(0.0108)
$Earnings_{i,t} \cdot CCB_i$				0.0273	0.0268	0.0232
				(0.0359)	(0.0358)	(0.0357)
$Equity_{i,t-1}$	-0.0007	-0.0005	-0.0005	-0.0005	-0.0003	-0.0003
	(0.0018)	(0.0018)	(0.0019)	(0.0018)	(0.0018)	(0.0019)
$Assets_{i,t}$	-0.0001	-0.0002*	-0.0003**	-0.0001	-0.0002*	-0.0003**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Loans_{i,t}$	0.0066***	0.0064***	0.0062***	0.0066***	0.0063***	0.0062***
	(0.0009)	(0.0010)	(0.0010)	(0.0009)	(0.0010)	(0.0010)
$\Delta Loans_{i,t}$	-0.0083***	-0.0082***	-0.0083***	-0.0081***	-0.0080***	-0.0081***
	(0.0022)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
$NPL_{i,t}$	0.0335***	0.0333***	0.0329***	0.0334***	0.0331***	0.0328***
	(0.0046)	(0.0046)	(0.0048)	(0.0046)	(0.0047)	(0.0049)
$Commissions_{i,t}$	-0.0064	-0.0067	-0.0072	-0.0061	-0.0064	-0.0069
	(0.0058)	(0.0060)	(0.0063)	(0.0059)	(0.0061)	(0.0063)
$\Delta GDP_{j,t}$	-0.0241***	-0.0230***	-0.0125*	-0.0241***	-0.0231***	-0.0127*
	(0.0068)	(0.0069)	(0.0067)	(0.0069)	(0.0069)	(0.0068)
$FDistance_{i,t}$		0.0001*	0.0002*		0.0001*	0.0002*
		(0.0000)	(0.0001)		(0.0000)	(0.0001)
$HHI_{j,t}$			0.0099*			0.0100*
			(0.0060)			(0.0060)
$BranchDens_{j,t}$			-0.0000***			-0.0000***
			(0.0000)			(0.0000)
CCB_i	-0.0017***	-0.0016***	-0.0015***	-0.0019***	-0.0019***	-0.0017***
	(0.0004)	(0.0004)	(0.0004)	(0.0006)	(0.0006)	(0.0006)
Macro-region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
P-value AR(2) test	0.5069	0.4968	0.4773	0.5024	0.4924	0.4734
P-value Hansen test	0.2407	0.2364	0.2134	0.1688	0.1651	0.1474
Number of banks	739	739	739	739	739	739
Number of observations	4414	4414	4414	4414	4414	4414

Notes: the Table reports the estimated coefficients of the augmented specifications defined by equation (4). Robust standard errors are reported in parentheses below the estimates. ***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Table 4 – The role of bank's risk on loan loss provisions

