DOES BANKING OVERSIGHT MAKE FINANCIAL STATEMENTS MORE RELIABLE? AN ANALYSIS THROUGH COUNTRIES WHICH ARE PART OF THE SINGLE SUPERVISORY MECHANISM (SSM)

Giacomo Ceccobelli [*], Alessandro Giosi [**]

* *Corresponding author*, Department of Management and Law, University of 'Tor Vergata', Rome, Italy
Contact details: Department of Management and Law, University of 'Tor Vergata', Via Cracovia 50 – 00133 Rome, Italy
** Department of Human Sciences, University of 'Libera Università Maria Santissima Assunta - Lumsa', Rome, Italy

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Abstract

The purpose of this research is to investigate earnings management purposes in the banking industry via loan loss provisions using a sample of 156 banks from 19 European countries under the Single Supervisory Mechanism (SSM) over the period 2006-2016. Using regression analysis, banks are tested for income smoothing, capital management, and signaling purposes.
This study contributes to the literature exploring the relationship between accounting quality and earnings management objectives by analyzing which one of the latter is the more important determinant. The hypotheses of income smoothing and signaling are strongly approved since loan loss provisions consist as a tool for smoothing the amount of net profit and to convey private information to the market; on the contrary, the capital management purpose is not supported. Additionally, the analysis finds that non-discretionary components of loan loss provisions (essentially non-performing loans) have played an important role, especially during the financial crisis.
Furthermore, the research is aimed at investigating the peculiar regulatory and supervisory environment in the banking industry on the basis of a set of indexes included in the "Bank Regulation and Supervision Survey", carried out by the World Bank.
Unlike previous literature, this study takes into account the latest release of the survey, emphasizes the role of an on-site inspection as the main supervisory tool and extends the analysis of the interaction between bank regulation and supervision and earnings management. The results demonstrate that such controls can influence the behaviour of bank managers in terms of income smoothing and signaling practices. Therefore they can be considered as effective instruments for reducing banks' management accounting discretion, making financial statements more reliable.

Keywords: Banks, Earnings Management, Loan Loss Provisions, Income Smoothing, Signaling, Bank Regulation And Supervision, On-Site Inspection

1. INTRODUCTION

Literature recognizes as a distinctive feature of the IAS-IFRS the 'principles-based' approach (Carmona & Trombetta, 2009). The publication of generic accounting standards gives a scope to manage reported revenues and causes leading managers to consider earnings management purposes. Studies of financial and non-financial firms have proved earnings management purposes of income smoothing, signaling and capital management. These policies are, respectively, aimed at reducing net

income changes through financial years, signaling private information about the earnings that management thinks the company will be able to achieve in the future, and (with reference to banks) raising the amount of capital to so as for being compliant with regulatory rules.

According to literature (Francis et al., 2016), the aforementioned purposes are realized through various practices generally attributable to real and accrual earnings management practices. The first are management actions that deviate from normal business practices with a direct impact on both P&L and current cash flows, while accruals-based earnings management reflects transactions that affect P&L and future cash-flow although cash has not currently changed hands.

Taking into account literature on accruals-earnings management in the non-financial sector, studies follow the Jones model (1991) adopting an aggregated approach that considers the total amount of accruals. These studies have excluded financial firms from their sample due to the specific characteristics and the highly regulated nature of the banking industry.

On the contrary, banking literature has essentially adopted a specific approach focusing on loan loss provisions since they are the most relevant accrual and the discretionary component attached to them is particularly relevant. Against this backdrop, this paper primarily intends to explore which earnings management purposes is the most relevant in the banking industry.

Banks operate in a very highly regulated environment, where authorities have set up a range of devices, under the umbrella of regulation and supervision, in an attempt to control risk-taking incentives. Banking regulation and supervision is the most prominent institutional factor that affects accounting estimations of banks. Few scholars have examined the relationship between earnings management and banking regulation and supervision, especially by means of indexes from the Bank Regulation and Supervision Survey developed by the World Bank.

The other purpose of this study is to investigate whether banking regulation and supervision instruments reduce management accounting discretion, using indexes not yet applied by previous research.

The empirical model considers as the dependent variable the loan loss provisions out of total assets; the independent variables are aimed at separating the discretionary and non-discretionary component of the dependent variable. Detecting whether bank managers use discretion to manage earnings is based on the empirical model developed by Curcio and Hasan (2015). It is hypothesized that the most prominent determinant of loan loss provisions is attributable to credit risk related components, expected to be more significant during the last economic downturn; as to earnings management purposes, loan loss provisions should be significantly positively related to earnings and one-year-ahead changes in earnings while on the contrary banks should have little incentive to manipulate capital via loan loss provisions, so that a non-significant relationship between provisions and capital is expected.

To sum up, bank regulation and supervision tools are supposed to be effective instruments for reducing banks' management accounting discretion.

By examining a sample of 156 European banks for the period 2006-2016, a panel data OLS regression with fixed effects has been run, showing as a critical non-discretionary explanatory variable the level of non-performing loans. Evidence supports the income smoothing and signaling hypothesis. The interaction between banking regulation and supervision explanatory variables and earnings management purposes demonstrates that banks are less likely to be involved in earnings management objectives if banking regulation and the supervision regime is stricter.

The paper is organized in the following way. Section 2 presents the theoretical background behind earnings management policies applied in the banking industry summarizing the body of relevant academic literature and discusses the role of banking regulation and supervision in the background of the SSM. Section 3 explains the methodology and 4 and 5 present respectively the empirical results and the conclusions.

2. THEORETICAL BACKGROUND

2.1. Earnings management against the background of the international accounting standards

The adoption of IAS-IFRS as a set of single and global accounting language ensures the neutrality of financial statements, standardizing accounting policies around the globe and the facilitation of high quality and comparable financial information. The mainstream recognizes that IAS-IFRS, as principle-based standards, give scope to manage reported revenues and costs in order to change current period earnings or to consider other intentions, all included under the notion of earnings management (Mechelli & Cimini, 2013; Leung, 2016; Salewski et al., 2016); a divergent opinion is given by El Guindy (2014).

Earnings management has been defined in many different ways. According to Healy and Wahlen (1999), earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers.

2.2. Real and accruals-based earnings management

Two main forms of earnings management have been addressed in literature: real earnings management and accruals earnings management. Roychowdhury (2006) provides an articulated framework of real earnings management, defined as management actions that deviate from normal business practices, undertaken with the primary objective of meeting certain earnings thresholds.

The same author has shown the existence of upward real-activity earnings management, which basically occurs when managers deviate from optimal business decisions. Francis et al. (2016) establish the existence of downward real earnings management by investigating several corporate events in which managers have incentives to temporarily deflate market valuations. Taking into account the banking industry, various studies (Cohen et al., 2014) have provided evidence of real

earnings management practices through the discretionary realizations of security gains or losses.

Accruals earnings management basically reflects business transactions that affect future cash-flow although cash has not currently changed hands: hence they reflect the time allocation of revenues and expenses with a direct impact only on the P&L statement.

Accruals earning management studies on the non-financial sector have adopted an aggregated approach, based on the calculation of the total amount of accruals, as the difference between cash flow and earnings. The model adopted by Jones (1991) and its modified version by Dechow et al. (1995) is the most common empirical approach used to test accruals earnings management.

In contrast, banking literature has essentially adopted a specific approach, focusing on a specific item that is loan loss provision, and the level of its discretionary amount. Previous studies hypothesized that bank managers used partial discretion when they estimated the number of yearly provisions. To test empirically this hypothesis, Kwak et al. (2009), Garsva and Skuodas (2012), Curcio and Hasan (2015) have defined a regression on which loan loss provisions, as the dependent variable, is modelled as a function of various components included in two different sets of categories:

– objective or non-discretionary accrual components, reflecting the credit-risk of the bank portfolio;

– subjective or discretionary accrual components, considered as explanatory variables of income smoothing, capital management, and signaling purposes.

