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Regulatory and contextual factors influencing earnings and capital management decisions: evidence from the European banking sector

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Abstract
This study investigates whether some regulatory and contextual features influenced Euro Area listed banks decisions to manage earnings and regulatory capital through discretionary provisions in the period 2013–2018. The new regulation factors are the pressure to increase high-quality regulatory capital (Basel III) and more timely recognition of loan losses (IFRS 9). The contextual features are the intensified banking competition at a national level, and the significant money market pressure. Results demonstrate that the pressure to increase high-quality regulatory capital for banks with lower Common Equity Tier 1 capital (CET1) in year $t-1$ is negatively associated with upward earnings and capital management in year t. The more timely recognition of loan losses in year t compared to year $t+1$ is negatively associated with upward earnings and capital management in year t. The strengthening of banking competition is positively associated with upward earnings management, but not associated with upward capital management. The increasing money market pressure is negatively associated with upward earnings management, but not associated with upward capital management. This study should be helpful to standard-setters, regulators, investors and academics interested in incentives and constraints to earnings and capital management by providing evidence regarding how listed banks reacted to the regulatory, accounting, and contextual factors, observed holistically during a unique historical period (i.e., 2013–2018) and regulatory setting (i.e., European banking sector).

Keywords Earnings management · Capital management · Banking sector · Discretionary loan loss provision

JEL Classification G21 · G28 · M41

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1 Introduction

The global financial crisis (GFC) of 2008 and the sovereign debt crisis (SDC) of 2010 caused negative effects on European banking, such as a considerable increase in non-performing loans (NPLs), low profitability, credit portfolio quality deterioration, and liquidity crises, which weakened financial soundness (ECB 2017; ECB 2018a). Many of those effects were still visible in European banks' financial statements before the Covid-19 pandemic (ECB 2017; ECB 2018a). Due to the Covid-19 pandemic, the European banking sector was further weakened by strong competitive pressures. This was also attributed to limited individual market shares and the entry of fintech (Carmona et al. 2018). Additionally, challenges in enhancing cost efficiency arose from enduring structural factors, including location, client composition, macroeconomic conditions, and regulatory aspects intensified competition (ECB 2019). On January 1, 2010, to enforce financial soundness and resilience in the international banking system and prevent further crises, the Basel Committee on Banking Supervision (BCBS) published "Basel III"—a stringent, capital-based regulatory framework that increases the minimum levels of regulatory capital, especially the high-quality one represented by the CET1.[1] Like the BCBS, many other regulatory authorities intervened to "increase banks' resilience through stronger capital and liquidity buffers, and reduce implicit public subsidies and the impact of bank failures on the economy and taxpayers through enhanced recovery and resolution regimes" (CGFS 2018, 1). Therefore, banks felt intense pressure by regulatory authorities and the financial market to increase the (reported) amount of high-quality regulatory capital (Corradin et al. 2020). Consequently, as confirmed by the European Central Bank (ECB) inspections and the European Banking Authority (EBA) stress tests, European banks increased their regulatory capital and liquidity buffers and became more resilient to financial shocks (ECB 2018b; EBA 2018b). The decline in financing costs and abundant liquidity led banks to increase their asset portfolio (Kedan and Ventula Veghazy 2019). But for banks expanding their balance sheets, meeting regulatory capital constraints became even more complicated, because it meant holding even higher reserves. Therefore, banks near quarter-end manipulated secured and unsecured overnight borrowings (mainly repo-borrowings) with 'window-dressing' strategies to deflate assets and meet capital constraints (Corradin et al. 2020). Such evidence underlined how strong the influence of Basel III regulation was on the (manipulative) accounting practices of European banks, even those with high regulatory capital and liquidity buffers (Corradin et al. 2020).

Meanwhile, to protect the stability of the financial system and avoid the negative effects of delaying loan loss provisions (LLP) (Bushman and Williams 2015), which contributed to the outbreak of the GFC (i.e., "too little too late provisions," BCBS 2015, 3), international standard setters replaced IAS 39 - *Financial Instruments Recognition and Measurement* with IFRS 9 - *Financial Instruments* (Nicoletti 2018) in June 2014. The expected credit losses (ECL) approach of IFRS 9 requires banks to be more careful in assessing the loans' value, thus recognizing their anticipated deterioration. With this intervention, the standard setters meant to stimulate conservative accounting practices, more timely recognition of potential loan losses and NPLs, and a forward-looking credit portfolio management

[1] Basel III, among other things, required careful evaluation of the riskiness of lending practices, improved loan loss reserves, higher thresholds of regulatory capital and an increase in the availability of liquid assets (BCBS 2011). Like the BCBS, many other regulatory authorities intervened to "increase banks' resilience through stronger capital buffers and reduce implicit public subsidies and the impact of bank failures on the economy and taxpayers through enhanced recovery and resolution regimes" (CGFS 2018, 1).

attitude (Laeven and Majnoni 2003; Beatty and Liao 2011; Bushman and Williams 2012; ECB 2018a; Kvaal et al. 2023; Mahieux et al. 2023).

During 2013–2018, when banks were still struggling with the effects of the two crises, the European banking sector experienced an increase in the money market pressure, due to the additional reserves provided by the central bank and the withdrawing of considerable amounts of funds by account holders (Von Hagen and Ho 2007; ECB 2017; ECB 2018a). In those years European banks registered a considerable increase in NPL, credit portfolio quality deterioration, and liquidity crises, which strengthened competition at the national level (CGFS 2018; Fosu et al. 2018).

The pressure to increase the amount of high-quality regulatory capital, the adoption of a more timely loan loss recognition method, the banking competition at the national level, and the money market pressure due to the effects of GFC and SDC contributed to create a unique historical setting in European banking in 2013–2018. These events, which disrupted European banking, had important national repercussions, but also represented the cornerstones of a unique historical period. Observing the effects of the four phenomena together offers a global, multilateral, heterogeneous and dynamic look at incentives or constraints for earnings and capital management for European banks in 2013–2018.

Prior accounting research found that regulatory interventions and contextual features deeply impacted accounting behavior within the banking sector (e.g., Ahmed et al. 1999; Anandarajan et al. 2007; Leventis et al. 2011; Pinto and Picoto 2018; Dal Maso et al. 2019). For instance, Leventis et al. (2011) examined whether the adoption of the IFRS framework in January 2005 had an impact on earnings and capital management for 91 European listed commercial banks. Using the period 1999–2008, they demonstrated that earnings management significantly reduced after implementation of IFRS, and that capital management was not significant in both pre and post IFRS regimes. However, this and many other studies focused only on one single regulatory or contextual feature at a time, without considering the multiple factors that characterized the setting. Instead, our study of both regulatory and contextual features is pivotal for understanding the current functioning of the financial system, as they are closely related to each other.[2]

The accounting practices of Euro Area (EA) listed banks may not have been sufficiently investigated. Earnings and capital management operations have been analyzed so far in a general way, without examining the direction of such manipulations, i.e., upward or downward. In addition, there is an urgent need to investigate the factors favoring or hindering earnings and capital management in recent years. This is necessary to enable timely and ad hoc corrective actions. The purpose of our study is to investigate whether four specific regulatory and contextual factors influenced EA banks to manage upwards or downwards earnings and capital, using positive and negative DLLP.[3] The pressure to increase the

[2] Recent studies demonstrate that regulatory banking interventions are needed to correct negative accounting effects caused by peculiar contextual characteristics that bias the way the entities react to such regulations (Tomy 2019). Hence, the contextual characteristics of the banking sector, which negatively affects the ethics of accounting practices (such as earnings and capital management), may induce authorities to intervene directly with regulation to correct such deleterious effects. In the same way, persistent contextual factors will affect the way banks react to new regulations.

[3] Earnings and capital management are based mainly on discretionary accruals for manipulating reported income and regulatory capital (see, among others, Lobo and Yang 2001; Beatty et al. 2002; Shrieves and Dahl 2003; Francis et al. 2004; Anandarajan et al. 2007; Bouvatier and Lepetit, 2008; Perez et al. 2008; Nichols et al. 2009; Ahmad-Zaluki et al. 2011; Filip and Raffournier 2014; and Curcio and Hasan 2015; Hong et al. 2020; Tran et al. 2020). While earnings management is aimed to alter financial reports to either

high-quality regulatory capital of Basel III for banks with lower CET1 in year t − 1 is captured by the lagged CET1 ratio, the more timely recognition of loan losses in year t compared to year t + 1 is captured by the change of NPL in year t + 1, the banking competition is measured at a national level through the Herfindahl–Hirschman Index (HHI) and the money market pressure is measured through the Von Hagen and Ho (2007) index. We use a sample of all EA listed banks from Orbis Bank Focus database representing 20 countries over the period 2013–2018.

In this study we investigate earnings and capital management through discretionary loan loss provisions (DLLP), either positive or negative, thus identifying the pursuit of downward and upward earnings and capital management, respectively (Kanagaretnam et al. 2003; Kanagaretnam et al. 2014; Nicoletti 2018; Dal Maso et al. 2019).

Almost all EA banks in 2013–2018 are '*overcapitalized*' (with annual loan loss reserves exceeding 1.25% of risk-weighted assets), consistent with ECB investigations (Andreeva et al. 2020). Therefore, we expect banks to pursue upward capital management through upward earnings management. The state of bank capitalization exerts a considerable influence on strategies to increase regulatory capital, such as in determining the economic consequences of provisioning (Mahieux et al. 2023). Undercapitalized banks aiming to increase regulatory capital may find it useful to boost DLLP. This would result in an increase in Tier 2 capital greater than the reduction in Tier 1 capital, thus generating an overall positive net effect on total capital. On the contrary, for overcapitalized banks the strategic reduction of DLLP would lead to increasing earnings, retained earnings and, consequently, Tier 1 capital.

Our results indicate that the earnings management and capital management of the EA listed banks was dependent, to some extent, on whether the bank was overcapitalized. However, there is no mechanical association between the purposes of upward earnings management and upward capital management. Consistent with Basel III (BCBS 2011), different strategies can be used to accomplish upward capital management (i.e., Tier 1). These strategies may include issuing more common shares that meet the classification for regulatory purposes or the equivalent for non-joint stock companies, increasing the stock surplus (share premium) resulting from the issue of instruments included in CET1, increasing other comprehensive income and other disclosed reserves, increasing the common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e., minority interest) that meet the criteria for inclusion in CET1 and doing the regulatory adjustments applied in the calculation of CET1 (BCBS 2011). Although upward earnings management raises banking earnings and retained earnings, with a (partial) positive effect on regulatory capital, this does not mean that the overall net variation of capital is also positive. Banks can pursue capital reduction at the same time by distributing dividends or buying back their own shares. Distributing profits to shareholders, even if previously managed upwards for opportunistic purposes, through dividends and share buy backs represent two direct ways for reducing the Tier 1 capital.

Footnote 3 (continued)

mislead some stakeholders about the underlying economic performance of the company or influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen 1999, 368), capital management attempts to avoid the costs of capital violations and send reassuring messages to the market about patrimonial soundness (see, among others, Moyer 1990; Scholes et al. 1990; Beatty et al. 1995; Collins et al. 1995; Ahmed et al. 1999; Wall and Koch 2000; Anandarajan et al. 2003; and Anandarajan et al. 2007).

Paying out dividends generates undoubted advantages for the bank, such as returning value to shareholders, rewarding them for their investment and strengthening confidence in that bank. Investors often look to dividends as a sign of the bank's financial stability and soundness, with positive consequences for its reputation. Reducing regulatory capital through the distribution of dividends may be attractive to those banks holding capital more than minimum requirements imposed by Basel III. In this case, the reduction in regulatory capital does not present a risk of non-compliance.

Likewise, the share buyback may be beneficial to bank and ordinary shareholders because it increases the earnings per share. It is a sign of the bank's confidence in its current and future financial performance. It may suggest that the bank perceives its stock to be undervalued and considers the repurchase as a financially advantageous investment. Even though the bank manages earnings upward, the repurchase of outstanding shares reduces the bank's net equity and increases earnings per share. This may be attractive to investors who look to this metric to assess the return on investment. In both cases, even if the bank manages earnings upward, the overall net effect on capital is negative.

Given the potential interactions among earnings and capital management, along with the other factors, a combined holistic analysis seems appropriate. For the reasons stated above, research hypotheses concerning earnings management and capital management are tested using separate regression models to not to confuse earnings management with capital management.

The analyses are conducted with pooled OLS regression models with bank fixed effects based on the Nicoletti (2018) two-stage approach. In the second stage, the recourse to earnings and capital management is captured by, alternatively, positive, and negative DLLP (Kanagaretnam et al. 2003; Kanagaretnam et al. 2014; Nicoletti 2018; Dal Maso et al. 2019; Hong et al. 2020; Tran et al. 2020). To assess the robustness of our main inferences we use a two-stage approach that estimates abnormal loan loss provisions (ALLP), adopted for earnings and capital management (Wahlen 1994; Liu and Ryan 2006; Kanagaretnam et al. 2010; Kanagaretnam et al. 2014; Beatty and Liao 2014; Dal Maso et al. 2019; Hong et al. 2020). In the second stage we adopt the system generalized method of moments (GMM) of Arellano and Bover (1995) and Blundell and Bond (1998).

Our results demonstrate that the pressure to increase high-quality regulatory capital for banks reporting lower CET1 in year $t-1$ is negatively associated with increasing earnings and capital management in year t. The more timely recognition of loan losses is negatively associated with increasing earnings and capital management. The increase in banking competition is positively associated with increasing earnings management but not associated with increasing capital management. The increasing money market pressure is negatively associated with increasing earnings management but not associated with increasing capital management.

The status of 'significant institution' (SI) or 'less significant institution' (LSI) of a bank operating within the Eurozone influences its accounting behavior (Fiordelisi et al. 2017). We conduct additional analyses on single subsamples of SI and LSI. The results show that SI and LSI sometimes respond in the same way to regulatory and contextual factors and sometimes in the opposite way, depending on their specific characteristics. Namely, the pressure to increase high-quality regulatory capital for banks reporting lower CET1 in year $t-1$ is positively associated with upward earnings management for SI and negatively for LSI. For both SI and LSI this pressure counteracts the increasing capital management. The more timely recognition of loan losses is negatively associated with increasing earnings and capital management in both SI and LSI. The increase in banking competition is positively associated with increasing earnings and capital management, but only for SI. The

higher money market pressure counteracts increasing earnings management for both SI and LSI, while it offsets increasing capital management only for SI.

This study should be helpful to regulators, standard-setters, investors and academics interested in incentives and constraints to earnings and capital management for many reasons. First this study provides evidence to regulators and banking authorities that the pressure to increase high-quality regulatory capital had the desired effect of boosting the banking capital through the years without recurring to earnings and capital management.

Second, this study suggests to standard-setters that the introduction of the more timely loan loss recognition of IFRS 9 reduced upward earnings and capital management, with positive effects for financial statements reliability and capital soundness. In addition, our study demonstrates them that even though the use of DLLPs has been more regulated, it remains a privileged tool for earnings and capital management.

Third, our study demonstrates to supervisory authorities that despite their supervision efforts on banking accounting behavior and capital adequacy to enhance financial stability in Europe (ECB 2018a), EA listed banks may continue to opportunistically inflate and deflate earnings and regulatory capital through discretionary provisioning. Our results suggest that earnings quality in Europe banks should keep on receiving protection by frequently updating the accounting regulatory framework and gauging the margin of discretion given to managers in their provisioning choices.

Finally, this study may assist investors in recognizing some accounting and capital-based items, as well as regulatory and contextual factors, that may be red flags indicating potentially increased earnings and capital management. In investigating both earnings and capital management in a joint manner, this study demonstrates how the two phenomena may be linked in ways not previously understood.

Section 2 reviews the existing literature and formulates the hypotheses. Section 3 describes the sample composition and explains the research methods. Section 4reports and discusses the results of our main analyses and robustness tests. Section 5 presents additional analyses, while Section 6 offers the conclusions and discusses the implications of this study.

2 Literature review and research hypotheses

2.1 The implication of pressure to increase high-quality regulatory capital

Prior research investigated the effects of regulatory variables on accounting practices through the observation of discretionary provision strategies (Alali and Jaggi 2011; Leventis et al. 2011; Kilic et al. 2012; Wezel et al. 2012; Ryan and Keeley 2013; Hamadi et al. 2016; Marton and Runesson 2017; Dal Maso et al. 2019; Hong et al. 2020; Tran et al. 2020), thus demonstrating that the introduction or the strengthening of the Basel regulations affected earnings and capital management (Moyer 1990; Kim and Kross 1998; Ahmed et al. 1999; Hamadi et al. 2016). According to one strand of literature, Basel I produced pro-cyclical and backward-looking LLPs (Danielsson et al. 2001; Bikker and Hu 2002; Cummings and Durrani 2016) and decreased income, especially during a financial crisis (Ahmed et al. 1999; Borio et al. 2001; Cavallo and Majnoni 2002). Kim and Kross (1998), instead, found that Basel I regulation caused a substantial reduction of LLPs, an excess of regulatory capital (Ahmed et al. 1999; Perez et al. 2008) and an increase in net income.

Likewise, the introduction of Basel II regulations impacted banks' provisioning strategies and accounting behavior, as its more accurate approach to credit rating (BCBS 2006) intensified market economic conditions pro-cyclicality (Turner 2000; Borio et al. 2001; Danielsson et al. 2001; Segoviano and Lowe 2002; Repullo et al. 2010). Many studies found that Basel II effects came across deleterious. The pressure to return within new minimum regulatory capital constraints increased the banking provisioning (Shrieves and Dahl 2003; Bouvatier and Lepetite 2008; Cummings and Durrani 2016), acting as an incentive for managing earnings (Hamadi et al. 2016). Other recent studies suggest that provisioning is influenced by different market pressures exacerbated by Basel II regulation, with potentially negative consequences for earnings reliability. Under this perspective, weaker banks felt more intense competitive pressure and engaged in manipulative behavior to signal optimism about economic performance, whereas retail banks showed different timeliness in LLP practices (Lim and Yong 2017).

Basel III has strengthened the financial soundness of European banks by raising the minimum regulatory capital limits and introducing new stringent qualitative capital constraints (i.e., CET1). This increased the pressure to improve, or at least maintain, high-quality capital adequacy levels to meet or beat regulatory requirements and market's expectations. Despite a few studies have theoretically examined whether Basel III impacts lending activities and accounting practices (Went 2010; Cummings and Durrani 2016), empirical evidence regarding European banking is still lacking. Since good banking capitalization generally influences credit policy (Bernanke and Lown 1991; Kishan and Opiela 2000, 2006; Cohen and Scatigna 2016; Gambacorta and Shin 2018), it is expected that lending activities could be adversely affected by Basel III (BCBS 2010a, 2010b; Harle et al. 2010; EBA 2014). The most recent empirical investigations of US banks suggest that the latest bank regulations reduced earnings management and discouraged abnormal LLPs (Dal Maso et al. 2019). Costello et al. (2019) posits that enforcement of capital adequacy regulation improves the quality of banks' financial statements.