	a) Without interaction effects				b) With interaction effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$LLP_{i,t-1}$	0.3541***	0.3623***	0.3660***	0.3621**	0.3685***	0.3755***	0.3810***	0.3786**
	(0.1322)	(0.1324)	(0.1385)	(0.1483)	(0.1376)	(0.1374)	(0.1443)	(0.1547)
$Earnings_{i,t}$	-0.0357***	-0.0353***	-0.0349***	-0.0315***	-0.0438***	-0.0432***	-0.0428***	-0.0394**
	(0.0115)	(0.0115)	(0.0117)	(0.0118)	(0.0155)	(0.0154)	(0.0159)	(0.0162)
$Earnings_{i,t} \cdot Risk_{i,t}$					0.0439***	0.0418**	0.0426**	0.0424**
					(0.0167)	(0.0164)	(0.0180)	(0.0186)
$Equity_{i,t-1}$	-0.0018	-0.0016	-0.0017	-0.0029	-0.0015	-0.0014	-0.0014	-0.0025
	(0.0028)	(0.0028)	(0.0029)	(0.0032)	(0.0028)	(0.0028)	(0.0029)	(0.0031)
$Assets_{i,t}$	0.0002*	0.0000	-0.0001	-0.0004**	0.0002*	0.0000	-0.0001	-0.0004**
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0001)	(0.0002)	(0.0002)
$Loans_{i,t}$	0.0076***	0.0073***	0.0074***	0.0076***	0.0075***	0.0072***	0.0073***	0.0075***
	(0.0010)	(0.0010)	(0.0011)	(0.0012)	(0.0010)	(0.0010)	(0.0011)	(0.0012)
$\Delta Loans_{i,t}$	-0.0117***	-0.0118***	-0.0120***	-0.0131***	-0.0116***	-0.0117***	-0.0119***	-0.0130***
	(0.0025)	(0.0025)	(0.0026)	(0.0028)	(0.0027)	(0.0027)	(0.0027)	(0.0030)
$NPL_{i,t}$	0.0351***	0.0347***	0.0346***	0.0350***	0.0343***	0.0340***	0.0338***	0.0341***
	(0.0063)	(0.0063)	(0.0066)	(0.0069)	(0.0064)	(0.0063)	(0.0067)	(0.0069)
$Commissions_{i,t}$	0.0023	0.0014	0.0006	-0.0033	0.0051	0.0041	0.0032	-0.0004
	(0.0067)	(0.0071)	(0.0075)	(0.0083)	(0.0070)	(0.0074)	(0.0077)	(0.0083)
$\Delta GDP_{j,t}$	-0.0282***	-0.0268***	-0.0139**	-0.0129**	-0.0272***	-0.0259***	-0.0131*	-0.0121*
	(0.0068)	(0.0068)	(0.0066)	(0.0065)	(0.0068)	(0.0068)	(0.0067)	(0.0066)
$FDistance_{i,t}$		0.0001**	0.0002*	0.0002*		0.0001*	0.0002*	0.0002*
		(0.0001)	(0.0001)	(0.0001)		(0.0001)	(0.0001)	(0.0001)
$HHI_{j,t}$			0.0138*	0.0126*			0.0135*	0.0124*
			(0.0079)	(0.0062)			(0.0079)	(0.0062)
$BranchDens_{j,t}$			-0.0000***	-0.0000***			-0.0000***	-0.0000**
			(0.0000)	(0.0000)			(0.0000)	(0.0000)
CCB_i				-0.0016***				-0.0016***
				(0.0005)				(0.0004)
$Risk_{i,t}$	0.0043***	0.0043***	0.0044***	0.0043***	0.0050***	0.0050***	0.0051***	0.0050***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0010)	(0.0011)	(0.0011)
Macro-region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Marginal Effects of $Earnings_{i,t}$:								
at min($Risk_{i,t}$)					-0.0438***	-0.0432***	-0.0428***	-0.0394**
					(0.0155)	(0.0153)	(0.0158)	(0.0162)
at median($Risk_{i,t}$)					-0.0427***	-0.0421***	-0.0417***	-0.0383**
					(0.0151)	(0.0150)	(0.0154)	(0.0157)
at max($Risk_{i,t}$)					0.2289**	0.2163**	0.2218**	0.2243**
					(0.0900)	(0.0883)	(0.0976)	(0.1010)
P-value AR(2) test	0.4306	0.4462	0.4427	0.4247	0.4612	0.4728	0.4727	0.4589
P-value Hansen test	0.1826	0.1803	0.1695	0.1619	0.1552	0.1565	0.1493	0.1430
Number of banks	703	703	703	703	703	703	703	703
Number of observations	3658	3658	3658	3658	3658	3658	3658	3658

Notes: the Table reports the estimated coefficients of the augmented specifications defined by equation (5). Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Figures