2.3. Earnings management purposes: income smoothing, signaling, and capital management

Under the umbrella of earnings management purposes, literature essentially refers to policies of income smoothing, signaling and capital management which are, respectively, aimed at: 1) reducing net income changes through financial years; 2) signaling private information about the amount of earnings that the management thinks the company will be able to reach in the future; 3) raising the amount of capital to be compliant with regulatory rules (and consequently to avoid costs associated with the violation of specific requirements). Each purpose is detailed below.

Various definitions on income smoothing exist, but all seem to agree that managers use flexibility stemming from accounting principles both in the financial reporting process and in operating decisions to reduce net income changes through financial years.

Gebhardt and Novotny-Farkas (2011) recognize that a stable earnings stream may be useful to portray the entity as less risky to investors and creditors, resulting in higher stock prices, lower borrowing costs and cost of capital.

Many studies related to income smoothing refer to the banking sector. Under the income smoothing behaviour, banks choose accruals to minimize the variance of reported earnings.

Greenwalt and Sinkey (1988) suggest that managers smooth income in an attempt to reduce the perceived riskiness of their banks' earnings. Kanagaretnam et al. (2003) hypothesize that bank managers smooth income when there is a need for their banks to look to external financing for meeting customer loan demands.

The hypothesis of income smoothing within the banking sector has been developed essentially by examining the association between loan loss provisions and the pre-impairment operating profit. The mainstream, see among others Collins et al. (1995), Laeven and Majnoni (2003), Gebhardt and Novotny-Farkas (2011), detects evidence of income smoothing by considering a strict correlation between loan loss provisions and earnings before taxes and loan loss provisions. However, a minority stream (Ahmed et al., 1999) concludes there is no evidence of income smoothing.

Another managerial scope is to signal private information about the earnings that management thinks the company will be able to achieve in the future.

This hypothesis has been developed essentially by examining the association between loan loss provisions and one-year-ahead change in earnings before taxes and loan loss provisions. Kanagaretnam et al. (2004), Curcio and Hasan (2015) conclude that commercial bank managers do engage in signaling via loan loss provisions: this suggests that private investors can interpret increases in loan loss provisions as good news and not as the anticipated deterioration of credit portfolios' future quality. However, a contrary opinion is given by Ahmed et al. (1999), who conclude there is insufficient evidence to support the signaling hypothesis.

Capital management is a purpose referable to industries subjected to a strict regulation primarily expressed in terms of the minimum amount of capital to ensure that the related entities do not take on excess risk and become insolvent. This regards firstly the banking sector, where regulators require a minimum amount of capital to operate essentially because capital provides protection against risk-taking operations.

Considering previous studies, the relationship between loan loss provisions and capital adequacy ratios does not imply a clear prediction of the sign of the association. Ahmed et al. (1999) conclude there is a negative association while Fonseca and Gonzalez (2008) find a significant positive association; Gebhardt and Novotny-Farkas (2011) do not detect significant relation between loan loss provisions and capital ratios.

This study, focusing on the banking industry, contributes to the literature by exploring the relationship between accounting quality and earnings management objectives and analyzing which one is the more important determinant of earnings management. These subjects lead to the first research question: *Which earnings management purposes between income smoothing, capital management, and signaling are the most relevant in the banking industry?*

The investigation of earnings management in the banking sector is based on adopting a specific approach, considering as explanatory variable the loan loss provisions since traditional banks based their business on credit intermediation and have substantial latitude in determining the number of provisions, which is their main accrual.

Provisions for bank credit risk are commonly distinguished in a discretionary and non-discretionary component. The non-discretionary component is mainly due to problem loans and to the default risk of a bank's credit portfolio; indicators such as the ratio of non-performing loans

to total loans are able to capture the underlying portfolio credit risk. Thus, the first hypothesis is formulated as follows:

H1: The most prominent determinant of loan loss provisions is attributable to credit risk related components, expected to be more significant during the last economic downturn.

As to discretionary components of loan loss provisions, the first driver of earnings management purposes is attributable to income smoothing. Managers adjust earnings figures for several subjective reasons: banks would recognize the underlying portfolio credit risk and build up loan-loss reserves in good times to be drawn on in bad times. Following the previous discussion, we hypothesize a significant association between loan loss provisions and income smoothing. Hence, the second hypothesis is stated as follows:

H2: Loan loss provisions are significantly positively related to earnings.

With respect to capital management, if the relationship is expected to be significantly positive, this means that banks tend to manage provisions on the basis of their proximity to the minimum regulatory capital levels. However, bank capital regulation has progressively reduced banks' incentives to adopt capital management strategies. In this respect, a part of the literature (Bouvatier et al., 2014) provides support for the limited role of capital management on loan loss provisions. Thus, the third hypothesis is formulated as follows:

H3: Banks have little incentive to manipulate capital via loan loss provisions so that a non-significant relationship between provisions and capital is expected.

Banks can also use provisions to signal their financial strength. Loan loss provisions are used as a signalling tool for stakeholders, especially investors regarding a bank's expected cash flows in the future year. Hence, the fourth hypothesis is formulated as follows:

H4: Loan loss provisions are positively related to one-year-ahead changes in earnings.

2.4. Earnings management and the role of banking regulation and supervision

Previous studies have explored how management estimations on discretionary accruals are affected by several institutional factors such as institutional ownership (Kwak et al., 2009; Rajpal & Jain, 2015; Grimaldi & Muserra, 2017; Al-Omush et al., 2018), accounting and auditing requirements (Fonseca & Gonzalez, 2008; Fernandez & Gonzalez, 2005), financial structure (La Porta et al., 2002) and corporate governance arrangements (Kang et al., 2013). Against this backdrop, the most relevant institutional factor in the banking sector is represented by banking regulation and supervision since credit intermediaries operate in a very highly regulated environment, where authorities have set up a range of devices in an attempt to control risk-taking incentives.

In the Euro Area, the Single Supervisory Mechanism, the first pillar of the European Banking Union, is based on a common methodology for the ongoing assessment of credit institutions, the so-called Supervisory Review and Evaluation Process (in short SREP). SSM Supervision on a credit institution basically consists of both off-site supervision, which mainly relies on the information reported by a credit institution, and on-site supervision performed through inspections in order to check, among other things, the accuracy of the information used to conduct off-site supervision. Therefore, inspection is the natural complement of ongoing (i.e. off-site) supervision.

The method adopted in the literature to explore the relation between earnings management and bank regulation and supervision is by means of the "Bank Regulation and Supervision Survey", carried out by the World Bank in four different releases. On the basis of the first release, Barth et al. (2001) have identified a set of indicators to sum up the most relevant features of banks' regulation and supervision practices. These indexes have been adopted in the literature to study whether banking regulation and supervision play a role, among others, in management accounting policies.

In this respect, Fonseca and Gonzalez (2008), Gebhardt and Novotny-Farkas (2011), Bouvatier et al. (2014) and Curcio and Hasan (2015), on the basis of a part of those indexes, recognized that the use of loan loss provisions to smooth income is reduced through stricter regulation on bank activities, official supervision, and private monitoring.

From a prudential point of view, their empirical evidence points out that banks are less likely to be involved in income smoothing if restrictions in banking activity are higher; they conclude by recognizing the need for a sound accounting framework since their findings support the probability that reported financial numbers may not reflect the underlying economic reality of European banks.

Differently, from previous literature, this study on the SSM banking system takes into account the indexes included in Barth et al. (2013). The authors carried out data quality on the indexes previously developed: compared to their previous works, the authors perform a process of quality assurance, resolving a large part of the inconsistencies and missing values of the four surveys by considering the time-series of answers given by Banking Authorities.

Additionally, it is worth noting that previous works do not emphasize the role of on-site inspection to influence, as the main supervisory tool, financial figures. In this respect, differently from previous literature, this study investigates the role of banking supervision by introducing the index of the frequency of on-site inspection.

Furthermore, this paper studies the role of banking regulation and supervision considering not only the association with income smoothing but expanding the focus on signaling and capital management as well. All that said, the relation between banking regulation and supervision and earnings management practices is based on the following research question: *Do banking regulation and supervision instruments reduce management accounting discretion? If so, in what manner?*

As to bank regulation, tighter rules on bank activities should reduce both opportunities for taking risk and earnings management practices. A similar assumption refers to bank supervision. For these reasons, it is expected a negative influence of both banking regulation and supervision on earnings management practices. To sum up the fifth hypothesis is developed:

H5: Bank regulation and supervision are effective instruments for reducing banks' management accounting discretion.