According to Basel III, an increase of DLLPs determines a reduction of Tier 1 capital due to earnings and retained earnings contraction and, at the same time, an increase of Tier 2 capital up to a yearly maximum total amount of 1.25% of Risk-Weighted Assets (RWA) (BCBS 2011). Hence, discretionary provisioning implies opposed and misleading effects on Tier 1 and Tier 2 capital. The net effect on regulatory capital of DLLP policies depends on the capacity of banks' LLR (Curcio and Hasan 2015; Curcio et al. 2017). Undercapitalized banks could enhance their capital through an increase of DLLPs without reducing insolvency risk (i.e., regulatory capital arbitrage) (Ahmed et al. 1999). In this case, when loan loss reserves do not exceed the 1.25% of RWA, the growth of Tier 2 capital is bigger than the decrease of Tier 1 capital. This results in a positive net effect for the total regulatory capital. So, the increase in capital management is carried out through the increase of Tier 2 capital.

Alternatively, overcapitalized banks could be interested in minimizing the DLLPs to increase their high-quality capital (i.e., CET1) through the growth of earnings and retained earnings. Thus, capital management occurs through the upwards earnings management. The sign of the relation between DLLPs and regulatory capital depends on the way banks pursue capital management and, so far, the prior empirical evidence is mixed (Ahmed et al. 1999; Anandarajan et al. 2007; Bouvatier and Lepetite 2008; Perez et al. 2008; Leventis et al. 2011). Since almost all EA listed banks had a yearly amount of loan loss reserves exceeding the 1.25% of their RWA during the 2013–2018 period, we expect that the attempt to increase CET1 may be pursued by reducing DLLPs and increasing earnings and retained earnings. Moreover, since EA listed banks adapt their capital buffer to the economic environment to manage the risk of unintended regulatory breaches and disclose their

target CET1 ratios, this allows the market to analyze how these targets evolve over time (Andreeva et al. 2020).

Consistent with this view, the pressure to keep CET1 high may incentivize banks with lower CET1 in year t − 1 to engage in upward earnings management for regulatory requirements purposes in year t. This exploits the fact that retained earnings feed CET1. However, another situation could also occur. Banks that reduced CET1 in year t − 1, due to a sudden loan loss absorbed by the capital buffer, might be more inclined in year t to increase DLLP for prudential purposes. The increase in DLLP would serve to identify the deterioration of loans at an early stage and better protect the bank against future potential loan losses. The increase in DLLP counteracts the upwards earnings management. Consistent with this view, the pressure to increase high-quality regulatory capital when the lagged CET1 is lower may be negatively associated with upwards earnings management. Since banks could adopt either behavior, the research question is open to both possibilities.

H1a: The pressure to increase high-quality regulatory capital when the lagged CET1 is lower is positively/negatively associated with upwards earnings management in EA listed banks.

The literature which investigated the effects of Basel I regulation on capital management gave contrasting results. According to some studies, the intensifying of banking capital adequacy regulation (Basel I) resulted in a major recourse to capital management for opportunistic purposes (Ahmed et al. 1999; Kim and Kross 1998; Wall and Koch 2000; Anandarajan et al. 2007), such as the avoidance of the costs connected to violation of capital adequacy ratios (Anandarajan et al. 2003). In other studies, a positive association was not empirically supported (Perez et al. 2008; Leventis et al. 2011; Curcio and Hasan 2015). Likewise, the investigations on the effects of the new Basel II regulatory capital constraints returned mixed and contrasting results (Ahmed et al. 1999; Anandarajan et al. 2007; Bouvatier and Lepetit 2008; Perez et al. 2008; Leventis et al. 2011). According to some prior literature, Basel II affected banking behavior by enhancing the policies of capital management and improving the procyclicality of provisioning (e.g., Gordy and Howells 2006; Perez et al. 2008). In this perspective, banks intervened directly on financial statements to disclose a more prudent risk management through the adoption of LLPs for increasing or decreasing regulatory capital (Lim and Yong 2017). The use of LLP as a tool for managing capital adequacy, however, is widely supported by the banking accounting literature (Moyer 1990; Scholes et al. 1990; Beatty et al. 1995; Collins et al. 1995; Ahmed et al. 1999; Wall and Koch 2000; Anandarajan et al. 2007). To date no one has demonstrated the existence of an association between the pressure to increase high-quality regulatory capital and the recourse to capital management upwards.

Empirical evidence may show two opposing phenomena, alternatively. On the one hand, the increasing regulatory pressure of Basel III toward securing greater high-quality regulatory capital may encourage banks with lower CET1 in year t − 1 to manage capital upwards in year t. This may happen if banks aim to demonstrate the recovery of a stronger patrimonial soundness and safer lending practices. On the other hand, the pressure from financial markets over banks to maintain or even increase regulatory capital ratios may limit the usability of the buffer (Andreeva et al. 2020). Banks are reluctant to grant loans fueling the real economy for fear of over-exposing themselves to risk (Andreeva et al. 2020). Therefore, the pressure to maintain or even increase regulatory capital ratios, given the same credit portfolio, may act to obstruct the lending practice. This may result in containing the risk exposure of the loan portfolio and, consequently, curbing upwards capital

management. This phenomenon may be even more likely in an environment where banks are over-capitalized and have large regulatory capital buffers. We expect that banks that are highly capitalized may be less sensitive to reductions in CET1 in year t − 1, due to their good capital soundness, and they may not manage upwards regulatory capital in year t. Therefore, consistent with this view, the pressure to maintain or even increase regulatory capital ratios can be neutralized or weakened by the over-capitalization of banks. Since banks could adopt either behavior, the research question is open to both possibilities.

H1b: The pressure to increase high-quality regulatory capital when the lagged CET1 is lower is negatively/positively associated with upwards capital management in EA listed banks.

2.2 The implication of more timely loan loss recognition

On July 24, 2014, the IASB switched from IAS 39 - *Financial Instruments Recognition and Measurement*'s incurred loss method (IL) to IFRS 9 - *Financial Instruments'* ECL method for mitigating the excessive volatility of fair value-based valuations, stopping the "too little too late" loan loss recognition and protecting financial stability through higher loan loss allowances and capital buffers (Beatty and Liao 2014; EBA 2015; Bushman and Williams 2015; Novotny-Farkas 2015; Acharya and Ryan 2016; Nicoletti 2018; Mahieux et al. 2023).[4] Although the IFRS 9 mandatory adoption was January 1, 2018, all European banks were required, starting January 1, 2017, to evaluate the loans and their losses according to both IAS 39 and IFRS 9 criteria (the "parallel running" instruction). In addition, the IFRS 9 voluntary early adoption was allowed by the European Commission (via local endorsement procedures) and warmly encouraged by banking supervisory authorities (EBA 2015). A survey by Moody's Analytics in 2015 found that banks were adopting ad hoc strategies for an early welcoming of IFRS 9, thus preparing themselves for a future mandatory full implementation of the ECL method (Moody's Analytics 2015). In addition, given the opportunity to use more discretion, it is reasonable to expect that European banks did not wait until 2018 to adopt the ECL method (Ronen and Yaari 2007; Moody's Analytics 2015; Bholat et al. 2018).[5] The results of the EBA tests provided evidence that soon after the introduction of IFRS 9 there was an increase in loan loss allowances in the European banking context (EBA, 2018a). Since the ECL approach allows quite subjective forecasts of future expected losses (EBA 2017; ESRB 2019), it provides banks with greater discretion about timing and quantity of yearly LLPs. According to some prior studies, the

[4] According to the ECL approach, when the loan is granted, it is necessary to make an initial provision for potential credit losses taking into consideration a time span of 12 months, since the loan is classified as stage 1, thus immediately recording a provision. The company must immediately account for future expected losses on its financial assets, regardless of whether there is a "trigger event" and must continually adjust the estimate based on the changes in the credit risk of the counterparty, past and present data, and forecasts about whether and how contextual macroeconomic variables may impact the value of financial assets. If the counterparty risk increases significantly, for example, then the loan is downgraded to stage 2 or 3 and the expected credit losses must be evaluated throughout the loan's lifetime. The evaluations of the expected credit losses over a 12-month period tend to be more plausible than the evaluations carried out over the lifetime of financial assets.

[5] "The calculation of future expected loss (whether under the IASB or FASB approach) necessarily involves a high degree of judgement based on forward-looking information, which in turn may lead to greater divergence in practice than is the case under incurred loss. Discretion over bank loan loss provisioning can have beneficial or negative consequences depending specifically on how managers exploit that discretion" (Bholat et al. 2018, 42).

forward-looking approach to loan loss identification may create the right condition for mitigating pro-cyclicality of loan losses (Laeven and Majnoni 2003; Beatty and Liao 2011; Bushman and Williams 2012; ECB 2018a) and increasing both the LLPs and loan loss reserves (Barclays 2017; Dal Maso et al. 2019) with a non-negligible impact on earnings and regulatory capital.

Prior studies investigated the effects of the forward-looking loan loss recognition of IFRS 9. Dal Maso et al. (2019) confirm that IFRS 9 increases the loan loss reserves. While the European Systemic Risk Board states that the adoption of the ECL approach could have a pro-cyclical effect deriving from the cyclical sensitivity of credit risk in evaluating the expected credit losses (ESRB 2017), Wheeler (2019) suggests timely LLP leads to less pro-cyclical lending by decreasing unrecognized loss overhangs. However, more timely loan loss recognition is expected to impede lending practice corruption since it uses a forward-looking provisioning approach (Akins et al. 2017). Moreover, it should favor lending practices during downturn periods (Beatty and Liao 2011) and reduce excessive risk exposure (Kyiu and Tawiah 2023), with positive effects on transparency (Bushman and Williams 2012). Regulatory agencies and policymakers understood the critical impact of loan loss recognition timeliness on banking accounting choices to be related to the provisions' tax deductibility (Andries et al. 2017). The more timely loan loss recognition should have positive effects because of greater supervisory actions (Gallemore 2018) and regulatory enforcement (Kyiu and Tawiah 2023). However, conflicting theories regarding IFRS 9 consequences exist.

More timely loan loss recognition fosters greater precision in evaluating future loan losses (Kvaal et al. 2023) and better explains future banking risk exposure (Salazar et al. 2023). However, under certain circumstances it may legitimize a potential increase in volatility and discretion about timing and amount of LLP (Bischof and Daske 2016; Novotny-Farkas 2016; Ozili and Outa 2017), that may be used to pursue earnings and capital management. Since the new loan loss recognition method encourages more general provisions (i.e., higher costs) with negative effects on bank profitability, such discretion can be opportunistically exploited for managing net income upward. By allowing banks to recognize early LLP, it may provide banks enough discretion to use LLP to decrease (increase) earnings in good (bad) times (Dugan 2009). At the same time, however, the guidance on how banks should account for expected credit losses and nonperforming loans may narrow the banks' margin of discretion in LLP choice (BCBS 2015; EBA 2017; ECB 2017). In fact, this guidance helps reduce the opportunity for companies to delay or minimize the loss recognition, as the process is based on specific criteria and indicators. Consistent with this view, the more timely loan loss recognition in year t compared to year t + 1, by increasing annual DLLP and deflating earnings, could constraint upward earnings management in year t. There is still little empirical evidence on the effects that more timely loan loss recognition may have on earnings management policies. Therefore, we ask if the more timely recognition of loan losses, captured by the change in NPL in year t + 1, is negatively associated with upwards earnings management. We expect more timely loan loss recognition in year t compared to year t + 1 will increase in positive DLLPs for over-capitalized banks thus obstructing upward earnings management.

H2a: The more timely recognition of loan losses is negatively associated with upward earnings management in EA listed banks.

Empirical studies of IFRS 9 effects on capital management are limited. The EBA, in collaboration with national authorities, has conducted numerous surveys within the European banking sector to identify the potential effects that the earlier recognition of loan losses would have on banks' regulatory capital. The results suggest that the adoption of IFRS 9 may cause a negative impact on capital due to an increase in loan loss provisioning and that this is more

likely for banks adopting an internal rating-based approach (IRBA) to credit risk rather than those adopting the standardized approach (SA) (EBA 2018a). Namely, banks adopting the SA are expected to experience a reduction in regulatory capital twice as large as banks using the IRBA (Deloitte 2016; Löw and Kluger 2018). Also, other studies confirm that the adoption of the ECL approach of IFRS 9 may lead to a weakening and a greater volatility of capital due to a heavy reliance on loan loss provisioning (Deloitte 2016; Novotny-Farkas 2016; EY 2018; Löw and Kluger 2018; Kund and Rugilo 2019). In addition, according to Novotny-Farkas (2016), the adoption of the ECL method may drive a significant increase in sovereign credit risk, which will be charged to regulatory capital earlier. However, the most expected effect of IFRS 9 adoption is an increase in LLP (EY 2018; Deloitte 2019), partly influenced by the need to recognize expected loan losses earlier, to better absorb the sudden losses, and partly by the increased discretion in assessing the effects of macroeconomic market variables on financial instruments (EY 2017; PwC 2017; Deloitte 2019). Dong and Oberson (2021) found that European publicly listed banks from 2016 to 2019 chose to adopt the Capital Transition Arrangements of IFRS 9, which neutralizes the effects of IFRS 9 on regulatory capital, based on their opportunistic aims related to bank risk taking. They demonstrate that instead of using the higher level of managerial discretions offered by IFRS 9 to manipulate the loan loss allowances, banks adopted the Basel III's capital transitional arrangement to decrease their risk taking.

We are not aware of any study to date that has investigated whether bank may use their discretion in determining the exact timing and amount of positive and negative DLLP for capital management purposes, thus avoiding the costs connected to capital requirements' violations, compensate for the low equity levels (Kilic et al. 2012; Bonin and Kosak 2013) and/or meet minimum regulatory capital requirements (Moyer 1990; Ahmed et al. 1999). Consistent with the expectations of BCBS (2017), not yet empirically proven, we believe that the more timely loan loss recognition in year t compared to year t + 1 encourages over-capitalized banks to increase positive DLLP in year t with a consequent negative impact on earnings and regulatory capital. Thus, we expect that earlier recognition of DLLPs under IFRS 9 reduces upward capital management, thus pushing banks to pursue (if needed) different capital management strategies.

H2b: The more timely recognition of loan losses is negatively associated with upward capital management in EA listed banks.

2.3 The implication of competition

The longstanding effects of the GFC and the SDC resulted in progressive financial deterioration of the banking system stability, stakeholders' skepticism and great competitive pressure among banks (ECB 2018a). During the GFC, the lack of liquidity, the reduction in credit portfolio quality and the growing bad loans intensified competition among banks (e.g., Caporale et al. 2017). These contextual features created strong pressure in listed banks to disclose (un)real positive economic performance for meeting stakeholders' expectations, attracting funds and stealing potential clients from competitors (Bikker and Haaf 2002). A significant consequence of further banking regulation and the introduction of Basel III was an increase in competitive pressure in national banking markets (Fosu et al. 2018). Currently, there is very little empirical research on the effects of

banking competition on earnings management.[6] Prior research showed that when competition intensifies bank risk increases and profits decline (Jiang et al. 2023). When competition increases managers are more prone to manipulate earnings to improve share value (Balakrishnan and Cohen 2009) and attract investors' capital (Laksmana and Yang 2014). Indeed, in the past, "competitive pressures contributed to the rise of aggressive corporate accounting practices" (Shleifer 2004, 416). More recently, Goetz (2017) found that when financial market competition is strong, managers tend to avoid more timely recognition of NPLs. Instead, for US banks, Tomy (2019) demonstrated that competition prompted bankers to increase LLPs to reduce earnings and discourage potential competitors from entering an apparently low-profit market.

In particularly competitive markets, information on profitability is extraordinarily relevant (DeFond and Park 1999) and represents an important driver for capital investment policies (Bagnoli and Watts 2000), especially considering the sensitivity of market participants' reactions to bad news (Stein 1989; Teoh et al. 1998; Bagnoli and Watts 2000; Bar-Gill and Bebchuck 2003; Shleifer 2004). We assume that when competition in the market intensifies, managers, to persuade market participants to invest capital in their company's business rather than competitors, may be oriented to increase profits through DLLP management. Our rationale for this assumption comes from the study of Bagnoli and Watts (2000) about earnings management practices in competitive markets. According to them, since investors and lenders compare the economic results of the target firms with those of their main competitors, it would be reasonable to expect that companies, before presenting profits, evaluate the quality of their performance compared to their competitors' profits. If needed, they may manage earnings through DLLP to protect their reputation. The hypothesis on the existence of a positive association between competition and earnings management embraces the theoretical perspective that companies choose to manipulate profits because they expect a similar attitude from competitors and finds its rationale in increasing banking competition in 2013–2018.

H3a: Financial market competition at a national level is positively associated with upwards earnings management in EA listed banks.

The ECB and EBA compliance control intensified pressure to set aside capital for prudent purposes and keep regulatory capital above the minimum limit (Scholes et al. 1990; Ahmed et al. 1999), even if it imposes higher costs for banks. Schaeck and Cihak (2012) note that equity is more costly than debt and using available funds to boost regulatory capital means giving up lending activity and weakening profitability. Moreover, Schaeck and Cihak (2012) reveal that banking competition promoted high capital ratios, exceeding the minimum thresholds required by Basel, though cross-country differences exist. The European scenario suggests that regulatory features intensified financial competition and laid the groundwork for recurring abuses related to capital management. We are not aware of any study to date that has investigated whether there is an association between the intensifying competition at a national level in the European banking sector and the upwards

[6] Competition has always been a topic of relevant interest among accounting scholars when it deals with the banking sector. There is a widespread belief that financial market competition must be restrained and controlled since disproportionate competition is dangerous for both companies and consumers. In fact, the strong competition leads to "socially undesirable results" (Boyd and de Nicolò, 2005) and, above all, risky assets, low profitability, and financial crises (e.g., Jiang et al. 2023). It threatens the solvency of single institutions and the stability of the whole banking system (Jimenez et al. 2013, Jiang et al. 2023). Banking concentration exerts a stronger influence on sectors characterized by strict regulation (as in Europe) and reduces financial market stability (Berger et al. 2004).

capital management. We believe that the competition between EA banking institutions at a national level has exacerbated the pressure to present capital buffers meeting of beating the regulatory authorities and/or market participants' expectations to provoke a greater recourse to upwards capital management policies through higher (lower) negative (positive) DLLPs.

H3b: Financial market competition at a national level is positively associated with upwards capital management in EA listed banks.

2.4 The implication of money market pressure

One of the consequences of financial stress is the high money market pressure, due to additional reserves provided by the central bank and/or the withdrawal by account holders (Von Hagen and Ho 2007). Until the outbreak of the Covid-19 pandemic, banks were still dealing with significant challenges of financial statements consolidation, credit exposures reduction and impaired loans management coming from GFC and SDC (ECB 2018a). In 2018, European banks' NPLs amounted to almost €636 billion (EBA 2019) and their appropriate accounting treatment was a crucial problem that needed to be solved (Bholat et al. 2018; ECB 2018a). Therefore, banking regulatory and supervisory authorities knew that the effects of the crisis were not yet over and that banks were forced to deal with low internal liquidity and great money market pressure to provide capital to finance the recovery (ECB 2018a; CGFS 2018).