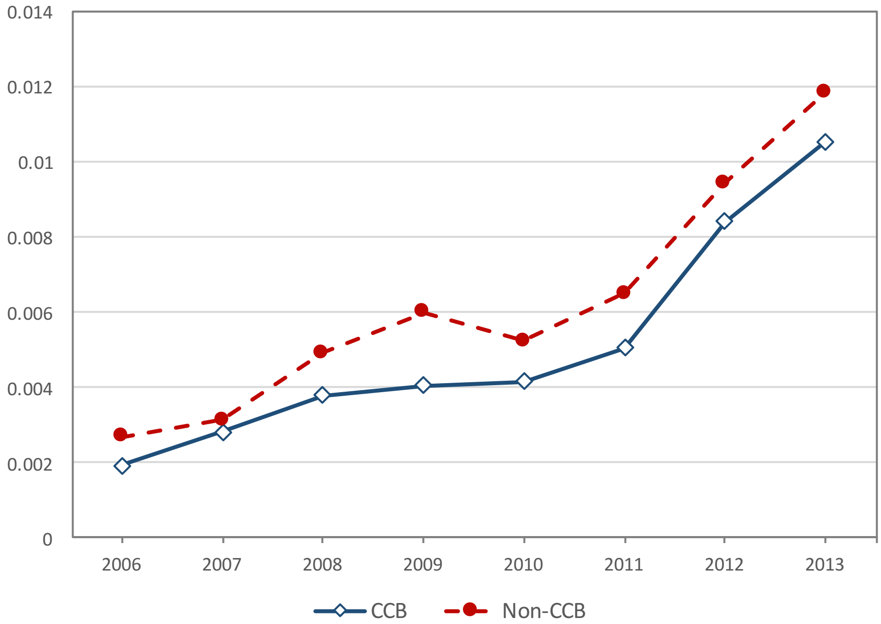

Figure 1: Average Loan Loss Provisions on Total Assets: CCB vs Non-CCB

Appendix

Table A1 – Variable definitions and descriptive statistics

Variable	Definition	Mean	Std. Dev.	Min	Max
Bank-level variables:					
LLP	Loan loss provisions (divided by bank's total assets)	0.0053	0.0075	-0.0065	0.0792
Earnings	Earnings before taxes and loan loss provisions (divided by bank's total assets)	0.0099	0.0226	-0.3382	0.2610
Equity	Equity (divided by bank's total assets)	0.1177	0.0844	0.0007	0.8637
Assets	Bank's total assets (in logs)	13.1956	1.7470	8.1579	19.8982
Loans	Net loans (divided by bank's total assets)	0.6403	0.1957	0	0.9880
ΔLoans	Growth of net loans ($Loans_t - Loans_{t-1}$)	-0.0030	0.0788	-0.5610	0.5274
NPL	Non performing loans on bank's net loans	0.0728	0.0679	0	0.6894
Commissions	Commissions and fees income (divided by bank's total assets)	0.0098	0.0312	-0.0076	0.3638
ΔGDP	Growth rate of per capita GDP at the regional level	-0.0105	0.0270	-0.0897	0.0459
CCB	Equals 1 if the bank is a cooperative bank; 0 otherwise	0.6264	0.4838	0	1
GeoConcentration	Bank's geographic concentration index, measured by the Herfindahl–Hirschman index of bank's branches distribution over the Italian territory, considering the province as the reference market. Formally, summing up the J branches of the i-th bank in each province at time t, the index is computed as: $GeoConcentration_{i,t} = \sum_{j=1}^{J}\left[\frac{\text{Bank branches in Province}_{ij}}{\text{Total bank branches}_i}\right]^2$	0.6809	0.3270	0	1
FDistance	Bank's functional distance (in logs). With reference to the i-th bank and for each year of observation, functional distance is measured as the sum of the distances between the head office's postal code and the j-th branch's postal code (weighted by the branch's months of opening): $Fdist_{i,t} = \ln\left\{1+\sum_{j=1}^{J}[\lvert \text{ZIP CODE Headquarter}_i - \text{ZIP CODE Branch}_{ij} \rvert \cdot (m_{ij}/12)]\right\}$	4.8498	2.7448	0	13.98
Signalling	One-year-ahead change of earnings before taxes and loan loss provisions ($Earnings_{t+1} - Earnings_t$)	-0.0004	0.0143	-0.1031	0.0968
Risk	Standard deviation (computed over 3-year rolling windows) of bank's modified ROE (earnings before taxes and loan loss provisions divided by bank's total equity)	0.0453	0.1320	0.0003	0.9185
Credit market factors:					
HHI	Herfindahl-Hirschman concentration index of bank loans at the regional level (Source: Bank of Italy)	0.0839	0.0258	0.0371	0.2190
BranchDens	Number of bank branches per 100,000 inhabitants in each region (Source: Bank of Italy)	65.8207	20.3648	24.4097	96.4826

Table A2 – Pairwise correlation matrix

	Earnings	Equity	Assets	Loans	ΔLoans	NPL	Commissions	ΔGDP	CCB	Geo Concentration	FDistance	Signalling	Risk	HHI	BranchDens
Earnings	1.0000														
Equity	-0.0471	1.0000													
Assets	0.0767	-0.3421	1.0000												
Loans	0.0617	-0.2672	0.1309	1.0000											
ΔLoans	-0.0073	0.1483	-0.0412	0.1331	1.0000										
NPL	0.0637	0.0596	-0.1147	0.0344	-0.1615	1.0000									
Commissions	0.3839	0.2998	-0.0475	-0.2252	0.0015	0.0500	1.0000								
ΔGDP	0.0296	0.0301	-0.0360	0.0705	0.1052	-0.0793	0.0008	1.0000							
CCB	0.0490	-0.0131	-0.5601	0.1061	-0.0808	0.1470	-0.1564	0.0411	1.0000						
GeoConcentration	-0.0289	0.1520	-0.6329	-0.0589	-0.0249	0.1050	-0.0267	0.0325	0.5366	1.0000					
FDistance	0.0965	-0.2922	0.6587	0.1985	-0.0192	-0.0436	-0.0114	-0.0642	-0.4015	-0.6106	1.0000				
Signalling	-0.3467	-0.0208	-0.0463	-0.0094	0.0523	-0.0632	-0.0867	0.0333	0.0186	0.0245	-0.0171	1.0000			
Risk	-0.1530	-0.0695	0.0715	-0.1382	0.0056	0.0291	0.0305	-0.0013	-0.1532	-0.0686	0.0344	0.0292	1.0000		
HHI	0.0045	-0.0902	0.1217	-0.1047	0.0558	-0.0139	0.0550	-0.2065	-0.1858	-0.2075	0.2097	-0.0174	0.0477	1.0000	
BranchDens	-0.0010	0.0087	0.0931	0.3302	-0.0544	-0.0778	-0.0071	0.1324	0.0687	0.0441	-0.0725	-0.0148	-0.0527	-0.5574	1.0000

