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The influence of accounting enforcement on earnings quality of banks: Implications of bank regulation and the global financial crisis

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ABSTRACT

We study the effects of country-level accounting enforcement on earnings quality of banks and whether bank regulation substitutes or complements the effect of accounting enforcement on bank earnings quality. We also examine whether the influence of accounting enforcement on bank earnings quality changed after the global financial crisis. Using a sample of listed banks from 40 countries between 2001 and 2014, and abnormal loan loss provisions (ALLP) as our main proxy for earnings quality, we document a consistent and strong association between accounting enforcement and bank earnings quality. More specifically, an increase in accounting enforcement decreases the level of ALLP and decreases the propensity to manage earnings to avoid losses. Furthermore, we provide empirical evidence that bank regulation complements the effect of accounting enforcement on bank earnings quality. Finally, unlike in the pre-crisis period, we find a positive association between accounting enforcement and income-decreasing ALLP in the post-crisis period, which indicates that stronger accounting enforcement is associated with more conservative earnings and higher loan loss reserves. Overall, our results indicate that accounting enforcement reduces opportunistic earnings management.

1. Introduction

We investigate the relation between country-level accounting enforcement and earnings quality of banks for a sample of publicly-listed international banks. We first examine how accounting enforcement by itself relates to bank earnings quality and then we examine the implications of bank regulation for the accounting enforcement-earnings quality relation. We also study whether the effect of accounting enforcement on earnings management changed after the global financial crisis.

Banking is a unique industry where accounting standard setters and regulatory agencies may not always have similar objectives to bank regulators. Whereas accounting standard setters and regulators are more concerned about transparent financial reporting that reflects true economic performance, bank regulators may prefer conservative accounting practices that can lead to over-provisioning of allowances for bad loans that act as a cushion against financial difficulties in bad times. For example, banks' loan loss provisioning practices came under scrutiny by the SEC's task force on earnings management (*The Wall Street Journal*, November 16, 1998). This emphasis on reserves stems from the SEC's broader concerns about earnings management in banking and other industries. Whereas

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some banks were trimming loss reserves to increase earnings and bolster their return on equity, other banks were being conservative by overly provisioning for loan losses (*American Banker*, June 29, 1998). In response to this concern, the SEC on November 16, 1998 ordered SunTrust bank to trim its 1994, 1995, and 1996 loan loss provisions, which resulted in an upward restatement of SunTrust's profits for the three years and a reduction in its loan loss reserves to $666 million from $766 million.

However, the objectives of accounting standard setters and bank regulators appear to be converging more recently. For example, the Financial Stability Forum (FSF, 2009) recommended that bankers be given more latitude to exercise "reasonable judgments" in establishing provisions. The U.S. Treasury (2009) similarly recommended that provisioning "incorporate a broader range of available credit information" and be more "forward-looking."[1] The Financial Accounting Standards Board (FASB, 2011), in an apparent reversal of its earlier position, concurred with the proposed standard that loan loss provisioning incorporate expected losses, as did the Basel Committee on Banking Supervision (BCBS, 2011) and the International Accounting Standards Board (IASB, 2011).

Accounting enforcement is generally carried out by government authorized or appointed enforcement bodies which have been delegated the task of supervising and enforcing listed companies' compliance with mandatory accounting standards (Brown et al., 2014). Recent evidence shows that accounting enforcement is related to earnings quality. For example, Christensen et al. (2013) add to the findings of prior research on the impact of accounting standards on capital market effects by demonstrating that the enforcement of common accounting standards plays a fundamental role in enhancing the quality of financial reports. However, this literature primarily focuses on industrial firms, which are less regulated and subject to less monitoring than banks.

Given that prior literature on accounting enforcement (AE) has not directly studied the banking industry, which is highly regulated and for which the effects of accounting enforcement are not clear, we address three research questions regarding the implications of accounting enforcement for bank earnings quality. First, we examine whether accounting enforcement enhances bank earnings quality. Second, we explore the implications of bank regulation for the relation between accounting enforcement and bank earnings quality. In particular, we study whether bank regulation (BR) substitutes or complements the effect of accounting enforcement on bank earnings quality. Third, we examine whether the focus of accounting enforcement on restricting banks from over-reserving changed after the financial crisis.

Our main measure of bank earnings quality is the abnormal component of loan loss provisions (LLP). LLP is the largest and most important accrual that affects bank performance (Beatty and Liao, 2014). Prior research documents that banks use abnormal loan loss provisions (ALLP) as a tool for opportunistic earnings management (Beatty et al., 2002; Kanagaretnam et al., 2010). We examine the use of both negative (income-increasing) and positive (income-decreasing) ALLP. We are particularly interested in income-increasing ALLP because it leads to overstatement of bank earnings and performance and to understatement of LLP and the riskiness of a bank's loan portfolio. We also use the propensity to just avoid losses as an alternative measure of earnings management.

We use a sample of international banks from the BankScope (now Orbis Bank Focus) database representing 40 countries over the 2001–2014 period to test our predictions. First, we document a consistently significant positive association between accounting enforcement and bank earnings quality. More specifically, an increase in accounting enforcement decreases the level of ALLP and decreases the propensity to manage earnings to avoid losses. These effects are particularly salient in the pre-crisis period during which accounting enforcement is negatively associated with both income-increasing and income-decreasing ALLP. However, the relation between AE and income-increasing ALLP is weak in the post-crisis period, most likely due to lower levels of opportunistic earnings management. This reduction in opportunistic actions in the banking industry is likely due to the increased scrutiny following the financial crisis. Second, we find that bank regulation positively influences the accounting enforcement-bank earnings quality relation, which suggests that bank regulation complements accounting enforcement in enhancing bank earnings quality. Third, we find a positive association between AE and income-decreasing ALLP in the post-crisis period (compared to the pre-crisis period), which indicates that stronger accounting enforcement is associated with more conservative earnings and higher loan loss reserves and provides some preliminary evidence of a shift in the focus of accounting regulators.

Our results contribute to the literature in several ways. First, they extend prior research on the effects of accounting enforcement to the highly regulated banking industry. Second, our results provide policy makers with deeper insight into the implications of bank regulation for the relation between accounting enforcement and bank earnings quality. In particular, we document that bank regulation complements the effect of accounting enforcement on bank earnings quality. These findings indicate that both accounting enforcement and bank regulation affect bank earnings quality and mutually reinforce each other's effect. Finally, we document that both accounting and banking regulators emphasize increasing bank stability through higher loan loss reserves in the post-crisis period.

The remaining sections of this paper are organized as follows. Section 2 reviews the relevant prior research and develop the main hypotheses, Section 3 describes the different measures of earnings quality employed in the study, Section 4 explains the data and sample selection, Section 5 presents the empirical results, and Section 6 provides our conclusion and discusses the implications of our findings.

[1] The U.S. Treasury Department released financial regulatory reform proposals on June 18, 2009. The accounting-specific items are: (1) The FASB, IASB, and SEC should review accounting standards to determine how financial firms should be required to employ more forward-looking loan loss provisioning practices that incorporate a broader range of available credit information; (2) A recommendation that accounting standard setters improve accounting standards for loan loss provisioning by the end of 2009 that would make it more forward looking, as long as the transparency of financial statements is not compromised; (3) A recommendation that accounting standard setters make substantial progress by the end of 2009 toward development of a single set of high quality global accounting standards.

2. Related literature and hypotheses

2.1. The implications of accounting enforcement for bank earnings quality

Our focus is on the effects of accounting enforcement on bank earnings quality. The Committee of European Securities Regulators (CESR, 2003) defines accounting enforcement as, "monitoring compliance of the financial information with the applicable reporting framework; taking appropriate measures in case of infringements discovered in the course of enforcement (p. 4)". Generally accounting enforcement is carried out through national enforcement bodies that are delegated the tasks of supervising and enforcing listed companies' compliance with mandatory accounting standards (Brown et al., 2014). These capital market regulators are concerned with not only the quantity of information but also the quality and usefulness of information to market participants. According to Brown et al. (2014), "[…] In theory, a more active regulator will promote the quality of financial reporting information by encouraging and assisting firms to provide the required information, identifying cases where suitable information has not been provided and taking action to ensure defective reporting is corrected (p. 8)." In the U.S. context, the Securities and Exchange Commission (SEC) has been a very active regulator of financial reporting, with several regulatory actions resulting in fines and penalties, including in the banking industry (for example the SunTrust action discussed earlier). In a 2012 address, Craig Lewis, the SEC's Chief Economist states "[…] The SEC has responsibility for facilitating the provision of accurate and fairly stated financial statements to the public. As a result, there is a cross agency need to identify and then investigate potentially misstated or even fraudulent financial statements. SEC Staff successfully engages in these efforts in many ways, including – as I described earlier – filer reviews, examinations, and enforcement actions."

Goldman and Slezak (2006) show that regulations that impose penalties can reduce earnings management if the penalties are sufficiently large. There also is recent empirical evidence documenting that accounting enforcement positively influences earnings quality. Christensen et al. (2013) find that improvements in earnings quality around IFRS adoption in Europe are limited to five EU countries that concurrently made substantive increases in reporting enforcement, thus demonstrating that strengthening accounting enforcement plays a critical role in improving earnings quality.[2] In related literature, Ernstberger et al. (2012) document the usefulness of accounting enforcement in increasing earnings quality in Germany. In an attempt to validate their proxy, Brown et al. (2014) show that their accounting enforcement index has explanatory power for country differences in earnings management and Bushman et al.'s (2004) measure of financial transparency, over that provided by other proxies representing legal system origin or legal setting.

To our knowledge, prior studies have not directly examined the effects of accounting enforcement on earnings quality in the banking industry. However, there is some evidence on how accounting regulations that strengthen internal controls on financial reporting affect bank earnings quality. In the early 1990s regulatory changes enacted through the Federal Deposit Insurance Corporation Improvement Act (FDICIA) placed SOX-like restrictions (related to internal controls on financial reporting) on U.S. bank holding companies with assets greater than 500 million dollars (increased to $1 billion in 2005). In particular, Altamuro and Beatty (2010) examine several earnings quality measures prior to and following FDICIA and find that the mandated internal control requirements increased the validity of LLP, earnings persistence and cash flow predictability, and reduced benchmark-beating and accounting conservatism for affected versus unaffected banks. This evidence suggests that enforcement of accounting rules through effective internal controls on financial reporting does increase bank earnings quality.

Drawing on the above reasoning and findings of the prior literature, we hypothesize the following:

H1: Accounting enforcement is positively related to bank earnings quality.

Unlike prior literature on accounting enforcement that focuses exclusively on industrial firms, banking is a highly regulated industry and therefore the effects of accounting enforcement on bank earnings quality could be muted. We further explore the interplay between accounting enforcement and bank regulation in the next hypothesis.

