Accounting and Business Research

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rabr20

Moving toward the expected credit loss model under IFRS 9: capital transitional arrangement and bank systematic risk

Minyue Dong & Romain Oberson

To cite this article: Minyue Dong & Romain Oberson (2022) Moving toward the expected credit loss model under IFRS 9: capital transitional arrangement and bank systematic risk, Accounting and Business Research, 52:6, 641-679, DOI: 10.1080/00014788.2021.1952060

To link to this article: https://doi.org/10.1080/00014788.2021.1952060

Accounting and Business Research, 2022
Vol. 52, No. 6, 641–679, https://doi.org/10.1080/00014788.2021.1952060

Moving toward the expected credit loss model under IFRS 9: capital transitional arrangement and bank systematic risk

MINYUE DONG [a] and ROMAIN OBERSON [b]*

[a]*Faculty of Business and Economics (HEC), University of Lausanne, Lausanne, Switzerland;*
[b]*Faculté des Sciences de l'Administration (FSA), Laval University, Québec, Canada*

This paper examines banks' option to adopt the capital transitional arrangement (CTA) set out by the Basel Committee on Banking Supervision, in response to the introduction of the International Financial Reporting Standard 9 (IFRS 9), which requires the use of an expected credit loss model instead of an incurred loss model to estimate the impairment of financial assets. Using a sample of publicly listed European banks from 2016 to 2019, we find that bank CTA adoption choice is associated with neutral factors captured by bank-specific fundamental characteristics, and potential opportunistic factors related to regulatory constraints implied by the application of IFRS 9. We further find that banks that adopted the CTA (CTA adopters) decrease their exposure to systematic risk during the transitional period. However, this relationship is only significant in countries with powerful banking authorities. In those with less powerful banking authorities, CTA adopters tend to exercise more aggressively their accounting discretion. Our study is the first to address banks' voluntary choice to adopt the CTA policy under the mandatory application of IFRS 9.

Keywords: systematic risk; regulatory capital; IFRS 9; expected credit loss; banks
JEL Classifications: G21; G28; M41; M48

1. Introduction

The 'incurred loss' (IL) model of estimating accounting impairments has been criticised by banking regulators as providing untimely recognition of banks' credit losses, creating financial instability, and intensifying the procyclicality of bank lending during the 2007–2009 financial crisis (Basel Committee on Banking Supervision [BCBS] 2009, Financial Stability Forum [FSB] 2009). Accounting standard setters and academics expressed less critical views regarding the role of accounting in contributing to the severity of the financial crisis, instead blaming the inappropriate application of the IL model by banks (e.g. Hoogervorst 2012, Bischof et al. 2020).

*Corresponding author. Email: romain.oberson@fsa.ulaval.ca
Paper accepted by Peter Joos, Per Olsson, and Alfred Wagenhofer.

Accounting standards mainly aim at providing transparent information for investors in the capital market, while bank regulation aims to ensure the stability of the financial system.[1] These two distinct objectives may well collide (Zeff 2012), raising the question of the need to reform the accounting for credit losses mainly to accommodate banking regulators.[2] The International Accounting Standards Board (IASB) responded to banking regulators' criticisms by introducing an expected credit loss (ECL) model in the International Financial Reporting Standard (IFRS) 9 that replaced the IL model under International Accounting Standard (IAS) 39.[3]

Effective from the first fiscal quarter of 2018, the IFRS 9 ECL model aims to ensure more timely recognition of credit losses, but leads to two fundamental changes with potentially adverse consequences. First, earlier recognition of credit losses is expected to increase loan loss allowance (LLA) and decrease regulatory capital. As pointed out by the Basel Committee on Banking Supervision (BCBS), 'the impact could be significantly more material than currently expected and result in an unexpected decline in capital ratios' (BCBS 2017, p. 4). Second, the use of forward-looking information to measure the LLA under IFRS 9 introduces a significant amount of managerial discretion, which can also detrimentally affect financial stability (Novotny-Farkas 2016).

Aiming to attenuate one of these perceived adverse consequences of the IFRS 9 ECL model (i.e. a potential 'capital shock'), the BCBS introduced a capital transitional arrangement (CTA) by providing banks a transitional period to adapt their risk management to this new ECL model (BCBS 2017). Specifically, the CTA authorises banks to take up to five years to rebuild their necessary capital resources, by allowing them to estimate their regulatory capital under the previous accounting regime (i.e. the IL model). Relevant to the debate on the accounting treatment of expected credit losses, the CTA does reflect the different objectives of accounting standard setters and bank regulators. Accordingly, investigating how banks respond to these two interconnected but different policies is of significant interest and importance.

The primary purpose of this study is to examine bank-specific characteristics that influence their CTA adoption choices upon the application of the newly introduced IFRS 9 ECL model, and the consequences of CTA choice during the transitional period. Specifically, we develop three research questions in relation to the CTA: What are the determinants of bank CTA adoption

---

[1]As defined in the International Accounting Standards Board's Conceptual Framework for Financial Reporting, the general purpose of financial reporting is to 'provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions relating to providing resources to the entity' (IASB 2018, par. 1.2). In contrast, the primary mission of banking regulators is to protect the financial system as a whole by avoiding bank failure and limiting the frequency and cost of systemic crises (e.g. Barth and Landsman 2010, Acharya et al. 2017).

[2]In a speech on June 4, 2012, IASB Chairman Hans Hoogervorst stated 'Stability should be a consequence of greater transparency, but stability cannot be a primary goal of accounting standard-setters. It is not our remit and we simply lack the tools for fostering stability. […] What accounting standard setters can also not do is to develop standards that make items appear to be stable when they are not. And, quite frankly, we are sometimes suspicious that we are being asked to put a veneer of stability on instruments that are inherently volatile in value. Our standards should not create volatility that is not already there economically. But, if volatility exists, our standards should certainly not mask it.' (Hoogervorst 2012) available at https://www.ifrs.org/.

[3]The IASB and the Financial Accounting Standards Board (FASB) worked jointly on a converged standard on credit loss impairment, but ultimately failed to develop a single ECL model. In 2016, the FASB published the Accounting Standard Update (ASC) topic 326, which describes the new impairment model: the current expected credit loss (CECL) model. The FASB's CECL model standard takes effect in 2020 for listed companies and in 2021 for all other firms. For detailed discussions of the development of ECL models and differences between the IFRS 9 ECL model and the FASB CECL model, see Giner and Mora (2019) and Hashim et al. (2016).

choice? Do banks strategically select the CTA? Does the CTA adoption choice affect bank risk-taking?

To address these questions, we rely on a sample of 101 European publicly listed banks between 2016 and 2019. We hand-collect the data on bank CTA adoption choice and information related to the model used by the bank to estimate the risk-weighted assets (RWAs) (i.e. the internal rating-based (IRB) approach versus the standardised approach (SA)).

Our first sub-hypothesis examines whether banks' choice in applying advanced credit risk modelling (i.e. those implementing the IRB approach) is associated with CTA adoption choice. From a reporting practice perspective, since the estimation of ECLs is more aligned with the IRB approach than with the SA (Novotny-Farkas 2016), we expect IRB banks to opt out of the CTA. From the perspective of heterogeneous supervisory scrutiny, IRB banks' motivation to opt out of the CTA might be influenced by the supervisory environment. In light of the recent European financial and sovereign debt crises, the European Central Bank (ECB) created a common supervisory framework – the Single Supervisory Mechanism (SSM) – which has endowed the ECB with direct supervisory authority over European banks deemed 'significant'. In 2015, the ECB launched the Targeted Review of Internal Models (TRIM) project, which aims to assess whether the internal models currently used by SSM 'significant' institutions comply with regulatory requirements. Thus, IRB banks' motivation to opt out of the CTA is expected to be influenced by regulatory scrutiny over their use of internal models. Consistent with this prediction, we find that the use of the IRB approach does not drive banks' CTA opting-out choice unless IRB banks are directly supervised by the ECB under the SSM. These results suggest that 'significant' IRB institutions in the SSM are likely to be more prepared to adopt the IFRS 9 ECL model, and to absorb the capital shock of Day One application of ECL.

In addition to considering bank-specific institutional factors such as the use of advanced credit risk modelling (i.e. the IRB approach) and the regulatory framework (i.e. the SSM), we develop our second sub-hypothesis to examine whether banks' opportunistic behaviour drives their CTA adoption choices. Consistent with prior literature on bank capital management (e.g. Ahmed et al. 1999, Iannotta et al. 2019), we find that banks subject to regulatory capital constraints prior to the implementation of IFRS 9 are more likely to opt for the CTA. However, this result should be regarded as a double-edged sword. On one hand, this relationship might point to the efficacy of the CTA policy, since these regulatory-constrained banks could benefit from the CTA to reduce their risk-taking or to improve risk management, which corresponds exactly to the initiative of the BCBS for setting up the CTA. On the other, this relationship might highlight opportunistic behaviour, if regulatory-constrained banks have actually selected the CTA to delay compliance with the minimum regulatory capital requirement, which could in turn lead to a critical situation regarding future financial stability.

To further examine banks' plausible CTA-related opportunistic choices underlying our results, we investigate whether CTA choice changes banks' risk-taking behaviour. By using CTA non-adopters as a control group, we conduct a difference-in-differences (DiD) analysis, examining changes in risk exposure upon CTA adoption. We find that CTA adopters decrease their exposure to systematic risk following the CTA adoption, implying that the CTA adoption choice is not driven by opportunistic motives, but is a consequence of regulatory compliance. These results lead us to examine the influence of banking authorities' power on banks' risk-taking. We find that the effect of reduced exposure to systematic risk by CTA adopters is more pronounced when banking authorities hold more power over banking activities. This relationship is robust when using two different measures of supervisory power: (1) a country-level indicator based on the 'official supervisory power' index (Barth et al. 2013) and (2) an indicator that captures significant institutions directly supervised by the ECB in the SSM.[4] Finally, we examine whether CTA adopters are more likely to exercise accounting discretion over loan impairment estimates instead of decreasing risk-taking. Consistent with this prediction, we find that CTA adopters operating in countries with less powerful banking authorities engage more aggressively in accounting discretion during the IFRS 9 period, compared to those operating under a more powerful banking authority.

To ensure that our results are robust with respect to different risk-taking measures and research designs, and that our identification strategy captures banks' reaction to the CTA adoption choice rather than other economic events or policy changes, we conduct several robustness checks and sensitivity analyses. First, we focus on bank exposure to tail risk measured by the long-run marginal expected shortfall (LRMES), and report that CTA adopters decreased their tail risk exposure following the CTA adoption. Second, we use average values instead of year-end values and employ different market indices (i.e. MSCI World index, MSCI Europe index, and the Euro Stoxx 50 Index) for estimating bank risk-taking. The post-CTA adoption risk reduction still holds using theses alternative measures. Third, to mitigate concerns surrounding changes in bank risk exposure due to bank-specific factors other than their CTA adoption choice, we employ entropy balancing (Hainmueller 2012) and report that differences in bank fundamentals across CTA adopters and non-adopters do not affect our inferences. Fourth, we apply an event study to test the parallel trend assumption underlying our DiD research design. In parallel, we also change our control group from CTA non-adopters to insurance companies. Both additional analyses confirm our inferences. Finally, we perform a permutation test, which further confirms that the reported reduction in banks' risk-taking following CTA adoption is not a random effect.