Notes: the Table reports the pairwise correlation coefficients among all the explanatory variables considered.

Table A3 –The determinants of loan loss provisions: CCB vs Non-CCB

	(1)		(2)		(3)	
	CCB	Non-CCB	CCB	Non-CCB	CCB	Non-CCB
$LLP_{i,t-1}$	0.6266**	0.2886**	0.6251**	0.3025**	0.6161**	0.2958**
	(0.2982)	(0.1148)	(0.2910)	(0.1193)	(0.2806)	(0.1158)
$Earnings_{i,t}$	-0.0188	-0.0398***	-0.0168	-0.0397***	-0.0171	-0.0400***
	(0.0444)	(0.0114)	(0.0445)	(0.0114)	(0.0443)	(0.0112)
$Equity_{i,t-1}$	0.0021	-0.0008	0.0022	-0.0005	0.0023	-0.0005
	(0.0027)	(0.0028)	(0.0027)	(0.0028)	(0.0026)	(0.0028)
$Assets_{i,t}$	0.0001	-0.0003*	-0.0001	-0.0005***	-0.0002	-0.0005***
	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0003)	(0.0002)
$Loans_{i,t}$	0.0028**	0.0077***	0.0027**	0.0071***	0.0030**	0.0074***
	(0.0012)	(0.0011)	(0.0011)	(0.0011)	(0.0012)	(0.0012)
$\Delta Loans_{i,t}$	-0.0058**	-0.0089***	-0.0056*	-0.0090***	-0.0058**	-0.0091***
	(0.0028)	(0.0021)	(0.0029)	(0.0021)	(0.0029)	(0.0021)
$NPL_{i,t}$	0.0352**	0.0303***	0.0350**	0.0298***	0.0356***	0.0301***
	(0.0139)	(0.0051)	(0.0136)	(0.0052)	(0.0135)	(0.0052)
$Commissions_{i,t}$	0.2657***	-0.0058	0.2431**	-0.0066	0.2036**	-0.0059
	(0.0932)	(0.0067)	(0.1064)	(0.0069)	(0.0900)	(0.0069)
$\Delta GDP_{j,t}$	-0.0261***	0.0037	-0.0243**	0.0045	-0.0176*	0.0034
	(0.0093)	(0.0111)	(0.0102)	(0.0110)	(0.0095)	(0.0103)
$FDistance_{i,t}$			0.0002	0.0002*	0.0002	0.0002*
			(0.0002)	(0.0001)	(0.0002)	(0.0001)
$HHI_{j,t}$					0.0164**	-0.0263***
					(0.0079)	(0.0087)
$BranchDens_{j,t}$					-0.0000***	-0.0000***
					(0.0000)	(0.0000)
Macro-region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
P-value AR(2) test	0.4162	0.6521	0.4115	0.6306	0.3965	0.6310
P-value Hansen test	0.4951	0.5380	0.5037	0.5522	0.5147	0.5628
Number of banks	444	295	444	295	444	295
Number of observations	2819	1595	2819	1595	2819	1595

Notes: the Table reports the coefficients of the models defined by equations (1), (2) and (3), separately estimated on the subsamples of CCB and non-CCB. Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Table A4 – Determinants of loan loss provisions: estimation on the fully balanced sample

