



Is accounting enforcement related to risk-taking in the banking industry?



Lorenzo Dal Maso^a, Kiridaran Kanagaretnam^b, Gerald J. Lobo^{c,*}, Francesco Mazzi^d

^a ESSEC Business School, 3 Avenue Bernard Hirsch, 95021, Cergy-Pontoise, France

^b Schulich School of Business, York University, 4700 Keele St, Toronto, ON M3J 1P3, Canada

^c University of Houston – Bauer College of Business, 4750 Calhoun Rd Room 305, Houston, TX 77204, USA

^d University of Florence, Department of Economics and Management, Via delle Pandette 9, Building D6, 50137, Florence, Italy

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ABSTRACT

Using a sample of banks from 36 countries, we document that accounting enforcement is negatively related to bank risk-taking. We also provide evidence that accounting enforcement enhances bank stability during the crisis. In addition, we show that banks assume less risk through more conservative lending decisions and a reduction in complexity in jurisdictions with higher accounting enforcement. Our results show that formal institutions such as accounting enforcement are associated with bank financial decisions and risk-taking behavior.

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1. Introduction

The global financial crisis of 2007–2009 is partly blamed on banks assuming excessive risks that caused large losses (Shehzad and De Haan, 2015). Several studies note that risk-taking was not mitigated despite banks being subject to considerable regulation by the financial system, accounting rules, and related supervisory mechanisms (e.g., Bushman and Williams, 2012). Investigating the extent to which these external country-level control mechanisms discipline bank risk-taking is critical not only for the banking community, but also for the wider business environment. Prior literature primarily focuses on the association between bank regulation and supervision and bank risk-taking (Klomp and de Haan, 2012), while neglecting examination of accounting enforcement as a potential factor that, jointly with accounting standards, contributes to bank transparency, which is essential for disciplining bank risk-taking (Bushman and Williams, 2012; Jin et al., 2018). We

join this debate by examining the relation between country-level accounting enforcement and bank risk-taking.

Accounting enforcement operates in tandem with other country-level control mechanisms for risk-taking and, in particular, with bank regulation and supervision. However, accounting enforcement, which is carried out by accounting or securities regulators, and bank regulation and supervision could have different objectives. Bank regulation and supervision are specifically designed to monitor banking activities, thus not only overseeing real actions related to bank risk-taking but also preferring conservative accounting practices that build adequate reserves, which act as a cushion against loan write-offs in bad times (Jin et al., 2018). By contrast, accounting standards and related enforcement actions are more concerned with financial reporting representing a true and fair view of the underlying economic performance of the firm.

On the other hand, accounting enforcement could aid bank regulation and supervision by imposing market discipline on risk-taking. Prior literature documents that accounting standards affect bank risk-taking (Bushman and Williams, 2012). However, the benefits of accounting standards depend on the strength of enforcement of the standards (Barth and Israeli, 2013). Therefore, accounting enforcement assumes a fundamental role in the production of accounting information, an important element of bank

* Corresponding author.

E-mail addresses: dalmaso@essec.edu (L. Dal Maso),

KKanagaretnam@schulich.yorku.ca (K. Kanagaretnam), gjlobo@uh.edu (G.J. Lobo), francesco.mazzi@unifi.it (F. Mazzi).

transparency, which is one of the main tools of market discipline over risk-taking (Bushman, 2014).

Prior literature defines bank transparency “as the availability to outside stakeholders of relevant, reliable information about the periodic performance, financial position, business model, governance, value, and risks of banks” (Bushman, 2014, p. 386). The level of bank transparency is influenced by various factors, including, for example, accounting information, mandatory and voluntary disclosures, and information intermediated by financial analysts, the media, credit rating agencies, and auditors. Primary among these factors is financial reporting, which aims to provide financial information that is useful to investors, lenders, and other users interested in providing resources to the reporting entity (FASB, 2010).

Although the quality of financial reporting is important for all industries, it is especially critical in the banking sector because banks assume risks that are difficult to verify (Beatty and Liao, 2014). Prior literature suggests that the availability of timely, consistent, and reliable information on banks’ financial performance and risks imposes market discipline that ultimately reduces excessive risk-taking (Stephanou, 2010). Adopting this framework, Bushman and Williams (2012) show the consequences of changing accounting standards for loan loss provisions. Using a sample of banks from 27 countries, they document that income-smoothing associated with loan loss provisioning increases risk-taking, consistent with reduced bank transparency inhibiting the ability of external monitors. Conversely, loan loss provisioning associated with timely recognition of expected future loan losses induces stronger discipline over risk-taking.

The quality of financial reporting is a function not only of accounting standards but also of the other institutional infrastructure (Ball, 2006; Leuz, 2010). Prior studies highlight that public enforcement (e.g., enforcement through security market regulators) is a fundamental institutional characteristic to consider when evaluating the compliance, application, and introduction of accounting standards. For example, Ernstberger et al. (2012) document higher accounting quality for German firms after the introduction of a new enforcement regime in 2005. In a similar context, Hitz et al. (2012) show that firms receiving sanctions from accounting enforcement bodies suffer negative market reactions. Christensen et al. (2013) report that many of the benefits highlighted in the prior literature are significant only when mandatory International Financial Reporting Standards (IFRS) adoption is contemporaneous with enforcement changes at the country level. Although these studies point to the critical nature of accounting enforcement for the quality of financial reporting, there is limited prior literature examining this institutional characteristic in the banking industry. We attempt to fill this gap by examining the relation between accounting enforcement and bank risk-taking.

Arguments related to bank transparency suggest a negative association between accounting enforcement and bank risk-taking. Although they permit some judgement, most of the accounting rules governing the banking sector are aimed at curtailing opportunistic use of managerial discretion in financial reporting (Kanagaretnam et al., 2010). For example, the incurred loss model for loan loss provisioning presumes that loans will be repaid until a triggering event provides evidence to the contrary (i.e., a reduction in future cash flows). In this setting, a high level of enforcement forces managers to comply with an accounting policy that limits their discretion and thus reduces their ability to smooth earnings (Ryan, 2012). Bank managers have incentives to smooth earnings to avoid attracting the attention of regulators, who may express concerns from the banking system perspective, and investors, who may perceive more risk and demand higher returns. However, higher accounting enforcement reduces the ability of bank managers to manage and/or smooth earnings. As a consequence, in countries

with a high level of accounting enforcement, bank managers are likely to assume less risk to reduce earnings volatility, since both accounting rules and enforcement mechanisms are designed to dampen reporting discretion.

We examine the relation between accounting enforcement and bank risk-taking for an international sample of 899 listed bank observations from 36 countries over the 2002–2006 period. Following Houston et al. (2010); Kanagaretnam et al. (2014a), and Laeven and Levine (2009), we use the volatility of net interest margin, the volatility of earnings, and Z-score to proxy for bank risk-taking. We measure accounting enforcement using the Brown, Preiato and Tarca (2014) index because it is developed to specifically proxy for country-level differences in enforcement of accounting standards. Whereas most studies use the legal setting as a proxy for enforcement, the Brown et al. (2014) index specifically focuses on the activities of market regulators and other bodies related to monitoring and reviewing annual reports and sanctioning companies for non-compliance with accounting standards. The Brown et al. (2014) accounting enforcement index incorporates both actual enforcement actions of accounting standards and characteristics of the enforcement body. Data are collected from various sources, including, for example, the International Federation of Accountants data, World Bank reports, and the reports of the body representing securities market regulators. Because it specifically focuses on country-level differences in enforcement of accounting standards, the Brown et al. (2014) index is widely used in recent literature (e.g., Choi et al., 2018; Dal Maso et al., 2018; Gao and Sidhu, 2018; Huffman, 2018).¹

We find that accounting enforcement is associated with a reduction in risk-taking. This result holds after controlling for several country-level factors that prior research has identified are related to bank risk-taking such as interest rate spread, culture, legal enforcement, and bank regulation. Our results are also robust to alternative measures of risk-taking such as aggressive risk-taking, alternative sample selection criteria that reduce potential concerns related to sample heterogeneity, and inclusion of additional country-level controls.

We conduct two types of additional analyses. First, we examine the effect of accounting enforcement on bank stability. Following Kanagaretnam et al. (2014a), we use financially troubled banks as a proxy for bank stability. We classify a bank as financially troubled based on accounting indicators related to profitability, capital adequacy, and asset quality. Consistent with our main analysis showing that accounting enforcement is negatively associated with bank risk-taking in the pre-crisis period, we find a negative relation between accounting enforcement and bank financial trouble during the crisis period.

Next, we investigate the channels through which managers operating in countries with higher accounting enforcement assume lower risk in their operations. We conjecture that managers may reduce risk via more conservative lending decisions, through a reduction in bank complexity, or both. Our results show that accounting enforcement is negatively related to growth in loans and to net loan charge-offs, consistent with managers making better lending decisions. Specifically, managers operating in countries with high levels of accounting enforcement reduce the quantity and increase the quality of loans to manage and reduce risk. Additionally, we document that accounting enforcement is negatively related to non-interest revenues and other deposits, suggesting that managers choose less complex operations to manage risk.

Our study makes two main contributions to the literature. First, we extend prior research examining the consequences of the struc-

¹ We provide further information on the Brown et al. (2014) accounting enforcement index in Section 3.

ture of the financial system for the banking industry. Accounting standard-setters, accounting enforcement bodies, and bank regulators impose regulations and policies that may have different objectives (Beatty and Liao, 2014; Bushman, 2014). Prior literature focuses primarily on the causes and consequences of the discretion inherent in the accounting standards (e.g., Bushman and Williams, 2012; Kanagaretnam et al., 2011, 2014b; Marton and Runesson, 2017) and the consequences of bank regulation and supervision (e.g., Barth et al., 2004, 2008; Beck et al., 2006; Shehzad and De Haan, 2015). Despite recognition that accounting rules and their enforcement influence the banking industry (Financial Stability Forum, 2009; US Treasury, 2009), academic research on this topic is scant. An exception is Dal Maso et al. (2018), who demonstrate that accounting enforcement is positively associated with bank earnings quality and that bank regulation complements the effect of accounting enforcement. Unlike Dal Maso et al. (2018) who focus on the relation between accounting enforcement and bank earnings quality, which is influenced by accounting choices, our study examines the relation between accounting enforcement and bank risk-taking, which is influenced by operating and investing decisions. We contribute to this line of research by showing that accounting enforcement is negatively related to bank risk-taking.

Second, we complement prior literature examining the influence of country characteristics on bank risk-taking. Several informal country-level factors influence risk-taking, including culture (Kanagaretnam et al., 2014a), religiosity (Kanagaretnam et al., 2015), social capital (Jin et al., 2017), and trust (Kanagaretnam et al., 2019). The recent financial crisis called for a reflection on the potential constraints that institutional factors impose on risk-taking (Bushman, 2014). While research on the relationship between bank regulation and risk-taking is abundant (see Klomp and de Haan (2012) for an extensive discussion of this literature), to our knowledge no prior study has examined the relation between accounting enforcement and bank risk-taking. We explore this relationship and show that accounting enforcement is negatively associated with bank risk-taking and examine several channels through which bank managers assume less risk.

The rest of this paper is organized as follows. We discuss related literature and develop our hypotheses on the relation between accounting enforcement and risk-taking in Section 2. We present the research design and sample selection in Section 3, report the results in Section 4, and discuss several additional tests in Section 5. We conclude the study in Section 6.