3. RESEARCH METHODOLOGY

3.1. Methodology and variable definition

Detecting whether bank managers use their discretion to manage capital and/or earnings and to signal future earnings is in line with prior research, separating the discretionary and non-discretionary components of loan loss provisions.

The variables adopted derive from a vast majority of prior literature (Curcio & Hasan, 2015; Ahmed et al., 1999; Bouvatier & Lepetit, 2008; Fonseca & Gonzalez, 2008) based on the regression of bank loan loss provisions on various explanatory variables.

A full list of variables and their definitions is provided below, as well as the rationale for a predicted relationship. In order to avoid influencing the results due to the different size of credit institutions, variables referred to single banks have been scaled by average total assets; this is a way to mitigate potential estimation problems with heteroskedasticity.

Dependent variable

LLP is the ratio of loan loss provisions to total assets at time t for the bank i. In line with previous literature, the value of the ratio is believed to be able to identify the magnitude of earnings management practices in the banking industry.

Non-discretionary variables

The first group of independent variables could be defined as non-discretionary (or objective) components of loan loss provisions, intended as direct proxies for the default risk of the loan portfolio and aimed at distinguishing between general and specific provisions. They consist of: 1) *NPL*, the ratio of non-performing loans to total assets that occurred at the bank i at time t. It represents the current level of losses within the loan portfolio. *NPL* can be considered a proxy for the part of loan-loss provisioning regarding specific provisions; it appears as the best proxy for loan portfolio credit risk and it is expected to be positively related to changes in *NPL*; 2) *LOA*, the ratio of customer loans to total assets that occurred at the bank i at time t. It represents the dynamics of losses within the loan portfolio and it is intended as a proxy to capture general provisions. As regards its relationship with *LLP*, the influence of *LOA* is supposed to be positive and depends on the quality of incremental loans; however, the association should be lower than the one between *LLP* and *NPL* given the lesser relevance of general provisions.

Discretionary variables

Three different bank-specific variables, namely current earnings before taxes and loan loss provisions, *Tier 1* ratio and one-year-ahead change in earnings before taxes and loan loss provisions, capture the discretionary (i.e. subjective) component of loan loss provisions:

– *EAR* is the ratio of current earnings before taxes and loan loss provisions to total assets that occurred at the bank i at time t. It consists of a pre-impairment operating profit, considered as a measure aimed at testing if income smoothing purposes have occurred. If the sign of the coefficient between *LLP* and *EAR* is positive, this means that banks with lower (higher) earnings tend to reduce (increase) loan loss provisions. According to the developed hypothesis, the adoption of income smoothing practices is verified and *LLP* is aimed at stabilizing *EAR*. Therefore, the expected association is positive.

– *T1* (*Tier 1*) is regulatory capital divided by risk-weighted assets that occurred at the bank i at time t. It is considered as the best variable for testing capital management policies: based on prudential rules, T1 includes equity and retained earnings and loan loss provisions are subtracted. According to some parts of previous studies (Bouvatier & Lepetit, 2008), financially distressed banks that have problems meeting capital requirements may have incentives to reduce their provision, since they have a constraint due to a tight solvency position. In light of this, *T1* is supposed to be a proxy of capital management practices and the expected association between *LLP* and *T1* could be positive. A different explanatory capital management variable would be the Total Capital Ratio, corresponding to the sum of *Tier 1* and *Tier 2* regulatory capital; if banks under internal rating based model are considered, the second part of the total amount of the own funds (*Tier 2* capital) include in a certain way the amount of loan loss provisions.

– *SIGN* is the ratio of one-year-ahead change in earnings before taxes and loan loss provisions to total assets that occurred at the bank i at time t. It indicates the existence of signaling practices via loan loss provisions. In line with previous studies, if the coefficient between *LLP* and *SIGN* is positive, this means that changes in loan loss provisions are positively correlated to future changes in earnings: in this case, the adoption of signaling practices are verified.

Further additional control variables have been added on the right side of the regression equation. In this respect the study includes:

–*GDP* is the annual growth rate in the gross domestic product at constant prices of country i at time t. Given that this is a cross-border study, *GDP* is supposed to be the most appropriate macroeconomic indicator as an indirect proxy for credit risk. Taking into consideration business cycle conditions, it could be seen as a control variable for procyclical effects of provisioning; a negative relationship with *LLP* is expected since a higher level of provisions should be observed if the economic situation declines. *GDP* data are from Eurostat.

–*SIZE* is a bank dummy variable. The intermediaries' categorization under the SSM is considered to take into account the dimension of the bank. Specifically, the banks in the sample have been distinguished in two groups, assuming the value of 0 if the bank is a less significant institution (meaning that it is supervised directly by a National Supervisory Authority), whereas 1 if it is a significant institution under the direct supervision of the European Central Bank. To the best of our knowledge, this is the first study investigating the relationship between this variable and *LLP*; there is no clear evidence of the possible sign of the relation between *SIZE* and *LLP*.

–*COU* is a country dummy variable. This is a set of country dummy variables controlling for specific differences in the level of loan loss provisions across

countries; they are included with an intention to assess if country-specific effects really matter.

–*YEAR* is a year dummy variable. This is a set of dummy time variables aimed at capturing unobserved time-invariant effects that are not included in the regression. There is no clear evidence of the possible sign of the relationship with *LLP*; a possible trend could be observed considering the impact of the last economic downturn.

Against this backdrop, it is worth noting that the accounting regime does not raise any issues since all the banks in the sample are under IFRS. Taking all the variables together, the following model specification is applied to give an answer to the first research question.

$$LLP_{i,t}=\alpha_0+\alpha_1 NPL_{i,t}+\alpha_2 LOA_{i,t}+\alpha_3 EAR_{i,t}+\alpha_4 T1_{i,t}+\alpha_5 SIGN_{i,(t+1,t)}+\alpha_6 GDP_{i,t}+\alpha_7 SIZE_t+\sum COU+\sum YEAR+\varepsilon \quad (1)$$

Banking regulation and supervision variables

The second set of components represents explanatory variables of banking regulation and supervision, which may have either a positive or a negative effect on credit institutions' decisions about earnings management practices.

As stated above, this profile is deepened using evidence from the "Bank Regulation and Supervision Survey", carried out by the World Bank. The survey is a source of comparable worldwide data on how banks are regulated and supervised by competent authorities; it is based on a list of questions sent to competent regulatory and supervisory authorities around the world and covers various aspects of banking, including entry requirements, ownership restrictions, capital requirements, activity restrictions, external auditing requirements, deposit insurance scheme characteristics, loan classification and provisioning requirements, accounting and disclosure requirements, troubled bank resolution actions, quality of supervisory personnel.

Four different releases of the survey, involving many countries, have been performed in 2001, 2003, 2007 and 2012. The releases of the survey are available on the World Bank website (https://www.worldbank.org/en/research/brief/BRSS).

The survey includes a set of indicators to sum up the most relevant features of banks' regulation and supervision practices and they can be used to study if banking regulation and supervision play a role in management accounting policies. In this respect, the influence of banking regulation and supervision is developed by virtue of specific indexes developed by Barth et al. (2013). The study includes the following banking regulation and supervision variables:

– *CAP* is an index of the stringency of bank capital regulation. The index takes into account the number of capital banks must hold and the stringency of regulations on the nature and source of regulatory capital. Specifically, it is composed of the answers given by the regulators on the basis of 10 specific survey questions: as a consequence, the maximum possible value is 10, while the minimum is 0. Larger values indicate more stringent capital regulation; in this respect, a positive relation between *LLP* and *CAP* is expected.

– *EXA* is a frequency of on-site inspections performed by Supervisory Authority. To study the influence of banking supervision, the paper focuses on the frequency with which inspections are carried out by supervisory inspectors. The information has been derived from Barth et al. (2013), where specific information at a national level has been provided. In this perspective the index adopted, differently from the ones considered by previous studies, is expected to be more strictly related to the amount of loan loss provisions.