Our research contributes to the literature on bank accounting and reporting in three key ways. First, given that the CTA aims to neutralise the effect of IFRS 9 on regulatory capital, we provide preliminary evidence that applying the new ECL model under IFRS 9 might influence bank risk-taking. Indeed, instead of using the higher level of managerial discretion offered by IFRS 9 to manipulate the LLA, CTA adopters commit to decreasing their risk-taking, provided that these banks operate under the umbrella of a powerful banking authority. Second, our study addresses an important interplay between accounting standards and the Basel regulation. We provide the first empirical evidence showing the effectiveness of the CTA policy, which allows banks to smooth the transition from the IL model to new ECL under IFRS, thereby avoiding a sharp impact on regulatory capital owing to the change of accounting standard. Third, the reported decrease in banks' systematic risk exposure subsequent to the CTA adoption choice complements and softens the conclusion currently dominating the literature, that banks often behave opportunistically in their use of internal models (e.g. Behn et al. 2016).

Our findings have timely implications for accounting standard setters, bank regulators, and, more generally, users of bank financial reporting. We show that the new IFRS 9 ECL model, in conjunction with the CTA policy, significantly changes banks' reporting choices, and risk-taking. Our results suggest that transitional policies such as the CTA can be effective in bridging the regulation gap between the Basel rules and IFRS. While banks can select the CTA for opportunistic purposes, we find that (1) IRB-'significant' SSM institutions prefer opting out of the CTA, and that (2) subject to powerful banking authorities, CTA adopters significantly reduce their risk exposure during the transitional period. Both findings imply the crucial role of banking authorities in monitoring banks' practices.

[4]Loipersberger (2018) provides evidence consistent with market participants viewing the ECB as holding significant power over banking activities through the SSM.

The remainder of the paper proceeds as follows. In Section 2, we discuss the regulatory background. In Section 3, we review prior literature and develop our hypotheses, and in Section 4, we present the research design. In Section 5, we discuss our main results and robustness tests. Section 6 offers a summary and concluding remarks.

2. Background

2.1. *Accounting for credit loss*

IAS 39 obliged firms to record impairment of financial assets conditional on the occurrence of an objective evidence of impairment, namely a 'trigger event'. This restriction was criticised as being too little, too late (European Central Bank [ECB] 2017) – a problem that IFRS 9 was designed to solve.[5] Under IFRS 9, banks stop waiting for a trigger event, instead estimating a buffer to cover potential loan losses upon initial loan recognition. IFRS 9 also differentiates the estimation of ECLs according to credit risk into three stages. Financial assets characterised as low-level credit risks, or whose risk level has not increased since the initial recognition, are classified as Stage 1. Financial assets whose credit quality has deteriorated significantly since initial recognition are recognised as Stage 2. Financial assets that are subject to incurred credit losses or are credit-impaired are designated as Stage 3. Banks report 12-month ECLs for Stage 1, but full-lifetime ECLs for Stages 2 and 3.[6] Therefore, the ECL amounts depend on the loan-stage classification and subsequent changes in credit risk. From the point when an ECL is initially recognised, any significant increase in credit risk on this loan requires a periodic update of additional provisions. Bank management should deal with various uncertainties in applying the new ECL model, including, the identification of change in credit risk and the lifetime estimate of ECLs.[7] Overall, IFRS 9 requires 'a significant increase in the role of risk management, data availability and expert judgment for accounting purposes, for which strong governance and clear internal processes have to be in place' (ECB 2017, p. 5).

[5] Gebhardt and Novotny-Farkas (2011) report that the adoption of IAS 39 by European banks resulted in delayed recognition of loan losses. O'Hanlon (2013) provides evidence suggesting that stricter requirements for the recognition of loan losses for UK banks implied by the adoption of IAS 39 did not result in less timely loan-loss provisioning. These contrasting results imply that multiple stakeholders (e.g. managers, enforcers and regulators) are key to determine the timeliness of loan loss recognition beyond the standards per se (Mora and Walker 2015). To judge whether the IFRS 9 ECL model will effectively solve the issues related to the IL model is unclear. As the IFRS 9 ECL model requires the immediate establishment of loss allowances at day 1 (unconditional conservatism) that may lead to earnings management, Hashim et al. (2019) note that this approach is 'consistent with the way in which bank regulators require expected losses on exposures to be reflected for the purpose of determining banks' capital requirements, [but] this approach is not easily justified for the purpose of measuring credit-loss expense and loss allowances in financial statements' (p. 713). Building on these arguments, they conclude that 'it is unlikely that any ex-ante acceptable method of accounting for credit-loss impairment would have substantially mitigated the consequences of a shock of the magnitude that occurred in the crisis.' (p. 715).

[6] IFRS 9 also specifies a 'simplified approach' for trade receivables, contract assets recognised under IFRS 15 and lease receivables under IAS 17 (or IFRS 16). When adopting the simplified approach, the entity does not need to calculate a 12-month ECL nor to identify a significant increase in credit risk, but instead should recognize a loss allowance based on lifetime ECLs at each reporting date from origination.

[7] Overall, the IFRS 9 impairment approach differs substantially from that under IAS 39. Only credit-impaired loans (Stage 3) are not modified, since this category of exposures also requires the estimation of lifetime expected losses under IAS 39. Consequently, the estimation of ECLs for Stage 1 and Stage 2 financial assets should result in greater accounting loan loss provisions (BCBS 2017).

2.2. *Basel rules on credit risk and capital adequacy*

As credit risk is the largest risk exposure for the majority of banking institutions, the BCBS has issued a series of interconnected regulations embodying credit risk and capital requirements. In 1988, the Basel I accords introduced a capital adequacy ratio (CAR) based on a framework that required banks to hold regulatory capital in proportion to risk-weighted assets (RWA). In contrast to on-balance-sheet total assets that do not entail risk implications, the level of RWAs is sensitive to the level of banks' exposure to credit risk. Depending on the type of asset and the associated counterpart's riskiness, one of four possible risk weights (i.e. 0%, 20%, 50%, or 100%) associated with credit risk is assigned to each bank asset. RWAs are calculated by using the sum of all assets multiplied by the respective risk weights. Since the value of RWAs is used as the denominator of the CAR, the higher the credit risk exposure, the higher the RWAs, and consequently the higher the regulatory capital requirements. This risk-sensitive capital charge remains the fundamental principle of the Basel accords, despite ongoing policy changes.[8]

In 2004, to enhance the stability of the financial sector by making capital charges more sensitive to banks' risk exposures, the Basel II framework extended the focus on credit risk to market and operational risks, and importantly, allowed banks to calculate the RWAs associated with these risks using two different approaches: the advanced approach and the standardised approach (SA).[9] In contrast to using the SA, under which risk weights are fixed and standardised, banks applying an advanced approach can use internally generated data and define different modelling processes to compute the RWAs. The advanced approach for credit risk, known as the IRB approach, allows banks to define either one or all three parameters for calculating credit risk: probability of default (PD), loss given default (LGD), and exposure at default (EAD).[10] In practice, the IRB approach is closely aligned with the new ECL model, since three similar parameters are used to estimate ECLs under IFRS 9 (see Novotny-Farkas (2016) for a detailed discussion). Unlike the SA, the IRB approach must be approved by the national banking supervisor. The approval of internal models is based on bank business models as well as on available bank resources: 'the process for determining which banks may be subject to the advanced approaches will require assessment of a number of factors, including a bank's risk profile, the nature of its operations, and its ability to meet the eligibility requirements for these approaches' (BCBS 2004, p. 11).[11] Since 2004, banks have increasingly implemented IRB models. However, these have been widely criticised, as banks seem to manipulate the estimated risk parameters to benefit from lower regulatory capital charges (e.g. Mariathasan and Merrouche 2014, Behn et al. 2016). Addressing those concerns, the ECB launched the TRIM initiative in 2015 to investigate whether the SSM-'significant' banks correctly apply internal models and report reliable and comparable risks estimates.[12]

[8]In 1996, the BCBS extended the RWA requirement from credit risk to market risk (BCBS 1996), but the minimum capital adequacy ratio (i.e. regulatory capital over RWAs) remained unchanged at 8%. In 2004, aiming to improve the risk sensitivity of capital requirements, the Basel II accords extended the risk-weight categories from credit risk and market risk to operational risks, and changed the rules for assigning risk weights to assets.

[9]Under Basel I, internal models were already available to banks for estimating market risk.

[10]IRB yields two methods: the foundation internal ratings-based (F-IRB) and the advanced internal ratings-based (A-IRB) methods. Under the F-IRB method, banks are allowed to define only one parameter – probability of default – while under the A-IRB method, banks can use their own methodologies to estimate all three main parameters.

[11]See the guidelines on the implementation, validation and assessment of Advanced Measurement (AMA) and Internal Ratings Based (IRB) Approaches (GL10) – https://eba.europa.eu/.

[12]In its 2018 annual report on supervisory activities, available at www.bankingsupervision.europa.eu, the ECB notes, 'TRIM is the largest project that ECB Banking Supervision has launched so far' (p. 38).

Since Basel I, accounting for loan losses has consistently received attention from banking regulators as it directly influences regulatory capital.[13] In October 2016, in reaction to the future introduction of ECL models by both the IASB and the FASB, the BCBS launched a consultation related to the regulatory treatment of accounting provisions under the new approach. Consistent with the accounting profession's view of the impact of the IFRS 9 ECL model (Ernst and Young 2018), the BCBS 'acknowledges that the transition to ECL accounting will generally result in an increase in the overall amount of loan loss provisions, which in many cases will reduce the CAR of banks' (BCBS 2017, p. 4).

To address this perceived adverse impact on bank regulatory capital, the BCBS introduced the CTA policy. The primary objective of the CTA is to ensure a stable transition from the old, incurred-based models to the new, expected-based ones by adding back a transitional adjustment to regulatory capital. Broadly speaking, the authorised transitional adjustment under the CTA policy corresponds to the difference in required provisions under the IAS 39 incurred-loss model and the IFRS 9 ECL model. This adjustment is phased out each year, allowing CTA adopters to absorb the Day One capital impact of an IFRS 9 adoption over a five-year transitional period. For banks applying the IRB approach, the transitional adjustment needs to be adjusted for any existing IRB provisioning 'shortfall'.[14] The CTA aims to give banks a protracted time of up to five years to rebuild regulatory capital following the application of ECL accounting. Through the Pillar 3 framework, banks are required to disclose publicly whether this CTA is applied. CTA adopters should also report publicly regulatory capital and leverage ratios on a 'fully loaded' basis, that is, without the impact of the CTA (BCBS 2017, p.6).

3. Review of the literature and hypothesis development

Two branches of the literature are relevant to this paper: (1) accounting and regulatory discretion in estimating credit losses, and (2) bank risk-taking. Drawing on these two streams of research, we develop hypotheses related to banks' motives for adopting the CTA policy and subsequent consequences of this adoption on bank risk-taking.

3.1. *Non-opportunistic determinants of CTA adoption*

Although the BSBC does not require bank election of the CTA option to bond with the RWA reporting approach, either SA or IRB, we expect an association between these two regulatory choices for several reasons.

First, in an assessment of the European banks' preparedness for the implementation of IFRS 9 (ECB 2017), the ECB expects a larger capital shock for SA banks than for IRB banks. Indeed, owning to the prudential treatment of accounting provisions for IRB banks, any shortfall will attenuate the impact on regulatory capital of the increase in LLA when IFRS 9 is first

[13]The effect of accounting loan loss provisions on regulatory capital is conditional on whether the loan loss allowance is lower or higher than 1.25% of the risk-weighted asset since the introduction of the Basel framework. The inclusion of general provisions in Tier 2 capital is limited to 1.25% of credit RWAs. The regulatory capital treatment of provisions under the SA and IRB approaches differs slightly since the adoption of Basel II. For more information please refer to BCBS (2017).

[14]It corresponds to the difference between accounting provisions under IAS 39, and prudential expected losses for portfolios under the IRB approach. If prudential expected losses under the IRB approach are higher than accounting provisions under IAS 39, the shortfall will absorb (totally or partially) the impact on CET1 of the increase in accounting provisions when IFRS 9 is first applied (which would not be the case for portfolios under the SA approach).

applied.[15] Consequently, other things being equal, IRB banks are more likely to have necessary regulatory capital resources to absorb the expected adverse capital shock upon the application of the IFRS 9 ECL model, thereby supporting their choice to opt out of the CTA.