2. Research background and hypothesis

2.1. Bank transparency, financial reporting discretion, and market discipline over risk-taking

Bank managers assume risks that are complex and opaque (i.e., difficult to verify and monitor) because their lending decisions are often based on private information that is not available to outsiders. For this reason, prior literature argues that banks are innately less transparent than non-financial firms (Flannery et al., 2004; Morgan, 2002). The lower transparency results in information asymmetry, which weakens regulators' monitoring of risk-taking by individual banks and their contribution to systemic risk (Financial Stability Forum, 2009; Hanson et al., 2011).

Bank transparency mitigates asymmetric information and, more importantly for this study, imposes market discipline on risk-taking decisions (Stephanou, 2010). The prior literature identifies direct and indirect channels through which market discipline operates. The former refers to the direct monitoring by market participants of bank risk-taking. For example, bank transparency may ex-ante discipline excessive risk-taking by allowing informed investors to

detect such behaviors and demand higher returns (Bushman and Williams, 2012; Bushman, 2014). The latter denotes a regulatory intervention that forces managers to reduce risk-taking (Flannery and Thakor, 2006; Hovakimian and Kane, 2000).

Prior empirical evidence generally supports the role of bank transparency in disciplining risk-taking and enhancing bank stability.² For example, Demircuc-Kunt et al. (2008) show that the Basel requirements to regularly report financial data are positively associated with Moody's financial ratings. Similarly, Barth et al. (2004) document that private monitoring of banks and accurate disclosure enhance bank stability. Tadesse (2006) finds that increased disclosure and transparency at the country level reduces banking crises. Nier and Baumann (2006) demonstrate that higher transparency motivates bank managers to hold larger capital buffers, and thereby limit default risk.

Bank transparency is the result of various components that contribute to produce, monitor, verify, and disseminate information to outsiders (Bushman, 2014). Among these components, financial reporting plays a fundamental role in reducing asymmetric information and imposing discipline on risk-taking (Beatty and Liao, 2014). In fact, financial reporting conveys information that is useful to a wide variety of users, including investors and lenders (FASB, 2010). However, accounting standards can only provide a representation of the consequences of an entity's underlying operations, without fully capturing the true economic outcomes. In fact, accounting policies sometimes require managers to exercise discretion in producing accounting numbers. The extent to which bank financial statements map into underlying economic reality depends on the degree of discretion available to and exercised by preparers.

The links between accounting discretion and bank transparency, and between transparency and bank stability are still under-researched areas (Bushman, 2014, 2016). On the one hand, reporting discretion exposes bank transparency to managers' opportunistic reporting behaviors. In this case, discretion dampens market discipline over risk-taking as investors are unable to correctly evaluate banks' fundamentals. On the other hand, reporting discretion allows managers to convey private information through accounting numbers.

Reporting discretion depends on both the extent of judgement permitted by accounting rules and the enforcement of those rules (Ball, 2006; Leuz, 2010). Prior literature examines the implications of discretion in accounting standards for risk-taking (e.g., Bushman and Williams, 2012) without considering the effect of accounting enforcement. We join this debate and examine the extent to which accounting enforcement relates to managerial risk-taking in the banking industry.

2.2. Accounting enforcement and bank risk-taking

The relation between accounting enforcement and bank risk-taking critically depends on the underlying accounting standards being enforced. The recent financial crisis forced the wider banking community to a deep reflection on accounting rules governing the banking sector. This discussion generated proposals to introduce more reporting discretion in fair-value accounting, hedge accounting, and accounting for loan losses (Financial Stability Forum, 2009; U.S. Department of the Treasury, 2009). Subsequently, in 2014 the IASB issued IFRS 9, Financial Instruments, which replaced the incurred loss model with the expected loan loss provisioning model. IFRS 9 also contains new accounting rules for classification and measurement of financial instruments and hedge accounting. Similarly, in 2016 the FASB issued a standard that is also based on

² For a detailed review of the literature see for example Beatty and Liao (2014); Bushman and Williams (2012), and Bushman (2014).

current expected credit losses. These standards allow bank managers higher reporting discretion. The former standard became effective in 2018, and then later just came into effect in 2020.

Before the new set of standards becoming fully effective, accounting standards were designed to reduce managers' reporting discretion and thus to limit their ability to opportunistically manage and/or smooth earnings (Beatty and Liao, 2014; Ryan, 2012). A clear example of this reduced reporting discretion is the incurred loss model for loan loss provisioning, which assumes that bank loans will be repaid unless a triggering event provides evidence of a decline in future cash flows. If such an event occurs, managers have to book a provision for future loan losses, which would restrict their ability to incorporate their expectations into accounting numbers. Otherwise, managers do not have to book a loan loss provision.

Prior literature suggests that bank managers have incentives to smooth earnings (e.g., Bushman, 2014; Kanagaretnam et al., 2004). Bank managers generally avoid reporting volatile earnings because they may attract the attention of regulators, who are concerned about bank stability, and investors, who may demand higher returns. High levels of accounting enforcement force banks to strictly follow accounting rules designed to limit reporting discretion, thus reducing their ability to opportunistically manage and/or smooth earnings. From a regulatory perspective, reducing opportunistic reporting discretion through higher accounting enforcement can improve financial stability because bank supervisors use reported performance and loan/asset quality to identify troubled banks. For example, the CAMELS rating system used by regulators in the U.S. to assess the health of individual banks and identify troubled banks is primarily based on accounting numbers from regulatory filings. As a consequence, in countries with a high level of accounting enforcement, bank managers are likely to assume less risk to reduce earnings volatility, since both accounting rules and enforcement mechanisms are designed to dampen opportunistic reporting discretion. Given these arguments, we state the following hypothesis:

Hypothesis 1. Accounting enforcement is negatively related to bank risk-taking

However, because accounting enforcement operates in tandem with other country-level factors, including bank regulation and supervision (e.g., Dal Maso et al., 2018), the relationship between accounting enforcement and risk-taking could be less pronounced in the banking industry. Additionally, prior literature documents that other bank-specific factors such as deposit insurance (Bushman, 2014) and creditor rights (Houston et al., 2010) relate to bank risk-taking. Consequently, the level of accounting enforcement may not be an important factor in influencing bank risk-taking as it is for industrial firms. The above reasoning provides some tension to our main hypothesis and provides justification for the empirical analysis.

3. Research design and data

3.1. Measure of accounting enforcement

We examine the relationship between accounting enforcement and bank risk-taking using an international dataset. Consistent with prior literature (e.g., Choi et al., 2018; Dal Maso et al., 2018; Gao and Sidhu, 2018; Huffman, 2018), we use the Brown et al. (2014) index as the main proxy for accounting enforcement because it is developed to specifically proxy for country differences in enforcement of accounting standards for listed firms. Alternative measures are less accurate as they broadly capture the strength of market regulations, shareholder rights, and law enforcement (e.g., Djankov et al., 2007; La Porta et al., 1998) or dichotomously proxy for changes in the activity of independent enforcement bodies (e.g., Christensen

et al., 2013; Hitz et al., 2012). Additionally, the Brown et al. (2014) index is more suitable for our research context than general legal system proxies (Gao and Sidhu, 2018).

In particular, the Brown et al. (2014) index is more comprehensive, because it is based on the weighted average of six different items. Data are collected from various sources, including, for example, International Federation of Accountants data, World Bank reports, and reports of the body representing securities market regulators. Items 1 and 2 refer to the characteristics of the enforcement body in each country. More specifically, item 1 identifies whether the country has a body responsible for monitoring compliance with accounting standards. Item 2 reports whether that body can set accounting and auditing standards. An enforcement body that has the power to set standards is likely to be associated with higher standard-setting outcomes and, in turn, higher financial reporting quality. Items 3–5 focus on output measures for the accounting enforcement body, measuring the level of activity of the body, not just whether it has the statutory power to act. In particular, item 3 measures whether the body undertakes reviews of financial statements. Item 4 proxies for the legitimacy of the body by capturing whether it issues public reports, and item 5 captures the enforcement actions through the number of firms required to revise and reissue financial statements. Finally, item 6 measures the level of resourcing for each enforcement body. As a result, the Brown et al. (2014) index captures both the power of authorized or appointed bodies in supervising and enforcing compliance with mandatory accounting standards and the real enforcement actions undertaken by those bodies.

The index is computed for 51 countries at three different points in time (i.e., 2002, 2005, and 2008) and ranges from 2 to 24, thus allowing for considerable variation across countries. In our tests, we use the median score of the accounting enforcement index computed for the years 2002 and 2005.

3.2. Measures of bank risk-taking

We use two accounting-based measures of bank risk-taking: standard deviation of net interest margin (SD_NIM) and standard deviation of return on assets (SD_ROA). Higher risk-taking is generally associated with higher volatility in a bank's operations (e.g., Houston et al., 2010; Kanagaretnam et al., 2014a; Laeven and Levine, 2009). SD_NIM and SD_ROA reflect the volatility of net interest margin (NIM) and return on assets (ROA). ROA is computed as profit before tax and loan loss provisions divided by total assets. Both variables are calculated as the standard deviation of the corresponding measure over the period 2002–2006. Higher values of SD_NIM and SD_ROA indicate a riskier and less stable bank.

We also employ Z-score to measure how far a bank is from insolvency. The variable Z_SCORE indicates the number of standard deviations that return on assets has to drop below its expected value before the bank is insolvent (Houston et al., 2010; Laeven and Levine, 2009). We calculate Z_SCORE for each bank-year observation as the sum of the return on assets and regulatory capital ratio, divided by the standard deviation of the return on assets measured over the rolling window $[t; t-4]$ ³. We then use the logarithmic transformation to correct for skewness (Kanagaretnam et al., 2014a). For consistency of interpretation with the other two risk measures, we multiply Z-score by -1, so that higher values

³ To preserve the number of sample observations, we require a minimum of 3 observations to measure the rolling standard deviation. Untabulated results show that our main results are consistent even if we require all five observations.

represent higher risk-taking. Finally, we compute *Z_SCORE* for each bank using the mean over the sample period.⁴

3.3. Empirical model

We employ the following model, commonly used in the banking literature (e.g., Houston et al., 2010; Jin et al., 2017; Kanagaretnam et al., 2014a), to test the association between accounting enforcement and bank risk-taking:

$$\begin{aligned} RISK = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP \\ & + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI + \\ & \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} MEAN_SIZE + \beta_{14} \\ & MEAN_NPL + \beta_{15} MEAN_REVG + \beta_{16} MEAN_LLP + \beta_{17} \\ & MEAN_EQUITY + \beta_{18} MEAN_DEPOSITS + \beta_{19} \\ & MEAN_NOINT_REV + \beta_{20} BIG + \varepsilon_t \end{aligned} \quad (1)$$

where:

RISK = *SD_NIM*, *SD_ROA*, or *Z_SCORE*;

AE = accounting enforcement (Brown et al., 2014);

ΔGDP = annual GDP growth (World Bank);

SPREAD = lending rate minus deposit rate (IMD World Competitiveness Yearbook 2016);

STMKGDP = value of listed shares to GDP (Čihák et al., 2012);

BR = banking regulation calculated as the sum of official supervisory power, activity restriction, and private monitoring (Barth, Caprio Jr. and Levine, 2013);

DISC = commercial banks' disclosure practices regarding assets, liabilities, funding, incomes, and risk profiles (Huang, 2006);

LENF = law enforcement index, calculated by the Fraser Institute (2010);

CR = creditor rights (Djankov et al., 2007);

IND = individualism in the country (Hofstede, 2001);

DI = an indicator variable that equals 1 if the country has deposit insurance, 0 otherwise (Demirguc-Kunt et al., 2008);

COMMON = an indicator variable that equals 1 if the country has a common law legal system, 0 otherwise (La Porta et al., 1998);

COMP = industry competition, measured as the sum of squares of the market shares (deposits) of each bank in each country (Kanagaretnam et al., 2014a);

MEAN_SIZE = natural logarithm of total assets (expressed in mln \$);

MEAN_NPL = non-performing loans divided by total loans;

MEAN_REVG = growth in interest revenue;

MEAN_LLPL = loan loss provisions divided by total loans;

MEAN_EQUITY = equity divided by total assets;

MEAN_DEPOSITS = deposits divided by total asset;

MEAN_NOINT_REV = non-interest income divided by operating income;

BIG = an indicator variable that equals 1 if the total deposits of a bank exceed 10 % of the total deposits of all banks in its country of domicile.