2.2. Implications of bank regulation for the relation between accounting enforcement and bank earnings quality

Although our focus is on accounting enforcement, bank regulatory supervision through on-site examination and off-site monitoring could also influence financial reporting practices. Since periodic financial reports form the basis for bank supervisors to assess the safety and soundness of these institutions, bank regulators have incentive to ensure that bank financial reports are free of manipulation. Consistent with this argument, Ghosh et al. (2017) report that banks are significantly less likely than control firms (consisting of non-banking firms) to report material weaknesses in internal controls and to restate their financial statements.

Since, both accounting and banking regulators are interested in financial reports that are free of manipulation, they have the same objective of reducing opportunistic actions by bank managers. Opportunistic reporting actions, among others, can take the form of

[2] Many countries have recently revised and strengthened their enforcement regimes, primarily around the time of IFRS adoption. For example, in the U.K. these changes in enforcement happened as follows. In the first phase, the Financial Reporting Review Panel (FRRP) officially switched from performing only reactive reviews to performing proactive reviews in the year prior to IFRS adoption. In the second phase and around IFRS adoption, the FRRP increased its power, enabling it to more effectively liaise with other regulators and also extend its reach to interim accounts (see Christensen et al., 2013).

income increasing accruals or managing earnings to just meet or beat earnings thresholds such as to avoid reporting a loss. Therefore, it is reasonable to argue that bank regulation could complement accounting enforcement in reducing opportunistic reporting actions by bank managers.

However, it is not clear whether stricter bank regulation is solely responsible for the increased earnings quality of banks or if other concurrent factors also contribute to it. For example, Gebhardt and Novotny-Farkas (2011) state that "……. the effect of IFRS adoption on the provisioning behavior of banks varies with the stringency and attitudes of regulatory or supervisory regimes," and empirically document a lower effect on income smoothing of the restriction on the incurred loss treatment under IAS39 in EU countries with stricter bank supervision (a commonly used proxy for strength of bank regulations). This empirical evidence suggests that banking regulation may serve as a substitute for enforcement of accounting standards in influencing earnings quality. More recently, Ghosh et al. (2017) argue that bank regulation and auditing are substitutes. In the U.S. context, they show that auditors expend less effort, as indicated by lower audit fees and shorter audit report lags, in audits of banks than in audits of similar firms, when bank regulation and supervision are more intense.

Given the above arguments that suggest bank regulation could either complement or substitute accounting enforcement in constraining bank earnings management, the interplay between accounting enforcement and bank regulation is ultimately an empirical question. Therefore, we state our second hypothesis as follows:

H2: Bank regulation may either complement or substitute accounting enforcement in influencing bank earnings quality.

2.3. Implications of accounting enforcement for bank earnings quality in the post-crisis period

In the pre-crisis period, accounting standard setters and enforcers and bank regulators had different objectives regarding bank financial reporting (Bushman and Williams, 2012). Accounting standard setters and enforcers are concerned with financial reporting providing information to external stakeholders and investors in order to support a wide range of decisions and contractual arrangements. By contrast, prudential bank regulation seeks to limit the frequency and cost of bank failures, and to protect the financial system as a whole by limiting systemic crises (Rochet, 2005).

These objectives came into direct conflict in loan loss accounting, with bank regulators preferring larger loan loss provisions that incorporate forward looking information, i.e., higher abnormal loan loss provisions that reduce current period's earnings (in effect smoothing earnings through the economic cycle – higher loan loss provisions during good times cushioning loan write-offs during bad times). On the other hand, accounting enforcement was focused on restricting managerial discretion and judgement due to concerns about earnings management by building cookie-jar reserves for intertemporal shifting of earnings that reduces the information value of current period's earnings to investors. Therefore, in the pre-crisis period, there was a direct conflict between accounting and banking regulators with regards to allowing bank managers to have higher abnormal loan loss provisions that build higher loan loss reserves.

However, after the financial crisis, there have been significant concerns and criticisms that the accounting standards for financial instruments were partially responsible for exacerbating the severity and the length of the crisis (Vyas, 2011; Kothari and Lester, 2012). These issues were highlighted in a report by the U.S. Government Accountability Office (GAO, 2013) titled "Causes and Consequences of Recent Bank Failures" to the congressional committee,[3] which states that "[…] early recognition of loan losses could have potentially reduced the pro-cyclicality in the crisis." In response to these criticisms, the IASB and the FASB began in 2009 to work towards the development of their versions of new financial instruments standards to replace the existing standards. In July 2014, the IASB replaced IAS 39 with its final and complete version of *Financial Instruments* (IFRS 9), which became effective for the annual periods beginning on or after January 1, 2018.

In summary, the new developments in financial reporting practices in the post-crisis period (although the new accounting standards came into effect well after our sample period) are more conducive to building higher loan loss reserves. In effect, both accounting enforcers and bank regulators are willing to permit higher loan loss provisions during good times to absorb loan write-offs during bad times. Therefore, it is reasonable to expect that the conflicting objectives of accounting and bank regulators described above are considerably reduced and that both these regulators encourage higher loan loss provisioning that can improve bank stability through higher loss reserves. We explore this conjecture using data from the post-crisis period.

3. Methodology

3.1. Measures of accounting enforcement and bank regulation

We use the enforcement index developed by Brown et al. (2014) to measure country level differences in accounting enforcement. This measure is designed to capture differences in the activities of national enforcement bodies in promoting compliance with accounting standards. It measures the power of authorized or appointed bodies in supervising and enforcing listed companies' compliance with mandatory accounting standards (Brown et al., 2014). We adopt the Brown et al. (2014) measure instead of other available proxies (e.g., La Porta et al., 1998; Kaufmann et al., 2010; Christensen et al., 2013) because it is a continuous index that specifically measures the enforcement power rather than a broader measure of market regulations and law enforcement (Brown et al.,

[3] External source: http://www.gao.gov/assets/660/651154.pdf.

2014).[4] Further, it is measured at three different points in time (i.e., 2002, 2005 and 2008) and is computed as the weighted average of six different items selected from the International Federation of Accountants (IFAC) surveys that are most likely to affect the quality of financial disclosures. The final value of AE ranges from 2 to 24 and is available for 51 countries (27 IFRS and 24 non-IFRS countries).

With respect to the proxy for Banking Regulation, we rely on the measure developed by Barth et al. (2013) because it represents the most complete and authoritative dataset specifically designed for the banking industry. Most of the previous studies have used the level of supervisory power from Barth et al. (2013) as the proxy for country level banking regulation (e.g., Fonseca and González, 2008; Gebhardt and Novotny-Farkas, 2011; Kanagaretnam et al., 2014b; Marton and Runesson, 2017). In addition to this variable, we also include other indicators that are likely to influence the effectiveness of regulation as a whole. In particular, we measure the level of banking regulation as the sum of the following three variables: (1) official supervisory power, (2) activity restriction, and (3) private monitoring. The first variable, official supervisory power, measures whether the supervisor has the authority to take specific actions to prevent and correct problems. The second variable, activity restriction, measures overall restrictions on banking activities. It has been used in prior banking research (e.g., Fonseca and González, 2008; Laeven and Levine, 2009; Houston et al., 2010; Kanagaretnam et al., 2014a) to measure the extent to which banks face regulatory restrictions on their activities in securities markets, insurance, real-estate, and share ownership in nonfinancial firms (Barth et al., 2013). This is because banks are potentially more influential in a financial system where they have fewer restrictions on their activities (Beck and Levine, 2004). In such settings, banks have higher bargaining power, which is likely to dilute bank regulators' monitoring efforts. The third variable, private monitoring, captures the incentives or ability or both for private monitoring of banks (Fonseca and González, 2008). The BR measure is a continuous variable, with higher values indicating that bank regulators have more oversight power over banks.[5]

3.2. Testing the relationship between accounting enforcement, bank regulation, and earnings quality

3.2.1. Using earnings management through abnormal loan loss provisions as a measure of earnings quality

To proxy for bank earnings quality, we focus primarily on the magnitude of abnormal loan loss provisions. Loan loss provisions are by far the largest and most important accrual for banks to manage earnings (Wahlen, 1994; Liu and Ryan, 2006; Kanagaretnam et al., 2010; Beatty and Liao, 2014). We use the following approach to estimate abnormal loan loss provisions (ALLP). Consistent with Kanagaretnam et al. (2010), we estimate the normal or non-discretionary component of loan loss provisions by regressing loan loss provisions on its determinants using the following model (firm subscripts are suppressed):

$$LLP = \beta_0 + \beta_1 BEGLLA + \beta_2 LCO + \beta_3 \Delta LOANS + \beta_4 \Delta NPL + \beta_5 LOANS + \beta_6 NPL + \beta_7 LOSS + LOAN\_CATEGORIES + \text{Year, Specialization and Country FE} + \varepsilon_t \quad (1)$$

where *LLP* is loan loss provisions in *t* divided by total assets in $t-1$; *BEGLLA* is loan loss allowance in $t-1$ divided by total assets in $t-1$; *LCO* is net charge-offs in *t* divided by total assets in $t-1$; *LOSS* is an indicator variable that equals 1 if the bank reports a negative income in $t-1$, 0 otherwise; *LOANS* is total value of loans in *t* divided by total assets in $t-1$; *NPL* is nonperforming loans in *t* divided by total assets in $t-1$; *ΔLOANS* and *ΔNPL* are the change from $t-1$ to *t* in total *LOANS* and *NPL*, respectively divided by total assets in $t-1$. We control for loan categories (*LOAN_CATEGORIES*), as well as for year, specialization (i.e., bank type), and country fixed effects. Please see Appendix B for detailed definitions of the variables.

We denote the absolute value of the residuals obtained from Eq. (1) as |*ALLP*| and use this measure as the main proxy for bank earnings quality. Higher |*ALLP*| indicates lower earnings quality. To test the relationship between AE and bank earnings quality (H1) and the implication of BR for that relationship (H2), we estimate the following regression model using OLS estimation (firm subscripts are suppressed):

$$|ALLP| = \beta_0 + \beta_1 AE + \beta_2 BR + \beta_3 AExBR + \beta_4 SIZE + \beta_5 LOSS + \beta_6 GROWTH + \beta_7 PASTLLP + \beta_8 EBTLLP + \beta_9 DEPOSIT + \beta_{10} IFRS + \beta_{11} REG\_CAP + \beta_{12} GDP + \beta_{13} DISC + \beta_{14} CR + \beta_{15} LEGAL + \beta_{16} MARKET\_GDP + \beta_{17} SH\_RIGHTS + \beta_{18} ANTISELF\_INDEX + \beta_{19} CONC + \beta_{20} FIRMS + LOAN\_CATEGORIES + Year\ and\ Specialization\ Fixed\ Effects + \varepsilon_t \quad (2)$$

where *AE* and *BR* are the measures of accounting enforcement and banking regulation, respectively; *SIZE* is the natural logarithm of total assets in $t-1$ (expressed in millions of $); *LOSS* is an indicator variable that equals 1 if the bank reports negative income in $t-1$, 0 otherwise; *GROWTH* is the change in total assets from $t-1$ to *t* divided by total assets in $t-1$; *PASTLLP* is the loan loss provision in $t-1$ divided by total assets in $t-1$; *EBTLLP* is the earnings before taxes and loan loss provision in *t* divided by total assets in $t-1$; *DEPOSIT* is the value of deposits and short-term funding in *t* divided by total assets in $t-1$; *IFRS* is an indicator

[4] Indeed most of the alternative proxies are either dummy variables (e.g., Christensen et al., 2013) or mostly related to the legal enforcement as a whole (e.g., La Porta et al., 1998; Kaufmann et al., 2010).