Prior accounting research focused on the financial crisis effects in the banking sector because of its central role in the global financial system (Manganaris et al. 2017), demonstrating that it is the most prone to opaqueness and complexity compared to other sectors (Morgan 2002; Iannotta 2006; Manganaris, et al. 2017).[7] According to a common belief, the accounting behavior can be easily affected by manipulative intent (Morgan 2002; Flannery et al. 2004, 2013; Bushman 2014; Manganaris et al. 2017). Some research suggests that the financial crisis effects reduced earnings management (Kousenidis et al. 2013; Azzali et al. 2014; Filip and Raffournier 2014; Cimini 2015) with a positive influence on financial statement reliability (Kousenidis et al. 2013; Manganaris et al. 2017). The reason for improved reliability is the growing need to exhibit transparent accountancy (Kousenidis et al. 2013; Manganaris et al. 2017) and conservatism, especially in smaller banks (e.g., Givoly et al. 2007; LaFond and Watts 2008). Other studies indicated that a crisis adversely affected investors' interest and the possibility of improving bank performances on the stock market (Ahmad-Zaluki et al. 2011; Filip and Raffournier 2014; Pinto and Picoto 2018).

However, the empirical evidence on the association between earnings management strategies and financial stress (Balasubramanyan et al. 2014; Caporale et al. 2017) is limited and mixed. According to some studies, financial crisis is positively related to earnings management (Chia et al. 2007; Jacob and Jorgensen 2007; Habib et al. 2013; Persakis and Iatridis 2015), and by entailing greater recognition of LLPs, banks likely try to avoid

[7] In this study the term "financial crisis effects" refers to the impact of two main separate crises. The first one was the global financial crisis, which began in Europe in 2008 (in 2007 in the United States) and lasted until around 2010, while the second was the sovereign debt crisis, which began in 2010 and had a variable duration due to cross-country differences (Manganaris et al. 2017). Both the crisis and the sovereign debt crisis provided a rationale for greater bank regulation (Agenor and Zilberman 2015; Cohen and Edwards 2017; Pinto and Picoto 2018).

earnings' reductions and losses (Burgstahler and Dichev 1997; Degeorge et al. 1999; Burgstahler and Eames 2003; Ayers et al. 2006). Jin et al. (2019) demonstrated that for U.S. banks, during periods of economic policy uncertainty (a financial crisis), managers are more prone to distort earnings, since in those periods the informative asymmetry between external stakeholders and managers is more pronounced and earnings are more unpredictable. According to other studies, crises influence banks to deflate income levels for acquiring higher bargaining power in labor union renegotiations; it also diminishes debt restructuring and favors access to state economic support measures (DeAngelo et al. 1994; Filip and Raffournier 2014).

Consistent with the literature on the currency crises (Eichengreen et al. 1995, 1996a, 1996b), we investigate the effects of the financial crisis by observing the change in the banking sector's aggregate demand for central bank reserves. Previous literature showed that "a banking crisis (effect) is characterized by a sharp increase in the short-term interest rate, a large increase in the volume of central bank reserves, or a combination of both, indicating a high degree of tension in the money market" (Von Hagen and Ho 2007, p.1043). Therefore, we use the money market pressure index created by Von Hagen and Ho (2007) to proxy for the financial crisis effect. Consistent with Von Hagen and Ho (2007), when the effects of the financial crisis intensify, the money market pressure index returns high values. We expect that during our analysis period the increasing money market pressure experienced by EA listed banks encouraged banks to carry out upwards earnings management for meeting or beating earnings benchmarks and signal strong profitability.

H4a: The money market pressure is positively associated with upwards earnings management in EA listed banks.

There is a paucity of empirical research regarding the effects of money market pressure, a tool widely used to identify banking financial crises (Von Hagen and Ho 2007), on capital management. Azzali et al. (2014) argued that in the Italian banking sector, the financial crisis was a deterrent to capital management operations, especially for banks exposed to higher risks. In other studies, the financial crisis prompted managers to use LLPs to manipulate regulatory capital (Leventis et al. 2011; Pinto and Picoto 2018). During periods of increased money market pressure, liquidity demand and financial uncertainty, banks feel stronger pressure from investors to increase regulatory capital to demonstrate better financial stability. During financial crisis or high uncertainty, investors prefer that banks do not take high risks, hold high capital buffers and rely on safe and liquid investments. Holding higher capital ratios would mean better protection against the risk of insolvency resulting from sudden losses. From this perspective, managing regulatory capital upwards would allow banks to promptly respond to external pressures on their capital strength. This would increase the perceived safety for investors and customers, thus boosting their confidence in times of uncertainty. Therefore, we expect that the increasing money market pressure is positively associated with upwards capital management.

H4b: The money market pressure is positively associated with upwards capital management in EA listed banks.

2.5 The contribution to the literature about banking loan loss provision

Our study responds to several calls for research that have emerged in recent years in the accounting literature about banking loan loss provisions (Ozili and Outa 2017). The main calls for additional research are summarized below.

Nowadays it is not clear whether the incremental increase (decrease) in LLPs, in response to changes in regulatory capital, is targeted at specific provisions or general provisions (i.e., DLLP). Ozili and Outa (2017) called for more research on whether abnormal changes in LLPs in response to changes in bank regulatory capital level are significantly associated with general provisions. Our study by investigating the association between Basel III pressure to increase high-quality regulatory capital and earnings and capital management through discretionary loan loss provisioning addresses this issue. We provide new empirical evidence and contribute to clarify this intricate issue. In addition, the process of updating the Basel regulatory framework allows scholars to continue to investigate the role of LLPs in bank accounting practices (Ozili and Outa 2017). Namely, our study responds to the call for more research on the impact of Basel III regulation on banks' provisioning discretion and financial reporting transparency.

The conflict between prudential LLP requirements from regulatory authorities and accounting standards and LLP requirements from standard setters is still a crucial issue today (Ozili and Outa 2017). Regulatory authorities require banks to have large capital buffers to protect against sudden loan losses even by keeping loan loss provisions (too) high. Such a prudential perspective sometimes is in contrast with the accounting one. It may be instrumental for manipulating accounting numbers, exposing LLP to being managed and resulting in negative consequences for financial statements transparency. This study addresses the need for more research on this topic (Ozili and Outa 2017) by investigating the association between the more timely loan loss recognition (IFRS 9) and capital management. In addition, there is a paucity of research about the effect of the adoption of more timely loan loss recognition on the characteristics of DLLP and their use for pursuing earnings and capital management. This study sheds light on a phenomenon than may be potentially dangerous for earnings quality, the transparency of financial statements and the adequacy of regulatory capital. In doing so, it helps to clarify further direction of new potential regulatory interventions on the accounting treatment of ECL.

To date, there is no study (of which we are aware) that analyzes how financial competition among banks may favor or hinder earnings and capital management for European banks soon after the GFC and the SDC. Our study contributes to the debate on how certain competitive market conditions influence accounting policies with specific consequences for the transparency of financial statements and the size of regulatory capital. In addition, this study contributes to clarify whether and how DLLPs can be used as accounting tools for gaining competitive advantages based on earnings and regulatory capital.

Currently, there is a gap in the literature on the effects that money market pressure may generate on the accounting behavior of banks. This study contributes to the studies on earnings and capital management in banks by exploring whether and how money market pressure might have exerted an influence on the earnings quality and the composition of regulatory capital. This study also contributes to clarify how banking monetary policies and/or financial crises influence banking discretionary provisioning, profitability and the capital adequacy. In addition, it suggests opening a new strand of research on the association between money market pressure and earnings and capital management.

Most previous studies on earnings and capital management have focused on the presence of overlapping motivations between earnings and capital manipulations. They ignored the possibility that in some cases, when there are conflicting motivations, banks may pursue only one of them (Ozili and Outa 2017). This study, instead, separates earnings and capital management strategies and investigates whether some factors may be positively associated with both of them or only one of them.

3 Methodology

3.1 Sample

Our sample is composed of all active EA listed banks involved in traditional lending activities from 2013 to 2018, a period of intensified supervisory pressure.[8] They are extracted from Orbis Bank Focus and come from 20 countries of EA.[9] When querying the Orbis Bank Focus database we excluded companies with no recent IFRS-compliant financial statements data and public authorities/states/governments. The choice of starting the empirical analyses in 2013 is based on avoiding effects that occurred in 2012 when the financial crisis was very severe (ECB 2012). Moreover, the minimum capital constraints introduced by Basel III in 2010 became officially mandatory for all European banks, according to the "phase-in arrangements" plan, only in 2013. We end the analysis in 2018 to avoid the distorting effects of the Covid-19 pandemic on strategic and accounting practices of EA listed banks in 2019. After excluding banks with the consolidation codes C*, U*, U2, LF, NF, we obtain a finale sample of 153 EA listed banks with 918 bank-year observations. Our analyses are based upon this sample of observations. All accounting data are extracted from Orbis Bank Focus database, while country-level variables, such as the gross domestic product and the real interest rate, are extracted from the World Bank's and Euro Area Statistics' online open databases. Continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. Table 1 provides the steps of sample selection.

3.2 Testing for earnings and capital management

To investigate whether the above regulatory and contextual features influenced banks' decisions to manage earnings and capital through DLLP, this study uses four pooled OLS regression models with fixed-effects (i.e., bank fixed effects), one for each hypothesis to be tested, based on the two-stage approach according to Nicoletti's model (2018). The regression model of the first stage is used to estimate *DLLP*, the dependent variable for the four models of the second stage. Since the total amount of LLPs is composed of discretionary and non-discretionary LLPs, we need to account for the non-discretionary component of LLPs to obtain DLLPs. Consistently with previous studies (such as, among all, Kim and

[8] Since the empirical investigation over 2013–2018 also required the acquisition financial data of 2010, necessary for the calculation of lagged variables, for the sake of consistency, all the extracted active EA listed banks that compose the sample were involved in traditional lending activities from 2010.

[9] The countries are Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Portugal, Slovakia, Slovenia and Spain.

Kross 1998; Beaver and Engel 1996; Beatty et al. 1995; Wahlen 1994) and the suggestions of Beatty and Liao (2014) about the *LLP* determinants models with the highest predictive power, we use the base model of Nicoletti (2018) for estimating the non-discretionary component of LLPs, thus regressing the *LLP* on its determinants (Eq. 1).

$$LLP_{i,t} = \alpha_0 + \alpha_1 \Delta NPL_{i,t} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t-1} + \alpha_4 \Delta NPL_{i,t-2} + \alpha_5 EBLLP_{i,t} + \alpha_6 Tier1_{i,t-1} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + YearFE + \varepsilon_i \quad (1)$$

where subscript i indexes the bank, t indexes the year. This model includes year fixed effects to control for distortive effects of macroeconomic variables that may change over time and influence banks' provisioning. After obtaining the estimate of the non-discretionary LLP in Eq. (1), we estimate the discretionary LLP as the difference between reported LLP and estimated non-discretionary LLP. *LLP* is the loan loss provision scaled by lagged total loans. *ΔNPL* is the change in non-performing loans scaled by lagged total loans and it captures changes in the quality of the underlying loan portfolio (i.e., the rising amount of NPL detects a deterioration of credit portfolio quality and requires higher provisions) (Nicoletti, 2018). *EBLLP* is the ratio of earnings before provisions and taxes, scaled by the beginning of total loans and a positive coefficient for *EBLLP* supports the thesis that discretionary provisions are used for managing earnings. *Tier1* is the ratio of Tier 1 capital to risk-weighted total assets accounting for capital management. *Size* is the natural logarithm of total assets. We use *Size* as control variable since it has demonstrated to influence deeply managerial behavior of earnings management (Alali and Jaggi 2011). *ΔLoan* is the change in total loans scaled by lagged total loans, controlling for changes in the size of a bank's loan portfolio and is positively related to LLPs. In the second stage, the four research hypotheses of earnings management and capital management are tested separately by running separate regression models. This is intended to not assimilate (or confuse) earnings management to (with) capital management. In addition, to better control for earnings and capital management in the regression models dedicated to each of them, specific control variables are used.[10]

Appendix 1 provides further details about the variables used in this set of analyses.

3.2.1 Earnings management

In the second stage, the four research hypotheses of earnings management are tested through four pooled OLS regression models with bank fixed-effects, consistent with Kanagaretnam et al. (2003) and Nicoletti (2018) models.[11] Namely, Eqs. 3–5 investigate,

[10] Running two separate regression models to test earnings and capital management is important because these two concepts are distinct and can have different determinants. Separating the analyses allows for a better understanding of the specific dynamics associated with each phenomenon and for more accurate and meaningful results. If earnings and capital management analyses are combined in a single regression model, the interactions between the variables could lead to biased or unclear results. By keeping the models separate, clearer and more well-defined results can be obtained for each practice. In addition, a clear and separate view of earnings management and capital management helps to better understand the financial and accounting dynamics of the company.

[11] The choice to run the fixed-effect regression model is justified by the necessity to control for all time-invariant differences between the entities (banks), so the estimated coefficients of the fixed effects model would not be biased because of omitted time-invariant characteristics such as culture, national supervisory pressure, and bank-specific internal factors. The basic assumption of the fixed-effect model is that individual characteristics of each entity (bank) do not change over the time; hence, the coefficients are estimated

Table 1 Sample selection *Source*: Orbis Bank Focus

Initial number of companies	Initial total observations (period 2013–2018)
All EA publicly listed banks; Status: active (20 Countries of Euro area: Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Portugal, Slovakia, Slovenia, and Spain *Default search options: Exclude public authorities/states/governments Exclude companies with no recent financial data	
329	1974
Exclude companies with these consolidation codes: C*, U*, U2, LF, NF	
− 176	− 1055
Final sample composition	
153	918

correspondently, whether the pressure toward increasing the high-quality regulatory capital, the more timely recognition of loan losses, the competition and the money market pressure were associated with earnings management, pursued through discretionary provisioning.

$$DLLP_{i,t} = \alpha_0 + \alpha_1 CET1_{i,t-1} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} + \alpha_6 EBLLP_{i,t} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} + \alpha_{10} ROA_{i,t} + YearFE + \varepsilon_i \quad (2)$$

$$DLLP_{i,t} = \alpha_0 + \alpha_1 \Delta NPL_{i,t+1} + \alpha_2 \Delta NPL_{i,t} + \alpha_3 \Delta NPL_{i,t-1} + \alpha_4 \Delta NPL_{i,t-2} + \alpha_5 EBLLP_{i,t} + \alpha_6 Size_{i,t} + \alpha_7 \Delta Loan_{i,t} + \alpha_8 LLR_{i,t} + \alpha_9 ROA_{i,t} + YearFE + \varepsilon_i \quad (3)$$

$$DLLP_{i,t} = \alpha_0 + \alpha_1 HHI_{t,j} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} + \alpha_6 EBLLP_{i,t} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} + \alpha_{10} ROA_{i,t} + YearFE + \varepsilon_i \quad (4)$$

$$DLLP_{i,t} = \alpha_0 + \alpha_1 IMP_{t,j} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} + \alpha_6 EBLLP_{i,t} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} + \alpha_{10} ROA_{i,t} + YearFE + \varepsilon_i \quad (5)$$

where subscript *i* indexes the bank, *t* indexes the year and *j* indexes the country.

DLLP is the proxy for the discretionary loan loss provisions, obtained as residuals from the first stage estimation and it is the dependent variable. Since DLLP can be used to manipulate earnings upwards or downwards, as needed, for income increasing and decreasing purposes (Collins et al. 1995; Kanagaretnam et al. 2003; Anandarajan et al. 2007; Bouvatier and Lepetit 2008; Soedarmono 2010; Kanagaretnam et al. 2014; Bouvatier et al. 2014; Cumming and Durrani 2016; Dal Maso et al. 2019; Hong et al. 2020; Tran et al. 2020), we ran each regression model with positive and negative value of the DLLP. The

Footnote 11 (continued)

by fixing such time-invariant features. Moreover, we performed the Hausman test which suggests that we should better rely upon the fixed-effect regression model.

positive value of DLLP captures an income decreasing strategy, while the negative value of DLLP captures an income increasing strategy (Kanagaretnam et al. 2003; Kanagaretnam et al. 2014; Dal Maso et al. 2019; Hong et al. 2020; Tran et al. 2020). The expected signs for the same variables used in regression models with positive and negative DLLP must be opposite to confirm the same hypotheses.

EBLLP is earnings before the LLP, taxes and extraordinary items scaled by lagged total loans and a negative coefficient for *EBLLP* supports the thesis that banks pursue income increasing strategies by increasing the negative DLLPs. *CET1* is the ratio of lagged Common Equity Tier 1 capital scaled by the lagged RWA. Since Basel III regulation pushes banks to keep the primary quality regulatory capital (suitable for the first coverage of potential losses) high, this proxy captures how the tension toward an increase of high-quality capital in banks reporting lower CET1 in year t − 1 influences the discretionary provisioning practice in year t.[12]

The Basel Committee's CET1 capital ratio contains both common stock and retained earnings. Since the reduction of DLLPs increases earnings and retained earnings and, in turn, expands the CET1 capital, we expect that banks aiming to manage the CET1 capital upward, through the increase of retained earnings, reduce the DLLPs. In other words, we expect that the Basel III pressure to increase high-quality regulatory capital will push banks to engage in upward earnings management. This hypothesis is confirmed by a negative coefficient on the *CET1* proxy (α_1) (Eq. 2). *ΔNPL* proxies (i.e., ΔNPL_{t+1}, ΔNPL_t, ΔNPL_{t-1}, ΔNPL_{t-2}) stand for the change in non-performing loans scaled by lagged total loans. The proxy that we use for the loan loss recognition timeliness in year t compared to year t + 1 is ΔNPL_{t+1} (Nicoletti 2018). The more timely recognition of loan loss is the natural consequence of a more timely recognition of loans deterioration, captured by the ΔNPL_{t+1} proxy (Novotny-Farkas 2015; Bholat et al. 2018). If ΔNPL_{t+1} decreases, it means that in year t there has been an in increase in identification of loans deterioration compared to year t + 1. Considering the timeliness of loan loss recognition, the decreasing ΔNPL_{t+1} signals the more timely recognition of loan losses in year t compared to year t + 1. Since the forward-looking loan loss recognition induces banks to increase the amount of DLLPs in year t compared to year t + 1 when the quality of credit portfolio is expected to fall (Novotny-Farkas 2015), we expect that it counteracts income increasing policies in year t by reducing negative DLLPs. This hypothesis is confirmed by positive coefficient of ΔNPL_{t+1} (α_1) (Eq. 3). Since loan loss recognition policies in each year are strongly influenced by those occurring in preceding years, the ΔNPL_t, ΔNPL_{t-1}, ΔNPL_{t-2} proxies are used as control variables (Nicoletti 2018).

HHI is the Herfindahl–Hirschman Index, the most common measure of industry concentration because it accounts for the market structure and the firm's performance (e.g., Hannan 1997; Degryse and Ogena 2005; Cheng et al. 2013; Datta et al. 2013; Fosu 2013; Jimenez et al. 2013).[13] It is widely used in accounting research to measure the level of

[12] Andreeva et al. (2020) use bank-specific capital measures (i.e., the combined buffer requirement and other CET1 requirements) as key regressors to capture the impact of regulatory pressures, we use the lagged CET1 reduction to identify the presence of de facto pressure from Basel III to increase primary quality capital, but also market expectations exerted a relevant pressure.