Interaction variables

To test the interaction between banking regulation and supervision variables and earnings management purposes, it has been sequentially incorporated an interaction term for each banking variable (*CAP* and *EXA*) and the explanatory variable of earnings management (*EAR*, *T1*, and *SIGN*).

The interaction of banking regulation and supervision with each earnings management variable has been considered separately rather than at the same time. The coefficient of each interaction term measures the influence of banking regulation and supervision on bank income smoothing, capital management, and signaling practices; to that end, a negative coefficient is expected if the banking regime is stricter, meaning that banks are less likely to be involved in income smoothing, capital management, and signaling practices

Therefore the following interaction between variables has been defined.

Banking regulation and earnings management purposes:

–*CAP*EAR*: interaction between banking regulation and income smoothing;

–*CAP*T1*: interaction between banking regulation and capital management;

–*CAP*SIGN*: interaction between banking regulation and signalling.

Banking supervision and earnings management purposes:

–*EXA*EAR*: interaction between banking supervision and income smoothing;

–*EXA*T1*: interaction between banking supervision and capital management;

–*EXA*SIGN*: interaction between banking supervision and signaling.

To develop the second research question, the following regression equations are applied.

$$\begin{aligned} LLP_{i,t} = {} & \alpha_0+\alpha_1 NPL_{i,t}+\alpha_2 LOA_{i,t}+\alpha_3 EAR_{i,t}+\alpha_4 T1_{i,t}+\alpha_5 SIGN_{i,(t+1,t)}+\alpha_6 CAP_{i,t}+\alpha_7 CAP*EAR_{i,t} \\ & +\alpha_8 CAP*T1_{i,t}+\alpha_9 CAP*SIGN_{i,t}+\alpha_{10} SIZE_i+\alpha_{11} GDP_{i,t}+\sum COU+\sum YEAR+\varepsilon \end{aligned} \quad (2)$$

$$\begin{aligned} LLP_{i,t} = {} & \alpha_0+\alpha_1 NPL_{i,t}+\alpha_2 LOA_{i,t}+\alpha_3 EAR_{i,t}+\alpha_4 T1_{i,t}+\alpha_5 SIGN_{i,(t+1,t)}+\alpha_6 EXA_{i,t}+\alpha_7 EXA*EAR_{i,t} \\ & +\alpha_8 EXA*T1_{i,t}+\alpha_9 EXA*SIGN_{i,t}+\alpha_{10} SIZE_i+\alpha_{11} GDP_{i,t}+\sum COU+\sum YEAR+\varepsilon \end{aligned} \quad (3)$$

3.2. Data and sample selection

The sample of countries and banks has been set out on the basis of the following criteria. From a geographical perspective, the population of countries included in the World Bank Survey (118, 151, 143 and 142 countries, respectively, in the 2001, 2003, 2008 and 2012 surveys) has been reduced to the 19 Euro Area Countries in the context of the SSM.

In order to define a balanced sample of banks, a subset of credit institutions has been selected, considering both Significant Institutions (SI), the largest banks supervised in the SSM, and Less Significant Institutions (LSI). The cut-off date for ECB significance decisions dated 1 April 2017 has been considered. This significance decision includes 124 significant institutions; the sample has been set by dropping 31 banks since their financial figures are missing for at least one year of observation (data not available both on Bankscope/Orbis and the banks' websites). Therefore, this procedure defines a sample of annual year-end information of 93 SI. Furthermore, the sample has been extended taking into account minor banks in terms of size. On the basis of the previous criterion that refers to banks whose financials are available for the whole observation period in Bankscope/Orbis or their web sites, a list of 63 LSI has been also added, of which the large majority are Italian (No. 41).

One possible explanation of the lack of data on LSI in both Bankscope/Orbis and websites depends on the adoption of national accounting principles applied, which do not generally require specific accounting information (such as the amount of non-performing loans). Otherwise, as regards the Italian financial system, since 2005 all banks have to prepare their financial statements according to specific schemes in line with IAS-IFRS, requiring a more extensive set of financial information compared to national standards. As a whole, the total sample consists of 156 banks: the representativeness essentially depends on the reporting quality of some of the indicators representing the bulk of this research (such as non-performing loans, loan loss provisions, *Tier 1* ratio). The analysis is mainly driven by Italian banks that represent around 1/3 of the sample (54 out of 156), whereas Germany and France respectively the second and third countries in terms of representation, accounting for almost 20% of the sample banks.

The time frame of interest starts from 2006 to 2016 and the use of this specific time series is due to the financial crisis. Specifically, as the turmoil of the financial crisis can represent a source of noise in the data, the analysis has been performed before and after the crisis period. Furthermore during the specific time frame banks were subjected to two major regulatory changes, i.e. the implementation of the Basel III Accord in 2014 and the change of supervision model through the launch of the SSM in November 2014.

The final sample size consists of 1,716 bank-year observations. Financial figures, expressed in USD currency, are from Bankscope/Orbis database (Bureau van Dijk); in order to avoid any data inconsistencies and lack of information, where not available, data have been taken from banks' web sites. Since financial figures from Bankscope/Orbis are in USD, data from banks' web sites have been converted according to the exchange rate of the euro to the USD (EUR-USD), available on the European Central Bank web site. The exchange rate EUR-USD reflects USD values as of end of each year, namely: 1.31 (2006), 1.47 (2007), 1.39 (2008), 1.44 (2009), 1.33 (2010), 1.29 (2011), 1.32 (2012), 1.38 (2013), 1.21 (2014), 1.09 (2015), 1.05 (2016). In some minor cases when data referred to specific variables (Non-performing loans, Total Capital Ratio, *Tier 1* ratio) were not available, estimation has been performed, mainly on the basis of the average values observed in the past. Non-performing loans is the only exception: taking into account the amount of loan loss reserves, it has been hypothesized a coverage ratio of 50%, therefore loan loss reserves has been doubled. Table 1 below highlights the final sample on a country basis.

Table 1. Distribution of banks and observations by country (sample statistics)

Countries	*A number of banks*	*of which: a number of SI*	*of which: a number of LSI*	*A number of observations*	*Percentage of total observations*
Austria	6	6	0	66	3,8%
Belgium	6	6	0	66	3,8%
Cyprus	1	1	0	11	0,6%
Estonia	2	2	0	22	1,3%
Finland	4	4	0	44	2,6%
France	10	10	0	110	6,4%
Germany	21	18	3	231	13,5%
Greece	6	4	2	66	3,8%
Ireland	3	3	0	33	1,9%
Italy	54	13	41	594	34,6%
Latvia	3	3	0	33	1,9%
Lithuania	6	3	3	66	3,8%
Luxembourg	2	0	2	22	1,3%
Malta	2	2	0	22	1,3%
Netherlands	8	5	3	88	5,1%
Portugal	3	2	1	33	1,9%
Slovakia	5	3	2	55	3,2%
Slovenia	7	3	4	77	4,5%
Spain	7	5	2	77	4,5%
Total	156	93	63	1.716	100,0%

Source: compiled by the authors

3.3. Descriptive statistics and correlation

Table 2 below provides some descriptive statistics for the period 2006-2016: firstly, considering the whole sample of banks, then by distinguishing in terms of institution size – SI and LSI. Furthermore, country segmentation is carried out in order to deepen if certain differences on a country basis occur.