Second, as noted above, the IRB approach requires the estimation of risk parameters, which are similar to those used in the IFRS 9 ECL model to estimate the LLA. Since building an efficient internal system for estimating ECLs is key for implementing IFRS 9 properly (ECB 2017), IRB banks have cost and experience advantages over SA banks. Moreover, banks with better management are more likely to obtain the IRB validation by national supervisors (Cucinelli et al. 2018). This discussion leads us to predict that IRB banks are better prepared to apply the IFRS 9 ECL model than SA banks. That is, IRB banks should be more likely to opt out of the CTA.

Third, in line with signalling theory, opting out of the CTA would signal that banks are ready to apply the new ECL model regardless of potentially adverse impacts on capital adequacy. Because IRB banks are larger (Cucinelli et al. 2018) and face more regulatory scrutiny (e.g. Vallascas and Hagendorff 2013), they have incentives to opt out of the CTA to avoid 'red flags' attracting further scrutiny.

However, IRB banks' ability and incentive to opt out of the CTA may depend on the ongoing evolution of their institutional frameworks and regulatory policies. As discussed in the introduction, the SSM framework is likely to influence IRB banks' CTA adoption choice, since IRB-'significant' banks in the SSM are subject to higher regulatory scrutiny over their use of internal models because of on-site investigations under the TRIM project. In addition, estimating ECLs remains challenging for most banks (Gruenberger 2012) and IRB models may be applied improperly by some banks (Behn et al. 2016), even those under the SSM system (ECB 2018).[16] Overall, these factors are expected to dilute the benefits for IRB banks of opting out of the CTA.

Based on these considerations, we develop our hypothesis as follows (in the null form):

> **H1a**: Banks that apply the IRB approach are not more likely to opt out of the CTA than banks applying the SA.

3.2. *Opportunistic determinants of CTA adoption*

Owing to the direct impact of loan impairment[17] on banks' net income and regulatory capital, accounting for loan losses has remained one of the dominant topics in bank accounting research (Ryan 2011, Beatty and Liao 2014). Indeed, loan impairment is the largest accrual for most banks, which gives rise to information asymmetry between bank managers and outsiders, since compared to outsiders, bank managers have superior information about the credit quality of their loans. Beatty and Liao (2014) and Ryan (2011) provide recent surveys of the literature showing that, depending on their characteristics and economic condition, banks exercise discretion over loan loss estimations in order to manage earnings and regulatory capital.

[15]See footnote 14. Please also refer to Novotny-Farkas (2016) for a detailed discussion over the regulatory capital treatment of IFRS 9 impairments of IRB banks.

[16]See details on https://www.bankingsupervision.europa.eu/, 'Status update on TRIM: overview of outcome of general topics review and interim update on preliminary results of credit risk on-site investigations'.

[17]The literature often refers to loan impairment as loan loss provision, which is the term used in the prudential bank regulation but not in accounting standards. In this study, we refer to loan impairment as the loss recognised in the income statement in the reporting period, and LLA is the accumulated impairment that appears in the balance sheet at the end of the reporting period.

Several studies focus specifically on the capital management incentive and provide evidence showing that U.S. bank managers have exercised discretion over accounting provisions to manage regulatory capital, both before (Moyer 1990, Beatty et al. 1995) and after the Basel accords (Ahmed et al. 1999). In a recent paper, Orozco and Rubio (2021) show that accounting discretion used to manage regulatory capital by US commercial banks has detrimental effects on bank stability. However, studies using European data tend not to observe such opportunistic behaviour (e.g. Curcio et al. 2017).

In contrast to the accounting research that almost exclusively focuses on banks' accounting discretion in loan loss provisioning, banking research has examined bank managers' discretionary behaviour over the calculation of the RWAs, in particular since 2004, when Basel II allowed for banks to use IRB approaches. The IRB approach offers bank managers more opportunities to manipulate the estimates of risk parameters (e.g. PD) as banks can use their own models and estimated parameters. Consistent with this opportunistic view, studies have documented evidence suggesting that as bank managers make strategic choices in modelling credit risk under the IRB framework, the required regulatory capital does not reflect banks' actual credit risk (e.g. Mariathasan and Merrouche 2014, Behn et al. 2016).

Further, unlike the IRB choice, for which banks should trade off between significant application costs and approval uncertainty by supervisors, the CTA option is not subject to any validation process and thereby is not affected by potential application costs and regulatory process uncertainties. By providing only their CTA decision and related mandatory disclosures under the Pillar 3 framework, banks can immediately obtain the regulatory benefit of delaying the application of ECL. Embracing this opportunistic view, we predict that regulatory-constrained banks are more likely to select the CTA to benefit from temporarily lower capital charges.

H1b: Regulatory-constrained banks are more likely to opt for the CTA.

3.3. *CTA adoption choice and bank risk-taking*

Along with the research on credit-risk reporting opportunistic choices, many studies have examined bank risk-taking under the Basel frameworks.

Focusing on RWAs estimation, Behn et al. (2016) find that, compared to SA banks, large banks are more likely to benefit opportunistically from lower capital charges under the IRB approach, subsequently expanding their risk-taking in lending. Indeed, if regulation of credit risk assessment fails to capture bank risk-taking, banks have incentives to take risks that they would not under more efficient regulation (Iannotta et al. 2019). In contrast, other studies report improvement in risk management owing to the application of IRB models. For instance, Cucinelli et al. (2018) provide evidence that IRB banks can curb the increase in credit risk driven by the macroeconomic slowdown more efficiently than SA banks.

Overall, the effect of bank CTA adoption choice on risk-taking is likely to be influenced by intrinsic motivation (i.e. opportunistic or non-opportunistic). On one hand, empirical studies have reported consistently that regulatory-constrained banks are more likely to engage in opportunistic behaviour (e.g. Ahmed et al., 1999, Mariathasan and Merrouche 2014). From this perspective, banks that select the CTA are expected to take advantage of the transitional period to take more risks than would be possible under a fully applied IFRS 9 framework. In contrast to this opportunistic view, banks opting for the CTA are expected to use the transitional period to reduce risk-taking, in order to rebuild the necessary capital resources following a potentially negative impact arising from the application of the IFRS 9 ECL model. Following the discussion in Section 3.1, we expect that the contention between these two competing arguments depends on banks' intrinsic motivation and, ultimately, their institutional environments.

With respect to banks' institutional environments, we focus on the power of the banking authority. Hoque et al. (2015) argue that the banking authority forms its assessments on bank risk on the basis of proprietary information, and might ultimately use its power to affect bank risk-taking. For instance, supervisors might adversely influence banks' risk-taking by intervening in bank activities, forcing them to issue risky loans to unqualified borrowers for private or political benefits.

Recent studies have investigated how heterogeneity in the power of the banking authority drives the differences in bank opportunistic behaviour that are likely to influence bank risk-taking. For instance, Mariathasan and Merrouche (2014) report that a powerful banking authority reduces banks' incentives, or abilities, to opportunistically underreport RWAs. Costello et al. (2019) and Hirtle et al. (2020) provide evidence that effective banking supervision may curb earnings and capital management by banks. While acknowledging that banking authorities are influenced by their political connections, García Osma et al. (2019) show that more politically independent supervisors moderate earnings smoothing in European banks, implying that political forces support earnings smoothing as it creates an appearance of economic health and financial stability. On the other hand, banking supervisors seek an optimal balance between prudential regulation and economically detrimental volatility. As a result of this political influence over banking authorities, we predict that politicians and banking authorities have converging objectives with respect to the CTA, since this policy aims to enhance financial stability via an important accounting rule change.

Following these arguments, we expect that banks' risk-taking following the adoption of the CTA policy varies with the power of the banking authority. We formulate our hypothesis without directional form:

H2a: Banking authority power affects CTA adopters' risk-taking.

As an extension of H2a, we further investigate whether banks react opportunistically to the CTA policy. Bushman and Williams (2012) conclude that the discretion provided by the IL model, in the form of delaying recognition of credit losses, provides banks managers with opportunities to engage in risk-shifting behaviour. Novotny-Farkas (2016) reports that the IFRS 9 ECL model enlarges the scope for judgement and managerial discretion compared to the IAS 39 IL model, and still provides bank managers with opportunities to delay the recognition of credit losses. Consequently, in the absence of strict enforcement, CTA adopters can easily benefit from the increased flexibility provided by the IFRS 9 ECL model in estimating the transitional adjustment during the CTA period. In other words, the CTA policy might lead banks to engage in opportunistic accounting discretion, rather than adapting their actual risk-taking. As noted by Bushman and Williams (2012): 'proposals to increase discretion in loan loss accounting embed significant risks of unintended consequences, as gains from reducing pro-cyclicality may be swamped by losses in transparency that dampen market discipline and increase the scope for less prudent risk-taking by banks' (p. 15). Thus, we predict that CTA adopters that did not reduce their risk-taking will engage more aggressively in accounting discretion during the CTA transitional period. For the same reasons discussed under H2a, we expect that the use of accounting discretion varies with the power of the banking authority. Following this discussion, we formulate our final hypothesis as follows:

H2b: Banking authority power affects CTA adopters' discretionary accounting choices.

4. Research design

4.1. *Sample and data*

Panel A of Table 1 summarises our sample selection process. We obtain our sample by identifying all European listed banks during the years 2016–2019 using S&P Global Market Intelligence.[18] This first screening yielded 174 banks across 26 European countries. We then exclude 23 sub-companies and include only the primary ones, because management decisions are likely to be made by the parent company, rather than at the subsidiary level. We also exclude 30 non-IFRS banks. We eliminate bank-year observations with missing data. As a final filter, we retain banks with at least 30 daily returns to compute market risk measures and banks with at least one observation in the pre- and post-IFRS 9 periods. Overall, this selection procedure yielded a final sample of 383 bank-year observations for 101 banks.

Panel B of Table 1 provides a breakdown of the sample composition by country, and banks' fundamentals and institutional features: the 'official supervisory power' and the 'rule of law' scores. Our sample is dominated by banks operating in Norway (21) and Italy (16).[19] For the 101 banks that composed our sample, we hand-collected information related to the CTA adaptation decision. Within our sample, 38 banks opted for the CTA, effective from the 2018 fiscal year.[20] All sample banks made a one-time decision, that is, to adopt or to opt out, during the investigated IFRS 9 period. We also report that 43 institutions are under the umbrella of the SSM and 57 institutions apply the IRB approach.

Table 2 presents descriptive statistics of the main variables used in the analysis. The average market beta (*SYSTEMATIC RISK*) is 0.82. During the 2016–2019 period, banks had an average return on assets (*ROA*%) of 0.62%. The proportion of loans (*LOANS*) represents 66% of total assets, of which 6% are non-performing (*NPL*). Banks are well capitalised, with an average regulatory capital ratio (*CAPITAL RATIO*) of 19%.

4.2. *Empirical models*

4.2.1. *Determinant analysis*

This section is exploratory in nature. As described in Sections 3.1 and 3.2, we rely on prior literature and use economic and institutional rationales to identify possible determinants: neutral or opportunistic motives. Our model follows previous studies that investigate the determinants of accounting and regulatory choices (e.g. Bischof et al. 2011, Fiechter et al. 2017, 2018). Specifically, we conduct a probit regression to identify cross-sectional determinants to adopt the CTA at a given point in time. Our base model is as follows:

$$\begin{aligned} \mathit{CTA\ ADOPTION}_{it} = {} & \beta_0 + \beta_1 \mathit{IRB}_{it} \\ & + \beta_2 \mathit{COST\ TO\ INCOME}_{it} + \beta_3 \mathit{ROA\%}_{it} + \beta_4 \mathit{LOANS}_{it} \\ & + \beta_5 \mathit{CAPITAL\ RATIO}_{it} + \beta_6 \mathit{SIZE}_{it} + \beta_7 \mathit{GDP\%}_{jt} \\ & + \beta_8 \mathit{SSM}_{it} + \beta_9 \mathit{SP}_{jt} + \beta_{10} \mathit{ROL}_{jt} + \varepsilon_{it} \end{aligned} \tag{1}$$

[18]More precisely, we focus on operating banks as of 31.12.2018 from developed European countries that are fully covered by S&P Global Market Intelligence.