[13] The HHI represents a direct measure for the market concentration because it captures the size of market shares of companies which compose a sector.

industry competition (Rhoades 1993; Berger et al. 2008; Li 2010; Karuna et al. 2012, 2015; Laksmana and Yang 2014).[14] Since competition between listed banks is particularly fierce within national borders, we clustered them by country for computing the measure of banking competition at a country level. In addition, the measure of banking competition is calculated by considering only the banks in the sample, thus excluding unlisted banks engaged in different financial activities for homogeneity and consistency purposes. We computed the *HHI* as the sum of squares of market shares of EA listed banks in each country. The market share was calculated using the value of the banks' operating revenues by following the strategy of Clerides et al. (2015). We used accounting data from banks with C1/C2 consolidation codes to get country aggregates, capture the actual size of the banking market and compute concentration measures (Duprey and Lé, 2016). Since *HHI* reflects the number of firms inside a market and the size of their market share, when the number of firms reduces and/or the size of market share increases, the competitive pressure intensifies (HHI decreases). As market concentration is inversely related to market competition (Laksmana and Yang 2014; Tomy 2019), when the *HHI* returns low values, industry concentration weakens, and market competition at country level intensifies. In these cases, managers could be more prone to use earnings management (upwards) as a competitive strategy for disclosing unreal favorable economic performance. Showing higher income could be instrumental in facing competition from other credit institutions, which could be exploiting accounting management with the same intentions. We expect that the increasing banking competition induces banks to do income increasing strategies. This hypothesis is confirmed by a negative coefficient of *HHI* proxy (α_1) (Eq. 4).

IMP is the money market pressure index (Von Hagen and Ho 2007) and it is the weighted average of changes in the ratio of reserves to non-bank deposits and the weighted average of changes in the short-term real interest rate.[15] The weights are the standard deviations of such components (Von Hagen and Ho 2007). The *IMP* measures the exposure of each credit institution to the effects of financial crisis through the measurement of market pressure about money availability. We expect that the increasing money market pressure as consequence of financial crisis' effects induces banks to do income increasing strategies. This hypothesis is confirmed by a positive coefficient of IMP proxy (α_1) (Eq. 5). Other variables are consistent with Nicoletti's (2018) model, except for *LLR* and *ROA*, which are added as control variables. *LLR* is the proxy for loan loss reserves scaled by total loans, reflecting the credit portfolio quality and cycle (Dungan 2009; Nicoletti 2018). *ROA* is the ratio of return on assets, and it measures the bank's income capacity in relation to total assets. It controls for bank profitability, a relevant driver for discretionary provisioning (Hong et al. 2020). Appendix 1 provides further details about the variables used in this set of analyses.

[14] "The HHI is generally considered to be a better measure of competition intensity than a four-firm concentration ratio or the number of firms in the market because HHI combines information about the number of firms in a market and their size distribution" (Gordon et al. 2009).

[15] The money market pressure index is defined as follows: $\text{IMP} = (\Delta\gamma/\sigma\Delta\gamma) + (\Delta r/\sigma\Delta r)$, where γ is the ratio of total reserves held by the banking system of a country in a specific year to total non-bank deposits, r is the real interest rate of a country in a specific year, and Δ is the difference operator (Von Hagen and Ho 2007). Total reserves held by the banking system correspond to the sum of cash in the vault and the deposit at the central bank.

3.2.2 Capital management

In the second stage, the four research hypotheses regarding capital management are tested through four pooled OLS regression models with bank fixed-effects, consistent with Kanagaretnam et al. (2003) and Nicoletti (2018). Equations 6–9 investigate, correspondently, whether the pressure toward increasing the high-quality regulatory capital, the more timely recognition of loan losses, the competition, and the money market pressure were associated with capital management, pursued through discretionary provisioning.

$$\begin{aligned} DLLP_{i,t} = {} & \alpha_0 + \alpha_1 CET1_{i,t-1} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} \\ & + \alpha_6 CAP_{i,t-1} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} + \alpha_{10} DEPOSIT_{i,t} \\ & + \alpha_{11} NCO_{i,t} + YearFE + \varepsilon_i \end{aligned} \tag{6}$$

$$\begin{aligned} DLLP_{i,t} = {} & \alpha_0 + \alpha_1 \Delta NPL_{i,t+1} + \alpha_2 \Delta NPL_{i,t} + \alpha_3 \Delta NPL_{i,t-1} + \alpha_4 \Delta NPL_{i,t-2} \\ & + \alpha_5 CAP_{i,t-1} + \alpha_6 Size_{i,t} + \alpha_7 \Delta Loan_{i,t} + \alpha_8 LLR_{i,t} + \alpha_9 DEPOSIT_{i,t} \\ & + \alpha_{10} NCO_{i,t} + YearFE + \varepsilon_i \end{aligned} \tag{7}$$

$$\begin{aligned} DLLP_{i,t} = {} & \alpha_0 + \alpha_1 HHI_{t,j} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} \\ & + \alpha_6 CAP_{i,t-1} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} + \alpha_{10} DEPOSIT_{i,t} \\ & + \alpha_{11} NCO_{i,t} + YearFE + \varepsilon_i \end{aligned} \tag{8}$$

$$\begin{aligned} DLLP_{i,t} = {} & \alpha_0 + \alpha_1 IMP_{t,j} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} + \alpha_5 \Delta NPL_{i,t-2} \\ & + \alpha_6 CAP_{i,t-1} + \alpha_7 Size_{i,t} + \alpha_8 \Delta Loan_{i,t} + \alpha_9 LLR_{i,t} \\ & + \alpha_{10} DEPOSIT_{i,t} + \alpha_{11} NCO_{i,t} + YearFE + \varepsilon_i \end{aligned} \tag{9}$$

To determine whether sampled banks adopted positive or negative DLLPs to increase regulatory capital (i.e., upward capital management), we investigated the capitalization status of the sampled banks. Of a total of 918 LLR year-end observations for 153 EA listed banks of our sample over 6 years (2013–2018), only about 202 LLR year-end observations (22%) showed banking undercapitalization. In all other cases, banks had annual LLRs greater than 1.25% of RWAs. Since the great majority of the banks in the sample are overcapitalized, we expect them to pursue upward capital management through a reduction of DLLPs. To corroborate the results of our analyses, we clustered the banks in the sample by separating the overcapitalized from the undercapitalized ones. Then, we run all the above regression models only for the cluster of overcapitalized banks to test the consistency of the results. As overcapitalized banks pursue upward capital management by increasing earnings and retained earnings, which serve to increase CET1, we interpret upward capital management policies though higher recourse to negative DLLPs.

Consistent with Basel III (BCBS 2011), positive DLLP negatively impacts earnings and retained earnings and, in turn, CET1; therefore, positive DLLP identifies the strategy of downward capital management. Likewise, negative DLLP impact positively earnings and retained earnings and, in turn, CET1; hence, negative DLLP identifies the strategy of upward capital management. Consequently, we run two regression models for each equation reported above, one with positive DLLP and one with negative DLLP.

CAP is the ratio of lagged regulatory capital (Tier 1 capital) before loan loss reserves to the minimum required regulatory capital; it is the most frequently used proxy to examine the use of provisions for capital management (Beatty et al. 1995; Ahmed et al. 1999; Anandarajan et al. 2003, 2007).[16] We believe that when banks record a reduction in Tier 1 capital in fiscal year t − 1 to the minimum required regulatory capital, they will be more inclined to do upward capital management through an increase of negative DLLPs in the following year, which are instrumental to increase earnings, retained earnings and, ultimately, CET1. Consequently, we expect the coefficient of the *CAP* proxy is negative.

We expect that the pressure to increase high-quality regulatory capital for banks with lower CET1 in year t, the increasing banking competition and the increasing money market pressure favor upward capital management in year t. These hypotheses are confirmed by negative coefficients on *CET1* proxy (α_1) (Eq. 6) and *HHI* proxy (α_1) (Eq. 8) and by a positive coefficient on *IMP* proxy (α_1) (Eq. 9), respectively. We expect that the more timely loan loss recognition in year t compared to year t + 1 obstructs capital management in year t. This hypothesis is confirmed by positive coefficient on ΔNPL_{t+1} proxy (α_1) (Eq. 7). *DEPOSIT* is the proxy for total deposits scaled by beginning total liabilities.

Figure 1 summarizes our research analyses and the methodology design.

3.3 Robustness tests

To assess the robustness of our main inferences we use a two-stage approach that estimates abnormal loan loss provisions (ALLP), adopted for earnings and capital management (Wahlen 1994; Liu and Ryan 2006; Kanagaretnam et al. 2010; Kanagaretnam et al. 2014; Beatty and Liao 2014; Dal Maso et al. 2019; Hong et al. 2020). Consistent with Kanagaretnam et al. (2010, 2014), Dal Maso et al. (2019), and Hong et al. (2020), we estimate the non-discretionary component of LLP by regressing the non-discretionary LLP on its determinants using the following model (Eq. 10)·

$$LLP2_{i,t} = \alpha_0 + \alpha_1 BEGLLA_{i,t} + \alpha_2 NCO_{i,t} + \alpha_3 \Delta Loan2_{i,t} + \alpha_4 \Delta NPL_{i,t} + \alpha_5 LOAN_{i,t} + \alpha_6 NPL_{i,t} + YearandCountryFE + \varepsilon_t \quad (10)$$

For this analysis, we run this regression with annual observations from 2010 to 2020 to obtain an even more likely estimate of ALLP. *LLP2* is loan loss provisions scaled by beginning total assets,[17] *BEGLLA* is loan loss allowance scaled by beginning total assets. *NCO* is the net loan charge-offs scaled by beginning total assets. *ΔLoan2* is the change in total loans scaled by beginning total assets.[18] *ΔNPL* is the change in non-performing loans scaled by beginning total assets. *LOAN* is total value of loans scaled by beginning total assets. *NPL* is non-performing loans scaled by beginning total assets. We control for year and country fixed effects. Appendix 2 provides further details about the variables used in this set of analyses.

[16] The CAP index has been calculated based on yearly minimum threshold of Tier 1 Capital required by Basel III regulation in the section "phase-in arrangements" (BCBS 2011). The minimum threshold of Tier 1 capital for 2013 is 4.5% of RWA, for 2014 it is 5.5% of RWA and from 2015 to 2019 it is 6% of RWA.

[17] We name this proxy *LLP2* to distinguish it from the previous proxy *LLP*. While *LLP* is the loan loss provision scaled by lagged total loans, *LLP2* is loan loss provisions scaled by beginning total assets.

[18] We name this proxy *ΔLoan2* to distinguish it from the previous proxy *ΔLoan2*. While *ΔLoan2* is the change in total loans scaled by lagged total loans, *ΔLoan2* is the change in total loans scaled by beginning total assets.

The residuals obtained from Eq. (10) are abnormal loan loss provisions (ALLP), the dependent variable for the second stage regression models. Higher ALLP signal the presence of greater discretion and subjectivity in LLP assessments, which may be used to opportunistically manage earnings and regulatory capital. We use as our second stage regression model the system generalized method of moments (GMM) of Arellano and Bover (1995) and Blundell and Bond (1998) for dynamic panel data. We use the GMM estimator because it is suitable for large cross-sectional and small time-series panels, independent variables that are not strictly exogenous (i.e., they may be correlated with past and current realizations of error), fixed effects, heteroskedasticity and autocorrelation within individuals (Roodman 2009). By exploiting the lagged explanatory variables as instruments, it provides unbiased and consistent estimates and addresses the issues of potential endogeneity and spurious correlation (Arellano and Bond 1991; Massa et al. 2015). Moreover, we rely upon the system GMM estimation because, compared to the difference GMM estimation of Arellano and Bond (1991), the system GMM estimation uses as instrumental variables the lags in both differences and levels, not only in differences. Hence system GMM augments difference GMM by estimating simultaneously in differences and levels.[19] Since the use of instrumental variables in differences and levels may cause instruments proliferation, we address the potential issue of overidentification by performing the Sargan test and the Hansen test (Sargan 1958; Roodman 2009; Labra and Torrecillas 2018).

In the second stage, the four research hypotheses of earnings management and capital management are tested separately, by running separate regression models to not assimilate (or confuse) earnings management to (with) capital management. In addition, to better control for earnings and capital management in the regression models dedicated to each of them, specific control variables are used, thus differentiating the regression model.

We test the association between the pressure toward increasing the high-quality regulatory capital (H1a), the more timely loan loss recognition method (H2a), the competition (H3a) and money market pressure (H4a), and earnings management by estimating the following regression models (Eqs. 11–14).

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 CET1_{i,t-1} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} + \alpha_5 \Delta NPL_{i,t-1} \\ & + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 EBLLP_{i,t} + \alpha_8 Size_{i,t-1} + \alpha_9 PASTLLP_{i,t-1} \\ & + \alpha_{10} LLR\_IMPL_{i,t} + \alpha_{11} RIR_{i,t} + \alpha_{12} ROA_{i,t} + \alpha_{13} CR_{i,t} \\ & + \alpha_{14} HLoan_{i,t} + \alpha_{15} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{11}$$

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} \\ & + \alpha_5 \Delta NPL_{i,t-2} + \alpha_6 EBLLP_{i,t} \\ & + \alpha_7 Tier1_{i,t} + \alpha_8 Size_{i,t-1} + \alpha_9 PASTLLP_{i,t-1} + \alpha_{10} LLR\_IMPL_{i,t} \\ & + \alpha_{11} RIR_{i,t} + \alpha_{12} ROA_{i,t} + \alpha_{13} CR_{i,t} + \alpha_{14} HLoan_{i,t} + \alpha_{15} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{12}$$

[19] "The Arellano-Bover/Blundell-Bond estimator augments Arellano-Bond by making an additional assumption that first differences of instrument variables are uncorrelated with fixed effects. This allows the introduction of more instruments and can dramatically improve efficiency" (Roodman, p.86, 2009).

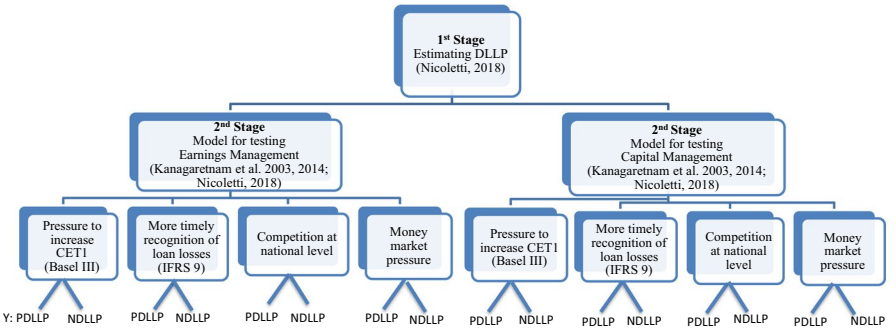

Fig. 1 Research methodology diagram. DLLP = discretionary loan loss provisions, Y = independent variable for regression models of the 2nd Stage, PDLL = positive discretionary loan loss provisions (positive residuals from the 1st Stage), income decreasing, NDLLP = negative discretionary loan loss provisions (negative residuals from the 1st Stage), income increasing

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 HHI_{t,j} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} + \alpha_5 \Delta NPL_{i,t-1} \\ & + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 EBLLP_{i,t} \\ & + \alpha_8 Tier1_{i,t} + \alpha_9 Size_{i,t-1} + \alpha_{10} PASTLLP_{i,t-1} + \alpha_{11} LLR\_IMPL_{i,t} \\ & + \alpha_{12} RIR_{i,t} + \alpha_{13} ROA_{i,t} + \alpha_{14} CR_{i,t} + \alpha_{15} HLoan_{i,t} + \alpha_{16} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{13}$$

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 IMP_{t,j} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} + \alpha_5 \Delta NPL_{i,t-1} \\ & + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 EBLLP_{i,t} + \alpha_8 Tier1_{i,t} + \alpha_9 Size_{i,t-1} \\ & + \alpha_{10} PASTLLP_{i,t-1} + \alpha_{11} LLR\_IMPL_{i,t} + \alpha_{12} RIR_{i,t} + \alpha_{13} ROA_{i,t} + \alpha_{14} CR_{i,t} \\ & + \alpha_{15} HLoan_{i,t} + \alpha_{16} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{14}$$

$ALLP_t$ is the absolute value of the negative abnormal loan loss provisions for the year t, obtained from the first stage estimation procedure and it captures the income increasing earnings management (Kanagaretnam et al. 2003). $ALLP_{t-1}$ is the lagged absolute value of the negative abnormal loan loss provisions for the year t − 1. *CET1*, ΔNPL proxies, *HHI*, *IMP*, *EBLLP*, *Tier1* and *ROA* have been previously described. $Size_{t-1}$ is the natural logarithm of (beginning) total assets. *PASTLLP* is beginning LLP scaled by beginning total assets. *LLR_IMPL* is loan loss reserves scaled by impaired loans. *RIR* is the proxy for the real interest rate, and it proxies for bank risk taking (Dell'Ariccia et al. 2014). *CR* is the reserves to bank deposit ratio, calculated as total reserves held by the banking system to total non-bank deposits in the banking sector per country per year. This ratio accounts for the tension in the money market because of the additional reserves made available to the banking system by the central bank (Von Hagen and Ho 2007). *HLoan* is the natural logarithm of the household loans, while *BLoan* is the natural logarithm of the business loans; they both explain the banking assets composition (Hong et al. 2020). These control variables are relevant determinants of LLP strategies. Inside each regression model we control for time with dummy variables. Appendices 1 and 2 provide further details about the variables used in this set of analyses.

Consistent with the arguments given above, we expect that *CET1* and *HHI* have negative coefficients, while ΔNPL_{t+1} and *IMP* have a positive coefficient. In addition, we expect that the coefficients of *EBLLP* and $ALLP_{t-1}$ are negative, thus supporting the idea that when

in year t − 1 (overcapitalized) bank increases the negative ALLP, in the following period t there should be a reduction of negative ALLP for pursuing income smoothing strategies (e.g., Massa et al. 2015). In addition, we test the association between the pressure toward increasing the high-quality regulatory capital for banks with lower CET1 in year t − 1 (H1b), the more timely loan loss recognition method (H2b), the competitive pressure (H3b) and money market pressure (H4b), and capital management by estimating the following regression models (Eqs. 15–18).