[5] Barth et al. (2013) collect information on banking industry through four surveys. In order to increase the comparability of the indices used in our research we retrieve information from the first, second and third surveys as we noticed some small changes in the questions of the fourth survey. Also, given that some countries present information not for all the surveys, we decided to adopt a more prudential approach to measure our BR variable as the median value on the three surveys (where the information was available) consistent with the approach we employed for the AE variable.

variable that equals 1 if the bank adopts IFRS, 0 otherwise; and *REG_CAP* is the total regulatory capital ratio in *t*.

We also control for several country-level characteristics that may influence bank earnings quality. Specifically we control for institutional and economic differences across countries in order to isolate the effect of accounting enforcement from other country-related characteristics. The first set of controls, relates to the institutional environment because previous literature demonstrates that high levels of investor protection, financial transparency, and disclosure reduce the level of earnings management within a country (Leuz et al., 2003; Fonseca and González, 2008; Kanagaretnam et al., 2010, 2011, 2014b). Accordingly we include the following country controls: *DISC* is an index that measures the actual disclosure practices of commercial banks around the world (Huang, 2006); *CR* is an index that aggregates different creditor rights (Djankov et al., 2007); *LEGAL* is a law enforcement index that ranges from 0 to 10, with higher values indicating stronger law enforcement (Economic Freedom of the World Annual Report 2010); *SH_RIGHTS* measures whether shareholders' rights are sufficiently implemented (IMD); and *ANTISELF_INDEX* is an anti-self-dealing index (Djankov et al., 2008). In addition, we control for differences in economic well-being and market development across countries because prior literature documents that the level of national economic development is associated with higher-quality institutions (Claessens and Laeven, 2003). Therefore we include the following country controls: *GDP* is the natural logarithm of GDP per capita in purchasing power terms (World Bank); *MARKET_GDP* is the ratio of total value of listed shares to GDP (Čihák et al., 2012); *CONC* is a proxy for bank concentration, measured as the fraction of total commercial bank assets owned by the three largest banks (Čihák et al., 2012); and *FIRMS* is the number of publicly listed companies per capita (Čihák et al., 2012). Finally, we control for loan categories (*LOAN_CATEGORIES*) and for year and specialization fixed effects. Appendices A and B provide detailed definitions of the country- and bank-specific variables.

To test our predictions on the influence of AE and its joint effect with BR on earnings quality, we first estimate Eq. (2) separately with the absolute value of (1) income increasing ALLP (negative residual from Eq. (1)), (2) income decreasing ALLP (positive residual from Eq. (1)), and (3) both income increasing and income decreasing ALLP together. The coefficients of interest are β_1 and β_3. We expect AE to reduce managerial discretion over LLP. Therefore, we expect β_1 to be negative. Although, we do not have a directional prediction for the interaction term $AE \times BR$, if these two sources of regulation complement each other in terms of their effect on earnings quality, then we would expect a negative coefficient on the interaction term $AE \times BR$. On the other hand, if the two sources of regulation are substitutes, then we would expect a positive coefficient for the interaction term $AE \times BR$.

To test our prediction regarding whether the relationship between AE and ALLP has changed over time (i.e., before and after the financial crisis), we estimate Eq. (2) separately for the period before 2008 (Pre-crisis) and the period after 2010 (Post-crisis). We expect that both accounting and bank regulators provide managers greater discretion to increase loan loss reserves after the financial crisis in order to increase financial stability.

An important concern relates to the undue influence on the coefficient estimates in Eq. (2) that may result from extreme values. This concern is especially pertinent because the measures of $|ALLP|$ used in Eq. (2), which are the error terms from estimating Eq. (1), may be unduly large as the estimation period spans the financial crisis.[6] To address this concern, we estimate our models using robust regression estimation, which generates less biased estimates than simple OLS (Leone et al., 2017).[7] We also mean-center the continuous variables used in the interaction terms (i.e., AE and BR) to reduce problems with multicollinearity (Neter et al., 1989; Aiken and West, 1991; Iacobucci et al., 2017).

3.2.2. Using earnings management to avoid a loss as a measure of earnings quality

We use the propensity to avoid reporting a loss as another measure of bank earnings management. Altamuro and Beatty (2010) and Kanagaretnam et al. (2010, 2015) document that bank managers have incentives to manage earnings in order to avoid reporting losses. We use the following logistic model to test whether AE reduces banks' propensity to manage earnings to avoid losses, and whether AE and BR have a complementary or substitution effect on loss avoidance (firm subscripts are suppressed):

$$\begin{aligned} LOSS\_AV = {} & \beta_0 + \beta_1 AE + \beta_2 BR + \beta_3 AExBR + \beta_4 IFRS + \beta_5 GROWTH + \beta_6 LOSS + \beta_7 LOANS + \beta_8 CHCASHFLOW \\ & + \beta_9 DEPOSIT + \beta_{10} LEV + \beta_{11} ALLOWANCE + \beta_{12} SIZE + \beta_{13} REG\_CAP + \beta_{14} GDP + \beta_{15} DISC + \beta_{16} CR \\ & + \beta_{17} LEGAL + \beta_{18} MARKET\_GDP + \beta_{19} SH\_RIGHTS + \beta_{20} ANTISELF\_INDEX + \beta_{21} CONC + \beta_{22} FIRMS \\ & + LOAN\_CATEGORIES + Year\ and\ Specialization\ Fixed\ Effects + \varepsilon_t \end{aligned} \quad (3)$$

where *LOSS_AV* equals 1 if *ROA* (profit before taxes divided by total assets) in *t* is in the interval (0, 0.005], and 0 otherwise[8]; *CHCASHFLOW* is change in operating cash flow (change in earnings before tax plus loan loss provision) from $t-1$ to *t* divided by

[6] Despite winsorizing the continuous variables in Eq. (1) at the 1st and 99th percentiles, we find many large estimated values of *ALLP* from Eq. (1).

[7] Commonly used statistical packages (e.g., SAS, STATA) do not include routines for estimatiing robust regression with clustered standard errors. To overcome this limitation, we first estimate Eq. (1) using robust regression and extract the probability weights associated with each observation, which we then use to weight the observations when estimating Eqs. (2) and (3). The robust regression procedure performs a preliminary screening in order to remove observations with Cook's distance above 1 (gross outliers) and then performs Huber (1964) iterations followed by bi-weight iterations (Li, 1985). As a result, the procedure assigns a weight of zero to the 1,078 observations identified as outliers. This explains the difference between the number of observations reported in Table 3, Panels A and B, and the number of observations in Tables 4, 5, 6 and 7. Additionally, we estimate Eqs. (2) and (3) without using the frequency weight obtained from the robust regression estimation of Eq. (1). Untabulated results using simple OLS estimation are consistent with our main results reported in Tables 5, 6 and 7.

[8] We find consistent results when we use the interval (0, 0.003].

total assets in $t-1$; *LEV* is the value of common equity in t divided by total assets in $t-1$; *ALLOWANCE* is loan loss reserve in t divided by total assets in $t-1$; and the other variables are as previously defined (please see Appendices A and B for more details).

The coefficients of interest in Eq. (3) are β_1 and β_3. We expect β_1 to be negative, which would indicate that AE reduces earnings management to avoid losses. For the interaction term β_3, we do not offer a directional prediction because BR could either complement or substitute AE.

4. Sample

Our initial sample includes all of the listed banks operating in the 51 countries covered by Brown et al. (2014) and with accounting and country data available from 2001 to 2014.[9] We obtain accounting data from the BankScope database[10] and country-level variables from Brown et al. (2014), Huang (2006), Barth et al. (2013), Čihák et al. (2012), La Porta et al. (2008), Kanagaretnam et al. (2014a), IMD competitiveness report, and the World Bank Database (see Appendix A for sources and description). We exclude observations with missing country level data. In particular, we do not have data to measure *BR* for Hong Kong, Israel and Ukraine; *GDP*, *MARKET_GDP, CONC* and *FIRMS* for Taiwan; *CR* and *LEGAL* for Egypt and Jordan; *SH_RIGHTS* for Morocco, Pakistan and Peru; and *ANTISELF_INDEX* for Slovenia.[11] We also drop banks that do not focus on lending activities, including banks with the following specializations: Investment & Trust corporations, Investment banks, Islamic banks, Securities firms, Private banking/Asset management companies, and Micro-financing institutions.[12] In addition, we delete observations with missing accounting data for computing the variables in our regression models.[13]

Table 1 shows the sample distribution by year and country. Consistent with previous studies (e.g., Kanagaretnam et al., 2014b, 2015), the U.S. has the largest number of bank-year observations (8,544), followed by Japan (996), Brazil (307), Indonesia (247), China (231), Russia (222), and Italy (177). The sample distribution ranges between 900 and 1,000 bank-year observations during 2005 and 2014 and is smaller prior to 2005 (IFRS adoption).[14]

Table 2 presents descriptive statistics for the country-level variables. As noted, there are some countries where both the accounting and banking regulation measures are high (e.g., the U.S. and Australia), and other countries where only one of these measures is high and the other low (e.g., Indonesia and Malaysia, which have high levels of BR and low levels of AE). Importantly, there is wide variation in AE and BR across countries although both types of regulators share the common goal of increasing earnings quality and confidence in the financial sector.

5. Results

5.1. Descriptive statistics and correlations

We report descriptive statistics for the variables used in the ALLP and LOSS-Avoidance tests in Panel A of Table 3. The mean (median) of *LLP* is 0.56% (0.28%) and the mean (median) of $|ALLP|$ is 0.26% (0.11%). The mean (median) of total loans (*LOANS*) is 72.9% (71.92%), of impaired loans (*NPL*) is 2.13% (1.12%), and of net charge-offs (*LCO*) is 0.44% (0.17%). The mean (median) of total deposits (*DEPOSIT*) is 90% (89.4%) and the mean (median) of regulatory capital ratio (*REG_CAP*) is 14.6% (13.56%). More than 10% of the banks included in the sample report a loss, 13% of the banks are identified as just avoiding a loss (*LOSS_AV*), and almost 14% of the sample comprises IFRS adopters.