Prior banking literature suggests the inclusion of several country-level variables associated with bank risk-taking (e.g., Jin et al., 2017; Kanagaretnam et al., 2014a, 2015, 2019; Shehzad and De Haan, 2015). Specifically, we control for the overall legal environment by including creditor rights (*CR*), banking regulation (*BR*), the presence of deposit insurance (*DI*), legal enforcement (*LENF*), and the type of judicial system (i.e., common or code law, *COM-*

MON). Also, we control for the extent of disclosure in the banking industry (*DISC*), the economic well-being (ΔGDP), the interest rate environment (*SPREAD*), the level of industry competition (*COMP*), and the relative importance of the stock market in the country (*STMKGDP*). Lastly, we control for the cultural trait of individualism (*IND*), which has been shown to influence financial decisions, including bank risk-taking (Kanagaretnam et al., 2014a).⁵

We also control for the following bank-specific variables: natural logarithm of total assets (*SIZE*), ratio of non-performing loans to total loans (*NPL*), growth in interest revenue (*REVG*), ratio of loan loss provisions to total loans (*LLP*), ratio of equity to total assets (*EQUITY*), ratio of deposits to total assets (*DEPOSITS*), ratio of non-interest income to operating income (*NOINT_REV*), and whether the bank accounts for more than 10 percent of its country's deposits (*BIG*). We measure all these bank-level controls as the average over the sample period. To preserve sample size, we require a minimum of three bank-year observations to calculate the bank-level control variables.⁶

Our main variable of interest is the level of accounting enforcement in the country (*AE*). When the main variable of interest is a country-level factor, the prior literature suggests that clustering by country is preferable and provides more reliable inferences (Barth and Israeli, 2013; Christensen et al., 2013). Therefore, we estimate Model (1) with robust standard errors clustered by country to control for potential correlation among the residuals.

To assess the influence of accounting enforcement on bank risk-taking, we examine the sign of the coefficient β_1 in Model (1). If our conjecture is correct (i.e., accounting enforcement is negatively related to bank risk-taking), we expect a negative estimate for β_1 .

3.4. Sample

We obtain accounting data from the BankScope database and country-level variables from Barth et al. (2013); Kanagaretnam et al. (2014a); Brown et al. (2014); Čihák et al. (2012); Hofstede (2001); Demirguc-Kunt et al. (2008); Djankov et al. (2007); Huang (2006), IMD World Competitiveness Yearbook, and the World Bank Database (see Appendices A and B for details of the data sources and descriptions of the variables). We begin our sample selection procedure with all banks operating in the countries covered by the Brown et al. (2014) index. We focus on listed banks because our accounting enforcement measure is specifically tailored for listed firms. We thus have a maximum of 51 countries available for the analysis. We exclude observations with missing country-level data. Hong Kong, Israel and Ukraine have missing data on *BR*; Taiwan has missing data on ΔGDP and *STMKGDP*; Egypt, Morocco, Pakistan, Slovenia and Turkey have missing data on *SPREAD*; Egypt, Jordan and Ukraine have missing data on *IND*, *CR*, *DI*, *COMP*, *COMMON*, and *LENF*. Because of the minimum number of observations we require to measure the dependent variables, we drop Argentina, Czech Republic, Mexico, New Zealand and Romania for which we have less than three bank-year observations. As a result, our final sample includes listed banks from 36 countries.

We begin our sample selection from 2002 because of the availability of the Brown et al. (2014) accounting enforcement index and end it in 2006, the last year before the start of the financial crisis. We exclude the financial crisis period for the following reasons. First, all banking functions, including lending and other risk-taking activities were directly affected during the crisis. Therefore, it would be

⁵ As a sensitivity check, we augment Model (1) with additional country-level control variables and obtain consistent results.

⁶ We repeat the analysis on a sample that is restricted to have a minimum of five bank-year observations to calculate the bank level variables. Untabulated results show that our main results are consistent.

⁴ In Section 4, we corroborate our results using measures of aggressive bank risk-taking.

Table 1
Country-level characteristics.

COUNTRY	AE	ΔGDP	SPREAD	STMKGDP	BR	DISC	LENF	CR	IND	DI	COMMON	COMP	# OBS.
AUSTRALIA	22	0.03	5.17	117.08	30	73	6.23	3	90	0	1	0.08	9
AUSTRIA	6.5	0.02	0.84	34.57	23	78	6.7	3	55	1	0	0.06	4
BELGIUM	17	0.02	2.00	75.06	24	70	5.65	2	75	1	0	0.09	1
BRAZIL	5	0.03	37.75	49.52	30	74	4.82	1	38	1	0	0.07	22
CANADA	22	0.03	3.63	121.52	19	75	4.81	1	80	1	1	0.12	10
CHILE	5	0.06	2.75	109.59	28	62	5.11	2	23	1	0	0.04	4
CHINA	16	0.11	3.33	32.15	29	59	6.73	2	20	0	0	0.08	15
CROATIA	3.5	0.04	9.48	26.84	24.5	56	5.4	3	33	1	0	0.11	1
DENMARK	17	0.02	5.14	64.20	25	79	6.19	3	74	1	0	0.08	29
FINLAND	10	0.03	2.49	100.70	23	85	8.06	1	63	1	0	0.16	2
FRANCE	19	0.02	0.60	77.81	17.5	66	6.91	0	71	1	0	0.02	3
GERMANY	12	0.01	1.22	43.57	21	74	6.62	3	67	1	0	0.02	4
GREECE	7	0.01	1.53	56.25	25	67	4.13	1	35	1	0	0.09	1
HUNGARY	8	0.04	3.37	28.26	31	73	7.15	1	80	1	0	0.23	1
INDIA	6	0.08	6.60	56.58	26	74	2.59	2	48	1	1	0.07	34
INDONESIA	6	0.06	5.97	25.69	33.5	69	1.17	2	14	1	0	0.15	23
IRELAND	8	0.06	1.97	56.25	24	70	4.95	1	70	1	1	0.07	4
ITALY	19	0.01	4.42	44.57	23	89	3.18	2	76	1	0	0.03	29
JAPAN	6	0.02	1.41	90.98	31	81	6.37	2	46	1	1	0.02	100
MALAYSIA	8	0.05	2.95	134.95	32	72	4.27	3	26	1	1	0.04	9
NETHERLANDS	6.5	0.02	0.43	89.43	19	86	5.11	3	80	1	0	0.12	1
NORWAY	17	0.03	2.21	55.78	22.5	84	7.53	2	69	1	0	0.07	19
PERU	3.5	0.06	22.94	35.73	26	57	4.77	0	16	1	0	0.06	3
PHILIPPINES	9	0.05	4.63	33.69	25	71	3.42	1	32	1	1	0.23	10
POLAND	4	0.03	4.04	28.71	25.5	71	4.27	1	60	1	0	0.05	4
PORTUGAL	9	0.01	1.60	35.72	28.5	73	5.25	1	27	1	0	0.07	6
REP. OF KOREA	9	0.04	1.87	71.27	29	68	8.11	3	18	1	1	0.04	7
RUSSIAN FED.	6	0.06	6.69	53.97	20	62	7.53	2	39	1	0	0.24	16
SINGAPORE	10	0.07	4.86	243.20	29.5	71	8.48	3	20	0	1	0.26	3
SOUTH AFRICA	6	0.05	4.58	209.01	22	78	3.93	3	65	0	1	0.06	8
SPAIN	7	0.04	0.82	84.02	23	81	5.54	2	51	1	0	0.05	10
SWEDEN	5	0.03	2.53	104.41	19	90	4.73	1	71	1	0	0.08	4
SWITZERLAND	19	0.03	2.60	236.51	27	83	6.03	1	68	1	0	0.1	3
THAILAND	15	0.04	3.92	69.10	27	75	6.11	2	20	1	1	0.96	12
UK	18	0.03	1.65	128.24	25	71	6	4	89	1	1	0.03	6
USA	21	0.04	2.68	133.68	31	76	7.33	1	91	1	1	0.01	482

challenging to disentangle the effect of accounting enforcement from that of all other inherent factors during the crisis period. Second, during the crisis period, a large number of banks experienced accounting losses due to higher than normal loan loss provisions (to catch up for under-provisioning during the good years) and loan charge-offs (due to higher non-performing loans). Because our risk measures are primarily based on reported accounting numbers, they could also be distorted due to large loan loss provisions and loan charge-offs during the crisis period and not properly reflect the underlying risk-taking activities. As a result, our final sample covers only the 2002–2006 pre-crisis period.⁷

We focus on banks that specialize in lending activities to reduce sample heterogeneity. Therefore, our sample consists of bank holding companies, commercial banks, cooperative banks, and savings banks. To avoid double-counting, we retain observations only for consolidated entities when a bank reports both consolidated and unconsolidated financial statements (Duprey and Lé, 2016). We also exclude bank-year observations with missing data to estimate Model (1).

Our final sample is distributed as follows: bank holding companies 380, commercial banks 476, cooperative banks 10, and savings banks 33. Table 1 shows the sample distribution and presents the descriptive statistics for the country-level variables. The final sample consists of 899 bank observations and, consistent with previous studies (e.g., Kanagaretnam et al., 2014a), the U.S. has the largest number of observations, followed by Japan, India, Italy,

Denmark, Indonesia, and Brazil. As reported, Australia, Belgium, Canada, Denmark, Norway, and the U.K. have the highest levels of accounting enforcement.

4. Empirical results

4.1. Descriptive statistics

Table 2 reports descriptive statistics for the variables used in Model (1). The mean values of *SD_NIM*, *SD_ROA* and *Z_SCORE* are 0.0037, 0.0043, and -3.7626, respectively. The average bank in our sample has 2.71 % of loans that are non-performing loans (*MEAN_NPL*), books 0.56 % of loans as loan loss provisions (*MEAN_LL*P), and has roughly 26 % non-core activities (*MEAN_NOINT_REV*). We also note that 10 % of our sample firms can be considered big banks (i.e., deposits exceed 10 % of all the deposits in a given country).

Table 3 presents Pearson correlation coefficients between the dependent and the independent variables. We document a negative and significant correlation between *AE* and our measures of risk-taking (coefficients for *SD_NIM*, *SD_ROA*, and *Z_SCORE* are -0.242, -0.228, and -0.258, respectively; $p < 0.01$), indicating that the higher the level of accounting enforcement in the country the lower the bank risk-taking. Overall, we consider these univariate coefficients as preliminary evidence that accounting enforcement is negatively associated with bank risk-taking.

4.2. Accounting enforcement and bank risk-taking

Columns (1) to (3) of Table 4 report coefficient estimates for Model (1) for the full sample. We note that observations from the

⁷ We replicate our analysis over the period 2002–2009. In this case, the accounting enforcement index is the median score over 2002, 2005 and 2008. We find consistent results using this alternative sample period.

Table 2
Descriptive statistics.