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 CET1_{i,t-1} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} \\ & + \alpha_5 \Delta NPL_{i,t-1} + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 CAP_{i,t-1} + \alpha_8 EBLLP_{i,t} \\ & + \alpha_9 Size_{i,t-1} + \alpha_{10} PASTLLP_{i,t-1} + \alpha_{11} NCO_{i,t} + \alpha_{12} RIR_{i,t} \\ & + \alpha_{13} ROA_{i,t} + \alpha_{14} CR_{i,t} + \alpha_{15} HLoan_{i,t} + \alpha_{16} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{15}$$

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 \Delta NPL_{i,t+1} + \alpha_3 \Delta NPL_{i,t} + \alpha_4 \Delta NPL_{i,t-1} \\ & + \alpha_5 \Delta NPL_{i,t-2} + \alpha_6 CAP_{i,t-1} + \alpha_7 EBLLP_{i,t} + \alpha_8 Size_{i,t-1} \\ & + \alpha_9 PASTLLP_{i,t-1} + \alpha_{10} NCO_{i,t} + \alpha_{11} RIR_{i,t} + \alpha_{12} ROA_{i,t} \\ & + \alpha_{13} CR_{i,t} + \alpha_{14} HLoan_{i,t} + \alpha_{15} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{16}$$

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 HHI_{t,j} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} \\ & + \alpha_5 \Delta NPL_{i,t-1} + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 CAP_{i,t-1} + \alpha_8 EBLLP_{i,t} \\ & + \alpha_9 Size_{i,t-1} + \alpha_{10} PASTLLP_{i,t-1} + \alpha_{11} NCO_{i,t} + \alpha_{12} RIR_{i,t} \\ & + \alpha_{13} ROA_{i,t} + \alpha_{14} CR_{i,t} + \alpha_{15} HLoan_{i,t} + \alpha_{16} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{17}$$

$$\begin{aligned} ALLP_{i,t} = {} & \alpha_0 + \alpha_1 ALLP_{i,t-1} + \alpha_2 IMP_{t,j} + \alpha_3 \Delta NPL_{i,t+1} + \alpha_4 \Delta NPL_{i,t} \\ & + \alpha_5 \Delta NPL_{i,t-1} + \alpha_6 \Delta NPL_{i,t-2} + \alpha_7 CAP_{i,t-1} + \alpha_8 EBLLP_{i,t} \\ & + \alpha_9 Size_{i,t-1} + \alpha_{10} PASTLLP_{i,t-1} + \alpha_{11} NCO_{i,t} + \alpha_{12} RIR_{i,t} \\ & + \alpha_{13} ROA_{i,t} + \alpha_{14} CR_{i,t} + \alpha_{15} HLoan_{i,t} + \alpha_{16} BLoan_{i,t} + \varepsilon_t \end{aligned} \tag{18}$$

Consistent with the arguments given above, for supporting our earnings and capital management hypotheses, we expect that *CET1* and *HHI* have negative coefficients, while ΔNPL_{t+1} and *IMP* have positive coefficients. In addition, we expect that the coefficient of *CAP* is positive, and the coefficient of $ALLP_{t-1}$ is negative to support the idea that (overcapitalized) banks manage regulatory capital upward by increasing earnings and retained earnings if they recorded in the previous year a reduction of regulatory capital (e.g., Massa et al. 2015).

4 Results

4.1 Descriptive statistics and correlations

Table 2 presents descriptive statistics for the variables used in our analyses. The mean of *LLP2* is far higher than the mean value of *NCO*, indicating that there is, on average, a common practice of discretionary provisioning that overcomes the current loan write-offs. Moreover, the mean value of *LLP2* represents double that of *EBLLP*. Hence, LLPs are a relevant

accrual for banks. The mean value of *CAP* is about 1.89 and it shows that, on average, banks have an amount of Tier 1 capital far above the minimum level required by Basel III. It suggests that there has been a notable pressure to increase the primary capital reserves. The mean value of *CET1* (0.1603) indicates that, on average, EA listed banks during 2013–2018 provided themselves with high-quality capital far above the minimum required by Basel III. This result is consistent with the empirical evidence provided by Soederhuizen et al. (2023). In addition, the mean value of *Tier1* is 0.1729 (i.e., about 17.29% of RWA) and it suggests that CET1 capital covers almost the entire Tier 1 capital in the sampled banks.

The mean values of ΔNPL_{t}, ΔNPL_{t+1}, ΔNPL_{t-1} and ΔNPL_{t-2} are extremely close to zero, suggesting that the amount of NPL was almost balanced over the years and the credit portfolio quality remained constant over time. The level of competition (*HHI*) inside the banking market was rather significant, such as the money market pressure (*IMP*). Despite increasing lending activities (*LOAN* and *ΔLOAN*), the mean values of *NCO* and *NPL* (respectively 0.0016 and 0.0698) suggest that banks efficiently managed the credit risks. The average value of the loan loss allowances (*BEGLLA*) held by banks (0.0390) indicates that EA listed banks generally adopted prudent provisioning practices to protect against the risk of sudden loan losses. The mean value of $Size_t$ is 22.15, thus suggesting that banks are large in terms of assets volume. The mean value of *RIR* during 2013–2018-time frame is about − 0.99.

Panel B and Panel C of Table 2 present Pearson correlation coefficients between the variables used in all (main and robustness) regressions with the significance at the one percent level noted. As expected, the results show a positive correlation between *LLP* and *EBLLP*; so, banks with lower earnings before provisions and taxes decrease the LLP, and vice versa, consistent with earnings management. Consistent with Nicoletti (2018), the negative correlation between *LLP* and *Tier1* shows that LLP strategies have opposite directions to Tier 1 capital management strategies; the positive correlation between *CET1* and *Tier1* reflects the ability of CET1 capital to increase TIER1 capital, by construction. This lends preliminary support to our prediction of capital management pursued through LLP and CET1 capital.

4.2 Regression results

4.2.1 Earnings management

The results of the first-stage regression estimating the DLLP (Eq. 1), shown in Table 3, confirm that there is a positive association between *LLP* and *EBLLP*, ΔNPL_{t}, ΔNPL_{t+1}, ΔNPL_{t-1}, ΔNPL_{t-2}. *LLP* is negatively associated with *Size* and positively associated with *ΔLoan.*

Panel A in Tables 4, 5, 6, and 7 present the overall results for the earnings management tests (Eqs. 2–5). The negative and statistically significant coefficients for *EBLLP* for negative DLLP confirm that when the level of *EBLLP* is high (low), the banks are significantly encouraged to adopt a discretional provisioning strategy to deflate (increase) income, consistent with Kanagaretnam et al. (2014). The consistency of statistical significance and coefficients' signs of the variables across positive and negative DLLP confirm the robustness of the inferences; they demonstrate that EA banks engaged in earnings management, either income increasing or income decreasing, using DLLP.

In Panel A of Table 4, for the analysis for negative DLLP, a positive and statistically significant coefficient for *CET1* is observed. This suggests that banks with lower *CET1* in year t − 1 do not adopt more income increasing policies in year t. Likewise, the negative and statistically significant coefficient for *CET1* for positive DLLP confirms that banks reporting a lower level of high-quality regulatory capital in year t − 1 do not feel a strong pressure

Table 2 Descriptive statistics and correlations for main analyses and robustness tests

Variable	Obs	Mean	Std. Dev.	Min	Q1	Q3	Max
Panel A: Descriptive statistics							
Appendix 1							
CAP	918	1.8989	1.8944	−3.3274	1.9372	2.0910	15.8912
CET1	918	0.1603	0.0687	0.0586	0.1405	0.1600	0.7517
$\Delta LOAN_t$	918	0.0939	0.4189	−1	−0.0159	0.0805	2.7118
ΔNPL_t	918	−0.0013	0.0860	−0.5408	−0.0014	0.0003	0.4096
ΔNPL_{t+1}	918	−0.0026	0.0436	−0.2233	−0.0034	0.0002	0.2313
ΔNPL_{t-1}	918	0.0025	0.0433	−0.2401	−0.0091	0.0020	0.2372
ΔNPL_{t-2}	918	0.0055	0.0419	−0.2541	0.0008	0.0028	0.2438
Deposit	918	0.6631	0.2838	0.0008	0.6215	0.8301	1.5383
EBLLP	918	0.0325	0.0498	−0.1317	0.0111	0.0375	0.3644
HHI	918	0.3959	0.1931	0.1722	0.2883	0.4472	1
IMP	918	−78.0539	589.051	−4615.5	−0.9660	0.7395	58.7243
LLP	918	0.0155	0.0370	−0.0918	0.0022	0.0155	0.24
LLR	918	0.0718	0.0829	0.0007	0.0255	0.0719	0.5318
NCO	918	0.0016	0.0061	−0.0275	0.0005	0.0016	0.0412
ROA	918	1.5286	4.5159	−17.25	0.56	1.6286	28
$Size_t$	918	22.1584	2.8637	14.8458	22.5813	24.0248	27.9195
TIER1	918	0.1729	0.0856	0.0681	0.1394	0.1714	0.8610
Appendix 2							
$ALLP_t$	918	−0.0210	1.0897	−4.1775	−0.4777	0.1085	8.0920
$ALLP_{t-1}$	918	0.0762	1.1788	−2.6028	−0.4315	0.1278	8.0920
BEGLLA	918	0.0390	0.0409	0.0001	0.0160	0.0390	0.2452
BLoan	918	0.2211	0.1819	0.1398	0.18	0.18	0.8056
ΔLOAN2	918	0.0231	0.0811	−0.2794	−0.0031	0.0301	0.5235
CR	918	41,388	255,678	0.0531	0.7567	42.1675	1,930,480
EBLLP	918	0.0309	0.0564	−0.1426	0.0077	0.0294	0.3364
HLoan	918	0.1299	0.0896	0.0004	0.0991	0.13	0.7188
LLP2	918	0.0617	0.1003	−0.0619	0.0080	0.0618	0.7069
LLR_IMPL	918	0.7119	0.3134	0.1135	0.5639	0.6910	2.4181
Loan	918	0.4734	0.2359	0.0011	0.3896	0.6604	0.8680
NPL	918	0.0698	0.0715	0.0001	0.0231	0.07	0.4489
PASTLLP	918	0.0065	0.0100	−0.0092	0.0011	0.0063	0.0683
RIR	918	−0.9996	0.8599	−4.8102	−1.4693	−0.5832	1.9387
$Size_{t-1}$	918	22.1951	2.7612	14.8458	20.8127	23.9037	27.9986

Panel B: Pearson correlation matrix Variables in Appendix 1

	#	1	2	3	4	5	6	7
CAP	1	1						
CET1	2	0.6868*	1					
ΔLOAN	3	0.2108*	0.1836*	1				
ΔNPL_t	4	−0.0080	−0.0640	0.1964*	1			
ΔNPL_{t+1}	5	−0.1462*	−0.0549	0.0762	0.0262	1		
ΔNPL_{t-1}	6	−0.0724	−0.0602	0.0034	0.0935	0.1085*	1	

Table 2 (continued)

Panel B: Pearson correlation matrix Variables in Appendix 1

	#	1	2	3	4	5	6	7
ΔNPL_{t-2}	7	−0.1946*	−0.0920*	−0.0121	−0.0910*	0.05165	0.0883*	1
Deposit	8	−0.1916*	−0.1958*	−0.1122*	−0.0088	0.0342	0.0245	0.0555
EBLLP	9	0.2185*	0.1781*	0.1801*	0.1293	0.0149	−0.0057	−0.0431
HHI	10	−0.0444	−0.0046	0.0474	0.0152	0.0057	−0.0615	−0.0947*
IMP	11	−0.1725*	−0.2949*	−0.0704	−0.0038	0.0335	0.0002	0.0219
LLP	12	−0.0981*	−0.1973*	0.0251	0.1154*	0.0593	0.2667*	0.2008*
LLR	13	−0.3185*	−0.0098	−0.0953*	−0.0236	−0.2184*	0.1878*	0.2324*
NCO	14	−0.1036*	0.0402	0.0232	−0.0041	−0.1254*	−0.0130	−0.0014
ROA	15	0.2038*	0.1263*	0.1216	−0.0178	0.0497	−0.0441	−0.0789
Size	16	−0.3029*	−0.2726*	−0.1229*	0.0055	−0.0454	0.0423	0.0962*
TIER1	17	0.6146*	0.6732*	0.1720*	−0.0210	−0.0352	−0.0560	−0.0681

	#	8	9	10	11	12	13	14
Deposit	8	1						
EBLLP	9	−0.2885*	1					
HHI	10	0.1110*	0.0150*	1				
IMP	11	0.1239*	0.0111	0.0216	1			
LLP	12	0.0454	0.2406*	0.0222	0.0655	1		
LLR	13	−0.0905	0.0110	−0.0064	−0.0310	0.4167*	1	
NCO	14	0.0635	−0.0028	0.2161*	−0.0068	0.1194*	0.2181*	1
ROA	15	−0.1190*	0.2808*	0.0103	−0.0316*	−0.1591*	−0.1412*	0.0420
Size	16	0.2491*	−0.1591*	−0.1378*	0. 1570*	0.1068*	−0.1124*	0.0299
Tier1	17	−0.2023*	0.2329*	0.0142	−0.2647*	−0.1671*	0.0139	0.0271

	#	15	16	17
ROA	15	1		
Size	16	−0.1338*	1	
Tier1	17	0.1320*	−0.3048*	

Panel C: Pearson correlation matrix Variables in Appendix 2

	#	1	2	3	4	5	6	7
$ALLP_t$	1	1						
$ALLP_{t-1}$	2	0.4771*	1					
BEGLLA	3	0.0149	0.2214*	1				
BLoan	4	0.0420	0.0751	0.2750*	1			
CAP	5	− 0.1036*	− 0.2115*	− 0.4250*	− 0.0310	1		
CET1	6	− 0.1914*	− 0.1712*	− 0.0074	− 0.0112	0.6868*	1	
ΔLOAN2	7	0.0154	− 0.0076	− 0.2148*	0.1617*	0.1054*	0.0071	1
ΔNPL_t	8	− 0.0101	− 0.1147*	− 0.0731	− 0.0289	− 0.0080	0.0640	0.0256
ΔNPL_{t+1}	9	− 0.1934*	− 0.0902	− 0.2417*	0.0745	0.1462*	− 0.0549	0.1315*
ΔNPL_{t-1}	10	− 0.2087*	− 0.3486*	0.1295*	0.1063*	− 0.0724	− 0.0602	− 0.0446
ΔNPL_{t-2}	11	− 0.1107*	0.1965*	0.2428*	0.799	− 0.1946*	− 0.0920*	− 0.0344
CR	12	− 0.0349	− 0.0538	− 0.0317	− 0.0370	0.2317*	0.3140*	− 0.0155

Table 2 (continued)

Panel C: Pearson correlation matrix Variables in Appendix 2

	#	1	2	3	4	5	6	7
IMP	13	0.0674	0.0354	− 0.0113	0.0532	− 0.1725*	− 0.2949*	0.0347
EBLLP	14	− 0.1096*	− 0.0840	− 0.0124	0.0411	0.1806*	0.1288*	0.0626
HHI	15	− 0.0301	0.0436*	− 0.0007	0.1958*	0.0444	0.0046	0.0531
HLoan	16	0.0536	0.0528	0.0809	0.1782*	− 0.0396	− 0.0517*	0.0352
LLP2	17	0.7042*	0.5013*	0.3772*	0.1094*	− 0.2981*	− 0.1973*	− 0.1529
LLR_IMP	18	− 0.0150	− 0.0607	− 0.0935*	− 0.1518*	0.0573	0.0278	0.0034
Loan	19	− 0.0137	0.0359	0.1223*	0.0225	− 0.3088*	− 0.2708*	0.0711*
NCO	20	− 0.0414	0.0607	0.2754*	0.0632*	− 0.1036*	0.0402	0.430
NPL	21	0.1529*	0.3044*	0.8224*	0.3113*	− 0.3897	− 0.0621	− 0.1498*
PASTLLP	22	0.3087*	0.5731*	0.5988*	0.1779*	− 0.3401*	− 0.1107*	− 0.1718*
RIR	23	0.1604*	0.1980*	0.3057*	0.0407	− 0.2068*	− 0.0878	− 0.0798
$Size_{t-1}$	24	0.0683	0.1057*	− 0.0229	− 0.2273*	− 0.3228*	− 0.2932*	− 0.0510
Tier1	25	− 0.1287*	− 0.1144*	− 0.0463	− 0.0118	0.6146*	0.6732*	− 0.0097

	#	8	9	10	11	12	13	14
ΔNPL_t	8	1						
ΔNPL_{t+1}	9	0.0262	1					
ΔNPL_{t-1}	10	0.0935	0.1085*	1				
ΔNPL_{t-2}	11	− 0.0910	0.0165	− 0.0883	1			
CR	12	− 0.0259	0.0032	− 0.0198	− 0.0176	1		
IMP	13	− 0.0038	0.0335	0.0002	0.0219	− 0.3692*	1	
EBLLP	14	− 0.0597	− 0.0548	− 0.0057	− 0.0353	− 0.0059	− 0.0435	1
HHI	15	0.0152	0.0057	− 0.0615	− 0.0947	0.0080	0.0216	0.0267
HLoan	16	− 0.0053	− 0.0028	− 0.0087	− 0.0210	− 0.0033	0.0096	− 0.0002
LLP2	17	0.1154*	0.0593	0.2667*	0.2008*	− 0.636	0.655	0.1700*
LLR_IMP	18	0.0084	0.1148*	− 00599*	− 0.1252*	0.0158	− 0.0373	0.0326
Loan	19	− 0.0197	− 0.0351	0.0947*	0.0986	− 0.2799	0.1487*	− 01221*
NCO	20	− 0.0041	− 0.1254*	− 0.0130	0.0014	− 0.0034	− 0.0068	0.0970*
NPL	21	− 0.0265	− 0.2048*	0.2737*	0.3375*	− 0.0312	0.0114	− 0.0283
PASTLLP	22	− 0.2819*	− 0.0698	0.1277*	0.2169*	− 0.0133	0.0301	− 0.0183
RIR	23	− 0.0020	0.0454	0.1496*	0.2097*	− 0.0885	0.0231	0.0055
$Size_{t-1}$	24	0.0336	− 0.0797	0.0428	0.0920*	− 0.3324*	0.1607*	− 0.1962*
Tier1	25	− 0.0210	− 0.0352	− 0.0560	− 0.0681	0.3743*	− 0.2647*	0.1340*

	#	15	16	17	18	19	20	21
HHI	15	1						
HLoan	16	0.1933*	1					
LLP2	17	0.0222	0.0802	1				
LLR_IMP	18	0.0848	− 0.0869*	− 0.0704	1			
Loan	19	0.0357	− 0.0115	0.1015*	− 0.0121	1		
NCO	20	0.2161*	0.1230*	0.1194*	0.1220*	0.0364	1	
NPL	21	− 0.0655	0.1052*	0.4745*	− 0.2511*	0.0711	0.2312*	1
PASTLLP	22	0.0342	0.0909*	0.4767*	− 0.0404	0.0790	0.2468*	0.5270*
RIR	23	− 0.2422*	− 0.1648*	0.2688*	0.0169	0.1239*	0.0996	0.3232*

Table 2 (continued)

	#	15	16	17	18	19	20	21
$Size_{t-1}$	24	−0.1401*	−0.0426	0.1162*	−0.1169*	0.4042*	0.0287	−0.0049
Tier1	25	0.0142	−0.0662	−0.1671*	0.0254	−0.0294*	0.0271	−0.0770

	#	22	23	24	25
PASTLLP	22	1			
RIR	23	0.2642*	1		
$Size_{t-1}$	24	0.0054	0.1517*	1	
Tier1	25	−0.1118*	−0.0822	−0.2970*	1

Pooled sample descriptive statistics and correlations. Panel A provides descriptive statistics. Panel B and Panel C provide Pearson correlations for the pooled sample of banks between 2013 and 2018 for both sets of analyses. *Denotes significance at the 1 percent level. Continuous variables are winsorized at the 1st and 99th percentiles. All variables are defined in Appendices 1 and 2.