Panel B of Table 3 presents Pearson correlation coefficients between the dependent and the independent variables. As expected, the results show a positive correlation ($p < 0.01$) between *AE* and *BR*, meaning that, in general, countries with higher bank regulation also exhibit higher accounting enforcement, and vice versa. Further, the negative correlation ($p < 0.01$) between *AE* and

[9] Brown et al. (2014) provide data on AE for the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Croatia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Rep. Korea, Malaysia, Mexico, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, United Kingdom, United States of America.

[10] To avoid double counting, we retain observations only for consolidated entities when a bank reports both consolidated and unconsolidated financial statements (see Duprey and LÉ, 2016).

[11] We drop New Zealand because of missing information on Total Regulatory Capital Ratio in BankScope.

[12] Our final sample includes the following bank specializations: Bank holdings companies (7,127 bank-years), Commercial banks (5320 bank-years), Cooperative banks (63 bank-years), Finance companies (50 bank-years), Real estate & mortgage banks (28 bank-years), Savings banks (297 bank-years), and Specialized governmental credit institutions (37 bank-years).

[13] Specifically, we start our sample selection with all the listed banks available in BankScope that operate in the countries covered by Brown et al. (2014) for the period 2001–2014 (28,494 bank-years). We then delete bank-years with missing country-level data (2,618 bank-years) and bank-level accounting data required to estimate our main regression models (12,782 firm-years). Lastly, we drop banks that do not specialize in lending activities (172 bankfirm-years). These steps result in a final sample of 12,922 bank-year observations (for 1,858 unique banks) from 40 countries for the period 2001–2014.

[14] As shown in Table 2, we have limited information available for most of the European countries prior to 2005 (IFRS adoption year). In order to check the robustness of our results, we re-estimate our main tests for the sample period 2005–2014. Untabulated results corroborate our main conclusions.

Table 1
Sample distribution by country-year.

COUNTRY NAME	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
ARGENTINA	0	0	0	2	2	0	0	2	3	3	3	2	0	0	17
AUSTRALIA	9	10	9	9	7	5	7	8	7	7	7	7	6	7	105
AUSTRIA	0	0	0	0	1	1	2	1	1	1	0	0	1	2	10
BELGIUM	0	0	0	0	0	0	1	1	1	0	0	0	1	1	5
BRAZIL	21	25	21	24	22	23	24	24	20	20	20	21	21	21	307
CANADA	10	10	10	10	10	11	11	10	11	4	5	11	11	11	135
CHILE	4	3	3	1	2	1	1	6	7	6	7	7	5	5	58
CHINA	3	6	11	11	15	18	18	20	20	22	20	21	23	23	231
CROATIA	2	0	0	0	1	1	8	9	8	6	5	6	6	4	56
CZECH REPUBLIC	0	0	0	0	0	0	1	1	1	1	1	0	0	0	5
DENMARK	2	2	2	0	0	2	4	4	6	10	8	15	17	17	89
FINLAND	1	1	1	0	0	1	1	1	0	1	0	1	0	0	8
FRANCE	0	0	0	0	1	2	2	4	2	1	2	1	4	3	22
GERMANY	4	2	2	5	6	5	5	5	5	6	6	4	4	5	64
GREECE	0	0	0	0	2	3	7	7	7	7	5	4	6	5	53
HUNGARY	2	0	0	1	1	1	1	2	2	2	0	0	0	1	13
INDIA	0	0	6	9	8	6	6	8	10	13	16	24	24	26	156
INDONESIA	16	18	16	19	21	23	19	19	5	5	14	21	22	29	247
IRELAND	4	4	3	3	0	1	4	4	3	2	1	0	0	2	31
ITALY	1	10	14	18	8	9	10	14	10	8	19	18	19	19	177
JAPAN	49	55	59	67	69	73	96	97	41	39	94	86	87	84	996
MALAYSIA	5	8	10	9	9	9	10	9	10	10	8	6	5	5	113
MEXICO	0	0	0	0	1	1	1	2	1	1	1	2	2	4	16
NETHERLANDS	1	1	1	1	1	2	1	0	1	3	2	1	1	1	17
NORWAY	8	9	10	7	6	4	7	15	17	18	18	17	17	16	169
PHILIPPINES	4	9	12	7	9	10	9	10	12	10	10	10	6	6	124
POLAND	0	0	0	0	3	9	10	10	10	12	12	11	12	11	100
PORTUGAL	6	6	6	5	5	4	5	5	5	6	5	4	3	4	69
REPUBLIC OF KOREA	0	0	0	3	5	6	8	7	1	1	8	8	6	8	61
ROMANIA	1	0	0	0	0	0	2	2	1	2	2	2	3	1	16
RUSSIAN FEDERATION	4	6	8	12	12	16	21	20	18	19	23	23	20	20	222
SINGAPORE	1	1	1	3	3	3	3	4	4	3	4	6	6	5	47
SOUTH AFRICA	8	6	6	6	4	7	6	6	6	6	7	5	5	4	82
SPAIN	10	11	8	4	10	10	10	10	10	10	9	6	4	3	115
SWEDEN	0	0	0	0	2	2	2	2	3	3	4	4	4	3	29
SWITZERLAND	0	0	1	2	2	2	2	2	4	4	1	1	1	2	24
THAILAND	8	13	14	13	11	10	12	12	11	11	10	8	7	8	148
TURKEY	5	9	6	8	6	10	12	11	12	13	13	8	11	11	135
UNITED KINGDOM	6	7	7	7	6	8	7	7	6	7	7	9	10	12	106
UNITED STATES OF AMERICA	493	507	518	466	950	711	669	667	653	628	608	583	556	535	8544
Total	688	739	765	732	1,221	1,010	1,025	1,048	955	931	985	963	936	924	12,922

ALLP, *LLP* and *LOSS_AV* lends preliminary support to our predictions.

5.2. Accounting enforcement and earnings quality

5.2.1. Managing earnings through loan loss provisions

Table 4 reports the results of estimating Eq. (1). The residuals from Eq. (1) represent ALLP. Despite the differences in sample composition and estimation approach, we find a positive association between *LLP* and *NPL*, *LOANS*, *LCO*, and *ΔNPL*, which is consistent with prior research (e.g., Kanagaretnam et al., 2010, 2014b).

Table 5 reports regression results for the tests of earnings management through ALLP for the full sample period. We report results for the income-increasing (absolute value of negative ALLP) and income-decreasing (positive ALLP) earnings management in the first and second columns, respectively. Income-increasing ALLP are of particular interest because they represent managers' under-estimation of future loan losses in a given year in order to increase the current period's net income. In other words, managers use their discretion in estimating loan loss provisions for future losses associated with the loan portfolio in order to increase the reported current period's net income. Consistent with H1, the coefficient of *AE* is statistically significant (coefficient = −0.004, $p < 0.01$). This means that in jurisdictions with higher AE, banks exhibit lower absolute value of income increasing ALLP, i.e., higher earnings quality. These results are also economically significant; a one unit change in AE implies a decrease in ALLP of 2%.[15] In contrast, we do not observe a significant association between AE and income decreasing ALLP.

[15] We compute the economic significance as follows: [(−0.004) + (−0.0007) + (−0.0004)]/0.26 = 2%. Recall that we multiply the dependent variable in Tables 5 and 6 by 100.

Table 2
Country-level characteristics.

COUNTRY NAME	AE	BR	GDP	DISC	CR	LEGAL	MARKET_GDP	SH_RIGHTS	ANTISELF_IND	CONC	FIRMS
ARGENTINA	2	26	9.631	66	1	5.02	32.236	5.220	0.444	41.039	0.026
AUSTRALIA	22	30	10.445	73	3	6.23	127.268	8.268	0.790	55.982	0.846
AUSTRIA	8	23	10.531	78	3	6.7	48.740	8.118	0.209	27.140	0.116
BELGIUM	22	24	10.475	70	2	5.65	86.088	7.270	0.540	77.655	0.145
BRAZIL	8	30	9.359	74	1	4.82	57.044	6.195	0.291	46.133	0.021
CANADA	22	19	10.546	75	1	4.81	129.067	7.000	0.651	52.935	1.163
CHILE	5	28	9.656	62	2	5.11	103.996	7.509	0.625	54.070	0.148
CHINA	16	29	8.680	59	2	6.73	59.708	5.765	0.778	68.193	0.011
CROATIA	5	24.5	9.737	56	3	5.4	42.364	4.906	0.251	56.051	0.412
CZECH REPUBLIC	5	26	10.075	65	3	3.54	30.336	6.171	0.340	59.951	0.028
DENMARK	22	25	10.527	79	3	6.19	75.078	8.618	0.466	55.266	0.370
FINLAND	12	23	10.445	85	1	8.06	114.821	8.674	0.460	96.877	0.254
FRANCE	19	17.5	10.390	66	0	6.91	93.360	6.946	0.382	43.195	0.113
GERMANY	19	21	10.442	74	3	6.62	49.325	7.189	0.279	34.827	0.080
GREECE	9	25	10.259	67	1	4.13	67.428	6.147	0.225	61.321	0.285
HUNGARY	8	31	9.811	73	1	7.15	32.250	7.551	0.204	59.397	0.041
INDIA	6	26	8.052	74	2	2.59	71.241	7.034	0.549	33.256	0.041
INDONESIA	6	33.5	8.782	69	2	1.17	30.683	5.864	0.683	46.675	0.015
IRELAND	8	24	10.698	70	1	4.95	62.252	7.821	0.787	40.404	0.134
ITALY	19	23	10.384	89	2	3.18	49.022	4.315	0.385	24.027	0.048
JAPAN	8	31	10.406	81	2	6.37	105.681	5.614	0.483	27.709	0.263
MALAYSIA	8	32	9.779	72	3	4.27	135.382	6.718	0.948	34.163	0.386
MEXICO	13	25.75	9.495	75	0	5.39	30.625	5.603	0.178	49.825	0.012
NETHERLANDS	8	19	10.612	86	3	5.11	102.131	7.658	0.209	87.060	0.138
NORWAY	22	22.5	10.899	84	2	7.53	69.720	7.828	0.435	71.147	0.418
PHILIPPINES	16	25	8.420	71	1	3.42	45.827	5.714	0.237	36.505	0.027
POLAND	6	25.5	9.626	71	1	4.27	36.205	5.280	0.300	56.405	0.070
PORTUGAL	9	28.5	10.113	73	1	5.25	42.441	6.618	0.486	76.435	0.044
REPUBLIC OF KOREA	10	29	10.159	68	3	8.11	84.899	5.195	0.461	71.267	0.350
ROMANIA	5	24.5	9.367	62	2	5.21	22.011	4.769	0.414	66.414	1.148
RUSSIAN FEDERATION	6	20	9.610	62	2	7.53	82.663	3.942	0.476	41.030	0.022
SINGAPORE	12	29.5	11.002	71	3	8.48	214.654	7.593	1.000	81.248	1.047
SOUTH AFRICA	10	22	9.267	78	3	3.93	239.134	7.750	0.814	70.944	0.084
SPAIN	9	23	10.336	81	2	5.54	92.698	5.952	0.370	36.174	0.757
SWEDEN	5	19	10.530	90	1	4.73	122.967	7.898	0.340	59.463	0.354
SWITZERLAND	19	27	10.713	83	1	6.03	274.502	7.378	0.267	83.134	0.342
THAILAND	15	27	9.309	75	2	6.11	66.689	6.687	0.849	44.312	0.077
TURKEY	6	27	9.520	80	2	6.16	29.665	5.647	0.426	51.659	0.045
UNITED KINGDOM	22	25	10.444	71	4	6	140.486	7.023	0.927	28.602	0.481
UNITED STATES OF AMERICA	21	31	10.746	76	1	7.33	138.131	7.515	0.651	19.603	0.172