[19]Our inferences remain qualitatively unchanged if we exclude banks operating in Norway or Italy (unreported).

[20]Our sample is characterised as 38% CTA adopters. The EBA reports that 43% of banks out of a sample of 54 (mostly) large banks opted for the CTA across 20 member states in 2018. Using all banks operating in the European Union, the percentage of CTA adopters increases to 57% (European Banking Authority [EBA] 2018).

Table 1. Sample.

Panel A: Sample selection

	Less	Remaining banks	Bank-year observations
Universe of listed European banks in SP Global Market Intelligence		174	
Less sub-companies	−23	151	
Less non-IFRS banks	−30	121	
Less bank year observations with missing data	−13	108	399
Less bank-year observations with less than 30 daily returns to compute market risk measures	0	108	395
Less banks without at least one observation in the pre- and post-IFRS 9 period	−7	101	383

Panel B: Number of banks, Bank-years observations by country & Institutional features

		Banks characteristics				Institutional features	
Countries	Bank-year observations	# Banks	#CTA banks	# SSM banks	# IRB banks	*SP*	*ROL*
Austria	19	5	0	3	3	11	1.84
Belgium	4	1	0	1	1	11	1.39
Cyprus	3	1	1	1	0	6	0.88
Czech Republic	4	1	0	0	0	9	1.09
Denmark	20	5	3	0	4	8	1.91
Finland	12	3	1	1	3	12	2.04
France	15	4	0	4	4	11	1.43
Germany	22	6	0	4	4	12	1.66
Greece	19	5	5	4	2	10	0.15
Ireland	8	2	1	2	2	8.5	1.55
Italy	58	16	11	11	8	13	0.29
Malta	11	3	1	1	0	13	1.08
Netherlands	10	3	0	2	3	11	1.87
Norway	83	21	1	0	7	8	2.01
Portugal	4	1	1	1	1	14	1.13
Spain	31	8	4	8	6	12	0.97
Sweden	11	3	0	0	3	14	1.97
Switzerland	15	4	1	0	1	14	1.94
United Kingdom	34	9	8	0	5	11	1.71

Note: The 'official supervisory power' index (*SP*) is drawn from Barth et al. (2013) and is measured using the 2019 Bank Regulation and Supervision Survey from the World Bank. The rule of law index (*ROL*) from the World Bank captures the perception of the extent to which agents have confidence in, and abide by, the rules of society. The values displayed in the last column represent the average *ROL* for the period 2016–2019 (using beginning-of-year estimates).

For CTA adopters, the dependent variable *CTA ADOPTION* equals one in the year prior to the adoption of the CTA, and is missing in the years before and after. For CTA non-adopters, *CTA ADOPTION* equals zero in the fiscal years prior to the effective implementation of IFRS 9 and is missing in the years after. We exclude bank-year observations in the years post-IFRS 9, to ensure that our findings are not driven by the changes in bank fundamentals owing to the adoption of IFRS 9. Our main explanatory variable is *IRB*, an indicator variable that takes the value one if bank *i* uses the IRB approach to measure credit risk for estimating

Table 2. Descriptive statistics.

Variable	N	Mean	SD	Q1	Median	Q3
CTA ADOPTION	153	0.22	0.42	0.00	0.00	0.00
TOTAL RISK	383	0.32	0.18	0.21	0.26	0.35
IDIOSYNCRATIC RISK	383	0.05	0.08	0.02	0.02	0.04
SYSTEMATIC RISK	383	0.82	0.55	0.32	0.80	1.15
CTA BANK	383	0.37	0.48	0.00	0.00	1.00
IRB	383	0.57	0.50	0.00	1.00	1.00
DIFF	383	0.11	0.05	0.08	0.10	0.13
NPL	383	0.06	0.10	0.01	0.03	0.06
COST TO INCOME	383	0.60	0.15	0.48	0.58	0.71
ROA%	383	0.62	0.65	0.32	0.58	0.94
ROA SD	383	0.40	0.61	0.12	0.19	0.43
MB	383	0.96	0.77	0.55	0.83	1.08
LOANS	383	0.66	0.18	0.56	0.69	0.81
CHARTER VALUE	383	0.98	0.07	0.95	0.98	1.00
CAPITAL RATIO	383	0.19	0.04	0.16	0.18	0.21
SIZE	383	10.58	2.19	9.06	10.62	12.37
RISK FREE RATE	383	0.07	0.66	−0.33	−0.31	0.72
GDP%	383	1.96	1.32	1.25	1.73	2.39
SSM	383	0.42	0.49	0.00	0.00	1.00
ROL	383	1.41	0.67	0.98	1.69	1.97
LI	141	0.00	0.00	0.00	0.00	0.00
ΔNPL	141	−0.01	0.02	−0.01	0.00	0.00
ΔLOANS	141	0.08	0.18	0.02	0.05	0.08
NCO	141	0.00	0.01	0.00	0.00	0.01
GROWTH	141	0.06	0.10	0.01	0.04	0.08
LOSS	141	0.03	0.17	0.00	0.00	0.00
SP NORM	141	0.56	0.27	0.25	0.63	0.75
DCB	260	1.12	0.47	0.85	1.11	1.36
LRMES	260	0.42	0.14	0.35	0.43	0.50

This table provides descriptive statistics for variables used in this study. All variables except dummies are winsorised at the 1st and 99th percentiles. The sample includes up to 101 banks for the period 2016–2019. See Appendix 1 for variable definitions.

regulatory capital, and zero otherwise. In the estimation of Equation (1), $\beta_1 = 0$ would be consistent with H1a as IRB banks would not appear less likely to adopt the CTA.

As suggested by the relevant literature (e.g. Beatty et al. 2002, Bischof et al. 2011, Lim et al. 2013, Fiechter et al. 2017, Cucinelli et al. 2018), we control for several bank-specific fundamentals, such as managerial inefficiency, using the ratio of operating expenses to operating income (*COST TO INCOME*), bank performance using the ratio of net income to total assets in percent (*ROA*%), bank asset structure and business model using the ratio of total gross loans to total assets (*LOANS*), bank capitalisation using the regulatory capital ratio (*CAPITAL RATIO*), and bank size using the logarithm of total assets in € millions (*SIZE*). Second, we use the relevant real GDP growth in percent (*GDP*%) to control for economic conditions in the bank's home country *j*. Finally, we control for two layers of institutional features likely to influence bank managerial decisions (Barth et al. 2004, Loipersberger 2018, García Osma et al. 2019). First, we control for bank-specific regulations related to the SSM, taking the value one for a bank categorised as a 'significant' institution in the SSM, and zero otherwise. Second, we control for the country-specific institutional environment. We use the rule of law (*ROL*) from Kaufmann et al. (2011) to capture the overall quality of the legal system, including the quality of contract enforcement, property rights, and the courts. We also consider the level of power of the banking authority – 'official supervisory power' (*SP*) (Barth et al. 2013) – and use data from the 2019 Bank Regulation and Supervision Survey published by the World Bank. This index captures the power of the supervisor to demand information or take legal action against auditors, to restructure troubled banks, and to require banks to provision for potential losses.

To test H1b, we alternatively include two additional variables in Equation (1) to capture banks that would operate with tight regulatory constraints under IFRS 9, due to higher credit risk. We first include *DIFF*, measured as the difference between the ratio of common equity to RWAs, and the ratio of common equity to total assets. Banks with lower values of *DIFF* are riskier, as the difference between the two ratios lies in the denominator (i.e. the risk-weighted assets and the total assets). Intuitively, *DIFF* captures the margin in terms of bank risk exposure as measured by the RWAs between the regulatory capital ratio and the leverage ratio. Our second variable is *NPL*, measured by the ratio of non-performing loans to total gross loans. In the estimation of Equation (1), a negative coefficient on *DIFF* or a positive coefficient on *NPL* would be consistent with H2b, as banks with a higher level of on-balance sheet credit risk should be more likely to adopt the CTA.

4.2.2. *Bank risk-taking*

To investigate how bank risk-taking evolved following the CTA adoption, we follow the banking literature (Flannery and James 1984, Kane and Unal 1988, Haq and Heaney 2012, Hoque et al. 2015) and focus on three measures of bank equity risk: total, idiosyncratic, and systematic.

To measure total risk (*TOTAL RISK*), we refer to Haq and Heaney (2012) and take the standard deviation of bank stock returns. This measure is estimated each fiscal year for each bank using daily stock return data available in that fiscal year. It is defined as follows:

$$STD\ RISK = \sqrt{\frac{1}{n}\sum_{t=1}^{N}(R_{it} - \bar{R}_i)^2} \tag{2}$$

where R_{it}=bank i return for day t, $\bar{R}_i$ = the average bank i return, and N = the number of observations. *TOTAL RISK* is the annualised standard deviation of bank stock returns (i.e. we multiply *STD RISK* by the square root of 250 (e.g. Flannery and Rangan 2008)).

We determine systematic and idiosyncratic risks using a market model regression of daily bank returns on daily market portfolio returns (Niu and Richardson 2006, Beltratti and Stulz 2012, Bushman et al. 2016, Acharya et al. 2017). The risk estimates are calculated each fiscal year for each bank using the following regression model:

$$R_{it} = \alpha_0 + \beta_{it} R\_MSCI_t + \varepsilon_{it} \tag{3}$$

where R_{it}= bank i return for day t, and as the market portfolio return, R_MSCI_t, we follow Beltratti and Stulz (2012) and Iannotta et al. (2019) by using the MSCI World index. Equation (3) is estimated at the end of the fiscal year using one year of data. The residual variance from the market model is used as an estimate of idiosyncratic risk (*IDIOSYNCRATIC RISK*),[21] and the equity market beta, β_{it}, is used as a proxy for systematic risk (*SYSTEMATIC RISK*).

To generate valid inferences, we implement a DiD design for H2a to remove the effects of contemporaneous changes in economic conditions affecting bank risk-taking from the effects

[21]The variable *IDIOSYNCRATIC RISK* is multiplied by 100 for expositional convenience.

of adopting the CTA. This approach allows for a comparison of the differences in bank risk-taking across a treatment group and a control group, before and after the CTA adoption. Specifically, we estimate the following model:

$$\begin{aligned} RISK_{it} = {} & \beta_0 + \beta_1 POST_{it} + \beta_2 CTA\ BANK_{it} + \beta_3 POST_{it}{}^{*} CTA\ BANK_{it} \\ & + \beta_4 CHARTER\ VALUE_{it} + \beta_5 MB_{it} + \beta_6 ROA\%_{it} + \beta_7 ROA\ SD_{it} \\ & + \beta_8 CAPITAL\ RATIO_{it} + \beta_9 SIZE_{it} + \beta_{10} RISK\ FREE\ RATE_{jt} \\ & + \beta_{11} GDP\%_{jt} + \beta_{12} SSM_{it} + \beta Fixed\ Effects + \varepsilon_{it} \end{aligned} \tag{4}$$

where *RISK* is *TOTAL RISK*, *IDIOSYNCRATIC RISK*, or *SYSTEMATIC RISK*. The main explanatory variables of interest are (a) *POST*, an indicator that equals one for years from the first fiscal year of IFRS 9 adoption and zero otherwise, and (b) *CTA BANK*, an indicator that equals one for banks that opt for the CTA (i.e. CTA adopters), and zero otherwise (i.e. CTA non-adopters). In the estimation of Equation (4), $\beta_3 \neq 0$ would be consistent with CTA adopters having changed their risk-taking behaviour after adopting the CTA, compared to CTA non-adopters.