Table 2. Descriptive statistics

		LLP	***NPL***	***LOA***	***EAR***	***T1***	***SIGN***
All banks	Observations	1,716	1,716	1,716	1,716	1,716	1,716
	Mean	0.007	0.054	0.590	0.010	12.88%	0.001
	Median	0.004	0.029	0.630	0.010	11.50%	0.0004
	Std deviation	0.013	0.075	0.198	0.013	6.23%	0.017
	Min	-0.011	0.000	0.008	-0.196	-6.10%	-0.159
	Max	0.185	0.757	0.964	0.158	66.89%	0.291
SI	Observations	1,023	1,023	1,023	1,023	1,023	1,023
	Mean	0.007	0.045	0.565	0.010	12.57%	0.001
	Median	0.003	0.022	0.604	0.008	11.34%	0.0005
	Std. deviation	0.013	0.068	0.180	0.012	6.24%	0.019
	Min	-0.011	0.000	0.008	-0.101	-6.10%	-0.158
	Max	0.134	0.544	0.931	0.118	66.89%	0.290
LSI	Observations	693	693	693	693	693	693
	Mean	0.008	0.068	0.626	0.011	13.34%	0.0009
	Median	0.005	0.046	0.669	0.011	11.83%	0.0003
	Std deviation	0.014	0.081	0.217	0.015	6.18%	0.014
	Min	-0.003	0.000	0.033	-0.196	0.58%	-0.102
	Max	0.185	0.757	0.964	0.158	47.20%	0.106
	Median LLP	***Median NPL***	***Median LOA***	***Median EAR***	***Median T1***	***Median SIGN***	***Median LLP***
Country	Austria	0.004	0.028	0.556	0.011	10.27%	0.0003
	Belgium	0.001	0.007	0.471	0.004	14.05%	0.001
	Cyprus	0.011	0.062	0.678	0.018	10.20%	0.001
	Estonia	0.001	0.014	0.772	0.020	22.01%	-0.001
	Finland	0.001	0.005	0.650	0.007	14.35%	0.0003
	France	0.002	0.017	0.335	0.006	11.15%	0.0004
	Germany	0.001	0.011	0.499	0.004	11.50%	0.0001
	Greece	0.011	0.090	0.664	0.010	11.75%	0.001
	Ireland	0.011	0.096	0.662	0.011	11.50%	0.001
	Italy	0.006	0.056	0.668	0.012	10.81%	0.0001
	Latvia	0.005	0.029	0.682	0.021	11.65%	-0.0001
	Lithuania	0.004	0.067	0.696	0.013	12.95%	0.002
	Luxembourg	0.001	0.005	0.190	0.007	13.72%	-0.0001
	Malta	0.002	0.024	0.524	0.016	10.50%	0.001
	Netherlands	0.001	0.015	0.672	0.005	15.20%	0.0001
	Portugal	0.007	0.037	0.693	0.008	9.03%	0.001
	Slovakia	0.006	0.031	0.554	0.021	15.31%	0.001
	Slovenia	0.006	0.068	0.631	0.012	10.39%	0.002
	Spain	0.005	0.028	0.711	0.011	10.77%	0.001
	Total	0.004	0.029	0.630	0.010	11.50%	0.0004

Source: compiled by the authors

The median ratio of loan loss provisions to total assets (*LLP*) is 0.4%, while the mean value is 0.7%. The difference is due to the weight of outlier observations; however, data are not curtailed in the upper and lower bound of the distributions in order to avoid loss of observations which could deteriorate the validity of the inferences. The value of the *LLP* median ratio confirms that loan loss provisions are a relatively important accrual for credit intermediaries. There is a difference between banks of different size: as to SI the median value is 0.3%, while for LSI it is higher (0.5%): this could be attributable to their different business models considering that LSI is more focused on traditional lending activity; on the contrary as to SI, non-interest business represents a more relevant business. The level of median *LLP* is quite divergent between countries, observing relevant variations between Southern European SSM countries (e.g. Cyprus and Greece: 1.1%, Portugal: 0.7%) and Northern European SSM countries (e.g. Belgium, Estonia, Finland, Germany, and the Netherlands 0.1%); in this respect provisions may be understandably lower in richer countries.

With regard to the credit quality portfolio of the whole sample, non-performing loans (*NPL*) are, on average, 5.4% of total assets, with higher level associated to LSI (6.8%) compared to SI (4.5%), due to their worse credit quality portfolio.

With reference to the business model, on average both SI and LSI account a number of loans (*LOA*) above 50% of their total assets. Specifically, significant institutions show a ratio a little bit lower (57% vs 63%). This is something expected since, as explained above, LSI might be more focused on a traditional lending activity (making loans and issuing deposits), while SI (especially cross-border intermediaries) should have a relevant part of their business involved in the non-interest-based activity.

As to profitability, the ratio of earnings before taxes and loan loss provisions to total assets (*EAR*) is circa 1%, with no material difference between SI and LSI. Quite surprisingly, Southern European SSM banks show a higher profitability level compared to Northern ones (e.g. Greece: 1% vs Germany: 0.4%); however, it should be considered that the indicator does not include the amount of loan loss provisions, more relevant for Southern European credit institutions.

Banks' capital endowment is measured by the ratio of primary quality capital to RWA (*Tier 1 capital, T1*), whose mean value is 12.88%. The ratio is well above the minimum amount required by Basel Accords 2 and 3 (respectively 4% and 6%), that were brought into force during the observation period (Basel 2 was in force since 2013, from 2014 Basel 3 Accords have been introduced). As confirmed by the standard deviation, the difference between SI and LSI are not material.

To create a better understanding of the data, Table 3 below presents pairwise Pearson correlation coefficients both for the whole period (2006-2016) and on a yearly basis.

Table 3. Pairwise Pearson correlation coefficients (Part 1)

	LLP	*NPL*	*LOA*	*EAR*	*T1*	*SIGN*	*GDP*	*SIZE*	*COU*	*YEAR*
LLP	1.000									
NPL	0.683	1.000								
LOA	0.191	0.276	1.000							
EAR	0.125	0.077	0.158	1.000						
T1	-0.091	0.002	-0.115	0.008	1.000					
SIGN	0.143	0.105	0.026	-0.408	-0.089	1.000				
GDP	-0.230	-0.148	-0.095	0.137	0.060	-0.031	1.000			
SIZE	-0.061	-0.155	-0.150	-0.035	-0.062	-0.033	0.113	1.000		
COU	0.106	0.088	0.211	0.059	-0.026	0.014	0.021	-0.268	1.000	
YEAR	0.138	0.327	-0.031	-0.093	0.368	0.046	-0.074	-0.001	-0.001	1.000

Table 3. Pairwise Pearson correlation coefficients (Part 2)

LLP	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
NPL	0.096	0.152	0.314	0.632	0.788	0.712	0.644	0.834	0.685	0.814	0.745
LOA	0.102	-0.022	0.317	0.270	0.245	0.276	0.337	0.204	0.272	0.188	0.148
EAR	0.762	0.780	0.446	0.226	0.032	-0.234	0.301	0.058	0.114	0.273	-0.911
T1	-0.009	0.158	-0.124	-0.088	-0.141	-0.305	-0.280	-0.166	-0.256	-0.070	-0.286
SIGN	-0.516	-0.709	-0.298	-0.187	0.014	0.193	-0.203	0.079	0.893	-0.351	0.538
GDP	-0.080	-0.010	-0.157	-0.745	-0.231	-0.376	-0.362	-0.195	-0.079	-0.033	-0.268
SIZE	0.026	0.050	0.053	0.159	0.005	0.051	-0.146	-0.082	-0.215	-0.203	-0.185
COU	0.043	-0.047	0.001	0.045	0.115	0.132	0.277	0.287	0.097	0.000	0.097

Source: compiled by the authors

The tables are aimed at providing a description of the correlations among selected variables, focusing on the strength and direction of the association between *LLP* and independent variables. The results show that, on average, *LLP* correlates positively with *NPL*, *LOA*, *EAR*, *SIGN*, *YEAR* and *COU*, while negatively with *GDP*, *SIZE* and *T1*.

The strongest correlation is observed between *LLP* and *NPL*: the Pearson correlation coefficient (0.683) witnesses that NPL is a very good indicator of the risk of default on banks' loans. Therefore, the expected positive relationship between *LLP* and *NPL* is confirmed; the relationship is weaker in the first three years, then becomes more robust since 2009.

As regards *LOA*, the coefficient associated is positive (0.191), however, the correlation is weaker than that observed with *NPL*; there are no significant variations, apart from 2007.

With reference to *EAR*, under the income smoothing hypothesis, banks understate (overstate) loan loss provisions when earnings are expected to be low (high) relative to that of other years. If banks use loan loss provisions to smooth earnings, then we would expect a positive relationship between EAR and *LLP*. Against this background, *LLP* is quite positively correlated with *EAR* (0.125); however, variations of the coefficient observed along the years are relevant.