Variable	Obs.	Mean	SD	25 Percentile	Median	75 Percentile
<i>SD_NIM</i> ^w	899	0.0037	0.0040	0.0015	0.0026	0.0043
<i>SD_ROA</i> ^w	899	0.0043	0.0046	0.0016	0.0028	0.0051
<i>Z_SCORE</i> ^L	899	-3.7626	0.8593	-4.3637	-3.9076	-3.2206
<i>MEAN_SIZE</i> ^L	899	8.1188	2.2521	6.4305	7.9347	9.6824
<i>MEAN_NPL</i> ^w	899	0.0271	0.0366	0.0038	0.0094	0.0378
<i>MEAN_REVG</i> ^w	899	0.1397	0.1877	0.0256	0.0852	0.1836
<i>MEAN_ILLP</i> ^w	899	0.0056	0.0064	0.0017	0.0039	0.0071
<i>MEAN_EQUITY</i> ^w	899	0.0878	0.0360	0.0634	0.0839	0.1051
<i>MEAN_DEPOSITS</i> ^w	899	0.8047	0.1049	0.7542	0.8275	0.8800
<i>MEAN_NOINT_REV</i> ^w	899	0.2586	0.1523	0.1485	0.2464	0.3407
<i>BIG</i>	899	0.1101	0.3132	0	0	0

See Appendix B for variable definitions. ^w winsorized at 1% and 99%, ^L expressed in natural logarithm.

U.S. represent more than 50 % of our sample. To ensure that our results are not overly influenced by the large number of observations from the U.S., columns (4) to (6) of Table 4 present the results of our main analysis after excluding U.S. banks.

The results in columns (1) to (3) indicate that the coefficient β_1 is significantly negative for all three measures of risk-taking, i.e., *SD_NIM*, *SD_ROA*, and *Z_SCORE* (coefficients are -0.0002 ($p < 0.01$), -0.0003 ($p < 0.01$), and -0.0310 ($p < 0.05$), respectively). Similarly, columns (4) to (6) of Table 4 shows that our results are generally consistent when we exclude observations from the U.S. In fact, we document a negative association between *AE* and our three measures of bank risk-taking (the coefficients are -0.0003 ($p < 0.01$), -0.0003 ($p < 0.01$), and -0.0312 ($p < 0.05$), respectively). These results are also economically significant. A one unit change in *AE* implies a reduction of roughly 5.5 % in *SD_NIM* ($= 0.0002/0.0037$, coefficient in column (1)) and roughly 6.9 % in *SD_ROA* ($= 0.0003/0.0043$, coefficient in column (2)). These results show that accounting enforcement is negatively associated with risk-taking, consistent with H1.

The results in Table 4 also show that the bank-level control variables *REVG* and *EQUITY* (*NPL*) are positively (negatively) associated with the measures of risk-taking, meaning that banks with higher revenue growth and equity capital (non-performing loans) are associated with higher (lower) risk-taking. These results are largely consistent with the evidence reported in earlier studies (Jin et al., 2017; Kanagaretnam et al., 2014a, 2015). Lastly, the signs of the coefficients of most of the country-level control variables are consistent with those reported in the prior literature (e.g., Kanagaretnam et al., 2014a, 2019).⁸

4.3. Accounting enforcement and aggressive risk-taking

Accounting enforcement can influence not only the level of bank risk-taking but also the probability of a bank being classified as an aggressive risk-taker. To assess the robustness of our main findings, we estimate Model (1) after replacing our measures of risk-taking with proxies for aggressive risk-taking (*AGG_RISK*) (e.g., Kanagaretnam et al., 2019). We define *AGG_RISK* as an indicator variable that equals 1 if the value of *SD_NIM*, *SD_ROA*, and *Z_SCORE* is in the top quartile of the distribution, and 0 otherwise.

Columns (1) to (3) of Table 5 report results for the aggressive risk-taking tests for the full sample. We document a consistent negative relationship between *AE* and our three measures of aggressive risk-taking. Specifically, the estimates of β_1 , the coefficients on *AE*, are -0.1392 ($p < 0.05$), -0.2527 ($p < 0.01$), and -0.1743 ($p < 0.05$) when the dependent variables are *AGG_SD_NIM*, *AGG_SD_ROA*, and

AGG_Z_SCORE, respectively. We also estimate the marginal effect of *AE* on the probability of being an aggressive risk-taking bank. We find that a unit change in *AE* reduces the probability of a bank being an aggressive risk-taker by between 1.87 % (column (1), $p < 0.05$) and 2.98 % (column (2), $p < 0.01$).

In columns (4) to (6) of Table 5 we replicate our analysis after excluding bank observations from the U.S. Similar to the full sample results, the coefficients on *AE*, are -0.1600, -0.4301, and -0.1896 when the dependent variables are *AGG_SD_NIM*, *AGG_SD_ROA*, and *AGG_Z_SCORE*. In this case, a one unit change in *AE* reduces the probability of a bank being an aggressive risk-taker by between 1.71 % (column (1), $p < 0.01$) and 4.13 % (column (2), $p < 0.01$).

Taken together, these results are consistent with the results for normal risk-taking and with H1.

4.4. Sensitivity tests

We check the robustness of our main findings by performing a battery of sensitivity analyses, including using alternative sample selection criteria that reduce potential concerns related to sample heterogeneity, additional country-level controls, and alternative techniques for addressing endogeneity such as two-stage least squares regression.⁹

First, we examine whether our results are sensitive to the inclusion of very large banks in our sample. Because large banks have more resources, they can easily either diversify risk or take on more risk than other banks. We define a bank as 'large' if the total value of its assets is in the top quartile. To ensure that our results are not influenced by the inclusion of these large banks, we replicate our analysis for both subsamples of banks. Untabulated results indicate that *AE* is negatively related to bank risk-taking for both subsamples and the relationship is stronger for small banks than for large banks.

Second, we examine the sensitivity of our results to the type of banks included. In our main tests, we include bank holdings companies, commercial banks, cooperative banks, and savings banks. We find consistent results when we include only commercial banks and also when we include all types of banks irrespective of their specialization.¹⁰

Third, we check whether our results are sensitive to the inclusion of additional country-level controls in Model (1). Prior literature documents that uncertainty avoidance, trust, and religion affect bank risk-taking (Kanagaretnam et al., 2014a, 2015, 2019). Therefore, we add the following country controls to Model

⁹ Full results are available upon request from the authors.

¹⁰ Specifically, we include the following types of banks: bank holdings and holding companies, commercial banks, cooperative banks, finance companies, investment banks, real estate and mortgage banks, savings banks, specialized governmental credit institutions.

⁸ We check for multicollinearity among country-level control variables by computing the VIF (Variance Inflation Factor). The mean VIF is 3.58, which is well below the conventional level of 10 (Gujarati, 2003, p. 262).

Table 3
Pearson correlations.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
SD.NIM	1	1																						
SD.ROA	2	0.638*	1																					
Z_SCORE	3	0.427*	0.611*	1																				
MEAN_SIZE	4	-0.143*	-0.183*	-0.195*	1																			
MEAN_NPL	5	0.140*	0.269*	0.307*	0.274*	1																		
MEAN_REVG	6	0.334*	0.225*	0.429*	-0.210*	0.015	1																	
MEAN_LLPL	7	0.334*	0.410*	0.323*	0.181*	0.602*	0.147*	1																
MEAN_EQUITY	8	0.308*	0.298*	0.077	-0.508*	-0.235*	0.243*	-0.003	1															
MEAN_DEPOSITS	9	-0.195*	-0.144*	0.046	-0.273*	0.129*	-0.026	-0.085	-0.212*	1														
MEAN_NOINT_REV	10	0.096*	0.124*	0.016	0.432*	0.056	-0.004	0.178*	-0.051	-0.447*	1													
BIG	11	0.028	-0.078	-0.07	0.522*	0.147*	0.022	0.106*	-0.186*	-0.294*	0.349*	1												
AE	12	-0.242*	-0.228*	-0.258*	-0.370*	-0.669*	-0.008	-0.493*	0.290*	-0.069	-0.065	-0.249*	1											
ΔGDP	13	0.215*	0.148*	0.141*	-0.052	0.150*	0.290*	0.172*	0.012	0.139*	0.037	0.067	-0.129*	1										
SPREAD	14	0.586*	0.499*	0.281*	-0.041	0.290*	0.236*	0.507*	0.190*	-0.212*	0.024	0.054	-0.309*	0.114*	1									
STMKGDP	15	-0.268*	-0.205*	-0.234*	-0.254*	-0.492*	-0.102*	-0.475*	0.191*	0.08	-0.090*	-0.164*	0.615*	-0.146*	-0.324*	1								
BR	16	-0.107*	-0.046	0.001	-0.319*	-0.108*	-0.048	-0.190*	0.145*	0.411*	-0.459*	-0.377*	0.257*	-0.045	-0.057	0.442*	1							
DISC	17	-0.306*	-0.147*	-0.109*	0.055	-0.064	-0.305*	-0.144*	-0.143*	-0.114*	-0.006	-0.201*	0.098*	-0.735*	-0.185*	0.126*	-0.073	1						
LENF	18	-0.251*	-0.260*	-0.250*	-0.232*	-0.523*	-0.098*	-0.435*	0.180*	0.107*	-0.276*	-0.194*	0.581*	-0.236*	-0.301*	0.623*	0.318*	0.002	1					
CR	19	-0.019	0.024	0.081	0.383*	0.375*	-0.108*	0.287*	-0.257*	-0.077	0.182*	0.229*	-0.517*	0.036	-0.061	-0.428*	-0.399*	0.059	-0.383*	1				
IND	20	-0.267*	-0.202*	-0.275*	-0.370*	-0.701*	-0.101*	-0.507*	0.256*	-0.072	-0.043	-0.271*	0.867*	-0.307*	-0.289*	0.707*	0.224*	0.305*	0.586*	-0.532*	1			
DI	21	0.044	0.02	0.043	-0.223*	-0.075	-0.079	0.027	0.152*	0.016	-0.053	-0.186*	0.037	-0.456*	-0.01	-0.034	0.086*	0.319*	0.035	-0.323*	0.188*	1		
COMMON	22	-0.367*	-0.206*	-0.133*	-0.194*	-0.130*	-0.066	-0.295*	-0.001	0.398*	-0.207*	-0.266*	0.352*	-0.052	-0.375*	0.699*	0.563*	0.075	0.412*	-0.356*	0.453*	0.096*	1	
COMP	23	0.242*	0.155*	0.211*	0.117*	0.395*	0.205*	0.236*	0.029	-0.051	0.165*	0.205*	-0.229*	0.205*	0.107*	-0.328*	-0.290*	-0.196*	-0.217*	0.239*	-0.472*	-0.07	-0.173*	1

See the Appendices A and B for variable definitions. Number of observations: 899. * Denotes significance at the 1 percent level.

Table 4
Accounting enforcement and risk-taking.