To test H2a specifically, we operationalise the power of the banking authority using the country-level 'official supervisory power' index (Barth et al. 2013). Although the Euro area introduced the SSM, this measure still plausibly captures heterogeneity in the power of the banking authority. First, the SSM regulation does not cover all European member states, and only large banks are monitored in the SSM.[22] Second, some aspects of bank supervision deemed non-essential for financial stability (e.g. consumer protection) remain a task for national supervisors. Third, competent national authorities still have macro-prudential power, and can impose stricter prudential requirements to banks in the SSM (Alexander 2016). On the basis of this index, we split the sample according to the median value of the 'official supervisory power' index (*SP*) and estimate Equation (4) for the two groups (i.e. strong versus weak).

As prior research suggests (Hong and Sarkar 2007, Haq and Heaney 2012, Hoque et al. 2015, Iannotta et al. 2019), we control for characteristics potentially associated with bank risk-taking. We include bank charter value (*CHARTER VALUE*), measured by the sum of the market value of equity and book value of liabilities, divided by total assets, bank growth opportunities using the market-to-book ratio (*MB*), and bank earnings volatility (*ROA SD*), measured as the standard deviation of *ROA*% over the last five fiscal years. The other bank-level control variables – *CAPITAL RATIO*, *ROA*%, *SIZE* and *SSM* – are defined as in Equation (1). We use two variables to control for the economic conditions of bank home country: *GDP*%, and the risk-free rate (*RISK FREE RATE*), measured by the country-specific money market interest rate as suggested by Hong and Sarkar (2007).

[22]Our sample comprises 42.6% of banks in the SSM. Amongst the 38 CTA adopters, 19 are operating in the SSM. Of those 19 banks, 13 are operating in countries characterised by a powerful banking authority as measured with the 2019 'official supervisor power' index (*SP*> = 11). The correlation between the indicator variable *SSM* that captures banks in the SSM and *SP* is 0.34. It indicates that SSM banks are operating in countries with more powerful national banking authorities. Loipersberger (2018) shows that the stock market reacted more positively to announcements that regard the implementation of the SSM in countries with a less powerful banking authority, suggesting that the SSM, in providing the ECB with supervisory powers over individual banking institutions, can influence financial system stability. Overall, the country-level SP index might capture the effect of the SSM as suggested by the positive correlation between *SP* and *SSM* (unreported). However, our goal is not to evaluate the efficacy of national versus supra-national supervisors, but rather to investigate the impact of the power of banking authority in general.

4.2.3. *Accounting discretion*

To examine H2b, we estimate the non-discretionary component of loan impairments under the IFRS 9 regime by regressing loan impairment on its determinants using two models. First, we estimate a linear loan impairment model following Beatty and Liao (2014, 2020):

$$LI_{it} = \beta_0 + \beta_1 \Delta LOANS_{it} + \beta_2 \Delta NPL_{it} + \beta_3 \Delta NPL_{it-1} + \beta_4 \Delta NPL_{it-2} + \beta_5 SIZE_{it} + \beta_6 GDP\%_{jt} + \epsilon_{it} \quad (5)$$

where *LI* is the ratio of loan impairment to beginning-of-year total loans for bank *i* in year *t*, ΔNPL is the change in non-performing loans scaled by beginning-of-year total loans, $\Delta LOANS$ is the change in total gross loans scaled by beginning-of-year total loans, and *SIZE* and *GDP%* are defined as in Equation (1).

Second, we include the asymmetry attributable to net loan charge-offs, since failure to model this aspect can change inferences (Basu et al. 2020):

$$LI_{it} = \beta_0 + \beta_1 \Delta LOANS_{it} + \beta_2 NCO_{it} + \beta_3 \Delta NPL_{it} + \beta_4 D\Delta NPL_{it}{}^{*} \Delta NPL_{it} + \beta_5 \Delta NPL_{it-1} + \beta_6 \Delta NPL_{it-2} + \beta_7 SIZE_{it} + \beta_8 GDP\%_{jt} + \vartheta_{it} \quad (6)$$

where NCO_{it} is net charge-offs scaled by beginning-of-year total loans, $D\Delta NPL_{it}$ is an indicator equal to one if $\Delta NPL_{it} < 0$, and is otherwise zero, and other variables are defined as in Equation (5). The absolute values of the residuals (discretionary components of loan impairments) from Equations (5) and (6) ($ALI = |\epsilon|$ and $ASYM\ ALI = |\vartheta|$ respectively) are then used in Equation (7) to test differences in discretionary behaviour over loan impairment estimates (e.g. Kanagaretnam et al. 2010) under the IFRS 9 regime, across CTA adopters and conditional on the power of the banking authority.

$$ALI_{it}\ or\ (ASYM\ ALI_{it}) = \beta_0 + \beta_1 CTA\ BANK_{it} + \beta_2 SP\ NORM_{jt} + \beta_3 CTA\ BANK_{it}{}^{*} SP\ NORM_{jt} + \beta_4 LI\ LAG_{it} + \beta_5 GROWTH_{it} + \beta_6 LOSS_{it} + \beta_7 CAPITAL\ RATIO_{it} + \beta_8 SIZE_{it} + \beta_9 GDP\%_{jt} + \varepsilon_{it} \quad (7)$$

where *SP NORM* is the ‘official supervisory power’ index that is normalised to take a value between zero and one for ease of interpretation, *LI LAG* is the lagged ratio of the loan impairment to beginning-of-year total loans for bank, *GROWTH* is the growth of total assets from beginning- to end-of-year, *LOSS* is an indicator variable that takes the value one if the bank reported a loss, and is zero otherwise. Other variables are defined as in Equation (4).[23]

[23]To maximise statistical power, we do not split the sample between strong versus weak banking authority, as we restrict the sample size to the IFRS 9 period. However, our inferences are qualitatively similar if we apply this split (unreported). We do not include the pre-IFRS 9 period when measuring *ALI* and *ASYM ALI* to ensure that the residuals (*ALI* and *ASYM ALI*) do not capture changes in ECL measurements.

5. Results

5.1. Main results

5.1.1. Determinants of CTA adoption choice

Table 3 reports the probit regression results based on Equation (1). In Column 1, the coefficients on *LOANS* and *CAPITAL RATIO* are significantly positive and negative at conventional levels, suggesting that banks with a higher proportion of loans are more likely to adopt the CTA. In other words, traditional lending activities drive the CTA adoption choice. This result is also supportive of the regulatory constraint hypothesis, since traditional banks that are characterised by a higher proportion of loans are more likely to incur higher regulatory capital charges (Mariathasan and Merrouche 2014). Thus, the CTA would advantage these banks in terms of reducing regulatory constraints. Larger banks are also more likely to adopt the CTA, as suggested by the positive and significant coefficient on *SIZE* at the 1% level. SSM-'significant' institutions are less likely to adopt the CTA ($\beta_8 = -1.77$; p-value <1%), suggesting that SSM banks are relatively well prepared for the adoption of the IFRS 9 ECL model. Interestingly, the coefficient on *SP* is statistically insignificant, which is consistent with the fact that the CTA adoption reflects the bank's own decisions, and is independent of the power of the banking authority. On the other hand, banks operating in countries with a stronger rule of law are less likely to adopt the CTA. Overall, institutional features in the form of bank-specific regulation through the SSM, and the quality of domestic enforcement as measured by the rule of law, seem to influence bank choice to adopt the CTA. In Column 2, the insignificant coefficient on *IRB* suggests that having experience with advanced credit risk modelling does not significantly influence banks' CTA adoption decisions.[24] However, in Column 3, the negative and significant coefficient on the interaction term *IRB*SSM* at the 1% level suggests that IRB-'significant' banks, under the umbrella of the SSM, are less likely to opt for the CTA. This result complements H1a, plausibly supporting the TRIM project under the SSM regulation aimed at strengthening the application of internal models for large European banks. Overall, our result is consistent with the ECB SSM thematic review on IFRS 9, which shows that large IRB banks are better prepared for the implementation of IFRS 9 than are less significant institutions (ECB 2017).

Table 4 reports the results of our investigation into the influence of regulatory constraints on banks' CTA adoption choices. In Column 1, we report that banks with a lower *DIFF*, a proxy for a bank's distance to regulatory constraints, are more likely to adopt the CTA, as suggested by the negative but marginally significant coefficient on *DIFF*.[25] In Column 2, we report that banks with a higher proportion of non-performing loans are more likely to adopt the CTA, as shown by the positive and significant coefficient on *NPL* at the 1% level. Both results are consistent with H1b, suggesting that banks characterised by tighter regulatory constraints under IFRS 9 are more likely to opt for the CTA. We attribute this result to the incentive of smoothing the adverse impact on regulatory capital of the transition from the incurred loss approach to the ECL model. Because the IRB approach has been widely criticised as a means of regulatory

[24]To avoid selection bias, in an unreported analysis we exclude 6 IRB banks that adopted the IRB approach concurrently to or after the publication of IFRS 9 in 2014. Overall, our conjecture is not affected by the exclusion of those banks.

[25]We acknowledge that we already control for bank capitalisation with the variable *CAPITAL RATIO*. In an unreported robustness test, we exclude the variable *CAPITAL RATIO* and we find that *DIFF* remains negative and statistically significant at the 1% level. In addition, we replace *DIFF* with the risk-weight density measured as in Vallascas and Hagendorff (2013) (i.e. using the ratio of the risk-weighted assets over total assets). Again, consistent with the level of bank credit risk influencing the choice to adopt the CTA, we find that the coefficient on the risk-weight density is positive and significant, as long as we exclude the variable *CAPITAL RATIO*.

Table 3. Bank institutional factors that may affect the CTA adoption choice: experience in advanced credit risk modelling (IRB) and the single supervisory mechanism (SSM).

	Base Model	IRB	IRB & SSM
	(1)	(2)	(3)
Dependent Variable: *CTA ADOPTION*			
IRB		−0.04	0.85
		(−0.09)	(1.51)
*IRB*SSM*			−2.24***
			(−3.02)
COST TO INCOME	1.68	1.69	2.08
	(1.26)	(1.25)	(1.44)
ROA%	−0.07	−0.07	0.20
	(−0.28)	(−0.28)	(0.75)
LOANS	2.81***	2.84***	3.23***
	(2.69)	(2.63)	(2.91)
CAPITAL RATIO	−12.04**	−11.97**	−16.14***
	(−2.09)	(−2.05)	(−2.82)
SIZE	0.39***	0.39***	0.43***
	(3.44)	(2.81)	(3.07)
GDP%	0.20**	0.21**	0.23**
	(2.05)	(2.05)	(2.17)
SSM	−1.77***	−1.76***	−0.38
	(−3.51)	(−3.51)	(−0.56)
SP	−0.13	−0.13	−0.09
	(−1.16)	(−1.16)	(−0.86)
ROL	−1.42***	−1.41***	−1.46***
	(−4.23)	(−4.25)	(−4.43)
Constant	−1.88	−1.98	−3.02
	(−0.86)	(−0.81)	(−1.18)
Pseudo-R^2	0.32	0.32	0.38
N	153	153	153

Note: Columns 1–3 of the table report the estimation of variations of Equation (1), investigating whether banks with advanced credit risk modelling are more likely to adopt the CTA. On the basis of the definition of *CTA ADOPTION* in Section 4.2, the sample comprises bank-year observations one year prior to the CTA adoption choice for CTA adopters, and bank-year observations prior to IFRS 9 adoption for CTA non-adopters. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

capital arbitrage (e.g. Mariathasan and Merrouche 2014, Behn et al. 2016), we further investigate whether IRB banks, in particular those facing larger regulatory constraints, opt for the CTA more aggressively. However, the coefficients on the interaction term *DIFF*IRB* in Column 3 and *NPL*IRB* in Column 4 are statistically insignificant. This result implies that banks more constrained by regulation select the CTA, regardless of the approach used to measure the RWAs.