Focusing on the interaction term *AE x BR*, the estimated coefficient in Column (1) is significantly less than zero (coefficient = −0.0004, $p < 0.01$). This result implies that the relation between ALLP and AE becomes stronger (more negative) as BR increases. In other words, bank regulation complements the dampening effect of accounting enforcement on income-increasing earnings management through LLP. Column (3) reports results for the pooled sample with both income-increasing and income-decreasing earnings management. We find consistent results with those reported in Column (1) for income-increasing ALLP. Taken together these results support our hypothesis that AE decreases managerial discretion and that BR complements this effect by further reinforcing the reduction in managerial discretion.

The results also show that the bank-level control variables *LOSS*, *SIZE*, *PASTLLP* are all positively associated with *ALLP* and *EBTLLP* is negatively (positively) associated with income increasing (decreasing) ALLP. Most of the country-level institutional control variables have significant coefficients whose signs are consistent with prior literature.

Table 6 reports results of estimating Eq. (2) separately for the pre- and the post-crisis periods. As is evident from the table, the relationship between AE and ALLP differs between these two periods. More specifically, AE is negatively associated with income-increasing, income-decreasing, and overall ALLP in the pre-crisis period (Columns (1) – (3) of Table 6). These results strongly support H1 and confirm the accounting regulators' focus on curtailing managerial discretion in the pre-crisis period. Additionally, the coefficient on the interaction term is also strongly negative, indicating a complementary effect between accounting and bank regulators. However, the results change in the post-crisis period. In particular, the relation between AE and income-increasing ALLP is weak in the post-crisis period. This may be due to reduction in opportunistic actions in the banking industry because of the increased scrutiny following the crisis. In addition, the relationship between AE (as well as BR) and income-increasing ALLP changes in the post-crisis period. This result is consistent with our prediction that in the post-crisis period (i.e., after 2010), both regulatory supervision and accounting enforcement are aligned to focus on financial market stability rather than financial reporting transparency. Consistent with this notion, there is more emphasis on building up loan loss reserves (i.e., higher income decreasing ALLP). The results in Column (5) of Table 6 support this conjecture, as evidenced by the significant, positive coefficients on *AE*, *BR*, and *AE x BR*.

Table 3
Descriptive statistics and correlations for the ALLP and Loss avoidance tests.

Panel A: Descriptive statistics

VARIABLE	OBS.	MEAN	STD. DEV.	Q1	MEDIAN	Q3
ALLOWANCE	12,922	0.0151	0.0139	0.0081	0.0112	0.0167
|ALLP|	12,922	0.0026	0.0044	0.0005	0.0011	0.0027
BEGLLA	12,922	0.0134	0.0119	0.0073	0.01	0.0150
CASHFLOW	12,922	0.0018	0.0096	−0.0011	0.0009	0.0042
ΔNPL	12,922	0.0024	0.0138	−0.0016	0	0.0040
ΔLOANS	12,922	0.0784	0.1476	0.0031	0.0456	0.1106
DEPOSIT	12,922	0.9001	0.1908	0.8060	0.8941	0.9710
EBTLLP	12,922	0.0155	0.0143	0.0085	0.0149	0.0214
GROWTH	12,922	0.1153	0.1961	0.0116	0.0661	0.1605
IFRS	12,922	0.1371	0.3440	0	0	0
LCO	12,922	0.0044	0.0074	0	0.0017	0.0053
LEV	12,922	0.1062	0.0587	0.0749	0.0974	0.1217
LLP	12,922	0.0056	0.0083	0.0009	0.0028	0.0067
RESIDENTIAL	12,922	0.1787	0.2552	0	0	0.3320
OTHER MORTGAGE	12,922	0.0237	0.0862	0	0	0
OTHER CONSUMER	12,922	0.0584	0.1065	0.0009	0.0192	0.0692
CORPORATE	12,922	0.1727	0.1903	0.0356	0.1104	0.24
OTHER_LOANS	12,922	0.2917	0.3211	0.0044	0.0760	0.5927
LOANS	12,922	0.7290	0.2000	0.6167	0.7192	0.8283
LOSS	12,922	0.1146	0.3186	0	0	0
LOSS_AV	12,922	0.1297	0.3360	0	0	0
NPL	12,922	0.0213	0.0287	0.0037	0.0112	0.0272
PASTLLP	12,922	0.0049	0.0071	0.0008	0.0025	0.0058
SIZE	12,922	7.9229	2.3261	6.3172	7.4608	9.5061
REG_CAP	12,922	14.5999	4.9957	11.7	13.56	16.1

Panel B: Pearson correlations (Number of observations = 12,922)

VARIABLE	#	1	2	3	4	5	6	7	8	9	10
AE	1	1									
BR	2	0.2962*	1								
LLP	3	−0.1283*	−0.0956*	1							
LOSS_AV	4	−0.2077*	−0.0350*	−0.0157	1						
|ALLP|	5	−0.2682*	−0.1184*	0.5652*	0.0749*	1					
BEGLLA	6	−0.3726*	−0.3054*	0.3507*	0.0267*	0.4142*	1				
LCO	7	−0.0985*	0.0473*	0.6934*	0.0625*	0.4326*	0.3498*	1			
LOSS	8	0.0481*	0.0388*	0.2571*	0.0520*	0.2135*	0.2080*	0.3024*	1		
ΔLOANS	9	−0.0064	−0.0299*	−0.0467*	−0.1001*	0.0518*	−0.1026*	−0.1914*	−0.0079	1	
ΔNPL	10	−0.0017	−0.0689*	0.4341*	−0.0238*	0.2090*	0.0032	0.1404*	0.0137	0.0781*	1
LOANS	11	0.1203*	0.0426*	0.0665*	−0.0679*	0.0763*	−0.019	−0.0478*	0.0166	0.7060*	0.1527*
NPL	12	−0.2892*	−0.1793*	0.5352*	0.1264*	0.4866*	0.6459*	0.4708*	0.3165*	−0.1569*	0.4096*
SIZE	13	−0.4182*	−0.3858*	0.0378*	0.1646*	0.0112	0.1177*	0.0618*	−0.1280*	−0.2118*	−0.0364*
GROWTH	14	−0.0338*	−0.0582*	0.0002	−0.0910*	0.0767*	−0.0672*	−0.1334*	−0.0193	0.8909*	0.0818*
PASTLLP	15	−0.1273*	−0.0839*	0.5535*	0.0278*	0.3466*	0.5298*	0.5666*	0.4784*	−0.1931*	0.0601*
EBTLLP	16	−0.1944*	−0.1293*	0.1054*	−0.1911*	0.0248*	0.1528*	−0.0061	−0.3421*	0.1017*	0.0196
DEPOSIT	17	0.0177	0.1879*	−0.0466*	−0.0349*	0.0468*	−0.0901*	−0.0952*	0.0183	0.6938*	0.0404*
IFRS	18	−0.3440*	−0.6972*	0.0841*	0.0215	0.1159*	0.2890*	−0.0659*	−0.0347*	0.0313*	0.0835*
CASHFLOW	19	−0.0714*	−0.0520*	0.0199	−0.0546*	0.0428*	0.0217	−0.0422*	0.1680*	0.2652*	−0.015
LEV	20	0.0995*	0.0889*	0.0205	−0.1770*	0.0679*	−0.0115	−0.0968*	0.0295*	0.5999*	0.0365*
ALLOWANCE	21	−0.3561*	−0.3314*	0.5359*	−0.0016	0.5123*	0.8684*	0.3176*	0.1987*	0.0698*	0.2400*
REG_CAP	22	0.0602*	0.0348*	−0.0778*	−0.1059*	−0.0219	−0.016	−0.1282*	0.0019	0.1318*	−0.0663*
GDP	23	0.6913*	0.3323*	−0.1462*	0.0092	−0.1974*	−0.3781*	−0.0647*	0.0812*	−0.0796*	−0.0077
DISC	24	0.1950*	0.1079*	−0.1265*	0.1666*	−0.0727*	−0.2496*	0.008	0.0398*	−0.1263*	−0.0381*
CR	25	−0.5286*	−0.4163*	0.0282*	0.1804*	0.1377*	0.2302*	0.0062	−0.0394*	−0.0155	−0.009
LEGAL	26	0.6260*	0.3193*	−0.0967*	−0.0399*	−0.1686*	−0.2880*	−0.0493*	0.0576*	−0.0159	−0.0318*
MARKET_GDP	27	0.6373*	0.4003*	−0.1490*	−0.0921*	−0.2261*	−0.4073*	−0.0546*	0.0520*	−0.0315*	−0.0441*
SH_RIGHTS	28	0.7628*	0.3951*	−0.1266*	−0.2114*	−0.2906*	−0.4179*	−0.0463*	0.0334*	−0.0072	−0.0235*
ANTISELF INDEX	29	0.4870*	0.4212*	−0.1224*	−0.1899*	−0.1842*	−0.2599*	−0.0792*	0.0054	0.0363*	−0.0686*
CONC	30	−0.5503*	−0.5821*	0.0860*	0.0239*	0.1146*	0.2837*	0.0026	−0.0735*	0.0292*	0.019
FIRMS	31	0.0796*	−0.2669*	−0.0939*	0.0548*	−0.0729*	−0.1237*	−0.0534*	−0.0197	−0.0538*	−0.0106

VARIABLE	#	11	12	13	14	15	16	17	18	19	20
LOANS	11	1									
NPL	12	−0.0196	1								

(continued on next page)

Table 3 (*continued*)