Table 3 First-stage regression for estimating DLLP (Eq. 1)

Dependent variable:$LLP_{i,t}$	
Constant	0.0738***
	(7.26)
$\triangle NPL_{i,t}$	0.1596***
	(11.85)
$\triangle NPL_{i,t+1}$	0.0066**
	(2.34)
$\triangle NPL_{i,t-1}$	0.0142**
	(2.40)
$\triangle NPL_{i,t-2}$	0.0457**
	(2.51)
$EBLLP_{i,t}$	0.1039**
	(2.33)
$Tier1_{i,t-1}$	−0.0243*
	(−1.73)
$Size_{i,t}$	−0.0024***
	(−5.94)
$\triangle Loan_{i,t}$	0.0016*
YearFE	(1.69)
Observations	Yes
Prof > F	918
R-squared	0.000
Adj. R-squared	0.1760
	0.1688

This table shows regression estimation results of Eq. (1). Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

Table 4 Second-stage regression for pressure to increase high-quality regulatory capital tests

	Panel A: earnings management		Panel B: capital management	
	|Negative DLLP|	Positive DLLP	|Negative DLLP|	Positive DLLP
Constant	−0.3687 (−1.45)	0.7621 (1.26)	−0.4666* (−1.71)	0.6055 (1.02)
$CET1_{i,t-1}$	0.5125** (2.31)	−0.9078* (−1.72)	1.0450*** (4.37)	−2.5963*** (−4.11)
$\Delta NPL_{i,t+1}$	0.5949** (2.17)	−2.7179*** (−4.17)	0.9303*** (3.74)	−1.999*** (−3.04)
$\Delta NPL_{i,t}$	−0.3338*** (−2.59)	0.6950** (2.27)	−0.2800** (−2.46)	0.9574*** (3.18)
$\Delta NPL_{i,t-1}$	−0.2081 (−0.75)	2.5887*** (3.43)	−0.3406 (−1.37)	2.1053*** (3.21)
$\Delta NPL_{i,t-2}$	−0.9667*** (−3.29)	0.0654 (0.09)	−0.9506*** (−3.63)	0.3345 (0.48)
$EBLLP_{i,t}$	−0.0040* (−1.92)	0.0056* (1.67)		
$CAP_{i,t-1}$			−0.0323*** (−3.38)	0.1164*** (4.62)
$Size_{i,t}$	0.0023 (0.21)	−0.0080 (−0.30)	0.0043 (0.43)	0.0018 (0.07)
$\Delta Loan_{i,t}$	−0.0069 (−0.23)	0.1210* (1.72)	−0.0265 (−1.01)	0.1223* (1.76)
$LLR_{i,t}$	−1.1637*** (−3.90)	0.9697 (1.36)	0.2973 (1.12)	01.9098*** (2.73)
$ROA_{i,t}$	0.0019 (0.56)	−0.0278*** (−3.35)		
$DEPOSIT_{i,t}$			−0.0801 (−1.23)	−0.1336 (−0.78)
$NCO_{i,t}$			−13.1397*** (−6.44)	17.2790*** (3.01)

Table 4 (continued)

	Panel A: earnings management		Panel B: capital management	
	|Negative DLLP|	Positive DLLP	|Negative DLLP|	Positive DLLP
YearFE	Yes	Yes	Yes	Yes
Observations	670	249	670	249
Prob > F	0.0000	0.0000	0.0000	0.000
R-sq. within	0.0918	0.0926	0.1589	0.1190
between	0.4147	0.2058	0.1439	0.0010
overall	0.2461	0.1291	0.1500	0.0452

This table shows in Panel A and Panel B the regression results of Eqs. (2) and (6), respectively

Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

Table 5 Second-stage regression results for the more timely loan loss recognition tests

	Panel A: earnings management		Panel B: capital management	
	|Negative DLLP|	Positive DLLP	|Negative DLLP|	Positive DLLP
Constant	0.4265* (1.68)	0.6597 (1.10)	0.5165* (1.70)	0.4310 (0.72)
$\triangle NPL_{i,t+1}$	0.6032** (2.20)	−2.7325*** (−4.19)	0.6314* (1.88)	−2.2430*** (−3.39)
$\triangle NPL_{i,t}$	−0.3595*** (−2.79)	0.6494** (2.12)	−0.5583*** (−3.66)	0.7784*** (2.59)
$\triangle NPL_{i,t-1}$	−0.1953 (−0.70)	2.2813*** (3.46)	−0.1308 (−0.39)	2.2708*** (3.39)
$\triangle NPL_{i,t-2}$	−0.9617*** (−3.27)	0.0741 (0.11)	−0.6170* (−1.74)	0.2590 (0.37)
$EBLLP_{i,t}$	−0.0043** (−2.03)	0.0052** (2.10)		
$CAP_{i,t-1}$			−0.0173* (−1.67)	0.0578*** (2.75)
$Size_{i,t}$	0.0017 (0.15)	−0.0092 (−0.34)	0.0079 (0.58)	−0.0020 (−0.08)
$\triangle Loan_{i,t}$	−0.0021 (−0.07)	0.1126 (1.60)	−0.0311 (−0.87)	0.1097 (1.56)
$LLR_{i,t}$	−1.2329*** (−4.14)	0.8470 (1.20)	−1.7053*** (−4.82)	1.4371** (2.06)
$ROA_{i,t}$	0.0021 (0.61)	−0.0281*** (−3.38)		
$DEPOSIT_{i,t}$			0.0250 (0.29)	−0.1180 (−0.68)
$NCO_{i,t}$			−13.9495* (−1.65)	18.6792*** (3.23)
YearFE	Yes	Yes	Yes	Yes
Observations	670	249	670	249
Prob > F	0.0000	0.0000	0.0000	0.0000
R-sq. within	0.0853	0.0890	0.0793	0.0991
between	0.4244	0.1658	0.5432	0.0044
overall	0.2493	0.1130	0.2892	0.0300

This table shows in Panel A and Panel B the regression results of Eqs. (3) and (7), respectively

Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

to replenish it through income increasing in year t and higher retained earnings. The reason may be due, among other things, to the spread of extremely large regulatory capital buffers after the introduction of the Basel III regulation. From this perspective, the reduction of CET1 in a year t − 1 could have been seen as a phenomenon not to be overly concerned about, given the bank's patrimonial soundness.

Panel A of Table 5, for the analysis on positive DLLP, shows negative and statistically significant coefficient of ΔNPL_{t+1}. This suggests that the more timely recognition of loan losses in year t compared to year t + 1 naturally favors income decreasing policies, as it encourages stronger protection against potential loan losses through greater discretionary provisions in year t. Likewise, the positive and statistically significant coefficient of ΔNPL_{t+1} for negative

Table 6 Second-stage regression for competition tests

	Panel A: earnings management		Panel B: capital management	
	|Negative DLLP|	Positive DLLP	|Negative DLLP|	Positive DLLP
Constant	0.6051**	0.7443	0.5378*	0.5504
	(2.26)	(1.19)	(1.74)	(0.88)
$HHI_{t,j}$	−0.0830*	0.1662*	−0.0918	0.2308
	(−1.70)	(1.65)	(−0.57)	(0.73)
$\triangle NPL_{i,t+1}$	0.9408***	−2.7482***	0.6399**	−2.2642***
	(3.35)	(−4.20)	(1.99)	(−3.42)
$\triangle NPL_{i,t}$	−0.3509***	0.6476**	−0.5601***	0.7738**
	(−2.67)	(2.12)	(−3.67)	(2.57)
$\triangle NPL_{i,t-1}$	−0.2118	2.2832***	−0.1307	2.2707***
	(−0.75)	(3.46)	(−0.39)	(3.44)
$\triangle NPL_{i,t-2}$	−1.0928***	0.0849	−0.6121*	0.2713
	(−3.63)	(0.12)	(−1.73)	(0.39)
$CAP_{i,t-1}$			−0.0173*	0.0579***
			(−1.67)	(2.76)
$EBLLP_{i,t}$	−0.0035*	0.0051*		
	(−1.75)	(1.68)		
$Size_{i,t}$	0.0038	−0.0099	0.0076	−0.0028
	(0.34)	(−0.37)	(0.55)	(−0.11)
$\triangle Loan_{i,t}$	−0.0044	0.1140	−0.0302	0.1119
	(−0.15)	(1.62)	(−0.85)	(1.59)
$LLR_{i,t}$	−0.2428	0.8398	−1.7122***	1.4198**
	(−0.80)	(1.18)	(−4.83)	(2.03)
$ROA_{i,t}$	0.0046	−0.0278***		
	(1.28)	(−3.34)		
$DEPOSIT_{i,t}$			0.0231	−0.1229
			(0.80)	(−0.71)
$NCO_{i,t}$			−13.9904	−18.5763***
			(−1.36)	(−3.21)
YearFE	Yes	Yes	Yes	Yes
Observations	670	249	670	249
Prob > F	0.0000	0.0000	0.0000	0.0000
R-sq. within	0.0520	0.0894	0.0797	0.0997
between	0.0397	0.1484	0.5579	0.0059
overall	0.0048	0.1085	0.2959	0.0264

This table shows in Panel A and Panel B the regression results of Eqs. (4) and (8), respectively

Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

DLLP confirms that when banks adopt a forward-looking approach to the loan losses identification in year t compared to year t+1, they do less income increasing in year t. Hence, the early identification of potential impairment of loans burdens the administrative year with higher costs for DLLP, thus counteracting the use of upward earnings management.

Panel A of Table 6, for the analysis on positive DLLP, shows a positive and statistically significant coefficient for *HHI*, thus suggesting that the competitive pressure persuades banks to adopt strategic DLLP to offset income reductions. In other words, when competitive pressure increases (and *HHI* diminishes), banks may avoid overloading the fiscal

Table 7 Second-stage regression for money market pressure tests

	Panel A: earnings management		Panel B: capital management	
	|Negative DLLP|	Positive DLLP	|Negative DLLP|	Positive DLLP
Constant	0.5906**	0.6374	0.5417*	0.4143
	(2.28)	(1.06)	(1.77)	(0.69)
$IMP_{t,j}$	−0.0349*	0.0332*	−0.0331	0.0229
	(−1.68)	(1.65)	(−1.58)	(1.38)
$\triangle NPL_{i,t+1}$	0.9453***	−2.7298***	0.6275*	−2.2403***
	(3.37)	(−4.18)	(1.87)	(−3.39)
$\triangle NPL_{i,t}$	−0.3570***	0.6452**	−0.5625***	0.7756**
	(−2.72)	(2.11)	(−3.68)	(2.57)
$\triangle NPL_{i,t-1}$	−0.2009	2.2893***	−0.1360	2.2742***
	(−0.71)	(3.47)	(−0.41)	(3.44)
$\triangle NPL_{i,t-2}$	−1.0846***	0.0764	−0.6135*	0.2613
	(−3.61)	(0.11)	(−1.73)	(0.37)
$EBLLP_{i,t}$	−0.0036*	0.0051*		
	(−1.70)	(1.66)		
$CAP_{i,t-1}$			−0.0169*	0.0581***
			(−1.89)	(2.77)
$Size_{i,t}$	0.0049	−0.0080	0.0093	−0.0011
	(0.43)	(−0.30)	(0.68)	(−0.04)
$\triangle Loan_{i,t}$	−0.0073	0.1145	−0.0294	0.1108
	(−0.24)	(1.62)	(−0.82)	(1.57)
$LLR_{i,t}$	0.2537	−0.8588	1.6856***	1.4502**
	(0.83)	(−1.21)	(4.76)	(2.08)
$ROA_{i,t}$	0.0050	−0.0286***		
	(1.41)	(−3.42)		
$DEPOSIT_{i,t}$			0.0185	−0.1223
			(0.21)	(−0.70)
$NCO_{i,t}$			−13.9652	18.6688***
			(−1.35)	(3.22)
YearFE	Yes	Yes	Yes	Yes
Observations	670	249	670	249
Prob > F	0.0000	0.0000	0.0000	0.0000
R-sq. within	0.0549	0.0894	0.0808	0.0993
between	0.0240	0.1712	0.5210	0.0037
overall	0.0069	0.1153	0.2821	0.0310

This table shows in Panel A and Panel B the regression results of Eqs. (5) and (9), respectively

Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

year with too many positive discretionary provisions that deflate income and damage banking reputation. Likewise, for negative DLLP, the negative and statistically significant coefficient of *HHI* confirms that when competitive pressure increases (and *HHI* diminishes), banks resort to income increasing strategies through higher negative DLLP. Therefore, in the presence of intensified competitive pressures, banks resort to upward earnings management to show better economic performance. Intensifying competition may have created pressure on banks to achieve (and communicate) increasingly ambitious financial targets

that meet or beat the market expectations. This was intended to improve their reputations and achieve significant stock returns. This pressure may have incentivized banks to resort to upward earnings management strategies through DLLP.

Panel A of Table 7, for the analysis on negative DLLP, shows a negative and statistically significant coefficient for *IMP*. It suggests that the higher the money market pressure the lower the recourse to an income increasing strategy. On the one hand, when the demand for liquidity in the money market increases, banks may face an increase in demand for loans from businesses and consumers. The increase in lending brings an increase in discretionary loss provisions, which negatively impact earnings, thus hindering upward earnings management. In addition, the increased money market pressure together with the financial crisis effects generally lead to increased scrutiny and transparency of banks' accounting operations. Regulators and supervisors are more observant of banking accounting behavior during and soon after periods of financial crisis. Being subjected to increased scrutiny and inspection may hinder banks in engaging in upward earnings management in order not to incur sanctions or suffer negative legal and reputational consequences.

We conducted sensitivity analyses by (1) clustering standard errors at the bank level and (2) running the analyses for the sub-sample of overcapitalized banks. The (untabulated) results are consistent.[20] We conducted additional sensitivity analyses using a dummy variable for each year (*YEAR*) to control the effects of specific market macroeconomic conditions, employing fixed-effects regressions. The (untabulated) results are consistent.[21]

4.2.2 Capital management

Panel B in Tables 4, 5, 6, and 7 provide the overall results for our capital management tests (Eqs. 6–9). The regression models with negative DLLP in Table 4, 5, 6 and 7 show significantly negative estimated coefficients for *CAP*. Such results demonstrate that banks pursue the upward capital management through an increase of negative DLLPs, consistent with the expectation explained in paragraph 3.2.2. The consistency of statistical significance and estimated regression coefficient signs across positive and negative DLLP confirm the robustness of the inferences.

However, Panel B of Table 4 shows, for the analysis on positive DLLP, a negative and statistically significant coefficient for *CET1*, indicating that banks with lower *CET1* in year $t-1$ report a higher correlation with positive DLLPs in year t, thus reducing earnings, retained earnings, and obstructing the upward Tier1 management. Likewise, the analysis on negative DLLP shows a positive and statistically significant coefficient for *CET1*. This result suggests that the pressure to increase high-quality regulatory capital does not push banks to do capital management to increase primary quality capital through DLLPs. So, banks do not perform upward capital management when CET1 in the previous year decreases. This may happen when banks consider the remaining CET1 capital still sufficient to cope with unexpected losses or financial stress. This phenomenon may be more pronounced when banks hold regulatory capital buffers higher than the Basel III minimum limits, as shown for almost all banks in our sample.

Panel B of Table 5 shows, for the analysis on positive DLLP, negative and statistically significant coefficient for ΔNPL_{t+1} suggesting that when there is a more timely loan loss

[20] The results of models without standard errors clustered are better in terms of statistical significance.

[21] The tables of results are available from the authors.

recognition in year t compared to t + 1 there is an increase in absolute and positive DLLPs that, for over-capitalized banks, hinders the use of upward capital management due to earnings reduction. Hence, the earlier recognition of DLLPs under IFRS 9 in year t compared to year t + 1 naturally hinders upward capital management for overcapitalized banks in year t, thus pushing them to pursue (if needed) different capital management strategies. The positive and statistically significant coefficient of ΔNPL_{t+1} for negative DLLP confirms the above inferences. This result is consistent with the findings of the study of EBA (2018a) about the immediate impact of IFRS 9 adoption over the capital ratios of European banks in 2018. The EBA report documented a reduction in the CET1 capital by 47 basis points on average for a sample of 38 European banks because of the adoption of a timelier loan loss recognition.

Panel B of Tables 6 and 7 indicate no conclusive evidence of an association between income decreasing/increasing DLLP and competition and money market pressure. These results suggest that the increasing competition and money market pressure are not statistically associated with income increasing/decreasing strategy for pursuing capital management aims. Competition between banks may not directly influence policies to increase or decrease regulatory capital for several reasons. Policies to increase or reduce regulatory capital are mainly driven by the need to comply with regulations and requirements imposed by financial regulators. This aim is for banks to achieve financial soundness and absorb losses in case of stress situations. Therefore, competition between banks, already overcapitalized and largely exceeding the Basel III minimum regulatory capital limits, may not lead to capital management. Under this view, the capital management could be more oriented towards maintaining the banking financial stability rather than being used as an instrument of competition.

During periods of increased money market pressure, banks face an increasing demand for liquidity from the market. In conditions of high liquidity needs, banks may prefer to use available financial resources to meet liquidity demands, thus depleting their capital reserves. Lewrick et al. (2020) demonstrated that in periods of high money market pressure, such as Covid-19 pandemic, banks used their capital buffers to meet the liquidity demand. The expansion of the loan portfolio and the exposure to the risk of sudden future loan losses are positively associated with an increase of DLLP. Since intensifying DLLP negatively impacts earnings and retained earnings, the increasing money market pressure is expected to obstruct the upwards capital management. Moreover, when money market pressure increases, banks are subject to stricter controls by supervisory authorities. Since accounting manipulative operations are monitored more closely, banks may be discouraged from pursuing upwards capital management. The increasing demand for transparency in financial reporting pushes banks to provide more detailed and accurate information about how they manage regulatory capital and its adequacy for capital requirements. This discourages upward capital management.

We conducted sensitivity analyses by clustering standard errors at bank level and running analyses for the sub-sample of overcapitalized banks**.** The (untabulated) results are consistent.[22] In addition, we conducted supplemental sensitivity analyses using a dummy variable for each year (*YEAR*), to control the effects of specific yearly market

[22] The results of models without standard errors clustered are better in terms of statistical significance.

macroeconomic conditions, employing fixed-effects regressions. The (untabulated) results are consistent.[23]

4.3 Results of robustness test

The results of Eq. (10) estimation, shown in Table 8, confirm that there is a positive association between *LLP2* and *NCO*, *ΔNPL*, *LOAN*, and *NPL*, and that *LLP2* is negatively associated with *BEGLLA* and *ΔLoans2*, consistent with previous studies (Kanagaretnam et al. 2010; Kanagaretnam et al. 2014; Dal Maso et al. 2019; Hong et al. 2020).

Table 9 shows the results of the system GMM regression models for all the earnings management hypotheses.[24] The negative and statistically significant coefficients for $ALLP_{t-1}$ and *EBLLP* for all the regressions of the table support the idea that when in year t − 1 (an overcapitalized) bank increases the negative ALLP, in the following period t there is a reduction of negative ALLP for pursuing income smoothing strategies (e.g., Massa et al. 2015). The positive and statistically significant coefficient of *CET1* confirms that the pressure exerted by Basel III on banks to increase primary quality capital does not push banks to resort to income increasing earnings management through discretionary loan loss provisioning. This result provides the first evidence that the prudential reinforcement of high-quality regulatory capital obstructs the increasing earnings management for overcapitalized banks. In addition, the positive and statistically significant coefficient for ΔNPL_{t+1} demonstrates that the more timely loan loss recognition is an effective obstacle to the use of income increasing earnings management.