	<i>SD_NIM</i>	<i>SD_ROA</i>	<i>Z_SCORE</i>	<i>SD_NIM</i>	<i>SD_ROA</i>	<i>Z_SCORE</i>
	Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)
	Full Sample	Full Sample	Full Sample	No U.S. Banks	No U.S. Banks	No U.S. Banks
Constant	0.0149** (2.51)	0.0084 (1.51)	-4.9563*** (-4.99)	0.0173** (2.19)	0.0066 (1.06)	-4.6340*** (-4.81)
AE	-0.0002*** (-4.77)	-0.0003*** (-3.87)	-0.0310** (-2.08)	-0.0003*** (-4.88)	-0.0003*** (-4.07)	-0.0312** (-2.22)
Δ GDP	0.0007 (0.05)	0.0039 (0.30)	0.7402 (0.32)	-0.0082 (-0.45)	0.0015 (0.12)	1.7662 (0.68)
SPREAD	0.0002*** (5.66)	0.0002*** (4.15)	0.0033 (0.37)	0.0003*** (6.96)	0.0003*** (6.08)	0.0169** (2.23)
STMKGDP	0.0000** (2.50)	0.0000 (0.31)	0.0004 (0.28)	0.0000** (2.25)	-0.0000 (-0.78)	-0.0011 (-0.77)
BR	0.0001 (1.17)	0.0002 (1.43)	0.0512*** (2.77)	0.0000 (0.10)	0.0000 (0.27)	0.0429* (1.97)
DISC	-0.0002*** (-3.10)	-0.0001 (-1.43)	0.0089 (0.94)	-0.0002*** (-3.03)	-0.0000 (-0.92)	0.0036 (0.38)
LENF	-0.0002* (-1.80)	-0.0001 (-1.15)	0.0131 (0.43)	-0.0003** (-2.70)	-0.0002** (-2.17)	0.0065 (0.24)
CR	-0.0000 (-0.03)	0.0000 (0.08)	0.0844 (1.25)	0.0004 (1.14)	0.0004 (1.17)	0.0766 (1.00)
IND	0.0000** (2.40)	0.0001** (2.62)	0.0039 (0.80)	0.0000 (1.29)	0.0000 (1.52)	0.0007 (0.15)
DI	0.0019** (2.40)	-0.0014 (-1.17)	0.1518 (0.91)	0.0015 (1.62)	-0.0020* (-1.72)	0.0708 (0.39)
COMMON	-0.0031*** (-3.13)	-0.0012 (-1.26)	-0.2938* (-1.72)	-0.0029*** (-2.85)	-0.0008 (-0.85)	-0.2248 (-1.37)
COMP	0.0080*** (5.47)	0.0043** (2.23)	0.6857 (1.58)	0.0076*** (4.66)	0.0041* (1.91)	1.0437*** (2.89)
MEAN_SIZE	-0.0001 (-1.62)	-0.0005*** (-4.85)	-0.1329*** (-11.74)	0.0000 (0.03)	-0.0001 (-0.81)	-0.0857*** (-2.35)
MEAN_NPL	-0.0070 (-1.44)	0.0189 (1.60)	4.4134** (2.09)	-0.0070 (-1.29)	0.0176 (1.45)	3.1184 (1.68)
MEAN_REVG	0.0025*** (3.46)	0.0011 (1.00)	1.7647** (2.71)	0.0032*** (2.74)	-0.0015 (-1.12)	0.3501 (1.09)
MEAN_LLPL	0.0110 (0.20)	0.1019 (1.49)	12.5396 (1.12)	-0.0198 (-0.29)	0.0539 (0.68)	11.7303 (0.85)
MEAN_EQUITY	0.0095 (1.65)	0.0173** (2.11)	-3.3586*** (-3.06)	0.0120 (1.18)	0.0299** (2.23)	-2.7768 (-1.19)
MEAN_DEPOSITS	-0.0020 (-1.34)	-0.0040*** (-2.86)	-0.3652* (-1.87)	-0.0018 (-0.70)	-0.0019 (-0.91)	-0.1528 (-0.42)
MEAN_NOINT_REV	0.0014 (1.25)	0.0053*** (3.63)	0.9000*** (5.44)	0.0008 (0.27)	0.0072** (2.26)	1.5232*** (6.15)
BIG	-0.0013* (-1.86)	-0.0016** (-2.24)	-0.0862 (-0.85)	-0.0016* (-1.89)	-0.0024*** (-2.74)	-0.2988*** (-2.81)
Observations	899	899	899	417	417	417
Adj - R ²	0.515	0.406	0.367	0.568	0.543	0.403

This panel reports results of the relation between accounting enforcement and risk-taking using the following regression model.

$$RISK = \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} MEAN_SIZE + \beta_{14} MEAN_NPL + \beta_{15} MEAN_REVG + \beta_{16} MEAN_LLP + \beta_{17} MEAN_EQUITY + \beta_{18} MEAN_DEPOSITS + \beta_{19} MEAN_NOINT_REV + \beta_{20} BIG + \varepsilon_t$$

Variable definitions are in Appendices A and B. We winsorize continuous variables at 1% and 99% (except *SIZE* and *Z_SCORE*, which are expressed as natural logarithm). The t-statistics shown in parentheses are based on standard errors clustered by country. *, **, and *** represent significance at the 10, 5 and 1% levels (two-tailed), respectively.

(1): *UA*, a proxy for the level of uncertainty avoidance (Hofstede, 2001); *TRUST*, the percentage of people who answered “Most people can be trusted” to the following question: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?” (World Values Survey, 5th Wave); *RELIGION*, the percentage of people who believe that religion is “Very important” or “Rather important” (World Values Survey, 5th Wave). Untabulated results show that our main inferences are mostly consistent even after including these additional country controls.

Fourth, the relation between country-level economic institutions and economic performance may be affected by endogeneity. Following the hierarchy of institutions hypotheses (e.g., Acemoglu and Johnson, 2005; Persson, 2004; Williamson, 2000), we use political institutions as instruments to control for potential endogeneity in the relation between country-level economic institutions and economic performance. The basic argument is that political insti-

tutions and related rules set the stage for economic institutions to influence economic performance. Prior literature already validates political institutions as exogenous instruments in the relationship between economic institutions and economic performance (Eicher and Leukert, 2009). The exogeneity of political institutions holds for advanced and developing countries, numerous datasets, and subsamples. Accordingly, we use *Voice and Accountability* and *Government Effectiveness* from the *World Governance Indicators* database (World Bank) as instruments for *AE*. We perform the Sargan over-identification test to assess the validity of our instruments. For this test, the null hypothesis is that the instruments are exogenous (uncorrelated with the error term). Consequently, a significant statistic indicates that the instruments are not exogenous. The test statistic is insignificant for all three measures of bank risk-taking, which suggests that the null hypothesis of exogenous instruments is not rejected. We obtain consistent results when we use this instrumental variable approach.

Table 5
Accounting enforcement and aggressive risk-taking.

	AGG_SD_NIM	AGG_SD_ROA	AGG_Z_SCORE	AGG_SD_NIM	AGG_SD_ROA	AGG_Z_SCORE
	Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)
	Full Sample	Full Sample	Full Sample	No U.S. Banks	No U.S. Banks	No U.S. Banks
Constant	-1.7158 (-0.39)	-13.9830** (-2.45)	-6.5920 (-0.98)	-1.7021 (-0.29)	-16.2170** (-2.50)	-6.3208 (-1.19)
AE	-0.1392** (-2.38)	-0.2527*** (-3.22)	-0.1743** (-2.11)	-0.1600*** (-2.88)	-0.4301*** (-4.67)	-0.1896*** (-3.13)
ΔGDP	17.1016 (1.14)	22.1423* (1.68)	15.0498 (0.77)	14.5422 (0.85)	2.1513 (0.17)	6.2700 (0.52)
SPREAD	0.0794** (2.00)	0.2360*** (4.79)	0.0251 (1.10)	0.1170*** (3.30)	0.4338*** (4.95)	0.0755*** (4.12)
STMKGDP	0.0110* (1.68)	-0.0090 (-1.37)	-0.0018 (-0.29)	0.0058 (0.88)	-0.0512*** (-3.07)	-0.0111 (-1.64)
BR	0.1405** (2.51)	0.2143** (2.24)	0.1676 (1.51)	0.0086 (0.10)	0.0350 (0.48)	0.0549 (0.55)
DISC	-0.0860** (-2.02)	0.0627 (1.52)	0.0630 (1.16)	-0.0536 (-1.02)	0.2176*** (3.00)	0.0642 (1.32)
LENF	-0.1554 (-1.44)	0.0125 (0.10)	0.1418 (0.74)	-0.2333* (-1.79)	0.1167 (0.98)	0.0810 (0.56)
CR	0.3786* (1.88)	0.3000 (1.10)	0.1367 (0.42)	1.0064*** (3.04)	1.7423*** (4.92)	0.4838 (1.36)
IND	0.0643*** (3.56)	0.0758*** (2.70)	0.0258 (1.23)	0.0308 (1.44)	0.0268* (1.65)	-0.0041 (-0.22)
DI	2.0429*** (2.86)	0.0106 (0.01)	-0.3873 (-0.60)	1.8629* (1.93)	-4.6690** (-2.26)	-1.2436* (-1.88)
COMMON	-2.2794*** (-3.16)	-0.3708 (-0.61)	-0.6427 (-0.94)	-2.3577*** (-2.88)	0.4979 (0.84)	-0.7272 (-1.14)
COMP	5.8000*** (5.71)	5.5552*** (3.16)	3.9090** (2.14)	5.3946*** (4.99)	5.9388*** (4.58)	4.8180*** (4.67)
MEAN_SIZE	-0.1577** (-2.13)	-0.3089*** (-5.93)	-0.5565*** (-3.73)	0.0408 (0.21)	-0.1531 (-1.00)	-0.2190 (-1.60)
MEAN_NPL	4.9432 (0.94)	2.7222 (0.41)	8.9860 (1.32)	3.9337 (0.64)	1.3480 (0.25)	5.1385 (1.04)
MEAN_REVG	2.3987*** (6.11)	1.0430* (1.87)	5.1639** (2.41)	2.4852** (2.35)	-0.3830 (-0.48)	0.5735 (0.79)
MEAN_LLPL	25.3791 (1.16)	108.8763*** (3.55)	62.9728** (2.27)	14.2167 (0.42)	129.9935*** (2.80)	73.9359* (1.67)
MEAN_EQUITY	1.8800 (0.74)	8.8105*** (2.73)	-11.1601*** (-2.82)	7.7739 (1.21)	17.2610* (1.96)	-10.8119 (-1.22)
MEAN_DEPOSITS	-1.7830** (-1.99)	-1.0198 (-1.18)	-0.8906 (-0.53)	-1.6510 (-0.65)	-0.2466 (-0.14)	1.7997 (1.36)
MEAN_NOINT_REV	0.5080 (0.85)	2.9540*** (4.03)	1.5451 (1.64)	1.2946 (0.96)	2.6620** (2.48)	5.0613*** (3.50)
BIG	0.3813 (0.66)	-0.5101 (-0.99)	-0.8123* (-1.81)	-0.0948 (-0.13)	-0.7902 (-1.37)	-1.6152*** (-3.96)
Observations	899	899	899	417	417	417
Pseudo R ²	0.2443	0.3187	0.3225	0.4464	0.5116	0.3466
Prob. AGG (1)	25 %	25 %	25 %	29.74 %	33.57 %	31.65 %
Margins (dy/dx)	-1.87%**	-2.98%***	-2.07%**	-1.71%***	-4.13%***	-2.47%***

This table reports results of the relation between accounting enforcement and aggressive risk-taking using the following logit model.

$$AGG_RISK = \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} MEAN_SIZE + \beta_{14} MEAN_NPL + \beta_{15} MEAN_REV + \beta_{16} MEAN_LLP + \beta_{17} MEAN_EQUITY + \beta_{18} MEAN_DEPOSITS + \beta_{19} MEAN_NOINT_REV + \beta_{20} BIG + \varepsilon_t$$

Variable definitions are in Appendices A and B. We winsorize continuous variables at 1% and 99% (except SIZE and Z_SCORE, which are expressed as natural logarithm). The t-statistics shown in parentheses are based on standard errors clustered by country. *, **, and *** represent significance at the 10, 5 and 1% levels (two-tailed), respectively.