With respect to *T1*, it should be underlined that accounting relations could influence the weak negative and constant relation between *LLP* and *T1* (-0.091). Indeed, regulatory capital is composed of *Tier 1*, which includes equity and retained earnings, and *Tier 2*, consisting of subordinated debt and, in the case of IRB model, loan loss allowances. Thus, *LLP* is positively correlated to *Tier 2* and negatively to *Tier 1*; therefore the supposed positive correlation, based on the fact that poorly capitalized banks are less willing to account loan loss provisions in order to be compliant with minimum regulatory capital, is not necessarily confirmed. Previous studies frequently highlight divergent results in terms of the relationship between *LLP* and *T1*. The use of a different regulatory capital to correlate with *LLP*, specifically TCR, does not alter the aforementioned result.

Taking into account *SIGN*, banks can use loan loss provisions to signal their financial strength and their ability to produce earning in the coming years. If signaling is an important incentive in choosing loan loss provisions, then a positive relationship between *LLP* and changes in future earnings before taxes and loan loss provisions is expected. Against this backdrop, the correlation coefficient of the variable is positive (0.143); however, the coefficient shows a variable pace along the years with a peak in 2014 (0.893).

The negative weak correlation between *LLP* and *SIZE* (-0.061) identifies a higher amount of provisions by LSI; this could reflect their business model, more focused on traditional lending activity in comparison to SI. It is observed a different trend of the correlation showing low but positive values until 2011, then negative from 2012.

As regards *GDP*, the macroeconomic environment affects the ability of borrowers to repay banks' loans; to assess if the private sector wealth varies with the economic cycle, there should be a negative relationship between *LLP* and the annual growth rate of *GDP*. The results confirmed that the economic cycle is a determinant of loan loss provisions, in other words, the procyclical effect of loan loss provisions: *GDP* negatively correlates with *LLP* (-0.230).

Finally, to test the influence of specific country and years, *COU* and *YEAR* are incorporated,

observing in both cases a positive correlation (respectively 0.106 and 0.138).

3.3.1. Descriptive statistics and correlation of the banking institutional environment

The selected indicators *CAP* and *EXA* identify the role played by specific features of existing regulation and supervision practices around SSM countries. As previously mentioned, these come from summary indices of key regulatory and supervisory banking policies on a country basis, giving the possibility to facilitate cross-country analysis.

The tables below compare the change of the indexes during the period of observation, that is from World Bank Survey III (2007) to Survey IV (2012), giving an idea of the evolution of banking regulation and supervision. Against this background, it is worth noting that Survey IV, the latest release available, covers the period after the emergence of the global financial crisis and the introduction of Basel III.

It is worth noting that the aforementioned financial statement's aggregates are annual from 2006 to 2016, while the indexes are available for 2 points in time; consequently, in line with previous research, the work is based on the assumption that the scores remain constant within these windows of time.

CAP is an index of the stringency of bank capital regulation ranging from 0 to 10. With regards to the latest release, the maximum level is accounted for both in Cyprus and Latvia (9), while the lowest is observed in Austria and Portugal (4). It is a matter of interest to investigate if countries tighten or ease bank capital regulation in the aftermath of the global financial crisis; in this respect, values represented in the column "Change", show positive (negative) numbers if there is an increase (decrease) in restrictions on bank regulation.

The table shows that the majority of SSM countries increased the stringency of their capital regulations following the crisis. Specifically, out of 19 SSM countries, 14 increased the stringency of capital regulation (including Italy and Germany) in the aftermath of the crisis, 3 decreased them (especially Portugal), and just 2 made no changes.

With reference to *EXA*, most of the countries do not indicate a significant difference in the frequency of on-site inspection from the two surveys. More precisely, the number of onsite examinations per bank in the last 5 years regarding all the SSM countries has accounted on average a decrease (from 5.4 to 3.4).

The number of on-site inspection provided by Slovakia Authority is quite divergent from 2007 to 2012 (from 40 to 2); therefore the mean value has been calculated not including Slovakia: in this case, the index remains basically stable (3.5).

The most relevant cases in terms of *EXA* changes are Slovenia and Italy, showing an increase in the amount of inspection performed by their National Supervisory Authorities (respectively from 5 to 11 and from 1 to 5). An opposite path has been observed primarily in the aforementioned case of Slovakia (from 40 to 2), additionally Latvia (from 8 to 4) and Belgium (from 4 to 0.8).

As regards data included in the dataset, it is worth noting that some Banking Authorities do not provide specific answers. Specifically: 1) Greek, Dutch, Finnish and French Authorities omitted 2007 information, consequently in this case 2012 answers have been used in the study; 2) German Authority omitted 2012 information, therefore 2007 answer has been taken into account; 3) Irish Authority omitted both 2007 and 2012 information, so the only answer available given in the 2000 WB Survey has been included.

Table 4. Indexes of banking regulation and supervision

Country	*CAP*			*EXA*		*Increase/decrease*
	WB 2007	*WB 2012*	*Change*	*WB 2007*	*WB 2012*	
Austria	5	4	-1	0	1.1	+
Belgium	3	8	+5	4	0.8	-
Cyprus	8	9	+1	5	5	=
Estonia	5	8	+3	2.5	3	+
Finland	4	6	+2	0.6	0.6	-
France	8	8	0	0.2	0.2	=
Germany	7	8	+1	0.7	0.7	=
Greece	4	7	+3	10	10	-
Ireland	3	8	+5	2	2	=
Italy	4	6	+2	1	5	+
Latvia	6	9	+3	8	4	-
Lithuania	3	7	+4	5	5	=
Luxembourg	7	7	0	2	1.5	-
Malta	6	7	+1	5	4.2	-
Netherlands	6	8	+2	7	7	+
Portugal	9	4	-5	2.5	1	-
Slovakia	4	6	+2	40	2	-
Slovenia	6	7	+1	5	11	+
Spain	9	8	-1	2	1.5	-
Mean value	**5.7**	**7.1**	**+1.4**			
Mean value - overall				**5.4**	**3.4**	
Mean value – without Slovakia				**3.5**	**3.5**	

Source: compiled by the authors

To create a better understanding of the data, the tables below present Spearman rank correlation between *LLP* and the above-mentioned institutional characteristics of the regulatory and supervisory environment. In order to make a comparison with *EXA*, the study of correlation includes *SUP*, representing the Official Supervisory Power Index included in the World Bank Surveys; it ranges from 0 to 14 and captures the power of supervisors to take prompt corrective action, to restructure and

reorganize troubled banks, and to declare a troubled bank insolvent.

As explained previously, this is the variable used in previous studies to take into account the role of banking supervision; in this respect according to this research, *EXA* is supposed to be more related to *LLP* (instead of *SUP*). To investigate the hypothesis, as a robustness test the regression model has been performed replacing *EXA* with *SUP* in order to assess its relation with *LLP* (in terms of sign and magnitude of the coefficient).

Not surprisingly, *LLP* shows a significant positive correlation with *EXA* (0.3988): this witnesses the conjecture of a higher level of *LLP* accounted by banks located in countries where the supervisory scrutiny is stricter by means of frequent on-site inspections by Supervisory Authorities. A positive (and weaker) correlation is also observed between *SUP* and *LLP* (0.2857). All that said, these confirm the idea that LLP correlates positively with both *EXA* and *SUP*; however, *EXA* denotes a stronger association than the one referred to *SUP*.

The correlation between *LLP* and *CAP* is negative (-0.1742); this is in line with the negative correlation between *CAP* and *EXA* (-0.2378), representing the interaction between banking regulation and supervision. As a consequence, this could mean that regulation and supervision are more likely to be substitutes instead of complements.

In order to better understand the observed relationships and reveal potential differences between the two surveys, the sample is further broken down taking into account the 2007 and 2012 surveys separately. We do not observe signification changes in terms of sign and strengths of association.