VARIABLE	#	11	12	13	14	15	16	17	18	19	20
SIZE	13	−0.3050*	0.0884*	1							
GROWTH	14	0.6089*	−0.1229*	−0.1667*	1						
PASTLLP	15	−0.0649*	0.5052*	0.0640*	−0.1408*	1					
EBTLLP	16	0.0386*	−0.0670*	0.1544*	0.1557*	0.0627*	1				
DEPOSIT	17	0.5532*	−0.0863*	−0.3230*	0.7700*	−0.1445*	−0.0051	1			
IFRS	18	−0.0472*	0.1905*	0.4059*	0.0590*	0.0691*	0.1130*	−0.1756*	1		
CASHFLOW	19	0.1597*	−0.0310*	−0.0414*	0.2714*	−0.0226	0.4750*	0.2016*	0.0410*	1	
LEV	20	0.3443*	−0.1173*	−0.3617*	0.6033*	−0.0594*	0.2043*	0.3435*	−0.0612*	0.2146*	1
ALLOWANCE	21	0.1186*	0.7003*	0.0751*	0.0895*	0.4810*	0.1856*	0.0246*	0.3141*	0.0872*	0.0972*
REG_CAP	22	−0.1683*	−0.1156*	−0.2530*	0.1489*	−0.0423*	0.1320*	−0.0363*	−0.016	0.0893*	0.6538*
GDP	23	0.1425*	−0.2321*	−0.3217*	−0.1328*	−0.1310*	−0.3152*	−0.0576*	−0.3358*	−0.1202*	−0.0089
DISC	24	0.0035	−0.0657*	−0.0414*	−0.1660*	−0.1045*	−0.2321*	−0.1529*	−0.2682*	−0.0800*	−0.1303*
CR	25	−0.0709*	0.2130*	0.4880*	0.0058	0.0353*	0.0457*	−0.0956*	0.4653*	0.0236*	−0.1950*
LEGAL	26	0.1560*	−0.2406*	−0.3151*	−0.0423*	−0.0856*	−0.1986*	0.0711*	−0.2873*	−0.0689*	0.0579*
MARKET_GDP	27	0.1070*	−0.2851*	−0.3208*	−0.0665*	−0.1385*	−0.2259*	0.0549*	−0.4147*	−0.0856*	0.0452*
SH_RIGHTS	28	0.1181*	−0.2963*	−0.3917*	−0.0443*	−0.1212*	−0.1506*	−0.0193	−0.4076*	−0.0658*	0.0927*
ANTISELF INDEX	29	0.1199*	−0.2297*	−0.2084*	0.0177	−0.1167*	−0.1013*	0.1565*	−0.3511*	−0.0341*	0.0421*
CONC	30	−0.0868*	0.1848*	0.4618*	0.0675*	0.0756*	0.2007*	−0.1313*	0.6073*	0.0720*	−0.0981*
FIRMS	31	0.0329*	−0.0353*	0.2116*	−0.0706*	−0.0887*	−0.1391*	−0.1069*	0.1583*	−0.0581*	−0.1572*

VARIABLE	#	21	22	23	24	25	26	27	28	29	30
ALLOWANCE	21	1									
REG_CAP	22	−0.0052	1								
GDP	23	−0.3735*	−0.0384*	1							
DISC	24	−0.2854*	−0.0832*	0.4898*	1						
CR	25	0.2166*	−0.0970*	−0.4283*	−0.1203*	1					
LEGAL	26	−0.2689*	−0.0281*	0.7520*	0.0959*	−0.4082*	1				
MARKET_GDP	27	−0.4074*	0.0139	0.7073*	0.2413*	−0.3648*	0.6361*	1			
SH_RIGHTS	28	−0.4140*	0.0847*	0.5789*	0.1928*	−0.4456*	0.4904*	0.6799*	1		
ANTISELF INDEX	29	−0.2618*	0.0277*	0.2547*	−0.1746*	−0.0416*	0.3175*	0.5844*	0.5274*	1	
CONC	30	0.2889*	−0.0199	−0.5949*	−0.3354*	0.5647*	−0.4651*	−0.5542*	−0.3857*	−0.2956*	1
FIRMS	31	−0.1253*	−0.0988*	0.2731*	0.1422*	0.2803*	0.0552*	0.2113*	0.1238*	0.1153*	0.2143*

See the Appendices A and B for variable definitions.
All the continuous variables are winsorized at 1% and 99% by year.
* Denotes significance at the 1 percent level.

The results indicate that a one unit increase in *AE* and *BR* after 2010 leads to an increase in abnormal loan loss provision of 5.3% ($p < 0.01$).

5.2.2. Managing earnings to avoid a loss

We report the results of the loss avoidance test in Table 7. The coefficient of *AE* is negative and statistically significant ($p < 0.01$), which is consistent with our prediction that accounting regulators dampen opportunistic earnings management. We also find support for complementary effects between AE and BR; in particular, the negative coefficient on the interaction term is significant at conventional levels ($p < 0.01$). In addition, our results are consistent between the pre-crisis and the post-crisis periods. At the bottom of Table 7, we also report the marginal effects. As reported, one unit change in AE reduces the probability of loss avoidance by 1.46%, and an extra 0.2% (overall sample) when AE and BR are considered jointly, which is consistent with the complementarity hypothesis. Finally, the signs of the coefficients on the control variables are largely consistent with prior literature (e.g., Kanagaretnam et al., 2014b, 2015).

5.3. Sensitivity checks

In this section, we report the results of several sensitivity checks to assess the robustness of our main inferences.[16] First, because bank size can influence the effectiveness of regulations, we re-estimate the main regressions after excluding small banks with assets below $100 million. Untabulated results indicate that our main results are not influenced by the inclusion of small banks.

Second, as reported in Table 1, a significant portion of the sample consists of banks from the U.S. and Japan. To mitigate the concern that our results may be driven by the observations from these two countries (despite using robust regression in our main inferences) we re-estimate Eqs. (2) and (3) after dropping observations from the U.S. and Japan. Untabulated results show that our main inferences are generally consistent when we exclude these observations.

Third, following Leuz et al. (2003), we augment our regression models with additional time-variant country controls that may

[16] Sensitivity test results are available upon request.

Table 4
First-stage regression for estimating ALLP.

	Coefficient
Dependent variable: LLP	
Constant	0.0052***
	(5.48)
BEGLLA	−0.0199***
	(−5.31)
LCO	0.8379***
	(143.72)
ΔLOANS	−0.0011***
	(−5.95)
ΔNPL	0.0763***
	(32.98)
LOANS	0.0034***
	(6.58)
NPL	0.0117***
	(7.75)
LOSS	−0.0005***
	(−8.50)
Loan Control	Yes
Specialization FE	Yes
Year FE	Yes
Country FE	Yes
Observations	11,844
Adjusted R^2	0.90

This table shows robust regression estimation results of Eq. (1):

$$LLP = \beta_0 + \beta_1 BEGLLA + \beta_2 LCO + \beta_3 \Delta LOANS + \beta_4 \Delta NPL + \beta_5 LOANS + \beta_6 NPL + \beta_7 LOSS + LOAN\_CATEGORIES. + Year\ ,\ Specialization\ and\ Country\ FE + \varepsilon_t$$

Variable definitions are in Appendices A and B. The robust regression procedure identifies 1,078 observations as extreme values (i.e., weight zero). This explains the difference in the number of observations between Table 3 (Panels A and B) and this table. We winsorize continuous variables at 1% and 99% by year. The t-statistics shown in parentheses are based on standard errors clustered by firm. *, **, and *** represent significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively.

affect LLP and the likelihood of loss avoidance. Particularly, we include real GDP growth and unemployment rate (from IMD) and re-estimate the main models. Our results remain robust after including real GDP growth and unemployment rate in the models.[17]

Finally, we strengthen the robustness of our results by adding additional firm-specific and country-specific controls to the models. Specifically, we include earnings before taxes and loan loss provisions (*EBTLLP*) and regulatory capital ratio (*REG_CAP*) in Eq. (1) because these variables could influence the non-discretionary LLP. Since prior research documents that differences in country cultural characteristics may affect bank earnings quality (e.g., Kanagaretnam et al., 2011), we include country-level measures of individualism and uncertainty avoidance (Hofstede, 2001) in Eqs. (2) and (3).[18] Additionally, because previous studies document that firms operating in countries with developed equity markets engage in lower earnings management (e.g., Leuz et al., 2003), we also add an indicator variable, which equals 1 if the bank operates in a country with a developed equity capital market, and 0 otherwise (Brown et al., 2014), to Eqs. (2) and (3).[19] Untabulated results show that our main inferences presented in Tables 4, 5 and 6 hold after including these additional firm and country control variables.

6. Conclusion

We study the effects of country-level accounting enforcement on earnings quality of listed banks and whether bank regulation substitutes or complements the effect of accounting enforcement on bank earnings quality. We use the absolute value of abnormal loan loss provisions (ALLP), income-increasing ALLP, and income-decreasing ALLP, and the extent of earnings management to avoid a loss to test the impact of accounting enforcement on earnings quality. We employ a sample of listed banks from the BankScope database representing 40 countries between 2001 and 2014 to test our predictions. We examine three questions. First, we examine whether accounting enforcement enhances the earnings quality of banks. Second, we examine whether bank regulation complements

[17] IMD does not provide information for the year 2001.

[18] We perform this analysis as a sensitivity test instead of controlling directly for country-level cultural differences in our main analyses because the measures of individualism and uncertainty avoidance are likely to be correlated with both the level of accounting enforcement and banking regulation, as well as some of the other country controls.

[19] We include individualism, uncertainty avoidance and the level of development in models (2) and (3) only because we already control for country fixed effects in model (1).