5. Additional analyses

5.1. Accounting enforcement and troubled banks

In this section, we examine whether accounting enforcement relates to the probability of a bank experiencing financial difficulty during the financial crisis. Prior literature suggests that an important reason for the 2007–2009 financial crisis is that banks assumed excessive risks that caused large losses (Shehzad and De Haan, 2015). Our main results show a negative relation between accounting enforcement and bank risk-taking in the 2002–2006 pre-crisis period. Therefore, we conjecture that accounting enforcement is negatively associated with the probability that a bank experiences financial difficulty during the financial crisis.

Relying on previous studies (e.g., Beltratti and Stulz, 2012; Lei and Miller, 2008), we use the following logistic model, clustered by

country, to test the association between accounting enforcement and financially troubled banks during the crisis period:

$$\begin{aligned} TROUBLEDBANKS(TB) = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD \\ & + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND \\ & + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} SIZE_2006 \\ & + \beta_{14} IFRS_2006 + \beta_{15} CAPREG_2006 + \beta_{16} NPL_2006 \\ & + \beta_{17} LLA_2006 + \beta_{18} REVG_2006 + \beta_{19} LOANS_2006 \\ & + \beta_{20} DEP_2006 + \beta_{21} CASHFLOW_2006 + \varepsilon_t \end{aligned} \quad (2)$$

where:

TB = an indicator variable that equals 1 if the bank is in financial trouble during the 2007–2009 crisis period;

IFRS_2006= an indicator variable that equals 1 if the bank adopts IAS/IFRS, 0 otherwise;

LLA_2006= loan loss reserve divided by total asset;

LOANS_2006= total loans divided by total assets;

DEP_2006= total deposits divided by total assets;

CASHFLOW_2006= change in profit before tax and loan loss provisions divided by total assets;

All the other variables are as defined earlier.

We classify a bank as financially troubled if at least one of the following criteria is satisfied in any of the years from 2007–2009: (1) negative net income, (2) equity to total assets below 5 %, and (3) loan loss provisions to total loans above 1 %.¹¹ Then, we retain only fiscal year 2006 and, accordingly, measure the bank-level control variables in 2006 (i.e., suffix *_2006*). Since we argue that accounting enforcement reduces bank risk-taking before the start of the financial crisis, we expect a negative coefficient for β_1 in Model (2).

We present the results in Table 6. Column (1) reports the results for the overall sample and column (2) for the subsample that excludes bank-observations from the U.S. As expected, accounting enforcement is negatively related to bank financial trouble during the crisis period. We also estimate the marginal effect of *AE* on the probability of being a financially troubled bank. We find that a unit change in *AE* reduces the probability of a bank being in financial trouble during the crisis period by 3.16 % ($p < 0.01$). As shown in column (2), the results are robust when we exclude observations from the U.S. For this subsample, a one unit change in *AE* reduces the probability of a bank being in financial trouble by 2.99 % ($p < 0.01$). These results imply that accounting enforcement not only is negatively related to risk-taking, it is also negatively related to the consequent financial difficulties experienced by banks. They suggest that accounting enforcement is an important factor to consider when evaluating the influence of the institutional framework on bank stability.

5.2. Potential economic channels

In countries with a high level of accounting enforcement, bank managers may assume less risk to reduce earnings volatility, since both accounting rules and monitoring mechanisms allow less reporting discretion. In this section, we explore the potential channels through which managers assume less risk in their operations. We argue that managers may reduce risk via closer scrutiny of lending decisions or reduction in the complexity of operations or both.

We explore the relation between accounting enforcement and lending decisions using net loan charge-offs and change in loans. We expect a negative relation between accounting enforcement and both change in loans (i.e., managers operating in countries with high levels of accounting enforcement tend to be more restrained in lending) and net loan charge-offs (i.e., managers operating in countries with high levels of accounting enforcement make relatively higher-quality loans). To test these channels for reducing risk-taking, we use the following models and estimate standard errors clustered by country:

$$\begin{aligned} NCO = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP \\ & + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI \\ & + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE \\ & + \beta_{15} REVG + \beta_{16} LOANS + \beta_{17} CASHFLOW + \beta_{18} CAPREG \\ & + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY + \beta_{22} BEGLLA + YearFE + \varepsilon_t \quad (3) \end{aligned}$$

¹¹ These thresholds are consistent with the prior literature (e.g., Jin et al., 2011; Kanagaretnam et al., 2014a).

Table 6
Accounting enforcement and bank financial trouble.

	Troubled Banks (TB)	Troubled Banks (TB)
	Column (1) Full Sample	Column (2) No U.S. Banks
Constant	4.8841 (0.99)	12.6721** (2.01)
AE	-0.1731*** (-3.12)	-0.1867*** (-3.88)
ΔGDP	-5.0787 (-0.56)	-8.0042 (-0.57)
<i>SPREAD</i>	0.0331 (0.83)	0.0231 (0.58)
<i>STMKGDP</i>	0.0055* (1.70)	0.0083 (1.45)
<i>BR</i>	0.0028 (0.07)	0.0347 (0.45)
<i>DISC</i>	-0.0909* (-1.91)	-0.1118** (-2.03)
<i>LENF</i>	0.0666 (0.57)	0.0468 (0.36)
<i>CR</i>	-0.4696** (-2.15)	-0.4538 (-1.29)
<i>IND</i>	0.0550** (2.57)	0.0558** (2.09)
<i>DI</i>	0.3142 (0.55)	0.4514 (0.83)
<i>COMMON</i>	-1.4708** (-2.18)	-1.7942** (-2.21)
<i>COMP</i>	1.6504 (1.36)	3.5424*** (2.92)
<i>SIZE_2006</i>	0.2342** (2.51)	0.0510 (0.35)
<i>IFRS_2006</i>	-1.3401*** (-3.31)	-1.5069*** (-3.37)
<i>CAPREG_2006</i>	-2.1395 (-0.56)	-14.8974 (-1.63)
<i>NPL_2006</i>	19.8528** (2.52)	24.6652* (1.92)
<i>LLA_2006</i>	-10.8019 (-0.34)	-47.4718 (-1.38)
<i>REVG_2006</i>	1.7296*** (7.87)	1.7190* (1.77)
<i>LOANS_2006</i>	1.8439* (1.68)	-0.7951 (-0.65)
<i>DEP_2006</i>	-1.1275 (-1.00)	-3.2192* (-1.73)
<i>CASHFLOW_2006</i>	17.3015 (1.31)	50.4126* (1.88)
Observations	869	329
Pseudo R ²	0.0908	0.1676
Prob. TB (1)	71.57 %	73.22 %
Margins (dy/dx)	-3.16%***	-2.99%***

This table reports the results of the relation between accounting enforcement and bank financial trouble using the following logit model.

$$TB_CRISIS = \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} SIZE_2006 + \beta_{14} IFRS_2006 + \beta_{15} CAPREG_2006 + \beta_{16} NPL_2006 + \beta_{17} LLA_2006 + \beta_{18} REVG_2006 + \beta_{19} LOANS_2006 + \beta_{20} DEP_2006 + \beta_{21} CASHFLOW_2006 + \varepsilon_t$$

Variable definitions are in Appendices A and B. We winsorize continuous variables at 1% and 99% (except *SIZE*, which is expressed as natural logarithm). The t-statistics shown in parentheses are based on standard errors clustered by country. *, **, and *** represent significance at the 10, 5 and 1% levels (two-tailed), respectively.

$$\begin{aligned} \Delta LOANS = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP \\ & + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR + \beta_9 IND + \beta_{10} DI \\ & + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE \\ & + \beta_{15} REVG + \beta_{16} LOANS + \beta_{17} CASHFLOW + \beta_{18} CAPREG \\ & + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY + \beta_{22} BEGLLA \\ & + \beta_{23} NCO + YearFE + \varepsilon_t \quad (4) \end{aligned}$$

where:

Table 7
Accounting enforcement and loan portfolio quality.

	NCO	Δ _LOANS	OTHER DEPOSITS	FEE_REV
Constant	Column(1) -0.0124 (-1.13)	Column(2) 0.2367* (1.81)	Column(3) 0.1329 (0.60)	Column(4) 0.5939*** (3.94)
AE	-0.0003** (-2.24)	-0.0037** (-2.31)	-0.0070** (-2.69)	-0.0036* (-1.86)
Δ GDP	-0.0279 (-1.27)	0.3679 (1.00)	-0.1429 (-0.22)	-1.5060*** (-3.19)
SPREAD	-0.0000 (-0.34)	0.0018*** (3.28)	0.0051*** (5.78)	0.0019*** (2.87)
STMKGDP	-0.0000 (-0.35)	-0.0002 (-1.46)	-0.0004 (-1.67)	0.0005** (2.66)
BR	0.0002 (1.16)	-0.0029** (-2.37)	-0.0017 (-0.92)	-0.0095*** (-8.78)
DISC	0.0001 (1.42)	-0.0027** (-2.28)	-0.0015 (-0.64)	-0.0019 (-1.36)
LENF	0.0005** (2.23)	-0.0018 (-0.61)	0.0068 (1.65)	-0.0142*** (-4.47)
CR	-0.0001 (-0.19)	0.0183*** (2.80)	-0.0172 (-1.37)	-0.0038 (-0.44)
IND	-0.0000 (-0.14)	0.0013*** (2.93)	0.0028*** (2.85)	0.0017** (2.38)
DI	-0.0006 (-0.46)	0.0047 (0.23)	-0.0630 (-1.37)	-0.0706* (-1.96)
COMMON	0.0015 (0.93)	-0.0200 (-1.33)	-0.0168 (-0.59)	-0.0593*** (-3.81)
COMP	-0.0080** (-2.28)	0.0228 (0.86)	0.1610** (2.30)	0.0954** (2.18)
IFRS	-0.0020** (-2.38)	0.0147 (1.13)	-0.0193 (-1.14)	-0.0227 (-1.61)
SIZE	0.0003*** (3.07)	-0.0030 (-1.38)	0.0172*** (6.90)	0.0190*** (6.38)
REVG	-0.0018*** (-3.11)	0.1204*** (3.34)	-0.0039 (-0.34)	-0.0328 (-1.22)
LOANS	0.0030 (1.51)	0.1312*** (7.42)	-0.0569 (-1.64)	-0.0951*** (-6.06)
CASHFLOW	0.0017 (0.04)	-0.0489 (-0.17)	0.2068 (0.78)	0.6003* (1.80)
CAPREG	-0.0143 (-1.37)	-0.0403 (-0.48)	0.2132*** (3.28)	-0.0896 (-0.75)
NPL	0.0604** (2.49)	-0.5375*** (-2.85)	-0.3048 (-1.67)	-0.2780 (-1.30)
ROA	0.0448 (1.50)	0.2558 (0.78)	-0.2875 (-0.96)	-0.7654* (-1.89)
EQUITY	-0.0039 (-0.31)	0.2941 (1.62)	-0.0041 (-0.01)	0.2062*** (2.96)
BEGLLA	0.1279*** (4.20)	0.6411 (1.12)	-0.7191* (-1.90)	0.8451*** (2.82)
NCO		-1.2377 (-1.26)	-0.8888* (-1.82)	-0.1160 (-0.21)
Year FE	Yes	Yes	Yes	Yes
Observations	2984	2984	2984	2984
Adjusted R ²	0.505	0.229	0.338	0.504

This table reports the results of the relation between accounting enforcement and loan portfolio quality using the following regression models.

$$\begin{aligned} NCO = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR \\ & + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE + \beta_{15} REVG + \beta_{16} LOANS \\ & + \beta_{17} CASHFLOW + \beta_{18} CAPREG + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY + \beta_{22} BEGLLA \\ & + Year FE + \varepsilon_t \end{aligned}$$

$$\begin{aligned} \Delta_LOANS = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR \\ & + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE + \beta_{15} REVG + \beta_{16} LOANS \\ & + \beta_{17} CASHFLOW + \beta_{18} CAPREG + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY + \beta_{22} BEGLLA \\ & + \beta_{23} NCO + Year FE + \varepsilon_t \end{aligned}$$

$$\begin{aligned} OTHER_DEPOSITS = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF \\ & + \beta_8 CR + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE \\ & + \beta_{15} REVG + \beta_{16} LOANS + \beta_{17} CASHFLOW + \beta_{18} CAPREG + \beta_{19} NPL + \beta_{20} ROA \\ & + \beta_{21} EQUITY + \beta_{22} BEGLLA + \beta_{23} NCO + Year FE + \varepsilon_t \end{aligned}$$

$$\begin{aligned} FEE_REV = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR \\ & + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS + \beta_{14} SIZE + \beta_{15} REVG + \beta_{16} LOANS \\ & + \beta_{17} CASHFLOW + \beta_{18} CAPREG + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY + \beta_{22} BEGLLA \\ & + \beta_{23} NCO + Year FE + \varepsilon_t \end{aligned}$$

Variable definitions are in Appendices A and B. We winsorize continuous variables at 1% and 99% (except for *SIZE*, which is expressed as a natural logarithm). The t-statistics shown in parentheses are based on standard errors clustered by country. *, **, and *** represent significance at the 10, 5 and 1% levels (two-tailed), respectively.