5.1.2. *Bank risk-taking following CTA adoption*

Table 5 reports the results of investigating how bank risk-taking changed with the CTA adoption. Our main variable of interest is the interaction term *POST*CTA BANK*. In Column 1, we show the results of our investigation of the impact on *TOTAL RISK*. The coefficient on *POST*CTA BANK* is negative, but not significant. In Column 2, the coefficient on the interaction term *POST*CTA BANK* is close to zero and insignificant. These results do not suggest that the choice to adopt the CTA changes bank exposure to total risk or diversifiable risk. However, the coefficient on *POST*CTA BANK* is significant

Table 4. CTA and regulatory capital constraints, measured by the difference between the ratio of common equity to RWAs and the ratio of common equity to total assets (DIFF), as well as the proportion of non-performing loans (NPL), and both factors interacted with the IRB adoption choice.

	DIFF	NPL	DIFF & IRB	NPL & IRB
	(1)	(2)	(3)	(4)
Dependent Variable: *CTA ADOPTION*				
DIFF	−10.13*		−13.13**	
	(−1.87)		(−2.28)	
NPL		8.98***		9.25***
		(3.69)		(3.32)
IRB			−0.64	0.13
			(−0.71)	(0.23)
*DIFF*IRB*			8.71	
			(1.07)	
*NPL*IRB*				−0.51
				(−0.16)
COST TO INCOME	1.61	1.71	1.39	1.70
	(1.15)	(1.18)	(0.96)	(1.16)
ROA%	−0.12	0.41	−0.13	0.42
	(−0.45)	(1.24)	(−0.49)	(1.27)
LOANS	2.11*	2.82**	1.95	2.80**
	(1.73)	(2.33)	(1.47)	(2.24)
CAPITAL RATIO	−3.37	−13.73**	−5.21	−14.01**
	(−0.45)	(−2.46)	(−0.68)	(−2.45)
SIZE	0.40***	0.50***	0.36**	0.49***
	(3.35)	(3.93)	(2.40)	(3.30)
GDP%	0.19*	0.03	0.18*	0.03
	(1.93)	(0.33)	(1.66)	(0.27)
SSM	−1.82***	−1.93***	−1.83***	−1.95***
	(−3.60)	(−3.86)	(−3.57)	(−3.73)
SP	−0.09	−0.02	−0.10	−0.02
	(−0.80)	(−0.20)	(−0.91)	(−0.16)
ROL	−1.46***	−0.59	−1.56***	−0.61
	(−4.08)	(−1.41)	(−4.29)	(−1.46)
Constant	−2.32	−5.58**	−0.90	−5.44**
	(−0.95)	(−2.29)	(−0.31)	(−2.12)
Pseudo-R^2	0.35	0.40	0.35	0.40
N	153	153	153	153

Note: Columns 1–4 of the table report the estimation of variations of Equation (1) investigating whether regulatory-constrained banks are more likely to adopt the CTA. Based on the definition of *CTA ADOPTION* in Section 4.2, the sample comprises bank-year observations one year prior to the CTA adoption choice for CTA adopters, and bank-year observations prior to IFRS 9 adoption for CTA non-adopters. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

at the 1% level in Column 3. The negative sign on this coefficient suggests that CTA adopters decreased their exposure to systematic risk during the transitional period.

These results can be explained as arising from two factors: (1) During our sample period, systematic risk contributed less to total risk (by percentage) than idiosyncratic risk[26] and (2)

[26]Using Equation (3), we decompose total risk (e.g. Holod et al. 2020) as: $\beta_i^2\sigma^2_{R\_MSCI}+\sigma^2_\varepsilon$. We find that systematic risk ($\beta_i^2\sigma^2_{R\_MSCI}$) represents 12.4% of total risk ($\beta_i^2\sigma^2_{R\_MSCI}+\sigma^2_\varepsilon$). Our inferences are qualitatively similar if we use this decomposition for total, systematic, and idiosyncratic risks in our analysis.

Table 5. CTA and bank risk-taking: total risk, idiosyncratic risk and systematic risk.

	Total risk	Idiosyncratic risk	Systematic risk
	(1)	(2)	(3)
Dependent Variable:	*TOTAL RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	−0.03	−0.01	−0.25***
	(−1.43)	(−0.60)	(−2.64)
CHARTER VALUE	0.15	0.13	0.65
	(0.18)	(0.29)	(0.28)
MB	−0.14**	−0.06*	0.03
	(−2.11)	(−1.87)	(0.20)
ROA%	−0.06**	−0.03*	−0.13
	(−1.99)	(−1.69)	(−1.55)
ROA SD	0.03	0.00	0.28*
	(1.51)	(0.11)	(1.87)
CAPITAL RATIO	0.56	0.32	2.00*
	(1.50)	(1.63)	(1.72)
SIZE	0.09	0.04	0.76***
	(1.08)	(0.92)	(2.76)
RISK FREE RATE	0.03	0.03**	0.26**
	(0.95)	(2.07)	(2.50)
GDP%	0.00	−0.00	0.05
	(0.31)	(−0.41)	(1.24)
SSM	−0.06***	−0.02	0.02
	(−2.68)	(−1.50)	(0.07)
Constant	−0.70	−0.43	−8.21**
	(−0.57)	(−0.66)	(−2.09)
Time FE	yes	yes	yes
Bank FE	yes	yes	yes
Adj. R^2	0.72	0.58	0.74
N	383	383	383

Columns 1–3 of the table report the estimation of variations of Equation (4) investigating changes in bank risk a consequence of the CTA adoption. Bank risk exposure is measured as *TOTAL RISK*, *IDIOSYNCRATIC RISK* or *SYSTEMATIC RISK*. Note that the main effects of *CTA BANK* and *POST* are not included because the fixed effect structure encompass the variation in *CTA BANK*and *POST*, preventing estimation of their coefficients. The sample comprises all available bank-year observations of 101 banks from 2016 to 2019. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. 'FE' denotes fixed effects. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

bank exposure to systematic risk is likely to increase the ECLs significantly in case of an adverse economic shock. Based on the Merton (1974) framework, Lönnbark (2017) incorporates economic outlooks to compute ECLs under IFRS 9 over a range of economic scenarios. The model specifies how systematic risk, and more generally the impact of a macro event, influences PD estimates. Importantly, it highlights that idiosyncratic risk is not necessarily independent of systematic factors. Consistent with this view, Bonfim (2009) provides empirical evidence showing that macroeconomic conditions significantly affect loan default beyond firm-specific factors. Recently, Gaffney and Mccann (2019) report evidence showing that an economic downside shock can substantially increase the switch of financial assets from Stage 1 to Stage 2 under IFRS 9.[27] Overall, because exposure to systematic risk affects banks' overall portfolios and can

[27]This effect is likely to induce a 'cliff effect' in loan impairment (Novotny-Farkas 2016). Moreover, Gaffney and Mccann (2019) report that when the economy improves, it is likely that a large amount of loans that had been transferred to Stage 2 will be re-classified into Stage 1.

trigger a large recognition of loan impairment in case of an expected adverse economic situation,[28] banks have incentives to decrease their exposure to this particular risk under IFRS 9. On the other hand, exposure to idiosyncratic risk is less likely to affect as much of the volatility of loan impairments.

Overall, our results suggest that CTA adopters commit to decreasing their risk exposure by investing in assets less exposed to non-diversifiable risk. This result should be of interest to policy makers. Acharya et al. (2017) argue that systemic risk arises because banks have incentives to take risks that are borne by all, and therefore financial regulators should 'focus on limiting systemic risk[29] that is, the risk of a crisis in the financial sector and its spillover to the economy at large' (p. 35). Complementary to H1b, these results also suggest that the adoption of the CTA is not fully driven by opportunistic motives.

Panel A of Table 6 reports the results of investigating how the power of the banking authority influences bank risk-taking following the adoption of the CTA (H2a). In Columns 1 and 2, we find that overall risk slightly decreased for banks operating in countries with a powerful banking authority ($\beta_3 = -0.05$; p-value <10%), while such an effect is not reported for banks operating in those with a less powerful banking authority ($\beta_3 = 0.04$; p-value >10%).[30] In Columns 3 and 4, we do not report any changes in banks' idiosyncratic risk exposure following the adoption of the CTA for either group. In Columns 5 and 6, results suggest that CTA adopters particularly commit to decreasing their systematic risk-taking in countries with a powerful banking authority, as shown by the negative and significant coefficient on β_3 in Column 5, versus the insignificant coefficient on β_3 in Column 6.

Alternatively, we test whether the direct supervision power attributed to the ECB in the SSM context corroborates our main findings. We expect that 'significant' institutions in the SSM are more likely to decrease their risk exposures following CTA adoption than are other banks that are arguably operating within a more lenient regulatory framework. To investigate this prediction, we split the sample into 'significant' institutions in the SSM ('SI-SSM banks') versus all other banks ('other banks'), then estimate Equation (4) for each group. The results in Panel B of Table 6 support our expectations.

5.1.3. *Accounting discretion analyses*

Table 7 presents the regression results of Equation (7). Consistent with H2b and empirical evidence presented in Section 5.1.2, we report that CTA adopters operating in countries with less powerful banking authorities engage more aggressively in accounting discretion over loan impairment estimates, as suggested by the positive and negative coefficients on *CTA BANK* and *CTA BANK*SP NORM* in Column 1. The results displayed in Column 2 are consistent

[28]For instance, this effect is reflected in the UBS financial report of the second quarter 2020: 'Total net credit loss expenses were USD 272 million during the second quarter of 2020, compared with USD 12 million in the prior-year quarter, reflecting net expenses of USD 202 million related to Stage 1 and 2 positions, and net expenses of USD 70 million related to credit-impaired (Stage 3) positions. Stage 1 and 2 net credit loss expenses of USD 202 million were primarily driven by a net expense of USD 127 million from an update to the forward-looking scenarios, factoring in updated macroeconomic assumptions to reflect the effects of the COVID-19 pandemic, in particular updated GDP and unemployment assumptions. This also led to exposure movements from stage 1 to stage 2 as probabilities of default increased' (p. 12).

[29]Systematic risk exposure can be key to bank contributions to systemic risk (e.g. Iannotta et al. 2019).

[30]An unreported Chow test reveals that the difference in the magnitude of β_3 is not statistically significant (two-tailed p-value = 0.17 clustered at the bank level) across Columns 1 and 2. Nevertheless, the magnitude becomes statistically significant at conventional levels if we exclude banks with the highest score in the weak group (i.e., when $SP = 10$).

Table 6. CTA and bank risk-taking: total risk, idiosyncratic risk and systematic risk – the power of the banking authority.