	(1)	(2)	(3)	(4)
$LLP_{i,t-1}$	0.3952***	0.3968***	0.4169***	0.4065***
	(0.1424)	(0.1377)	(0.1330)	(0.1343)
$Earnings_{i,t}$	-0.0238*	-0.0234*	-0.0226*	-0.0215*
	(0.0125)	(0.0124)	(0.0121)	(0.0117)
$Equity_{i,t-1}$	-0.0002	-0.0000	-0.0001	-0.0006
	(0.0031)	(0.0031)	(0.0031)	(0.0031)
$Assets_{i,t}$	0.0003***	0.0001	0.0001	-0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Loans_{i,t}$	0.0050***	0.0049***	0.0050***	0.0053***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)
$\Delta Loans_{i,t}$	-0.0096***	-0.0098***	-0.0097***	-0.0104***
	(0.0025)	(0.0025)	(0.0025)	(0.0026)
$NPL_{i,t}$	0.0295***	0.0296***	0.0294***	0.0299***
	(0.0056)	(0.0055)	(0.0056)	(0.0057)
$Commissions_{i,t}$	-0.0193***	-0.0210***	-0.0216***	-0.0241***
	(0.0066)	(0.0065)	(0.0063)	(0.0062)
$\Delta GDP_{i,t}$	-0.0301***	-0.0285***	-0.0171***	-0.0166***
	(0.0060)	(0.0060)	(0.0059)	(0.0059)
$FDistance_{i,t}$		0.0001***	0.0001**	0.0001**
		(0.0000)	(0.0000)	(0.0000)
$HHI_{j,t}$			0.0112*	0.0117*
			(0.0059)	(0.0063)
$BranchDens_{j,t}$			-0.0000***	-0.0000***
			(0.0000)	(0.0000)
CCB_i				-0.0008**
				(0.0004)
Macro-region fixed effects	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes
P-value AR(2) test	0.3737	0.3704	0.3582	0.3662
P-value Hansen test	0.1230	0.1305	0.1388	0.1293
Number of banks	490	490	490	490
Number of observations	3430	3430	3430	3430

Notes: the Table reports the coefficients of the specifications defined by equations (1) to (4) estimated on the sample of banks observed in all the eight years of the period of analysis. Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.

Table A5 – Bank's signalling behaviour and loan loss provisions

	(1)	(2)	(3)	(4)
$LLP_{i,t-1}$	0.2013***	0.2005***	0.1919***	0.1939***
	(0.0503)	(0.0499)	(0.0488)	(0.0473)
$Earnings_{i,t}$	-0.0321*	-0.0324*	-0.0327*	-0.0326*
	(0.0189)	(0.0187)	(0.0190)	(0.0192)
$Equity_{i,t-1}$	0.0016	0.0018	0.0020	0.0014
	(0.0032)	(0.0031)	(0.0031)	(0.0030)
$Assets_{i,t}$	0.0003**	0.0000	0.0002*	-0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
$Loans_{i,t}$	0.0057***	0.0056***	0.0068***	0.0068***
	(0.0006)	(0.0007)	(0.0007)	(0.0007)
$\Delta Loans_{i,t}$	-0.0021	-0.0022	-0.0034	-0.0043*
	(0.0024)	(0.0024)	(0.0025)	(0.0024)
$NPL_{i,t}$	0.0325***	0.0323***	0.0323***	0.0337***
	(0.0116)	(0.0116)	(0.0119)	(0.0118)
$Commissions_{i,t}$	0.0102	0.0097	0.0097	0.0048
	(0.0079)	(0.0081)	(0.0075)	(0.0078)
$\Delta GDP_{i,t}$	-0.0309***	-0.0297***	-0.0188***	-0.0177***
	(0.0062)	(0.0062)	(0.0059)	(0.0060)
$FDistance_{i,t}$		0.0001*	0.0001*	0.0002*
		(0.0000)	(0.0000)	(0.0001)
$HHI_{j,t}$			0.0106*	0.0072*
			(0.0062)	(0.0038)
$BranchDens_{j,t}$			-0.0000**	-0.0000***
			(0.0000)	(0.0000)
CCB_i				-0.0016***
				(0.0004)
$Signalling_{i,t}$	-0.0380	-0.0383	-0.0377	-0.0315
	(0.0237)	(0.0234)	(0.0243)	(0.0246)
Macro-region fixed effects	Yes	Yes	Yes	Yes
Period fixed effects	Yes	Yes	Yes	Yes
P-value AR(2) test	0.3788	0.3794	0.3905	0.3967
P-value Hansen test	0.2214	0.2281	0.2209	0.2660
Number of banks	703	703	703	703
Number of observations	3658	3658	3658	3658

Notes: the Table reports the estimated coefficients of the specifications defined by equations (1) to (4), augmented to include the one-year-ahead change of earnings before taxes and loan loss provisions ($Signalling_{i,t}$) Robust standard errors are reported in parentheses below the estimates.
***, ** and * denote significance at the 1, 5 and 10% levels, respectively.