NCO= net charge-offs divided by total assets;

$\Delta LOANS$ = change in total loans from year $t-1$ to year t divided by total assets at year end;

All the other variables are as defined earlier.

We further explore the association between accounting enforcement and bank complexity using the percentage of other deposits to total deposits and the percentage of fee revenues and net commissions to operating income. We expect a negative relation between accounting enforcement and both other deposits (i.e., managers operating in countries with higher levels of accounting enforcement rely less on financing sources other than savings and commercial deposits) and fee revenues and net commissions (i.e., managers operating in countries with higher levels of accounting enforcement engage less in other activities besides lending). To test these channels for reduced risk-taking, we use the following models and estimate standard errors clustered by country:

$$\begin{aligned} OTHER_DEPOSITS(FEE) = & \beta_0 + \beta_1 AE + \beta_2 \Delta GDP + \beta_3 SPREAD \\ & + \beta_4 STMKGDP + \beta_5 BR + \beta_6 DISC + \beta_7 LENF + \beta_8 CR \\ & + \beta_9 IND + \beta_{10} DI + \beta_{11} COMMON + \beta_{12} COMP + \beta_{13} IFRS \\ & + \beta_{14} SIZE + \beta_{15} REVG + \beta_{16} LOANS + \beta_{17} CASHFLOW \\ & + \beta_{18} CAPREG + \beta_{19} NPL + \beta_{20} ROA + \beta_{21} EQUITY \\ & + \beta_{22} BEGLLA + \beta_{23} NCO + YearFE + \varepsilon_t \end{aligned} \quad (5)$$

where:

OTHER_DEPOSITS= other deposits and short-term borrowings divided by total deposits;

FEE_REV= fees and net commissions divided by operating income;

All the other variables are as defined earlier.

Columns (1) and (2) of Table 7 show that accounting enforcement is negatively associated with loan charge-offs (coefficient is -0.0003, $p < 0.05$) and change in future loans (coefficient is -0.0037, $p < 0.05$). These results corroborate our conjecture that managers operating in countries with higher levels of accounting enforcement tend to be more restrictive in lending and make relatively higher-quality loans. Columns (3) and (4) of Table 7 show a negative and significant coefficient on *AE* for both *OTHER_DEPOSITS* and *FEE_REV* (coefficients are -0.0070 ($p < 0.05$) and -0.0036 ($p < 0.1$), respectively). These results support the conjecture that managers operating in countries with higher levels of accounting enforcement rely less on financing sources other than savings and commercial deposits and engage less in other activities outside lending. We interpret the results reported in Table 7 as evidence that managers are more conservative in lending decisions (i.e., they make fewer loans that are of higher quality) and reduce bank complexity to manage risk because of the reduced reporting discretion imposed by accounting enforcement.

6. Conclusions

Prior literature highlights that a deeper understanding of the relation between the production of accounting numbers, as part of bank transparency, and bank risk-taking constitutes an important direction for future research. In this study, we argue that accounting enforcement is a fundamental component of the institutional infrastructure influencing financial reporting and bank transparency and examine the extent to which accounting enforcement is associated with bank risk-taking. We argue that accounting enforcement requires managers to closely align with accounting standards designed to dampen reporting discretion. Lacking the accounting discretion to manage earnings, which may alert regulators to the true health of the bank, managers ultimately assume lower risk to reduce earnings volatility.

Using an international sample of banks, we find evidence consistent with a negative relation between accounting enforcement and bank risk-taking. In additional analyses, we show that accounting enforcement is negatively associated with bank financial trouble during the financial crisis. Lastly, we show that bank managers assume less risk through more conservative lending practices and a reduction in operating complexity.

Our study has implications for policymakers and standard setters who are considering the revision of accounting standards governing the banking sector. Our findings could help in evaluating the potential consequences of proposed accounting policies on risk-taking, particularly the importance of accounting enforcement. Our results suggest that financial reporting should not be considered in isolation of other elements in the institutional infrastructure. In the international accounting literature, prior studies have focused mainly on the benefits of common accounting standards such as the introduction of International Financial Reporting Standards (IFRS) (e.g., Koning et al., 2018). Our findings add to this line of research by showing that not only common accounting standards but also other accounting institutions such as accounting enforcement bodies are important for managers' reporting and real actions.

Our study is subject to certain limitations. First, our results may be driven by omitted country-level factors. Although we include several country controls in our main model and control for additional country characteristics in sensitivity analyses, we cannot completely rule out that our results may be attributable to omitted variables. Second, we note that the association between accounting enforcement and bank risk-taking may not result from underlying causal relations. Finally, we restrict our sample to listed banks because our measure of accounting enforcement is specifically designed for listed firms. As a result, our findings may have implications for listed banks only.

Declaration of Competing Interest

None.

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Appendix A.

Country-level variables.

Variables	Description
Accounting Enforcement (<i>AE</i>)	<i>AE</i> is the median value of the Accounting Enforcement Index for the years 2002 and 2005. Source Brown et al. (2014)
Bank Regulation (<i>BR</i>)	<i>BR</i> is the median value, where data are available, from the 1 st through the 3 rd Survey, of the sum 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) Private Monitoring Index: measures whether there are incentives/ability for the private monitoring of firms; (3) Activity Restriction: the sum of Securities Activities + Insurance Activities + Real Estate Activities. Source Barth et al. (2013)

GDP growth (ΔGDP)	Annual GDP growth (2005). Source World Bank
Interest rate spread ($SPREAD$)	Lending rate minus deposit rate (2005). Source IMD World Competitiveness Yearbook 2016
Stock market capitalization ($STMKGDP$)	Value of listed shares to GDP (2005). Source Čihák et al. (2012)
Disclosure index ($DISC$)	Actual disclosure practices of commercial banks around the world, in relation to their assets, liabilities, funding, incomes, and risk profiles. This index 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. Source Huang (2006)
Individualism (IND)	Measure of individualism. Source Hofstede (2001)
Deposit Insurance (DI)	Dummy variable that equals 1 if the country has deposit insurance, 0 otherwise. Source Demirguc-Kunt, Kane and Laeven (2008)
Competition ($COMP$)	Competition is the sum of the squares of the market shares (deposits) of each bank in each country. The index is calculated over the period 2000–2006 and ranges from 0 to 1, with a higher value indicating greater monopoly power. Source Kanagaretnam et al. (2014)
Creditor Rights (CR)	CR is an index, ranging from 0 to 4, which 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. Source Djankov et al. (2007)
Legal Enforcement ($LENF$)	Law enforcement index that ranges from 0 to 10, with higher values indicating greater law enforcement. Source Fraser Institute (2010)
Common Law ($COMMON$)	Dummy variable that equals 1 if the country is a common law country, 0 otherwise. Source La Porta et al. (1998)

Appendix B.

Firm-level variables

Panel A: Variables used in the Risk-Taking test

Variable	Description
SD_NIM	Standard deviation of net interest margin during the period 2002–2006.
SD_ROA	Standard deviation of return on assets (profit before tax plus loan loss provision divided by total assets) during the period 2002–2006.
Z_SCORE	Natural logarithm of $[(ROA + CAP_REG) / SD_ROA]$, where ROA is profit before taxes plus loan loss provision divided by total assets, CAP.REG is total regulatory capital ratio, SD.ROA is the standard deviation of ROA, estimated over the rolling window $[t; t-4]$. We multiply the score by -1 so that higher Z_SCORE implies higher risk-taking and then average it over the period 2002–2006.
AGG_NIM	Aggressive Risk-taking. Dummy variable that equals 1 if the value of SD_NIM is in the top quartile of the distribution, 0 otherwise.
AGG_ROA	Aggressive Risk-taking. Dummy variable that equals 1 if the value of SD_ROA is in the top quartile of the distribution, 0 otherwise.
AGG_ZSCORE	Aggressive Risk-taking. Dummy variable that equals 1 if the value of Z_SCORE is in the top quartile of the distribution, 0 otherwise.
$MEAN_SIZE$	Natural logarithm of total assets (expressed in mln \$), averaged over the period 2002–2006.
$MEAN_NPL$	Non-performing loans divided by total loans, averaged over the period 2002–2006.
$MEAN_REVG$	Interest revenue growth, averaged over the period 2002–2006.
$MEAN_LLP$	Loan loss provision divided by total loans, averaged over the period 2002–2006.

$MEAN_EQUITY$	Equity divided by total assets, averaged over the period 2002–2006.
$MEAN_DEPOSITS$	Deposits divided by total assets, averaged over the period 2002–2006.
$MEAN_NOINT_REV$	Non-interest income divided by operating income, averaged over the period 2002–2006.
BIG	Dummy variable that equals 1 if the total deposits of the bank exceed 10 % of the total deposits of all banks in its country of domicile.

Panel B: Variables used in the troubled bank test.

Variable	Description
TB	Dummy variable that equals 1 if the bank is in financial trouble during the period 2007–2009. We define a troubled bank as a bank that meets at least one of the following criteria: (a) negative net income, (b) equity to total assets below 5%, and (c) loan loss provisions to total loans above 1%.
$IFRS_2006$	Dummy variable that equals 1 if the bank adopts IAS/IFRS, at the end of the year 2006; 0 otherwise.
$SIZE_2006$	Natural logarithm of total asset (expressed in mln \$), at the end of the year 2006.
$LOANS_2006$	Total loans divided total assets, at the end of the year 2006.
DEP_2006	Total deposits divided total assets, at the end of year 2006.
NPL_2006	Non-performing loans divided by total loans, at the end of year 2006.
$CAPREG_2006$	Total regulatory capital ratio, at the end of year 2006.
$CASHFLOW_2006$	Change of profit before tax and loan loss provisions divided by total assets, at the end of year 2006.
LLA_2006	Loan loss reserve divided by total assets, at the end of year 2006.
$REVG_2006$	Interest revenue growth, at the end of year 2006.

Panel C: Variables used in the robustness tests.