Panel A: Official Supervisory Power

	Total risk		Idiosyncratic risk		Systematic risk	
Supervisory power	Strong	Weak	Strong	Weak	Strong	Weak
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	*TOTAL RISK*	*TOTAL RISK*	*IDIOSYNCRATIC RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	−0.05*	0.04	−0.01	0.01	−0.22**	−0.00
	(−1.94)	(0.62)	(−0.75)	(0.38)	(−2.00)	(−0.02)
CHARTER VALUE	−0.27	2.11	−0.10	1.24	−0.32	2.82
	(−0.30)	(0.99)	(−0.21)	(1.02)	(−0.12)	(0.40)
MB	−0.11*	−0.20*	−0.05*	−0.11*	0.06	0.49
	(−1.84)	(−1.98)	(−1.68)	(−1.77)	(0.33)	(1.32)
ROA%	−0.09**	−0.07	−0.04	−0.03	−0.19**	−0.09
	(−2.02)	(−1.24)	(−1.62)	(−1.04)	(−2.44)	(−0.41)
ROA SD	0.01	0.08	−0.01	0.03	0.09	0.84**
	(0.22)	(1.46)	(−0.59)	(1.04)	(0.84)	(2.56)
CAPITAL RATIO	0.59	1.90	0.29	1.19	0.61	5.98*
	(1.38)	(1.46)	(1.36)	(1.55)	(0.42)	(1.78)
SIZE	−0.02	0.21*	−0.02	0.12*	0.31	0.76
	(−0.16)	(1.82)	(−0.42)	(1.86)	(0.97)	(1.46)
RISK FREE RATE	0.11**	0.07	0.05**	0.06	0.45**	−0.04
	(2.23)	(0.70)	(2.47)	(1.07)	(2.03)	(−0.16)
GDP%	0.01	−0.01	0.00	0.00	0.15**	−0.05
	(0.71)	(−0.45)	(0.21)	(0.39)	(2.47)	(−1.14)
SSM	−0.05	−0.10	−0.01	−0.07*	−0.51***	0.46
	(−1.65)	(−1.59)	(−0.95)	(−1.97)	(−4.60)	(1.40)
Constant	0.89	−3.80	0.45	−2.37	−2.05	−10.75
	(0.54)	(−1.44)	(0.50)	(−1.55)	(−0.43)	(−1.24)
Time FE	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes
Adj. R^2	0.65	0.79	0.46	0.70	0.73	0.78
N	246	137	246	137	246	137

Panel B: Significant Institutions (SI) under the SSM

	Total risk		Idiosyncratic risk		Systematic risk	
SSM	SI-SSM banks (1)	Other banks (2)	SI-SSM banks (3)	Other banks (4)	SI-SSM banks (5)	Other banks (6)
Dependent Variable:	*TOTAL RISK*	*TOTAL RISK*	*IDIOSYNCRATIC RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	−0.02	−0.01	−0.00	0.01	−0.30**	−0.14
	(−0.42)	(−0.66)	(−0.07)	(0.69)	(−2.20)	(−1.23)
Control Variables	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes
Adj. R^2	0.71	0.72	0.51	0.68	0.74	0.72
N	163	220	163	220	163	220

Columns 1–6 of both panels in the table report the estimation of variations of Equation (4) investigating how the power of the bank authority influences changes in bank risk as a consequence of the CTA adoption. Bank risk exposure is measured as *TOTAL RISK*, *IDIOSYNCRATIC RISK* or *SYSTEMATIC RISK*. The sample comprises all available bank-year observations of up to 101 banks from 2016 to 2019. Note that the main effects of *CTA BANK* and *POST* are not included because the fixed effect structure encompass the variation in *CTA BANK* and *POST*, preventing estimation of their coefficients. In Panel A, we measure the power of the banking authority using the ‘official supervisory power’ index (*SP*) drawn from Barth et al. (2013) and measured using the 2019 Bank Regulation and Supervision Survey from the World Bank. In Panel B, we measure the power of the banking authority based on whether the bank is a SSM-‘significant’ institution. ‘FE’ denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

Table 7. CTA adoption and accounting discretion.

	Discretionary LI		Income-decreasing		Income-increasing	
ALI model	ALI	Asymmetric ALI	ALI	Asymmetric ALI	ALI	Asymmetric ALI
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	*ALI*	*ASYM ALI*	*ALI*	*ASYM ALI*	*ALI*	*ASYM ALI*
CTA BANK	0.29**	0.17^{+}	0.10	−0.30	0.14^{+}	0.24**
	(2.33)	(1.47)	(0.26)	(−0.54)	(1.40)	(2.59)
SP NORM	0.21*	0.22*	0.31	0.05	0.13**	0.27***
	(1.68)	(1.98)	(0.55)	(0.20)	(2.08)	(3.33)
*CTA BANK*SP NORM*	−0.45*	−0.29^{+}	−0.44	0.26	−0.10	−0.36*
	(−1.98)	(−1.44)	(−0.71)	(0.38)	(−0.78)	(−1.99)
LI LAG	38.77**	22.56**	68.61***	50.44***	−0.29	0.05
	(2.59)	(2.11)	(5.58)	(3.45)	(−0.09)	(0.01)
GROWTH	0.31	−0.01	0.01	0.32*	0.14	−0.25^{+}
	(0.93)	(−0.03)	(0.01)	(1.74)	(0.42)	(−1.36)
LOSS	−0.28	−0.06	−1.27***	−0.32*	0.14	0.16
	(−0.93)	(−0.61)	(−4.96)	(−1.80)	(0.84)	(1.04)
CAPITAL RATIO	0.33	−0.18	−1.68	0.72	0.90**	0.06
	(0.44)	(−0.29)	(−0.49)	(0.40)	(2.11)	(0.10)
SIZE	−0.02	−0.02	−0.04	−0.01	−0.00	−0.01
	(−1.11)	(−1.19)	(−0.90)	(−0.35)	(−0.29)	(−0.96)
GDP%	0.03**	0.03^{+}	0.00	0.04	0.03**	0.04**
	(2.47)	(1.45)	(0.06)	(0.89)	(2.07)	(2.19)
Constant	0.06	0.18	0.62	−0.09	−0.10	0.04
	(0.30)	(0.97)	(0.79)	(−0.17)	(−0.88)	(0.26)
Adj. R^2	0.43	0.25	0.68	0.44	0.16	0.25
N	141	141	39	47	102	94

Note: Columns 1–6 of the table report the estimation of variations of Equation (7) investigating discretionary behaviour of CTA adopters over LIs measurement during the IFRS regime. Discretionary behaviour is measured using the absolute value of the residuals from Equations (5) and (6) (*ALI* and *ASYM ALI* respectively). The sample comprises all available bank-year observations of 101 banks from 2016 to 2019. $^{+}$, *, ** and *** represent significance levels of 0.10 (one-tailed), 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

with those displayed in Column 1, although the estimated coefficients are marginally significant, which can be expected when including net charge-offs in loan impairment models (Beatty and Liao 2020).[31]

To disentangle whether the reported discretionary accounting behaviour reflects banks' incentives to provide either more or less for expected losses, we estimate Equation (7) separately, with the absolute value of income decreasing abnormal loan impairments (positive residual from Equations (5) and (6)), and income increasing abnormal loan impairments (negative residual from Equations (5) and (6)). Results displayed in Columns 3–6 of Table 7 are consistent with

[31]We also provide level of significance based on a one-tailed test, as we have a clear prediction and signs are consistent.

the view that these CTA adopters exercise accounting discretion over loan impairment estimates as a mean to overstate their net income. To further address concerns about the use of residuals as dependent variables (W. Chen et al. 2018), we estimate Equation (6) and include the variables *CTA BANK* and *SP NORM*, as well as their interaction. Unreported statistics show that, on average, CTA adopters report lower levels of loan impairments compared to CTA non-adopters (i.e. negative and significant coefficient on *CTA BANK*). In contrast, the recognition of loan impairments increases for CTA adopters operating in countries with more powerful banking authorities (i.e. positive and significant coefficient on *CTA BANK**SP NORM*).

Complementary to the main results for H2a, tests of H2b suggest that CTA adopters operating in countries that are characterised by less powerful banking authorities did not take the transitional opportunity to adapt their risk exposures. On the contrary, they exercise accounting discretion more aggressively over loan-loss estimates compared to other CTA adopters and non-adopters.

5.2. *Additional analysis and robustness check*

5.2.1. *Tail risk*

Since banks' exposure to tail risk was an important driver of the 2007–2009 financial crisis (Acharya et al. 2012) and is not captured by the market beta (De Jonghe 2010, Acharya et al. 2017), we further investigate whether CTA adopters also decreased their exposure to this specific type of risk. We use the LRMES (Brownlees and Engle 2017) as a proxy for banks' exposure to tail risk, and retrieve the dynamic conditional beta (DCB) to assess the sensitivity of our results to an alternative estimate of market beta.[32]

Table 8 presents the results. In Column 1, we confirm that our inferences are robust to alternative measurement of the market beta. In Column 2, we find that CTA adopters are less exposed to tail risk following the adoption of the CTA. Again, inferences regarding the influence of banking authorities remain robust (Columns 3 and 4). Despite alternative measures of risk, our results remain consistent in indicating that CTA adopters have committed to decreasing their risk-taking during the CTA adoption period covered by our sample.

5.2.2. *Robustness checks*

We also perform a series of sensitivity tests to assess the robustness of our findings. First, we use alternative market portfolios[33] to compute the systematic and idiosyncratic risk measures that have been used in the literature (e.g. Ferreira and Orbe 2018, Haq and Heaney 2012). Specifically, we use the MSCI Europe index and the Euro Stoxx 50 index. Results displayed in Table 9 confirm that our inferences are not affected by the nature of the market portfolio.

Second, we change the estimation procedure of the risk measures estimated with the market model. Specifically, we change the average value of risk measures over the fiscal period instead

[32]LRMES is the fraction of the bank's loss when the MSCI World index declines 40% over a six-month window. Intuitively, if one multiplies the LRMES by the market value of equity, it results in the absolute market value loss due to a systemic financial crisis in millions of euros. The DCB used in the computation of the LRMES is estimated using generalised autoregressive conditional heteroscedasticity and dynamic conditional correlation. LRMES and DCB data are collected from V-Lab, maintained by the NYU Stern School of Business. The theoretical motivation of the measure is given in Acharya et al. (2012).

[33]The use of the MSCI World index in our main tests should not bias our results, because European countries did not experience a 'local' crisis during the period 2016–2019 (Engle et al. 2015).

Table 8. CTA and bank risk-taking: systematic risk and tail risk.

	DCB & LRMES		DCB		LRMES	
Supervisory power			Strong	Weak	Strong	Weak
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	*DCB*	*LRMES*	*DCB*	*DCB*	*LRMES*	*LRMES*
*POST*CTA BANK*	−0.18**	−0.04**	−0.20**	−0.41	−0.05***	−0.08
	(−2.43)	(−2.47)	(−2.53)	(−1.71)	(−2.68)	(−1.49)
CHARTER VALUE	−0.43	−0.12*	−0.04	−1.06***	−0.01	−0.25***
	(−1.65)	(−1.77)	(−0.34)	(−2.95)	(−0.52)	(−3.26)
MB	0.60	0.10	0.37	11.56	0.08	2.06
	(0.23)	(0.18)	(0.14)	(1.02)	(0.16)	(0.80)
ROA%	−0.08	−0.02	0.01	−1.02	0.00	−0.17
	(−0.68)	(−0.64)	(0.07)	(−1.13)	(0.08)	(−0.83)
ROA SD	−0.16*	−0.03*	−0.21*	−0.17	−0.05*	−0.04
	(−1.81)	(−1.88)	(−1.78)	(−1.27)	(−1.97)	(−1.22)
CAPITAL RATIO	−0.03	−0.02	−0.04	−0.26	−0.02**	−0.05
	(−0.61)	(−1.33)	(−0.74)	(−1.07)	(−2.12)	(−0.92)
SIZE	−2.46*	−0.58	−1.40	−1.58	−0.31	−0.82
	(−1.70)	(−1.59)	(−1.06)	(−0.17)	(−0.90)	(−0.40)
RISK FREE RATE	0.42*	0.07	−0.02	0.84*	−0.02	0.16
	(1.81)	(1.39)	(−0.10)	(1.90)	(−0.36)	(1.68)
GDP%	0.27	0.07*	0.49**	0.07	0.12**	0.02
	(1.54)	(1.94)	(2.08)	(0.23)	(2.39)	(0.25)
SSM	−0.05*	−0.01**	0.07*	−0.11***	0.01	−0.03***
	(−1.77)	(−2.02)	(1.69)	(−3.19)	(1.44)	(−3.26)
Constant	−3.30	−0.27	1.44	−16.80	0.66	−2.79
	(−0.76)	(−0.28)	(0.34)	(−1.60)	(0.71)	(−1.20)
Time FE	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes
Adj. R^2	0.71	0.81	0.73	0.70	0.84	0.76
N	260	260	199	61	199	61

Note: Columns 1–6 in the table report the estimation of variations of Equation (4) investigating changes in bank risk as a consequence of the CTA adoption (including the influence of the power of the banking authority on this relationship). Bank risk exposure is measured as either dynamic conditional beta (*DCB*) or the long-run marginal expected shortfall (*LRMES*). Note that the main effects of *CTA BANK* and *POST* are not included because the fixed effect structure encompass the variation in *CTA BANK* and *POST*, preventing estimation of their coefficients. The sample comprises all available bank-year observations of up to 101 banks from 2016 to 2019. The sample size decreases because the V-Lab does not cover all the banks included in our main analysis. We measure the power of the banking authority using the 'official supervisory power' index (*SP*) drawn from Barth et al. (2013) and measured using the 2019 Bank Regulation and Supervision Survey from the World Bank. 'FE' denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

of the fiscal year-end value (e.g. Pagano and Sedunov 2016, Buch et al. 2019) and examine the sensitivity of our results to this measurement. Results displayed in Table 10 confirm that our inferences are not affected by such a change.