Table 5. Spearman rank correlation coefficients between LLP and institutional factors

(2006-2016)				
	LLP	CAP	EXA	SUP
LLP	1.0000			
CAP	-0.1742	1.0000		
EXA	0.3988	-0.2378	1.0000	
SUP	0.2857	-0.2270	0.5532	1.0000
(2006-2007)				
LLP	1.0000			
CAP	-0.1605	1.0000		
EXA	0.1153	-0.3176	1.0000	
SUP	-0.0593	0.1403	0.5202	1.0000
(2008-2016)				
LLP	1.0000			
CAP	-0.3054	1.0000		
EXA	0.4127	-0.3372	1.0000	
SUP	0.2618	-0.5866	0.5402	1.0000

Source: compiled by the authors

4. EMPIRICAL RESULTS

4.1. Earnings management purposes: income smoothing, capital management, and signaling hypothesis

The summary results of the first stage of the regression analysis are provided below (see Table 6). A panel data regression with fixed effects based on *YEAR* as variable dummy has been performed (the reference year is 2006). This is the appropriate approach as demonstrated by the Hausmann test. The quality of statistics of the model is reasonable, particularly taking into account the adjusted R-squared of 66%; the F-test is significant at the level of 1%.

The discretionary and non-discretionary explanatory variables demonstrate predicted relationships with *LLP* in terms of *SIGN*; *LOA* is the only exception. Confirming *H1*, the critical non-discretionary explanatory variable is *NPL*: the coefficient of the ratio of non-performing loans to total assets is positive and significant (0.1197), meaning that an increase in the amount of *NPL* of 1% determines an increase of *LLP* by approximately 0.12%. As a matter of fact, the model confirms the direct and strong relation between loan loss provisions and the deterioration of the credit portfolio quality.

As regards the other non-discretionary explanatory variable, *LOA*, the association with *LLP* is very weak (-0.0030) which is not a predicted result. As explained above, *LOA* reflects the number of loans. The sign observed, unlike the correlation index, mostly depends on its interaction with *NPL*; if *NPL* is dropped, the relationship between LLP and *LOA* becomes positive (0.0051). However, the relationship remains weak.

As to the first research question to be developed, confirming *H2*, *EAR* is positively associated with *LLP* with a coefficient of 0.1538. This means that upward (downward) movements in *LLP* are accompanied by statistically significant upward (downward) movements in *EAR*, and vice versa. It is significant at the 1% level; therefore the income smoothing hypothesis is strongly supported and constitutes the first earnings management objectives in terms of importance.

The coefficient of *T1* is negative (-0.0078), entailing that the banks in the sample do not use loan loss provisions to manage their capital ratios; therefore the capital management purpose (*H3*) is not supported by evidence. A possible explanation may be attributable to the strict supervisory regime observed during the crisis when reporting low loan loss provisions by banks with a significant amount of non-performing loans determined additional supervisory scrutiny in most SSM countries.

As to the signaling hypothesis, the coefficient of the variable *SIGN* is positive (0.1114) and significant at 1% level, consequently, the expected association between *SIGN* and *LLP* (see *H4*) is confirmed, witnessing that *LLP* could be interpreted as a way to give information to the market regarding future earnings.

Taking into account other additional variables considered in the regression model, the association between *LLP* and *SIZE* is not significant (0.0024), meaning that the amount of accounted loan loss provisions are weakly associated with the bank's size.

With reference to *GDP*, the interaction with *LLP* (-0.0774) is negative and statistically significant at 1% level, thus the supposed pro-cyclical behavior by credit institutions is confirmed.

Table 6. Test of capital management, income smoothing, and signaling hypothesis during the period 2006-2016: estimation of LLP using Bankscope/Orbis data

Explanatory variables	*Coefficient*	*t-Value*	*P>|t|*	*Std. Error*
NPL	0.11971 ***	35.05	0.000	0.0034
LOA	-0.00301 ***	-2.84	0.005	0.0010
EAR	0.15384 ***	8.05	0.000	0.0191
T1	-0.00784 **	-2.15	0.031	0.0036
SIGN	0.11144 ***	7.46	0.000	0.0149
SIZE	0.00242 ***	5.36	0.000	0.0004
GDP	-0.07747 ***	-7.99	0.000	0.0096
COU	0.00022 ***	5.36	0.000	0.0004
Year dummies				
2007	0.00150	1.58	0.114	0.0009
2008	-0.00099	-1.02	0.307	0.0009
2009	-0.00235*	-1.89	0.058	0.0012
2010	0.00059	0.59	0.553	0.0009
2011	0.00050	-0.51	0.608	0.0009
2012	-0.00184*	-1.76	0.079	0.0010
2013	-0.00011	-0.11	0.914	0.0010
2014	-0.00179*	-1.75	0.080	0.0010
2015	-0.00139	-1.34	0.182	0.0010
2016	-0.0042***	-4.05	0.000	0.0042
Adjusted R^2	0,661			
F-test	177.20***			
Number of observations	1,715			
Number of banks	156			

*Source: compiled by the authors; ***, **, and * represent significance at the 1%, 5% and 10% level, respectively. For year dummies the reference year is 2006.*

4.2. Earnings management practices: the role of banking regulation and supervision

The summary results of the second stage of the regression analysis are provided below (see Tables 7 and 8). The regression models are basically in line with the previous one, apart from the addition of the specific variables referred to banking regulation and supervision and the interaction variables.

As explained above the hypothesis is that the more efficient bank regulation and supervision proves to be in limiting bank risk (expressed by a positive association between *LLP* and values of *CAP* and *EXA*), the fewer the incentives for bank managers to smooth bank earnings, to manage with regulatory capital and to signal the amount of net income expected next year.

In this case, in line with *H5* if Authorities have greater powers to intervene in banks, thus they would also be able to reduce managers' incentives to use loan loss provisions and to adopt earnings management practices; therefore a negative value of the coefficient of the interaction variables reflects the ability of banking regulation and supervision to reduce income smoothing, capital management, and signaling.

The quality of statistics of the empirical model remains reasonable, taking into account in both cases an adjusted R-squared of 64%; the F-test is significant at the level of 1%.

On the basis of the results, the hypotheses on income smoothing and signaling are confirmed; in line with first-stage regression, firstly managers give relevance to current economic performance (i.e. income smoothing), then next year results (i.e. signaling). The hypothesis of capital management needs to be rejected in this case as well. The coefficient of the variable measuring banking regulation (*CAP*) is positive, meaning that the higher the regulation regime, the higher the amount of loan loss provisions accounted.

The interaction terms *CAP*EAR* and *CAP*SIGN* are both negative and significant at 1% level, meaning that banks are less likely to be involved in income smoothing and signaling practices if restrictions in banking regulation are higher.

As to banking supervision, similar conclusions can be defined: the positive relation between *EXA* and *LLP* means that banks with more frequent on-site inspection on average account higher loan loss provisions. Furthermore, bank managers' incentives to smooth income and to signal future financial information are reversed: this is demonstrated by virtue of the interaction variable *EXA*EAR* and *EXA*SIGN*, which shows a negative coefficient in both cases, significant at the conventional confidence levels.

To sum up, it is worth noting that the interaction variables confirm the hypothesis that bank managers have lower incentives to consider earnings management purposes when banking regulation and the supervision regime is stricter.

This means that the banking tools adopted by regulators and supervisory impact on credit institutions' decisions to smooth their income and on signaling practices. Thus a stricter bank regime may reduce incentives for risk-taking behavior by banks and tending to make financial statements more reliable.