Variable	Description
NCO	Net Charge-offs divided by total assets at the end of the year.
Δ_LOANS	Total loans at $t+1$ minus total loans at t divided by total asset at the end of year.
$OTHER_DEPOSIT$	Other deposits and short-term borrowings divided by total deposits at the end of the year.
FEE_REV	Fees and net commissions divided by operating income at the end of the year.
$IFRS$	Dummy variable that equals 1 if the bank adopts IAS/IFRS; 0 otherwise.
$SIZE$	Natural logarithm of total assets (expressed in mln \$) at the end of the year.
$REVG$	Interest revenue growth at the end of the year.
$LOANS$	Total loans divided by total assets at the end of the year.
$CASHFLOW$	Change of profit before taxes and loan loss provisions divided by total assets at the end of the year.
CAP_REG	Total regulatory capital ratio at the end of year.
NPL	Non-performing loans divided by total loans at the end of the year.
$BEGLLA$	Loan loss reserve divided by total asset both at the end of the previous year.
ROA	Profit before taxes plus loan loss provisions divided by total assets at the end of the year.
$EQUITY$	Equity divided by total assets at the end of the year.

References

- Acemoglu, D., Johnson, S., 2005. *Unbundling institutions*. *J. Polit. Econ.* 113 (5), 949–995.
- Ball, R., 2006. *International Financial Reporting Standards (IFRS): pros and cons for investors*. *Account. Bus. Res.* 36 (suppl), 5–28.
- Barth, M.E., Israeli, D., 2013. *Disentangling mandatory IFRS reporting and changes in enforcement*. *J. Account. Econ.* 56 (2–3), 178–188.
- Barth, J.R., Caprio Jr., G., Levine, R., 2004. *Bank regulation and supervision: what works best?* *J. Financ. Intermediation* 13 (2), 205–248.
- Barth, J.R., Caprio Jr., G., Levine, R., 2008. *Bank Regulations are Changing: For Better or Worse?*, 4646, World Bank Policy Research Working Paper.
- Barth, J.R., Caprio Jr., G., Levine, R., 2013. *Bank regulation and supervision in 180 countries from 1999 to 2011*. *J. Financ. Econ. Policy* 5 (2), 111–219.
- Beatty, A., Liao, S., 2014. *Financial accounting in the banking industry: a review of the empirical literature*. *J. Account. Econ.* 58 (2–3), 339–383.

- Beck, T., Demirgüç-Kunt, A., Levine, R., 2006. Bank supervision and corruption in lending. *J. Monet. Econ.* 53 (8), 2131–2163.
- Beltratti, A., Stulz, R.M., 2012. The credit crisis around the globe: why did some banks perform A. *J. financ. econ.* 105 (1), 1–17.
- Brown, P., Preiato, J., Tarca, A., 2014. Measuring country differences in enforcement of accounting standards: an audit and enforcement proxy. *J. Bus. Finance Account.* 41 (1–2), 1–52.
- Bushman, R.M., 2014. Thoughts on financial accounting and the banking industry. *J. Account. Econ.* 58 (2–3), 384–395.
- Bushman, R.M., 2016. Transparency, accounting discretion, and bank stability. *Econ. Policy Review* 22 (1), 129–150.
- Bushman, R.M., Williams, C.D., 2012. Accounting discretion, loan loss provisioning, and discipline of banks' risk-taking. *J. Account. Econ.* 54 (1), 1–18.
- Choi, A., Choi, J.H., Sohn, B.C., 2018. The joint effect of audit quality and legal regimes on the use of real earnings management: international evidence. *Contemp. Account. Res.* 35 (4), 2225–2257.
- Christensen, H., Hail, L., Leuz, C., 2013. Capital-market effects of securities regulation: the role of implementation and enforcement. *J. Account. Econ.* 56 (2), 147–177.
- Čihák, M., Demirgüç-Kunt, A., Feyen, E., Levine, R., Policy Research Working Paper 6175 2012. Benchmarking Financial Development around the World. World Bank, Washington DC.
- Dal Maso, L., Kanagaretnam, K., Lobo, G.J., Terzani, S., 2018. The influence of accounting enforcement on earnings quality of banks: implications of bank regulation and the global financial crisis. *J. Account. Public Policy* 37 (5), 402–419.
- Demirgüç-Kunt, A., Detragiache, E., Tresselt, T., 2008. Banking on the principles: compliance with Basel Core Principles and bank soundness. *J. Financ. Intermediation* 17 (4), 511–542.
- Djankov, S., McLiesh, C., Shleifer, A., 2007. Private credit in 129 countries. *J. financ. econ.* 84 (2), 299–329.
- Duprey, T., Lé, M., Accessed August 14, 2018 2016. Bankscope Dataset: Getting Started. <http://ssrn.com/abstract=2191449>.
- Eicher, T.S., Leukert, A., 2009. Institutions and economic performance: endogeneity and parameter heterogeneity. *J. Money Credit Bank.* 41 (1), 197–219.
- Ernstberger, J., Stich, M., Vogler, O., 2012. Economic consequences of accounting enforcement reforms: the case of Germany. *Eur. Account. Rev.* 21 (2), 217–251.
- FASB, 2010. Statement of Financial Accounting Concepts No. 8. Conceptual Framework for Financial Reporting, 2010. Financial Accounting Standards Board of the Financial Accounting Foundation, September.
- Financial Stability Forum (FSF), Accessed August 14, 2018 2009. Report of the Financial Stability Forum on Addressing Procyclicality in the Financial System. <http://www.fsb.org/wp-content/uploads/r.0904a.pdf>.
- Flannery, M., Thakor, A., 2006. Accounting, transparency and bank stability. *J. Financ. Intermediation* 15 (3), 281–284.
- Flannery, M.J., Kwan, S.H., Nimalendran, M., 2004. Market evidence on the opaqueness of banking firms' assets. *J. financ. econ.* 71 (3), 419–460.
- Fraser Institute, Accessed August 14, 2018 2010. Economic Freedom of the world: annual report 2010. <https://www.fraserinstitute.org/sites/default/files/economic-freedom-of-the-world-2010.pdf>.
- Gao, R., Sidhu, B.K., 2018. The impact of mandatory International Financial Reporting Standards adoption on investment efficiency: standards, enforcement, and reporting incentives. *ABACUS* 54 (3), 277–318.
- Gujarati, D., 2003. Basic Econometrics, fourth edition. McGrawHill, USA.
- Hanson, S., Kashyap, A., Stein, J., 2011. A macroprudential approach to financial regulation. *J. Econ. Perspect.* 25 (1), 3–28.
- Hitz, J.M., Ernstberger, J., Stich, M., 2012. Enforcement of accounting standards in Europe. Capital-market-based evidence for the two-tier mechanism in Germany. *Eur. Account. Rev.* 21 (2), 253–281.
- Hofstede, G., 2001. Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations. Sage Publications Inc., Thousand Oaks, CA.
- Houston, J.F., Lin, C., Lin, P., Ma, Y., 2010. Creditor rights, information sharing, and bank risk-taking. *J. financ. econ.* 96 (3), 485–512.
- Hovakimian, A., Kane, E., 2000. Effectiveness of capital regulation at U.S. Commercial banks, 1985 to 1994. *J. Finance* 55 (1), 451–469.
- Huang, R., Accessed August 14, 2018 2006. Bank Disclosure Index: Global Assessment of Bank Disclosure. <http://ssrn.com/abstract=1425915>.
- Huffman, A., 2018. Asset use and the relevance of fair value measurement: evidence from IAS 41. *Rev. Account. Stud.* 23 (4), 1274–1314.
- Jin, J.Y., Kanagaretnam, K., Lobo, G.J., 2011. Ability of accounting and audit quality variables to predict bank failure during the financial crisis. *J. Bank. Financ.* 35 (11), 2811–2819.
- Jin, J.Y., Kanagaretnam, K., Lobo, G.J., Mathieu, R., 2017. Social capital and bank stability. *J. Financ. Stab.* 32 (2), 99–114.
- Jin, J.Y., Kanagaretnam, K., Lobo, G.J., 2018. Discretion in bank loan loss allowance, risk taking and earnings management. *Account. Financ.* 58 (1), 171–193.
- Kanagaretnam, K., Lobo, G.J., Yang, D.H., 2004. Joint tests of signaling and income smoothing through bank loan loss provisions. *Contemp. Account. Res.* 21 (4), 843–884.
- Kanagaretnam, K., Krishnan, G.V., Lobo, G.J., 2010. An empirical analysis of auditor independence in the banking industry. *Account. Rev.* 85 (6), 2011–2046.
- Kanagaretnam, K., Lim, C.Y., Lobo, G.J., 2011. Effects of national culture on earnings quality of banks. *J. Int. Bus. Stud.* 42 (6), 853–874.
- Kanagaretnam, K., Lim, C.Y., Lobo, G.J., 2014a. Influence of national culture on accounting conservatism and risk-taking in the banking industry. *Account. Rev.* 89 (3), 1115–1149.
- Kanagaretnam, K., Lim, C.Y., Lobo, G.J., 2014b. Effects of international institutional factors on earnings quality of banks. *J. Bank. Financ.* 39 (1), 87–106.
- Kanagaretnam, K., Lobo, G.J., Wang, C., Whalen, D.J., 2015. Religiosity and risk-taking in international banking. *J. Behav. Exp. Finance* 7 (1), 42–59.
- Kanagaretnam, K., Lobo, G.J., Wang, C., Whalen, D.J., 2019. Cross-country evidence on the relationship between societal trust and risk-taking by banks. *J. Financ. Quant. Anal.* 54 (1), 275–301.
- Klomp, J., de Haan, J., 2012. Banking risk and regulation: does one size fit all? *J. Bank. Financ.* 36 (12), 3197–3212.
- Koning, M., Mertens, G., Roosenboom, P., 2018. Drivers of institutional change around the world: the case of IFRS. *J. Int. Bus. Stud.* 49 (3), 249–271.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W., 1998. Law and finance. *J. Polit. Econ.* 106 (6), 1113–1155.
- Laeven, L., Levine, R., 2009. Bank governance, regulation and risk-taking. *J. financ. econ.* 93 (2), 259–275.
- Lel, U., Miller, D., 2008. International cross-listing, firm performance and top management turnover: a test of the bonding hypothesis. *J. Finance* 63 (4), 1897–1937.
- Leuz, C., 2010. Different approaches to corporate reporting regulation: how jurisdictions differ and why. *Account. Bus. Res.* 40 (3), 229–256.
- Marton, J., Runesson, E., 2017. The predictive ability of loan loss provisions in banks – effects of accounting standards, enforcement and incentives. *Br. Account. Rev.* 49 (2), 162–180.
- Morgan, D.P., 2002. Rating banks: risk and uncertainty in an opaque industry. *Am. Econ. Rev.* 92 (4), 874–888.
- Nier, E., Baumann, B., 2006. Market discipline, disclosure and moral hazard in banking. *J. Financ. Intermediation* 15 (3), 332–361.
- Persson, T., 2004. Consequences of constitutions. *J. Eur. Econ. Assoc.* 2 (2–3), 139–161.
- Ryan, S.G., 2012. Financial reporting for financial instruments. *Found. Trends Account* 6 (3–4), 187–354.
- Shehzad, C.T., De Haan, J., 2015. Supervisory powers and bank risk taking. *J. Int. Financ. Mark. Inst. Money* 39 (1), 15–24.
- Stephanou, C., Policy Research Working Paper 5227 2010. Rethinking Market Discipline in Banking: Lessons from the Financial Crisis. The World Bank.
- Tadesse, S., 2006. The economic value of regulated disclosure: evidence from the banking sector. *J. Account. Public Policy* 25 (1), 32–70.
- US Treasury, Accessed August 14, 2018 2009. A New Foundation: Rebuilding Financial Supervision and Regulation. Financial Regulatory Reform. https://www.treasury.gov/initiatives/Documents/FinalReport_web.pdf.
- Williamson, O.E., 2000. The new institutional economics: taking stock, looking ahead. *J. Econ. Lit.* 38 (3), 595–613.