The negative and statistically significant coefficient of *HHI* confirms that when competitive pressure increases (and *HHI* diminishes), banks resort to income increasing strategies through higher negative ALLP. Therefore, in the presence of intensified competitive pressures, banks resort to upward earnings management to show better economic performance.

The negative and statistically significant coefficient for *IMP* suggests that the higher the money market pressure is negatively associated with the income increasing strategy.

We conducted additional sensitivity analyses for earnings management by running all previous system GMM regression models without the controlling variables of *HLoans* and *BLoans* and the (untabulated) results are consistent.[25]

Table 10 shows the regression results of the system GMM regression models for all the capital management hypotheses. The negative and statistically significant coefficient for *CAP* for all regression models supports the idea that (overcapitalized) banks manage regulatory capital upward by increasing earnings and retained earnings through DLLP. The positive and statistically significant coefficient for *CET1* confirms that Basel III does not push banks to do capital management in year t to increase primary quality capital when *CET1* is lower in year t − 1. The positive and statistically significant coefficient of ΔNPL_{t+1} confirms that the earlier recognition of DLLPs under IFRS 9 hinders upward capital management for banks that are already overcapitalized since it reduces the increase of negative DLLP. There is no conclusive evidence regarding the association between income increasing strategy for capital management and competition and money market pressure.

[23] The tables of results are available from the authors.

[24] The rationale for choosing GMM for robustness tests is presented in paragraph 3.3 'Robustness tests'.

[25] The tables of results are available from the authors.

Table 8 First-stage regression for estimating ALLP (Eq. 10)

Dependent variable:$LLP2_{i,t}$	
Constant	0.0023* (1.78)
$BEGLLA_{i,t}$	−0.1921*** (−4.21)
$NCO_{i,t}$	0.3426* (1.88)
$\triangle Loan2_{i,t}$	−0.0988*** (−3.64)
$\triangle NPL_{i,t}$	0.1375*** (5.44)
$LOAN_{i,t}$	0.0379*** (4.10)
$NPL_{i,t}$	0.1581*** (3.22)
YearFE	Yes
CountryFE	Yes
Observations	1683
Prob > F	0.000
R-squared	0.2745
Adj R-squared	0.2600

This table shows regression estimation results of Eq. (10). Variable definitions are in Appendices 1 and 2. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

We conducted additional sensitivity analyses for capital management by running all previous system GMM regression models without the controlling variables of *HLoans* and *BLoans* and the (untabulated) results are consistent.[26]

5 Additional analyses

5.1 Significant institutions versus less significant institutions

Previous studies showed that accounting behavior of European banks can be deeply influenced by their size and significance within the European banking system (Fiordelisi et al. 2017). Their inclusion in the list of 'significant institutions' (SI) or 'less significant institutions' (LSI) may be another factor to consider. The ECB classified European banks into SI and LSI in 2014 because of the launch of the Single Supervisory Mechanism (SSM). SI are banks of major or systemic importance within the European financial system. They are generally large banks playing a significant savings-raising and lending role in the economy. The financial stability of the entire market depends on SI. Given their relevance, SI are directly supervised by the ECB and subject to more intensive prudential supervision. LSIs

[26] The tables of results are available from the authors.

Table 9 System GMM estimation (second stage) for all earnings management tests

	|Negative ALLP|			
	Basel III	IFRS 9	Competition	Money market pressure
Constant	0.6910 (0.19)	0.2056 (0.06)	9.3197 (1.26)	4.8534 (0.91)
$ALLP_{i,t-1}$	−0.3656** (−2.18)	−0.3692** (−2.24)	−0.1047** (−2.46)	−0.2473* (−1.88)
$CET1_{i,t-1}$	1.5000* (1.81)			
$HHI_{t,j}$			−1.0032* (−1.80)	
$IMP_{t,j}$				−0.0831** (−1.97)
$\triangle NPL_{i,t+1}$	6.7230** (2.29)	5.9273** (2.22)	4.6342 (1.37)	5.4719* (1.87)
$\triangle NPL_{i,t}$	−3.5241* (−1.74)	−3.4059* (−1.78)	−3.2995 (−1.39)	−3.0613 (−1.40)
$\triangle NPL_{i,t-1}$	−3.7701 (−1.49)	−4.1483* (−1.79)	−5.7774* (−1.89)	−4.7827* (−1.87)
$\triangle NPL_{i,t-2}$	2.0000 (0.83)	2.0264 (0.92)	2.9321 (1.07)	2.4304 (0.91)
$EBLLP_{i,t}$	−0.1867** (−2.12)	−0.1605** (−1.97)	−0.1796* (−1.76)	−0.1613* (−1.79)
$Tier1_{i,t-1}$		−1.7917 (−1.35)	−6.3620 (−1.17)	−4.0601 (−0.90)
$Size_{i,t-1}$	−0.0083 (−0.06)	−0.0229 (−0.17)	−0.3513 (−1.33)	−0.1994 (−1.04)
$PASTLLP_{i,t-1}$	31.2518* (1.76)	28.9954* (1.75)	18.7981 (0.94)	26.545 (1.46)
$LLR\_IMPL_{i,t}$	−0.4131 (−0.59)	−0.2778 (−0.44)	−0.4000 (−0.51)	−0.2873 (−0.41)
$RIR_{i,t}$	0.1258 (1.22)	0.1001 (1.02)	0.0065 (0.05)	0.0545 (0.49)
$ROA_{i,t}$	0.1935* (1.88)	0.1545* (1.90)	0.1440 (1.21)	0.1461 (1.37)
$CR_{i,t}$	−0.0057 (−0.85)	−0.0060 (−0.51)	−0.0065 (−0.05)	−0.0061 (−0.45)
$HLoan_{i,t}$	−0.0366 (−0.89)	−0.0218 (−0.59)	−0.0484 (−0.76)	−0.0084 (−0.19)
$BLoan_{i,t}$	−0.1464 (−0.23)	−0.0029 (−0.05)	−0.0530 (−0.66)	−0.0354 (−0.51)
YearFE	Yes	Yes	Yes	Yes
Observations Prob > F Arellano-Bond zero-autocorr. test	852 0.0000 Satisfied	852 0.0000 Satisfied	852 0.0000 Satisfied	852 0.0000 Satisfied

This table shows regression results of Eqs. (11–14) respectively

Variable definitions are in Appendices 1 and 2. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

Table 10 System GMM estimation (second stage) for all capital management tests

	|Negative ALLP|			
	Basel III	IFRS 9	Competition	Money market pressure
Constant	−0.9459 (−0.38)	−4.8120 (−1.58)	−5.5522* (−1.69)	−4.7698 (−1.57)
$ALLP_{i,t-1}$	−0.4592** (−1.97)	−0.4061*** (−5.70)	−0.4060 (−1.59)	−0.4044 (−0.34)
$CET1_{i,t-1}$	5.8286** (2.45)			
$HHI_{t,j}$			−0.4548 (−1.27)	
$IMP_{t,j}$				−0.0220 (−0.34)
$\triangle NPL_{i,t+1}$	11.9350*** (2.72)	11.1406** (2.07)	10.5753** (2.20)	11.1541** (2.07)
$\triangle NPL_{i,t}$	−0.8380* (−1.86)	−1.9767** (−2.32)	−2.0382** (−2.45)	−1.9939** (−2.35)
$\triangle NPL_{i,t-1}$	−3.4337 (−1.06)	−3.3635 (−1.17)	−3.1094 (−1.11)	−3.3630 (−1.17)
$\triangle NPL_{i,t-2}$	−1.6815 (−0.55)	−2.0096 (−0.48)	−1.3605 (−0.36)	−1.9408 (−0.46)
$CAP_{i,t-1}$	−0.3759*** (−2.86)	−0.2467** (−2.01)	−0.2178** (−2.09)	−0.2467** (−2.01)
$EBLLP_{i,t}$	−6.6142** (−2.33)	−6.4968*** (−3.21)	−5.9932** (−2.44)	−6.1225*** (−2.87)
$Size_{i,t-1}$	0.0672 (0.62)	0.2072 (1.62)	−0.2263* (−1.73)	−0.2051 (−1.61)
$PASTLLP_{i,t-1}$	20.2789 (1.20)	13.3906 (0.89)	43.5095** (2.52)	13.7191 (0.92)
$NCO_{i,t}$	−12.9385 (−0.47)	−24.8918 (−0.74)	−20.4280 (−0.68)	24.8046 (0.73)
$RIR_{i,t}$	0.1627* (1.73)	0.1239 (1.20)	0.0899 (0.99)	0.1230 (1.19)
$ROA_{i,t}$	−0.0368 (−1.54)	0.1984 (0.25)	0.0387 (0.51)	0.0196 (0.25)
$CR_{i,t}$	0.0001 (0.16)	0.0001 (1.20)	−0.0001 (−1.18)	−0.0001 (−0.96)
$HLoan_{i,t}$	−0.0234 (−0.55)	−0.0529 (−1.26)	−0.0769* (−1.65)	−0.0535 (−1.25)
$BLoan_{i,t}$	0.0556 (1.23)	−0.1037** (−2.11)	0.0991** (2.31)	0.1030** (2.11)
YearFE	Yes	Yes	Yes	Yes
Observations Prob > F Arellano-Bond zero-autocorr test	852 0.0000 Satisfied	852 0.0000 Satisfied	852 0.0000 Satisfied	852 0.0000 Satisfied

This table shows regression results of Eqs. (15–18), respectively

Variable definitions are in Appendices 1 and 2. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

are smaller regional bank or smaller banks whose activities do not generate a significant impact on the European financial system. Given their lower relevance than the former, they are supervised mainly by national authorities, although the ECB can intervene if necessary. The investors and the market participants are expected to pay more attention to accounting behavior and economic and market performance of SI than to LSI. In addition, SI are the favourite subject of detailed news and analysis by the financial media and analysts, respectively; this phenomenon increases public attention to SI activities and corporate performance. Moreover, SI are subjected to particularly extensive and rigorous supervisory controls by the ECB.

It is unknown if the status of SI/LSI may have influenced the banks' propensity toward earnings and capital management. Likewise, it is unknown the way they react to the pressure to increase high-quality regulatory capital exerted by Basel III, the adoption of a more timely loan loss recognition method, the competition at the national level, and the money market pressure. Therefore, we conducted additional analyses by separating SI from LSI, consistent with the list provided by ECB in 2014 (ECB 2014). Starting from the initial sample, the sub-sample of SI is composed of 47 banks with 282 observations, while the sub-sample of LSI is composed of 60 banks with 360 observations.

We run the regression models of the main analyses for earnings management (Eqs. 2–5) and capital management (Eqs. 6–9) for both samples of SI and LSI. The dependent variable is the absolute value of the negative DLLPs.

Table 11 shows the results for earnings management while Table 12 for capital management. The results of Table 11 show that both SI and LSI do upward earnings management through the strategic use of DLLPs.

Panel A shows a negative and statistically significant coefficient of CET1 for SI and a positive and statistically significant coefficient of CET1 for LSI. These results suggest that the Basel III pressure to increase high-quality regulatory capital results in greater use of upward earnings management in SI. The opposite happens for LSI. The different behavior can be traced to the former's greater need to reassure investors and lenders about the capacity of retained earnings to provide the regulatory buffers for greater capital soundness. Moreover, SI need to prepare to overcome the ECB's stringent supervisory controls.

Panel B shows positive and statistically significant coefficients of ΔNPL_{t+1} for both SI and LSI, thus suggesting that the more timely recognition of loan losses in year t compared to year $t+1$ counteracts upward earnings management in year t for both SI and LSI, regardless of the significance of banks in the international banking environment.

Panel C shows that increased competition drives SI to engage in more upward earnings management transactions. In LSI the competition is not significantly associated with earnings management. The reason could be that SI are more exposed to national and international competition than LSI. Their larger size and systemic importance make SI particularly susceptible to fierce competition from other large banks and financial institutions. Moreover, SI banks have greater media and public exposure than LSI, so maintaining a solid reputation is crucial for competing effectively in the financial sector.

Panel D shows that money market pressure counteracts upward earnings management in both SI and LSI. Increased pressure on the money market, combined with the financial crisis, generally leads to increased scrutiny and transparency of the accounting operations of banks. This is especially true for those that are already under the control of the ECB and national authorities. Being subjected to increased control and inspection may hinder upwards earnings management for opportunistic purposes.

The results reported in Table 12 show that SI and LSI resort to DLLP to pursue upward capital management. However, Panel A indicates that neither for SI nor for LSI the

reduction in *CET1* regulatory capital in year t − 1 provided an incentive to replenish the capital buffer through the strategic use of DLLP in year t. This result is consistent with Fiordelisi et al. (2017). They showed that EA banks strengthened equity capital ratios over the period 2011–2014 due to the announcement of the imminent launch of the SSM. The authors added that the increase in equity capital ratios was greater for SI than for LSI. Hence, the better capitalization of SI and LSI may have represented a natural disincentive to engage in upwards capital management when in the year t − 1 there has been a reduction of the regulatory capital.

Panel B shows that the timelier recognition of loan losses in yar t compared to year t + 1 counteracts the upwards capital management in year t by reducing the negative DLLP for both IS and LSI. Panel C shows that the stronger competition is associated with higher negative DLLP in SI and upward capital management. Panel D shows that money market pressure counteracts the use of negative DLLP, thus hindering upward capital management for SI.

5.2 The zombie lending

In 2012, the ECB launched the Outright Monetary Transaction (OMT). It is a program aiming to avert the risk of the European debt crisis threatening the financial stability of Eurozone banks. Under the OMT program, the ECB declared to buy Europe's government bonds in the secondary market without limit, making large injections of liquidity to the European banks. After two years, despite the injected liquidity having improved the financial condition of many banks, there was no corresponding improvement in the condition of the real economy. Part of the problem was due to the diffusion of zombie lending (Acharya et al. 2019). Instead of using the money received from the ECB to grant loans to healthy companies, with positive consequences for the real economy, the banks gave subsidized loans to 'zombie companies'. The zombie companies had borrowed money from the bank and were insolvent. These companies on the verge of bankruptcy were kept alive by subsidized loans granted by their own banks. The zombie companies used the subsidized loans to repay overdue debts or interest. Zombie lending was not only convenient for zombie companies, but also for banks. Banks employing zombie lending avoided recording loan losses (NPLs) (Caballero et al. 2008), thus postponing them to the future, and opportunistically safeguarding their profitability (Acharya et al. 2019; 2021; 2022). In such a way those banks did not signal to the market and investors the poor quality of the banking credit portfolio and their precarious financial equilibrium. Zombie lending affected financial statement numbers. Banks doing zombie lending crystallized their loan portfolio by postponing the recognition of non-performing loans/loan-write-offs to the future. Hence, in years of zombie lending, banks were expected to record low levels of NPLs and loan losses and make lower discretionary loan loss provisions.

Based on previous studies on zombie lending and the peculiar characteristics of our sample, we have reasons to believe that the banks in our sample did not have a significant incentive to do zombie lending. In addition, we expect that their loan loss provisioning practices were not significantly biased by zombie lending.

Acharya et al. (2019) showed that the European banks that did zombie lending were poorly capitalized. In addition, they showed that well capitalized banks did not do zombie lending but improved the quality of the loan portfolio by lending to healthy companies. The strong association between the low capitalization of banks and the use of zombie lending, which was suggested as early as 2014 by Bruche and LLobet (2014), was subsequently

confirmed by other studies, such as Acharya et al. (2022). The EA listed banks in our sample between 2013 and 2018 enjoyed high capitalization and capital strength.

Blattner et al. (2023) suggested that banks holding an amount of regulatory capital above the threshold limit are less likely to engage in zombie lending. The mean value of *CET1* (0.1603) of the banks in our sample indicates that, on average, banks provided themselves with high-quality capital far above the minimum required by Basel III, consistent with Soederhuizen et al. (2023). In addition, the mean value of Tier1 is 0.1729 (i.e., about 17.29% of RWA) and it suggests that CET1 capital covered almost the entire Tier 1 capital in the sampled banks.

According to Acharya et al. (2022) and Giannetti and Simonov (2013), the trend of improving capitalization counteracts the use of zombie lending. The annual average values of the CET1 ratio for all banks in our sample show that there was a trend of strengthening capitalization over the period 2013–2018. We calculated the percentage value of the annual change in each bank's CET1 capital over 6 years. On average, the banks in the sample experienced an increase in CET1 capital of 2.5%.

According to Angelini et al. (2020) and Bonfim et al. (2023), the ECB's on-site inspections performed on banks in Italy and Portugal led to a reduction in zombie lending since the inspected banks were more likely to reclassify loans as non-performing and to make more loan loss provisions after the inspections. Therefore, banks undergoing on-site inspections are discouraged from zombie lending, given the potential reputational damage they would face. In the period 2014–2018 there was a massive increase in on-site inspections by the ECB.

We compared the "List of significant supervised and the list of less significant institutions" from 2014 to 2018 with the list of banks in our sample. Significant banks were subject to on-site inspections by the ECB, while less significant banks were inspected by the relevant national authorities, consistent with ECB Regulation (EU) No. 468/2014. Therefore, we consider that the banks in our sample had less incentive to engage in zombie lending during the period 2013–2018. In addition, the results of the descriptive statistics (provided above) show prudential banking behavior in stark contrast to zombie lending practices. The mean of LLP is far higher than the mean value of NCO. It indicates that there is, on average, a common practice of discretionary provisioning that overcomes the current loan write-offs. This seems to contrast with the purpose traditionally pursued by banks doing zombie lending, such as crystallizing their loan portfolio by avoiding the recognition of non-performing loans/loan-write-offs. In addition, they are expected to reduce the loan loss provisions. In contrast, the banks in our sample are particularly cautious about provisioning. In fact, the average value of the loan loss allowances held by banks is much greater than the average amount of annual LLP. It indicates that EA listed banks of the sample generally adopt prudent provisioning practices to protect against the risk of sudden loan losses. We looked at the empirical evidence gathered from the above studies, the analyses of bank capitalization and on-site inspections, together with the results of the descriptive statistics in an integrated way. Therefore, we believe that banks in our sample did not have an incentive to engage in zombie lending and that, therefore, loan loss provisioning practices were not biased by zombie lending.

6 Conclusion

During the 2013–2018 period, the European banking sector was disrupted by (1) the pressure to increase high-quality regulatory capital, (2) the adoption of a more timely loan loss recognition method, (3) banking competition at the national level, and (4) money market pressure. These factors exerted a significant influence on bank accounting behavior with important national repercussions on banking. They represent a unique opportunity to understand how the combination of these events impacted bank management of earnings and capital requirements. Prior research on the single abovementioned topics showed mixed results, sometimes suggesting that these factors do not exert a relevant influence on accounting practices. Our study investigated these factors in a comprehensive and holistic manner. In addition, by investigating both earnings management and capital management in a joint manner, we show how the two phenomena may be intertwined under certain conditions. In doing so this study meets the need to look at accounting practices from a holistic perspective. It captures the interrelationships between DLLP strategies aimed at managing earnings and those employed to manage regulatory capital.