Table 7. Test of interaction between earnings management and banking regulation during the period 2006-2016: estimation of LLP using Bankscope/Orbis and World Bank data (Part 1)

Explanatory variables	*Coefficient*	*t-Value*	*P>|t|*	*Std. Error*
NPL	0.12100 ***	35.61	0.000	0.003
LOA	-0.00387 ***	-3.37	0.001	0.001
EAR	0.59753 ***	6.62	0.000	0.090
T1	-0.05487 ***	-4.30	0.000	0.012
SIGN	0.32791 ***	4.05	0.000	0.081
CAP	0.00023	1.28	0.202	0.000
CAP*EAR	-0.06399***	-5.00	0.000	0.012
CAP*T1	0.00643***	3.45	0.001	0.001
CAP*SIGN	-0.03256***	-2.62	0.009	0.012
SIZE	0.00192***	3.86	0.000	0.000
GDP	-0.08351***	-8.50	0.000	0.000
COU	0.00020***	3.94	0.000	0.009
Year dummies				
2007	0.00125	1.22	0.223	0.001
2008	-0.00152	-1.37	0.170	0.001
2009	-0.00324**	-2.34	0.020	0.001
2010	-0.00018	0.17	0.867	0.001
2011	-0.00082	-0.75	0.454	0.001
2012	-0.00240**	-2.06	0.040	0.001
2013	-0.00061	-0.53	0.598	0.001
2014	-0.00228**	-2.04	0.042	0.001
2015	-0.00172	-1.53	0.126	0.001
2016	-0.00474***	-4.17	0.000	0.001
Adjusted R^2	0,642			
F-test	140.84***			
Number of observations	1,715			
Number of banks	156			

*Source: compiled by the authors; ***, **, and * represent significance at the 1%, 5% and 10% level, respectively. For year dummies the reference year is 2006.*

Table 8. Test of interaction between earnings management and banking supervision during the period 2006-2016: estimation of LLP using Bankscope/Orbis and World Bank data

Explanatory variables	*Coefficient*	*t-Value*	*P>|t|*	*Std. Error*
NPL	0.11542 ***	32.60	0.000	0.003
LOA	-0.00296 ***	-2.68	0.007	0.001
EAR	0.17006 ***	5.24	0.000	0.032
T1	-0.00825 *	-1.79	0.073	0.004
SIGN	0.11011 ***	7.45	0.000	0.014
EXA	0.00013	0.94	0.348	0.000
EXA*EAR	-0.00785	-1.60	0.110	0.004
EXA*T1	0.00005	0.07	0.945	0.000
EXA*SIGN	-0.26323***	-6.79	0.000	0.038
SIZE	0.00218 ***	4.81	0.000	0.000
GDP	-0.06456 ***	-6.60	0.000	0.000
COU	0.00019 ***	3.64	0.000	0.009
Year dummies				
2007	0.00116	1.23	0.219	0.000
2008	-0.00088	-0.91	0.365	0.000
2009	-0.00141	-1.13	0.259	0.001
2010	0.00046	0.47	0.636	0.001
2011	-0.00116	-1.18	0.239	0.001
2012	-0.00142	-1.35	0.178	0.001
2013	-0.00009	0.09	0.929	0.001
2014	-0.00155	-1.51	0.131	0.001
2015	-0.00143	-1.37	0.170	0.001
2016	-0.00392***	-3.70	0.000	0.001
Adjusted R^2	0,646			
F-test	143.84***			
Number of observations	1,715			
Number of banks	156			

*Source: compiled by the authors; ***, **, and * represent significance at the 1%, 5% and 10% level, respectively. For year dummies the reference year is 2006.*

4.3. Robustness tests

In this section, we have performed some additional tests to check the robustness of primary results. First, we examine the association between *LLP* and another definition of the regulatory capital, total capital ratio (defined as TCR), rather than the one adopted in the previous section (*T1*) to check if the capital management hypothesis continues to be rejected.

Second, in order to support the relevance of the supervision index used in the model (*EXA*), the model has been performed replacing *EXA* with the banking supervision index adopted by previous studies that is the Official Supervisory Power Index (*SUP*).

Finally, we exclude from the sample all the Italian banks, because Italy has the largest number of observations, representing 1/3 of the banks in the sample.

Test of the impact of capital management purpose by associating LLP and TCR

As mentioned above, the empirical results show that banks in the sample do not use loan loss provisions for managing capital; this is witnessed by the negative value of the coefficient of *T1*. A different exponent of capital management variable would be the Total Capital Ratio (TCR), corresponding to the sum of *Tier 1* and *Tier 2* regulatory capital.

The scope of this test is to investigate if the relationship between *LLP* and the variable reflecting capital management purposes change if the hypothesis is developed using TCR. Evidence shows that the adoption of this new measure of capital does not alter the overall results previously discussed. *LLP* is essentially confirmed as an income smoothing and signaling tool; the coefficient of *EAR* and *SIGN* remain positive and significant. With regard to the capital management hypothesis, the coefficient of TCR is negative, in line with *T1*: therefore, the capital management hypothesis continues to be rejected.

Test on the role of banking supervision by using SUP (instead of EXA)

Another way to examine whether the regulatory environment can constrain managers' behavior is by virtue of *SUP*, which can be interpreted as an independent variable less related to the amount of loan loss provisions.

Compared to *EXA*, results stemming from the adoption of SUP are counterintuitive; the coefficient of the interaction variables *SUP*EAR* and *SUP*SIGN* show positive values.

Indeed *SUP* reflects general monitoring by supervisory authorities; *EXA* considers the role of on-site inspection, primarily focused on the credit file review which determines a sort of "moral persuasion" to push managers to take into account inspectors' evaluations. Thus, results confirm that *EXA* is strictly connected to the amount of loan loss provisions accounted by each bank, while we do not have the same evidence by using SUP.

Test of the impact of exclusion of Italian Banks from the original sample

As noted above, 1/3 of the sample consists of Italian banks (54 out of 156); in this respect as a robustness test, the empirical model has been performed without Italian banks to see if the empirical results are basically confirmed.

The results remain qualitatively similar to those discussed previously. However, some changes are reflected in terms of earnings management, essentially: 1) higher value of *EAR* coefficient, meaning a more significant relevance of income smoothing practices; 2) conversely, signaling does not reveal significant relevance. In this respect, it is observed that income smoothing practices are applied around the European banks, while signaling appears more related to the Italian perspective.

Additionally the table confirms that stricter regulations on bank and stricter official supervision reduce the use of loan loss provisions to smooth earnings; still, this institutional factor is effective in improving the reliability of financial reports, dampening incentives for bank's managers to smooth income and to reduce the volatility of bank earnings.

5. CONCLUSIONS

Academic research suggests that accounting quality is not necessarily determined only by accounting standards; several studies (Leuz et al., 2003; Garsva et al., 2012; Papadaki & Tzovas, 2017) find that the quality of financial reporting is shaped by various firms' reporting incentives.

This study examines earnings management purposes, in terms of income smoothing, capital management and signaling for a sample of 156 banks from the 19 European countries under the SSM over the period 2006-2016. Data are from Bureau Van Dijk's Bankscope and Orbis database (in some minor cases figures are from individual bank's websites). A panel data OLS regression with fixed effects has been run.

In the present study, attention is first directed to assess if earnings management purposes occur in the banking industry and which one is the most relevant. Loan loss provision is a key accounting choice that significantly influences the reported earnings of banks.

Overall, the study evidences that loan loss provisions are linked to the credit portfolio quality, showing as a critical non-discretionary explanatory variable the level of non-performing loans.

As to earnings management objectives, in line with previous studies (Gebhardt & Novotny-Farkas, 2011; Curcio & Hasan, 2015), primarily the hypothesis of income smoothing and then signaling are strongly approved. Thus loan loss provisions consist of a tool for income smoothing firstly and to convey private information to the market secondly. On the contrary, capital management purpose is not supported, in line with Ahmed et al. (1999).

Furthermore, the research is aimed at investigating the peculiar regulatory and supervisory environment in the banking industry; some previous studies (Fonseca & Gonzalez, 2008; Bouvatier et al., 2014) demonstrate that such controls can influence the behavior of bank managers in terms of income smoothing strategies.

In this respect, the study extends the impact of bank regulation and supervision assessing the role of capital management and signaling purposes. The results obtained show that bank supervision and regulation systems impact on income smoothing and signaling practices, in the sense that they reduce incentives for realizing these purposes in the banking system. In short, bank regulation and supervision can be considered as efficient tools to make financial statements more reliable.

There are several limitations to this study. The estimation of the accruals into the banking system is basically based taking into account the amount of loan loss provisions. In this respect, there is a relative paucity of research with reference to the estimation of discretionary accruals by virtue of an aggregate approach.

As regards banking regulation and supervision indexes, they are available for two points in time, while the financial statement's aggregates are annual. In line with previous studies, the work assumes that the scores remain constant within these windows of time.

The research could address further studies on the relationship between discretionary accruals and

the regulatory and supervisory regime, taking into account a recent strengthening of the prudential framework. From another perspective, a natural extension to the analysis developed is the role of an inspection performed by Supervisory Authorities per intermediary.

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