Table 5
Regression results for the ALLP test.

	|ALLP|	|ALLP|	|ALLP|
	Residual < 0	Residual > =0	All
Constant	0.4506***	0.2944***	0.3736***
	(7.05)	(3.82)	(7.22)
AE	**−0.0039*** **	**0.0004**	**−0.0018*** **
	(−5.98)	**(0.49)**	**(−3.33)**
BR	−0.0007	0.0000	−0.0004
	(0.74)	(0.02)	(−0.56)
AE × BR	**−0.0004*** **	**−0.0002***	**−0.0003*** **
	(−3.17)	**(−1.74)**	**(−3.24)**
SIZE	−0.0061***	−0.0063***	−0.0059***
	(−6.26)	(−6.07)	(−7.69)
LOSS	0.0047	−0.0003	0.0030
	(0.76)	(−0.04)	(0.62)
GROWTH	0.0044	0.0234	0.0095
	(0.29)	(1.38)	(0.79)
PASTLLP	2.9721***	5.4458***	4.2177***
	(8.06)	(13.54)	(14.72)
EBTLLP	−0.2212*	0.5082***	0.2598***
	(−1.80)	(3.34)	(2.59)
DEPOSIT	−0.0316**	−0.0319**	−0.0302**
	(−2.13)	(−1.97)	(−2.56)
IFRS	0.0077	0.0126	0.0093*
	(1.10)	(1.62)	(1.73)
REG_CAP	−0.0003	−0.0006*	−0.0004*
	(−0.85)	(−1.72)	(−1.79)
GDP	−0.0177***	−0.0050	−0.0113**
	(−2.64)	(−0.67)	(−2.10)
DISC	0.0001	0.0006	0.0003
	(0.16)	(0.98)	(0.55)
CR	0.0098***	0.0100**	0.0092***
	(2.96)	(2.40)	(3.46)
LEGAL	0.0032	−0.0024	0.0001
	(1.27)	(−0.88)	(0.04)
MARKET_GDP	0.0000	0.0000	0.0000
	(0.63)	(0.09)	(0.08)
SH_RIGHTS	−0.0154***	−0.0161***	−0.0148***
	(−4.40)	(−3.85)	(−4.88)
ANTISELF_INDEX	−0.0468**	−0.0175	−0.0335**
	(−2.23)	(−0.74)	(−2.00)
CONC	−0.0002	−0.0001	−0.0002
	(−1.41)	(−0.64)	(−1.32)
FIRMS	−0.0124	−0.0404***	−0.0249***
	(−1.24)	(−3.43)	(−3.09)
Loan Categories	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Specialization Fixed Effects	Yes	Yes	Yes
Observations	6,139	5,705	11,844
Adjusted R^2	0.138	0.155	0.135

This table shows estimation results of Eq. (2).

$$|ALLP| = \beta_0 + \beta_1 AE + \beta_2 BR + \beta_3 AExBR + \beta_4 SIZE + \beta_5 LOSS + \beta_6 GROWTH + \beta_7 PASTLLP + \beta_8 EBTLLP + \beta_9 DEPOSIT + \beta_{10} IFRS + \beta_{11} REG\_CAP + \beta_{12} GDP + \beta_{13} DISC + \beta_{14} CR + \beta_{15} LEGAL + \beta_{16} MARKET\_GDP + \beta_{17} SH\_RIGHTS + \beta_{18} ANTISELF\_INDEX + \beta_{19} CONC + \beta_{20} FIRMS + LOAN\_CATEGORIES + Year\ and\ Specialization\ Fixed\ Effects + \varepsilon_t$$

Variable definitions are in Appendices A and B. We multiply the dependent variable (|ALLP|) by 100 for ease of presentation. We control for the influence of potential outliers by estimating the model after weighting observations with the weights extracted from the robust regression estimates of Eq. (1). We mean-center the continuous variables in the interaction terms to reduce problems with multicollinearity (Neter et al., 1989; Aiken and West, 1991; Iacobucci et al., 2017), winsorize continuous variables at 1% and 99% tail by year, and cluster standard errors by firm. *, **, and *** represent significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively.

or substitutes the effect of accounting enforcement on earnings quality. Third, we examine whether the influence of accounting enforcement on bank earnings quality has changed after the financial crisis.

We document a consistent and strong association between accounting enforcement and bank earnings quality. More specifically, an increase in accounting enforcement decreases the level of ALLP and decreases the propensity to manage earnings to avoid losses. Furthermore, we provide empirical evidence that bank regulation complements the effect of accounting enforcement on bank earnings quality. Finally, we find a positive association between accounting enforcement and income-decreasing ALLP in the post-

Table 6
Regression results for the ALLP test – Pre/post crisis period.

	Year < 2008	Year < 2008	Year < 2008	Year > 2010	Year > 2010	Year > 2010
	|ALLP| Residual < 0	|ALLP| Residual > =0	|ALLP| All	|ALLP| Residual < 0	|ALLP| Residual > =0	|ALLP| All
Constant	0.1938**	0.3756***	0.2558***	0.4548***	0.3013**	0.4126***
	(2.09)	(3.02)	(3.19)	(3.00)	(2.31)	(3.97)
AE	**−0.0100*** **	**−0.0036*** **	**−0.0070*** **	**−0.0013**	**0.0057*** **	**0.0016**
	(−8.99)	**(−3.33)**	**(−8.69)**	**(−0.95)**	**(4.40)**	**(1.58)**
BR	−0.0031**	−0.0031***	−0.0029***	0.0006	0.0073***	0.0028**
	(−1.99)	(−2.68)	(−2.88)	(0.39)	(3.60)	(2.25)
AE × BR	**−0.0015*** **	**−0.0009*** **	**−0.0011*** **	**0.0005*** **	**0.0009*** **	**0.0005*** **
	(−7.84)	**(−5.54)**	**(−8.88)**	**(2.69)**	**(4.43)**	**(3.50)**
SIZE	−0.0013	−0.0090***	−0.0045***	−0.0078***	−0.0054***	−0.0067***
	(−0.98)	(−5.71)	(−4.18)	(−4.11)	(−3.02)	(−4.86)
LOSS	−0.0249***	−0.0079	−0.0132*	0.0328***	0.0170	0.0259***
	(−2.95)	(−0.70)	(−1.89)	(2.91)	(1.55)	(3.32)
GROWTH	−0.0426**	0.0391*	−0.0062	0.0445	0.0306	0.0428
	(−2.34)	(1.74)	(−0.39)	(1.19)	(0.84)	(1.59)
PASTLLP	3.0727***	6.7837***	5.6860***	2.1305***	4.0419***	2.9963***
	(4.49)	(7.42)	(9.73)	(3.79)	(6.55)	(7.04)
EBTLLP	−0.3295**	0.7837***	0.3170**	−1.0419***	0.7025**	−0.1670
	(−2.35)	(4.19)	(2.53)	(−2.71)	(2.02)	(−0.66)
DEPOSIT	0.0234	−0.0184	0.0080	−0.0472	−0.0523	−0.0630**
	(1.31)	(−0.88)	(0.54)	(−1.21)	(−1.47)	(−2.31)
IFRS	0.0415***	0.0064	0.0207***	0.0121	0.0173	0.0109
	(3.63)	(0.61)	(2.61)	(0.82)	(1.19)	(1.02)
REG_CAP	0.0000	−0.0013***	−0.0006*	0.0018*	0.0004	0.0010*
	(0.12)	(−2.88)	(−1.76)	(1.96)	(0.58)	(1.79)
GDP	−0.0356***	−0.0317**	−0.0321***	0.0159	−0.0160	−0.0016
	(−3.43)	(−2.51)	(−3.73)	(1.18)	(−1.32)	(−0.16)
DISC	0.0029***	0.0017*	0.0024***	−0.0040***	0.0031***	−0.0005
	(2.96)	(1.79)	(3.22)	(−3.16)	(2.93)	(−0.64)
CR	0.0082	0.0136***	0.0102**	0.0150**	0.0178**	0.0131**
	(1.55)	(2.68)	(2.52)	(2.16)	(2.45)	(2.53)
LEGAL	0.0138***	0.0092**	0.0118***	−0.0121**	−0.0074*	−0.0088***
	(3.46)	(2.29)	(3.91)	(−2.57)	(−1.66)	(−2.66)
MARKET_GDP	0.0005***	0.0001	0.0002***	−0.0005***	−0.0001	−0.0002**
	(3.59)	(1.15)	(2.91)	(−2.89)	(−1.27)	(−2.10)
SH_RIGHTS	−0.0124**	−0.0069	−0.0098**	0.0021	−0.0286***	−0.0155***
	(−2.14)	(−1.21)	(−2.34)	(0.29)	(−4.60)	(−3.07)
ANTISELF_INDEX	−0.0656**	−0.0212	−0.0394*	−0.0260	−0.0376	−0.0279
	(−2.11)	(−0.61)	(−1.68)	(−0.51)	(−0.92)	(−0.81)
CONC	−0.0004	−0.0006**	−0.0005**	−0.0009**	0.0001	−0.0004
	(−1.53)	(−2.00)	(−2.33)	(−2.45)	(0.23)	(−1.62)
FIRMS	−0.0787***	−0.0396**	−0.0513***	0.0060	0.0449**	0.0162
	(−4.16)	(−2.57)	(−4.09)	(0.31)	(2.04)	(1.03)
Loan Categories	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Specialization Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,061	2,631	5,692	1,765	1,815	3,580
Adjusted R^2	0.277	0.179	0.203	0.129	0.160	0.119

This table shows estimation results of Eq. (2).

$$|ALLP| = \beta_0 + \beta_1 AE + \beta_2 BR + \beta_3 AExBR + \beta_4 SIZE + \beta_5 LOSS + \beta_6 GROWTH + \beta_7 PASTLLP + \beta_8 EBTLLP + \beta_9 DEPOSIT + \beta_{10} IFRS + \beta_{11} REG\_CAP + \beta_{12} GDP + \beta_{13} DISC + \beta_{14} CR + \beta_{15} LEGAL + \beta_{16} MARKET\_GDP + \beta_{17} SH\_RIGHTS + \beta_{18} ANTISELF\_INDEX + \beta_{19} CONC + \beta_{20} FIRMS + LOAN\_CATEGORIES + Year\ and\ Specialization\ Fixed\ Effects + \varepsilon_t \quad (2)$$

Variable definitions are in Appendices A and B. We multiply the dependent variable (|ALLP|) by 100 for ease of presentation. We control for the influence of potential outliers by estimating the model after weighting observations with the weights extracted from the robust regression estimates of Eq. (1). We mean-center the continuous variables in the interaction terms to reduce problems with multicollinearity (Neter et al., 1989; Aiken and West, 1991; Iacobucci et al., 2017), winsorize continuous variables at 1% and 99% tail by year, and cluster standard errors by firm. *, **, and *** represent significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively.

crisis period, which indicates that stronger accounting enforcement is associated with more conservative earnings and higher loan loss reserves.

Our results are timely given the increased emphasis on limiting opportunistic earnings management as well as on bank loan loss provisioning practices that can help bank stability through recognition of higher loss reserves. Our findings are also relevant given the increasing importance of the banking sector in market stability. Indeed, banking is a unique industry where bank regulators and accounting standard setters may not always have similar objectives. While regulators may prefer conservative accounting practices,

Table 7
Regression results for the loss avoidance test.