Our results demonstrate that the pressure to increase high-quality regulatory capital is negatively associated with increasing earnings and capital management. These results contribute to the accounting literature by clarifying how the new stringent regulatory capital regulation impacts accounting behavior and patrimonial soundness of European banks, a phenomenon never investigated before. This study also responds to the call for more research on the impact of Basel III regulation on banks' provisioning discretion and financial reporting transparency in banking context. In addition, these results contribute to the studies investigating the quality of earnings and the size of the regulatory capital of European listed banks in recent times. The results suggest that earnings and capital reliability may have not been threatened by the pressure to increase the high-quality regulatory capital. Our inferences are in line with recent studies by Dal Maso et al. (2019) and Costello et al. (2019) conducted on the US banking sector.

Our results also demonstrate that more timely recognition of loan losses in year t compared to year t + 1 is negatively associated with increasing earnings and capital management in year t. This study contributes to the current debate about the consequences of the adoption of ECL method for earnings quality and capital soundness. Recent studies (Bischof and Daske 2016; Novotny-Farkas 2016) suggest that the introduction of the ECL method gives bank managers enough discretion in defining the loan loss identification strategy to pursue earnings management policies. Our results, instead, infer that the more timely loan loss recognition reduces upward earnings and capital management. Therefore, our study suggests that the introduction of the ECL method is beneficial for improving financial disclosure reliability and capital soundness. Our results are consistent with Gallemore (2018) showing that the implementation of the ECL method brings accounting improvements to the balance sheet.

We demonstrate that the same competitive pressure that increases earnings for intrinsic earnings management purposes does not increase earnings for capital management purposes. Our study demonstrates that when banks do upwards earnings management, they are not necessarily and mechanically pursuing the goal of increasing regulatory capital. These results contribute to enrich the strand of banking accounting literature on the effects of competition on earnings (Balakrishnan and Cohen 2009; Soedarmono et al. 2013; Laksmana and Yang 2014). Our study reveals that when national level competition increases, managers manage earnings upward through larger negative DLLP. The strong

Table 11 Significant institutions versus less significant institutions – earnings management (second stage regression)

	|Negative DLLP|							
	Panel A: Basel III		Panel B: IFRS 9		Panel C: Competition		Panel D: Money Market Pressure	
	SI	LSI	SI	LSI	SI	LSI	SI	LSI
Constant	0.2957 (0.50)	0.5580 (0.59)	0.1368 (0.34)	1.3733 (1.63)	0.8067 (1.64)	1.3832 (1.63)	0.1671 (0.29)	0.5840 (0.62)
$CET1_{i,t-1}$	−1.6612* (−1.78)	0.5391* (1.67)						
$\triangle NPL_{i,t+1}$	0.8843* (1.72)	1.7616*** (4.04)	1.1728*** (2.59)	1.9814*** (5.12)	0.9495* (1.73)	1.9815*** (5.11)	0.7975* (1.66)	1.8080*** (4.16)
$\triangle NPL_{i,t}$	−3.9644** (−1.96)	−0.2389* (−1.65)	−4.3286*** (−3.07)	−0.4303** (−2.30)	−3.7904** (−2.27)	−0.4301** (−2.29)	−3.9386* (−1.93)	−0.3246* (−1.84)
$\triangle NPL_{i,t-1}$	−1.7658*** (−2.75)	0.0189 (0.05)	−1.3945*** (−3.22)	0.3862 (1.11)	−1.0783** (−2.10)	0.3853 (1.10)	−1.5821** (−2.52)	−0.0118 (−0.03)
$\triangle NPL_{i,t-2}$	1.0310 (1.53)	1.2633*** (3.15)	0.1216 (0.26)	1.4080*** (3.94)	0.9636* (1.76)	1.4072*** (3.93)	1.2227* (1.84)	1.2572*** (3.13)
$HHI_{t,j}$					−0.2069* (−1.90)	−0.0291 (−0.13)		
$IMP_{t,j}$							−0.0026* (−1.68)	−0.0047* (−1.65)
$EBLLP_{i,t}$	−0.0291** (−1.98)	−0.0067** (−2.21)	−0.0077** (−2.25)	−0.0025*** (−2.95)	−0.0081* (−1.91)	−0.0025* (−1.95)	−0.0322* (−1.78)	−0.0069** (−2.28)
$Size_{i,t}$	0.0270 (1.13)	−0.0060 (−0.14)	0.0251 (1.53)	−0.0391 (−1.03)	0.0006 (0.03)	−0.0390 (−1.03)	0.0224 (0.94)	−0.0039 (−0.09)
$\triangle Loan_{i,t}$	0.1254 (0.87)	0.0172 (0.39)	0.1328 (1.32)	0.0607 (1.60)	0.0212 (0.18)	0.0607 (1.60)	0.1114 (0.76)	0.0357 (0.84)
$LLR_{i,t}$	−1.3743 (−1.38)	−0.7796 (−1.52)	−1.5581** (−2.26)	−0.4960 (−1.08)	−1.8479** (−2.25)	−0.4970 (−1.08)	−1.4651 (−1.47)	−0.7421 (−1.44)
$ROA_{i,t}$	0.0573** (2.36)	0.0042 (0.63)	0.0095 (0.57)	0.0050 (0.85)	0.0393** (1.97)	0.0050 (0.85)	0.0588** (2.41)	0.0072 (1.07)

Table 11 (continued)

	|Negative DLLP|							
	Panel A: Basel III		Panel B: IFRS 9		Panel C: Competition		Panel D: Money Market Pressure	
	SI	LSI	SI	LSI	SI	LSI	SI	LSI
YearFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	282	360	282	360	282	360	282	360
Prob > F	0.0000	0.0000	0.0000	0.000	0.0000	0.0000	0.0000	0.0000
R-sq. within	0.2075	0.1774	0.2107	0.1792	0.1826	0.1792	0.2015	0.1765
between	0.3531	0.0337	0.1630	0.0023	0.3804	0.0027	0.3917	0.0374
overall	0.0008	0.0453	0.0018	0.0606	0.0269	0.0619	0.0027	0.0474

This table shows the regression results of Eqs. (2), (4), (6) and (8) for the sample of significant institutions (SI) and the sample of less significant institutions (LSI), respectively. The sample of SI is composed of 47 banks, while the sample of LSI is composed of 60 banks, consistent with the lists issued by the ECB (2014). Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

Table 12 Significant institutions versus less significant institutions – capital management (second stage regression)

	|Negative DLLP|							
	Panel A: Basel III		Panel B: IFRS 9		Panel C: Competition		Panel D: Money Market Pressure	
	SI	LSI	SI	LSI	SI	LSI	SI	LSI
Constant	0.3468 (0.59)	0.5806 (0.61)	0.1835 (0.31)	0.6209 (0.65)	0.1522 (0.25)	0.6243 (0.65)	0.1721 (0.29)	0.6577 (0.54)
$CET1_{i,t-1}$	2.7155** (2.09)	0.5192* (1.87)						
$\triangle NPL_{i,t+1}$	1.2564* (1.81)	1.9663*** (4.33)	1.0641* (1.68)	2.0523*** (4.57)	1.0677* (1.66)	2.0527*** (4.56)	1.0670* (1.73)	1.3399** (2.35)
$\triangle NPL_{i,t}$	−7.2356*** (−3.89)	−0.3116 (−1.39)	−7.0986*** (−3.79)	−0.4051* (−1.91)	−7.1078*** (−3.79)	−0.4051* (−1.91)	−7.0919*** (−3.78)	−0.2926** (−2.09)
$\triangle NPL_{i,t-1}$	−1.9515*** (−3.07)	0.0425 (0.11)	−1.7080*** (−2.72)	0.0113 (0.03)	−1.7030*** (−2.70)	0.0108 (0.03)	−1.7184*** (−2.73)	0.4125 (0.81)
$\triangle NPL_{i,t-2}$	1.0191 (1.50)	1.3328*** (3.23)	1.2611* (1.87)	1.3433*** (3.25)	1.2514* (1.85)	1.3429*** (3.24)	1.2778* (1.89)	1.0852** (2.07)
$HHI_{t,j}$					−0.0460* (−1.67)	−0.0114 (−0.04)		
$IMP_{t,j}$							−0.0032* (−1.73)	−0.0034 (−0.72)
$CAP_{i,t-1}$	−0.0833** (−2.25)	−0.0207* (−1.65)	−0.0645* (−1.78)	−0.0259** (−2.06)	−0.0644* (−1.78)	−0.0259** (−2.06)	−0.0649* (−1.79)	−0.0245 (−1.53)
$Size_{i,t}$	0.0132 (0.56)	−0.0053 (−0.12)	0.0064 (0.27)	−0.0036 (−0.08)	0.0067 (0.28)	−0.0036 (−0.08)	0.0066 (0.28)	0.04761 (0.85)
$\triangle Loan_{i,t}$	0.0373 (0.25)	0.0278 (0.60)	0.0367 (0.24)	0.0448 (1.01)	0.0331 (0.22)	0.0448 (1.01)	0.0304 (0.20)	0.0808 (1.43)
$LLR_{i,t}$	−1.5397 (−1.55)	−0.8136 (−1.56)	−1.7339* (−1.74)	−0.7947 (−1.52)	−1.7107* (−1.70)	−0.7954 (−1.52)	−1.7358* (−1.74)	0.2039 (0.31)
$DEPOSIT_{i,t}$	0.4823* (1.72)	−0.0763 (−0.74)	0.4553 (1.61)	−0.0890 (−0.87)	0.4617 (1.62)	−0.0896 (−0.87)	0.4619 (1.63)	0.0672 (0.52)

Table 12 (continued)

	|Negative DLLP|							
	Panel A: Basel III		Panel B: IFRS 9		Panel C: Competition		Panel D: Money Market Pressure	
	SI	LSI	SI	LSI	SI	LSI	SI	LSI
$NCO_{i,t}$	6.4764 (1.12)	−2.7257 (−0.67)	3.7479 (0.66)	−2.9005 (−0.72)	3.7146 (0.65)	−2.9017 (−0.72)	0.4619 (1.63)	−5.3901 (−1.05)
YearFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	282	360	282	360	282	360	282	360
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-sq. within	0.2170	0.1682	0.2013	0.1766	0.2014	0.1797	0.2020	0.1792
between	0.2293	0.0770	0.2661	0.1054	0.2503	0.2287	0.2624	0.0023
overall	0.0002	0.0251	0.0026	0.0239	0.0019	0.0074	0.0027	0.0606

This table shows the regression results of Eqs. (3), (5), (7) and (9) for the sample of significant institutions (SI) and the sample of less significant institutions (LSI), respectively. The sample of SI is composed of 47 banks, while the sample of LSI is composed of 60 banks, consistent with the lists issued by the ECB (2014). Variable definitions are in Appendix 1. The symbols *, **, and *** denote two-sided significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively. Continuous variables are winsorized at the 1st and 99th percentiles

capitalization of EA banks in 2013–2018 may have disincentivized them from using capital management as a tool to face competition, since banks' potential competitors were also highly capitalized.

To our knowledge our study is the first demonstrating that increasing money market pressure is negatively associated with increasing earnings management, but not associated with increasing capital management. In doing so, our study suggest further research is appropriate on this interaction. The increasing demand for liquidity in the money market may lead banks to face an increase in businesses and consumers loans, with a consequential increase in discretionary loss provisions. In addition, the prudential write-down of assets particularly pronounced in distressed periods may stimulate an increase in DLLP which negatively impacts earnings and obstructs upwards earnings management. Being subjected to increased scrutiny and inspection during periods of financial crisis or intensified money market pressure may hinder banks in engaging in upward earnings management. The motivation may be to avoid sanctions or suffer negative legal and reputational consequences. This study suggests future studies investigate the role that intensified scrutiny could play on banks behaviors. Other reasons why the money market pressure is not associated with capital management may be traced back to the regulatory pressures soon after the introduction of the SSM. The dissemination of capital adequacy checks, including ECB stress tests and EBA asset quality reviews, and the publication of such results may have discouraged banks from manipulating regulatory capital. Also, the massive use of these buffers to face money market pressure may have discouraged capital management, as happened during the Covid-19 pandemic when banks released buffers to manage liquidity demand (Lewrick et al. 2020; Gambacorta and Shin 2018).

Finally, our study contributes to accounting researches by pointing out that the interest in pursuing earnings and capital management might be different depending on whether the bank is a SI or a LSI. This study provides the first empirical evidence on the difference of accounting behavior between SI and LSI when they are exposed to the same regulatory and contextual factors. The results suggest regulators and standard setters to consider the inherent differences between SI and LSI when investigating how they react to banking accounting or regulatory policies. Our results and inferences, summarized in Table 13, provide useful insights for standard-setters, banking regulators, supervisory authorities, investors, and academics.

Our study may reassure regulators about the effectiveness of Basel III regulation. It demonstrates that Basel III regulation enabled strengthening the capital soundness of European banks after the GFC and the SDC, and acted as a natural barrier to accounting and capital manipulation.

However, some factors still positively impact upwards earnings management, such as competition. Therefore, this evidence suggests caution in assessing the earning capacity and capital strength of an over-capitalized bank which makes extensive use of LLP. Even if the use of DLLPs has been significantly regulated over the years, it remains one of the privileged accounting tools for earnings and capital management. ECB and EBA regulations and guidelines strongly influence capital management decisions, but they do not consider the competitive specificities of banking markets. This study encourages banking regulators to develop future policies towards the reliability of financial statements numbers and earnings quality by considering the role of competition on earnings management practices.

In addition, our evidence suggests that earnings quality in the European banking sector should receive better protection. Our inferences suggest continuing with supervisory controls on the methods banks adopt to strengthen banks capital buffers and their impact on earnings. The use of integrated, constant and in-depth monitoring systems aimed at identifying aggressive earnings and capital management policies may have contributed to discourage accounting misconduct.

This study may assist investors in recognizing that the implementation of accounting and capital-based regulation, as well as regulatory and contextual factors, should be taken into consideration during the analysis of banks' financial statements and capital adequacy.

The recent Covid-19 pandemic has greatly increased the tension within financial markets all over the world, including the European banking sector, thus threatening the financial reporting quality of European banks (Taylor et al. 2023). Future research investigating the interaction between the Covid-19 pandemic and earnings and capital management could extend the work in our study.

7 Appendix 1: Variable description—main analyses

Variables	description
$CET1_{i,t}$	Ratio of lagged Common Equity Tier 1 capital scaled by the lagged risk weighted assets
$\Delta Loan_{i,t}$	Change in total loans scaled by lagged total loans
$\Delta NPL_{i,t}$	Change in non-performing loans scaled by lagged total loans. The proxies for the change in non-performing loans scaled by lagged total loans used in this study are related to the year t, $t-1$, $t-2$, or $t+1$ (i.e., $\Delta NPL_{i,t}$; $\Delta NPL_{i,t-1}$; $\Delta NPL_{i,t-2}$; $\Delta NPL_{i,t+1}$) (Nicoletti, 2018)
$Deposit_{i,t}$	Total deposits scaled by beginning total liabilities
$EBLLP_{i,t}$	Earnings before the loan loss provision, taxes and extraordinary items scaled by lagged total loans
$HHI_{t,j}$	Herfindahl–Hirschman Index calculated as the sum of squares of market share of EA listed banks per year (t) per country (j)
$IMP_{t,j}$	Money market pressure index calculated as the weighted average of change in the ratio of reserves held by the banking system of a country (j) in a specific year (t) to non-bank deposits and the weighted average of change in the short-term real interest rate, where the weights are the standard deviations of such components
$LLP_{i,t}$	Loan loss provision scaled by lagged total loans
$LLR_{i,t}$	Loan loss reserve scaled by total loans
$NCO_{i,t}$	Net loan charge-offs scaled by beginning total assets
$ROA_{i,t}$	Gross income scaled by total assets
$Size_{i,t}$	Natural logarithm of total assets
$Tier1_{i,t}$	Tier1 risk-based capital ratio, defined as the ratio of Tier 1 capital to risk-weighted total assets

8 Appendix 2: Variable description—Robustness tests

Variables	Description
$ALLP_{i,t}$	Absolute value of the negative abnormal loan loss provisions for the year t (continuous variable)
$ALLP_{i,t-1}$	Lagged absolute value of the negative abnormal loan loss provisions for the year t − 1 (continuous variable)
$BEGLLA_{i,t}$	Loan loss allowance scaled by beginning total assets
$BLoan_{i,t}$	Natural logarithm of the business loans
$CAP_{i,t}$	Ratio of lagged regulatory capital (Tier 1 capital) before loan loss reserves to the minimum required regulatory capital
$CET1_{i,t}$	Ratio of lagged Common Equity Tier 1 capital scaled by the lagged risk weighted assets
$\Delta Loan2_{i,t}$	Change in total loans scaled by beginning total assets
$\Delta NPL_{i,t}$	Change in non-performing loans scaled by lagged total loans. The proxies for the change in non-performing loans scaled by lagged total loans used in this study are related to the year t, $t-1$, $t-2$, or $t+1$ (i.e., $\Delta NPL_{i,t}$; $\Delta NPL_{i,t-1}$; $\Delta NPL_{i,t-2}$; $\Delta NPL_{i,t+1}$) (Nicoletti, 2018)
$CR_{i,t}$	Reserves to bank deposit ratio, *i.e.,* total reserves held by the banking system to total non-bank deposits in the banking sector per country per year
$EBLLP_{i,t}$	Ratio of earnings before provisions and taxes scaled by beginning total assets
$HHI_{t,j}$	Herfindahl–Hirschman Index calculated as the sum of squares of market share of EA listed banks per year (t) per country (j)
$HLoan_{i,t}$	Natural logarithm of the household loans
$IMP_{t,j}$	Money market pressure index calculated as the weighted average of change in the ratio of reserves held by the banking system of a country (j) in a specific year (t) to non-bank deposits and the weighted average of change in the short-term real interest rate, where the weights are the standard deviations of such components
$LLP2_{i,t}$	Loan loss provisions scaled by beginning total assets
$LLR\_IMPL_{i,t}$	Loan loss reserves scaled by impaired loans
$Loan_{i,t}$	Total value of loans scaled by beginning total assets
$NCO_{i,t}$	Net loan charge-offs scaled by beginning total assets
$NPL_{i,t}$	Non-performing loans scaled by beginning total assets
$PASTLLP_{i,t}$	Beginning loan loss provisions scaled by beginning total assets
$RIR_{i,t}$	Real interest rate
$Size_{i,t-1}$	Natural logarithm of (beginning) total assets
$Tier1_{i,t}$	Tier 1 risk-based capital ratio, *i.e*., the ratio of Tier 1 capital to risk-weighted total assets

Table 13 Table of results

Earnings management	
HP1—Pressure to increase high-quality regulatory capital (Basel III)	Counteract upwards earnings management
HP2—More timely loan loss recognition (IFRS 9)	Counteract upwards earnings management
HP3—Competition at national level	Favor upwards earnings management
HP4—Money market pressure	Counteract upwards earnings management
Capital Management	
HP1—Pressure to increase high-quality regulatory capital (Basel III)	Counteract upwards capital management
HP2—More timely loan loss recognition (IFRS 9)	Counteract upwards capital management
HP3—Competition at national level	No significant association
HP4—Money market pressure	No significant association

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