	All	Year < 2008	Year > 2010
	LOSS_AV	LOSS_AV	LOSS_AV
Constant	−12.7137***	−7.6964	−4.8588
	(−4.88)	(−1.38)	(−1.43)
AE	**−0.1836*** **	**−0.2326*** **	**−0.1883*** **
	(−7.69)	**(−5.04)**	**(−5.05)**
BR	−0.1650***	−0.3061***	−0.2211***
	(−4.16)	(−3.76)	(−3.52)
AE × BR	**−0.0246*** **	**−0.0531*** **	**−0.0222*** **
	(−7.08)	**(−4.42)**	**(−4.05)**
IFRS	−0.7996***	−1.3807***	−0.8176*
	(−3.95)	(−3.61)	(−1.78)
GROWTH	1.5305***	2.2741**	2.7108***
	(2.68)	(2.45)	(2.59)
LOSS	0.4209***	1.0069***	0.8657***
	(3.21)	(3.21)	(3.84)
LOANS	−2.1030	−1.8713	−7.9474**
	(−1.28)	(−0.76)	(−2.45)
CHCASHFLOW	−20.0335***	−85.4302***	−35.0402***
	(−4.87)	(−7.73)	(−3.40)
DEPOSIT	−0.5529	−1.8512**	−0.6227
	(−1.06)	(−2.24)	(−0.67)
LEV	−12.1807***	−11.0340***	−12.8440***
	(−5.18)	(−2.70)	(−3.73)
ALLOWANCE	3.1852	12.1298	−16.4401*
	(0.56)	(1.29)	(−1.84)
SIZE	−0.0608	−0.1379**	−0.1635***
	(−1.63)	(−2.04)	(−2.58)
REG_CAP	0.0322*	−0.0537	0.0402
	(1.84)	(−1.60)	(1.49)
GDP	1.2459***	0.8173	0.7350*
	(3.99)	(1.39)	(1.95)
DISC	−0.0164	−0.0140	−0.0272
	(−0.96)	(−0.42)	(−1.05)
CR	0.4375***	0.0293	0.9455***
	(3.60)	(0.13)	(4.40)
LEGAL	0.1778**	0.5010***	0.3362**
	(1.96)	(2.91)	(2.16)
MARKET_GDP	0.0039	0.0100**	0.0115**
	(1.33)	(2.47)	(2.05)
SH_RIGHTS	0.0122	−0.2167	0.1141
	(0.13)	(−1.13)	(0.70)
ANTISELF_INDEX	−2.8372***	0.1155	−6.6640***
	(−3.74)	(0.09)	(−4.48)
CONC	−0.0177**	−0.0059	−0.0417***
	(−2.51)	(−0.53)	(−3.22)
FIRMS	−1.3538***	−4.0340***	−0.2322
	(−3.26)	(−3.49)	(−0.37)
Loan Categories	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Specialization Fixed Effects	Yes	Yes	Yes
Observations	11,844	5,679	3,572
Pseudo R2	0.233	0.219	0.303
Marginal effect (*dy/dx*):			
AE	−1.46%***	−1.06%***	−1.82%***
BR	−1.32%***	−1.39%***	−2.14%***
AE x BR	−0.20%***	−0.24%***	−0.21%***

This table shows estimation results of Eq. (3).

$$LOSS\_AV = \beta_0 + \beta_1 AE + \beta_2 BR + \beta_3 AExBR + \beta_4 IFRS + \beta_5 GROWTH + \beta_6 LOSS + \beta_7 LOANS + \beta_8 CHCASHFLOW + \beta_9 DEPOSIT + \beta_{10} LEV .$$
$$+ \beta_{11} ALLOWANCE + \beta_{12} SIZE + \beta_{13} REG\_CAP + \beta_{14} GDP + \beta_{15} DISC + \beta_{16} CR + \beta_{17} LEGAL + \beta_{18} MARKET\_GDP$$
$$+ \beta_{19} SH\_RIGHTS + \beta_{20} ANTISELF\_INDEX + \beta_{21} CONC + \beta_{22} FIRMS + LOAN\_CATEGORIES$$
$$+ Year\ and\ Specialization\ Fixed\ Effects + \varepsilon_t$$

Variable definitions are in Appendices A and B. We control for the influence of potential outliers by estimating the model after weighting observations with the weights extracted from the robust regression estimates of Eq. (1). We mean-center the continuous variables in the interaction terms to reduce problems with multicollinearity (Neter et al., 1989; Aiken and West, 1991; Iacobucci et al., 2017), winsorize continuous variables at 1% and 99% tail by year, and cluster standard errors by firm. *, **, and *** represent significance at the 0.10, 0.05, and 0.01 levels (two-tailed), respectively.

which may lead bank managers to overprovision allowances for bad loans in good times in order to create a cushion in bad times, accounting standard setters may be more concerned with transparent financial reporting that reflects true economic performance. In this context our study integrates prior literature on the positive influence of stricter accounting enforcement and its interaction with bank regulation on earnings quality by focusing on the banking industry and documenting the interplay between these two types of regulation.

Our empirical findings have several important implications for bank regulators, policy-makers, and investors. First, they suggest that policymakers can be confident that the enforcement of accounting standards increases the quality of bank earnings. Policy-makers therefore can rely on accounting enforcement to reduce opportunistic discretionary accounting practices of bank managers. In addition, our results provide bank regulators and policy-makers with deeper insight into the relationship between accounting enforcement and bank regulation by documenting a complementary effect between these two policy tools. In fact, our findings suggest that despite having different objectives and using different approaches, these two types of regulation are able to influence each other and, more importantly, reinforce each other's objectives. Therefore, the results of our study are of interest to both investors and policy-makers. The former can make more informed decisions regarding which countries offer better and safer investment opportunities based on the reliability of the banking system. The latter can increase bank stability and reduce opportunistic earnings management practices by using stricter bank regulation or stricter enforcement of accounting standards or both.

We acknowledge the following limitations of our study. First, while accounting enforcement and bank regulation are determined at the country level, the other variables in the study (i.e., earnings quality measures) are calculated at the individual bank level. Second, the survey-based measures used in the study for accounting enforcement and bank regulation are somewhat noisy and further research is needed to refine these measures as well as to understand how they operate (i.e., the underlying mechanisms) to affect the earnings quality of banks. Third, although we document a consistent negative relationship between AE and bank earnings quality in the pre-crisis period, the relationship is one of association and does not imply causation.

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Appendix A. Country level variables

Variables	Description	Source
Accounting Enforcement (AE)	AE is the median value of the Enforcement Index over the three years provided by Brown et al. (2014)	Brown et al. (2014)
Bank Regulation (BR)	BR is the median value, from the 1st through the 3rd Survey, of the following variables: (1) Official Supervisory Power: whether the supervisory authorities have the authority to take specific actions to prevent and correct problems; (2) Activity restriction: the sum of Securities Activities + Insurance Activities + Real Estate Activities; (3) Private Monitoring Index: measures whether there are incentives/ability for the private monitoring of firms	Barth et al. (2013)
GDP	Natural Log of GDP (PPP) per capita (2006)	World Bank
Disclosure index (DISC)	Actual disclosure practices of commercial banks around the world, in relation to their assets, liabilities, funding, incomes, and risk profiles. DISC is a composite disclosure index that aggregates information from the following six sub-indices: Loans, Other Earning Assets, Deposits, Other Funding, Memo, Incomes. It is measured using information on 20,000 banks distributed worldwide	Huang (2006)
Creditor Rights (CR)	Index, ranging from 0 to 4, that aggregates the following creditor rights: absence of automatic stay in reorganization, requirement for creditors' consent or minimum dividend for a debtor to file for reorganization, secured creditors are ranked first in reorganization, and removal of incumbent management upon filing for reorganization	Djankov et al. (2007)[a]
Legal Enforcement (LEGAL)	Law enforcement index that ranges from 0 to 10, with higher values indicating greater law enforcement	Economic Freedom of the World: 2010 Annual Report[a]
Anti-self-dealing index (ANTISELF_INDEX)	Anti-self-dealing index as measured by Djankov et al. (2008)	La Porta et al. (2008)

Shareholders rights (SH_RIGHTS)	Shareholders' rights are sufficiently implemented (2006)	IMD World Competitiveness
Stock Market Capitalization (MARKET_GDP)	Value of listed shares to GDP (2006)	Čihák et al. (2012)
Number of Listed companies (FIRMS)	Number of publicly listed companies per capita (2006)	Čihák et al. (2012)
Bank concentration (CONC)	Assets of three largest banks as a share of assets of all commercial banks (2006)	Čihák et al. (2012)

[a] As in Kanagaretnam et al. (2014a).

Appendix B. Accounting variables for the ALLP and loss avoidance test

Variables	Code Bankscope	Description
IFRS	Accstand	1 if the bank adopts IFRS, IAS; 0 otherwise
LLP	Data2095	Loan Loss Provision$_t$/Total Assets$_{t-1}$
|ALLP|	–	Abs. value of the residual errors from model (1)
BEGLLA	Data2070	Loan Loss Reserve$_{t-1}$/Total Assets$_{t-1}$
LCO	Data2150	Net Charge Offs$_t$/Total Assets$_{t-1}$
LOSS	Data2115	1 if the bank reports a Net Income $_{t-1}$ negative; 0 otherwise
ΔLOANS	Data2001	(Loans$_t$ - Loans$_{t-1}$)/Total Assets$_{t-1}$
ΔNPL	Data2170	(Impaired Loans$_t$ - Impaired Loans$_{t-1}$)/Total Assets$_{t-1}$
LOANS	Data2001	Loans$_t$/Total Assets$_{t-1}$
NPL	Data2170	Impaired Loans$_t$/Total Assets$_{t-1}$
SIZE	Data2025	Ln (Total Assets$_{t-1}$in millions of US$)
GROWTH	–	(Total Assets$_t$ - Total Assets$_{t-1}$)/Total Assets$_{t-1}$
PASTLLP	Data2095	Loan Loss Provision$_{t-1}$/Total Assets$_{t-1}$
PLLP	Data2105, Data2095	Profit before Tax $_t$ + Loan Loss Provision$_t$
EBTLLP	–	PLLP$_t$/Total Assets$_{t-1}$
CHCASHFLOW	–	(PLLP$_t$ - PLLP$_{t-1}$)/Total Assets$_{t-1}$
DEPOSIT	Data2030	Total Deposits$_t$/Total Assets$_{t-1}$
ROA	Data2105	Profit before Tax$_t$/Total Asset$_t$
LOSS_AV	–	1 if the ROA$_t$ is between (0, 0.005]; 0 otherwise
LEV	Data2055	Total Equity$_t$/Total Assets$_{t-1}$
ALLOWANCE	Data2070	Loan Loss Reserve$_t$/Total Assets$_{t-1}$
REG_CAP	Data18155	Total Regulatory Capital Ratio$_t$
RESIDENTIAL	Data11040	Residential Mortgage Loans$_t$/Total Assets$_{t-1}$
OTHER MORTGAGE	Data11045	Other Mortgage Loans$_t$/Total Assets$_{t-1}$
OTHER CONSUMER	Data11050	Other Consumer Loans$_t$/Total Assets$_{t-1}$
CORPORATE	Data11060	Corporate and Commercial Loans$_t$/Total Assets$_{t-1}$
OTHER LOANS	Data11070	Other Loans$_t$/Total Assets$_{t-1}$

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