Third, in Section 5.1, we report that CTA adopters and CTA non-adopters differ in their bank-specific characteristics. An alternative is that these bank characteristics, rather than the CTA policy, may contribute to the changes in bank risk-taking. To mitigate this concern, we use entropy balancing (Hainmueller 2012) that, compared to other matching techniques, has the

Table 9. Sensitivity analysis to the choice of market portfolio.

Market portfolio	MSCI Europe (1)	Euro Stoxx (2)	MSCI Europe (3)	Euro Stoxx (4)
Dependent Variable:	*IDIOSYNCRATIC RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	−0.01	−0.00	−0.15**	−0.15**
	(−0.49)	(−0.31)	(−2.17)	(−2.56)
CHARTER VALUE	0.15	0.13	1.15	−0.55
	(0.33)	(0.31)	(0.53)	(−0.37)
MB	−0.07*	−0.06*	−0.11	0.03
	(−1.90)	(−1.93)	(−0.65)	(0.25)
ROA%	−0.03*	−0.02	−0.08	−0.05
	(−1.68)	(−1.51)	(−1.47)	(−0.99)
ROA SD	0.00	−0.00	0.12	0.12
	(0.05)	(−0.04)	(1.50)	(1.43)
CAPITAL RATIO	0.30	0.32*	0.96	1.34
	(1.61)	(1.70)	(1.00)	(1.57)
SIZE	0.04	0.02	0.53***	0.39**
	(0.96)	(0.68)	(2.77)	(2.22)
RISK FREE RATE	0.03*	0.03**	0.13	0.44***
	(1.94)	(2.03)	(1.63)	(5.12)
GDP%	−0.00	−0.00	0.03	−0.00
	(−0.33)	(−0.56)	(1.10)	(−0.07)
SSM	−0.02	−0.02	0.04	−0.03
	(−1.65)	(−1.50)	(0.18)	(−0.46)
Constant	−0.45	−0.32	−5.95**	−3.17
	(−0.71)	(−0.53)	(−2.15)	(−1.36)
Time FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Adj. R^2	0.59	0.57	0.77	0.75
N	383	383	383	383

Note: Columns 1–4 of the table report the estimation of variations of Equation (4) investigating changes in bank risk a consequence of the CTA adoption. Bank risk exposure is measured as *IDIOSYNCRATIC RISK* or *SYSTEMATIC RISK*. Bank risk exposure is computed using the MSCI Europe index or the Euro Stoxx 50 index as the market portfolio. Note that the main effects of *CTA BANK* and *POST* are not included because the fixed effect structure encompass the variation in *CTA BANK* and *POST*, preventing estimation of their coefficients. The sample comprises all available bank-year observations of 101 banks from 2016 to 2019. 'FE' denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

advantage of preserving the sample size. To implement entropy balancing,[34] we specify the first and second moment as balance constraints, then match banks on the bank-specific variables. The results in Table 11 confirm that CTA adopters decrease their risk exposure to systematic risk, but not to idiosyncratic risk or total risk.

Next, we validate the inferences drawn from the DiD approach. Similar to Chen and Garriott (2020), we employ an event-study approach to test the parallel trend assumptions underlying our

[34]The implementation of this matching procedure is based on the *ebalance* command in Stata, further described in Hainmueller and Xu (2013).

Table 10. Sensitivity analysis to using the average risk estimates from the market model over the fiscal year.

Market portfolio	MSCI World		MSCI Europe		Euro Stoxx	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: *Average*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	−0.03	−0.39***	−0.03	−0.25***	−0.03	−0.27***
	(−1.56)	(−3.60)	(−1.59)	(−3.65)	(−1.44)	(−3.52)
CHARTER VALUE	0.05	−0.50	0.05	−0.41	0.05	1.02
	(0.09)	(−0.22)	(0.09)	(−0.27)	(0.10)	(0.68)
MB	−0.03	0.04	−0.03	−0.03	−0.03	−0.14
	(−0.82)	(0.24)	(−0.79)	(−0.28)	(−0.79)	(−1.47)
ROA%	−0.01	−0.02	−0.01	−0.04	−0.01	−0.00
	(−0.36)	(−0.32)	(−0.41)	(−1.00)	(−0.30)	(−0.06)
ROA SD	0.01	0.18	0.01	0.15	0.01	0.10
	(0.43)	(1.28)	(0.50)	(1.54)	(0.45)	(1.10)
CAPITAL RATIO	0.76**	3.33***	0.79**	2.89***	0.77**	2.27***
	(2.08)	(2.86)	(2.08)	(3.47)	(2.08)	(2.74)
SIZE	0.11*	0.63**	0.11*	0.48***	0.10	0.49***
	(1.68)	(2.57)	(1.69)	(2.77)	(1.56)	(3.05)
RISK FREE RATE	0.02	0.15	0.02	0.21***	0.02	0.05
	(1.59)	(1.43)	(1.61)	(2.72)	(1.59)	(0.70)
GDP%	−0.00	0.01	−0.00	0.02	−0.00	0.03
	(−0.14)	(0.15)	(−0.11)	(0.39)	(−0.16)	(0.59)
SSM	−0.01	0.21**	−0.01	0.14**	−0.01	0.21
	(−0.40)	(2.05)	(−0.38)	(2.28)	(−0.35)	(1.31)
Constant	−1.24	−5.99	−1.29	−4.59*	−1.17	−5.70**
	(−1.24)	(−1.63)	(−1.25)	(−1.78)	(−1.17)	(−2.37)
Time FE	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes
Adj. R^2	0.48	0.76	0.48	0.79	0.47	0.80
N	383	383	383	383	383	383

Note: Columns 1–6 of the table report the estimation of variations of Equation (4) investigating changes in bank risk a consequence of the CTA adoption. Bank risk exposure is measured as *IDIOSYNCRATIC RISK* or *SYSTEMATIC RISK* using average values over the fiscal year. Bank risk exposure is computed using the MSCI Europe index, the MSCI Europe index or the Euro Stoxx 50 index as the market portfolio. Note that the main effects of *CTA BANK* and *POST* are not included because the fixed effect structure encompass the variation in *CTA BANK*and *POST*, preventing estimation of their coefficients. The sample comprises all available bank-year observations of 101 banks from 2016 to 2019. 'FE' denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

Table 11. Entropy balancing and the parallel-trends assumption.

	Total risk	Idiosyncratic risk	Systematic risk	Systematic risk
	(1)	(2)	(3)	(4)
Dependent Variable:	*TOTAL RISK*	*IDIOSYNCRATIC RISK*	*SYSTEMATIC RISK*	*SYSTEMATIC RISK*
*POST*CTA BANK*	0.04	0.03	−0.24**	
	(0.61)	(0.79)	(−2.10)	
*2017*CTA BANK*				−0.31
				(−1.65)
*2018*CTA BANK*				−0.39*
				(−1.97)
*2019*CTA BANK*				−0.36**
				(−2.47)
CHARTER VALUE	1.94	1.10	1.05	1.35
	(1.35)	(1.39)	(0.24)	(0.31)
MB	−0.29***	−0.14**	−0.19	−0.24
	(−2.72)	(−2.38)	(−0.53)	(−0.70)
ROA%	−0.13**	−0.07**	−0.07	−0.05
	(−2.51)	(−2.34)	(−0.83)	(−0.54)
ROA SD	−0.06	−0.05*	0.37**	0.41**
	(−1.43)	(−1.83)	(2.12)	(2.31)
CAPITAL RATIO	2.70**	1.76***	−0.97	−2.31
	(2.51)	(2.78)	(−0.43)	(−0.90)
SIZE	−0.04	−0.04	0.73**	0.74**
	(−0.27)	(−0.43)	(2.17)	(2.22)
RISK FREE RATE	0.20*	0.14**	0.18	0.17
	(1.78)	(2.22)	(1.23)	(1.08)
GDP%	−0.01	−0.01	0.08	0.06
	(−0.95)	(−1.57)	(1.37)	(1.02)
SSM	−0.19***	−0.11***	0.43***	0.45***
	(−3.49)	(−3.48)	(2.85)	(2.97)
Constant	−1.08	−0.68	−8.00	−8.11
	(−0.50)	(−0.59)	(−1.53)	(−1.60)
Time FE	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes
Adj. R^2	0.75	0.62	0.81	0.81
N	383	383	383	383

Note: Columns 1–4 of the table report the estimation of variations of Equation (4) investigating changes in bank risk a consequence of the CTA adoption by employing entropy balancing. Bank risk exposure is measured as *TOTAL RISK*, *IDIOSYNCRATIC RISK* or *SYSTEMATIC RISK*. Note that the main effects of *CTA BANK* and *POST* (or *YEAR* in Column 4) are not included because the fixed effect structure encompass the variation in *CTA BANK*and *POST* (or *YEAR* in Column 4), preventing estimation of their coefficients. In Column 4, *2016* is the reference year, consequently the fixed effect structure prevents the estimation of the coefficient on *2016∗CTA BANK*. The sample comprises all available bank-year observations of 101 banks from 2016 to 2019. 'FE' denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

research design. Specifically, we replace the *POST* variable with a set of year dummies (*YEAR*) and re-estimate the model in Column 3, Table 11. Column 4 in Table 11 presents the result of this test, using 2016 as a reference year. The coefficient on 2017**CTA BANK* is insignificant, while the coefficients on the post-CTA period (i.e. 2018**CTA BANK* and 2019**CTA BANK*) are negative, and statistically significant at a conventional level, which mitigates the concerns about violations of the parallel-trends assumption.

To ensure that our results do not capture strategic shifts in business models across CTA adopters and non-adopters unrelated to the CTA policy, we employ insurance companies as control group. The use of insurance companies as a control group is justifiable since the accounting requirement (i.e. the application of IFRS)[35] and the jurisdictional environment between these the groups are comparable, but differ in the application of the CTA policy.[36]

To estimate Equation (4), we replace the variable *CTA ADOPTION* by the variable *BENCHMARK*, which takes the value one for CTA adopters and zero for insurance companies. Because insurance companies are not subject to the Basel regulation, we follow Iannotta et al. (2019) and replace the variable *CAPITAL RATIO* by *LEVERAGE RATIO* (i.e. the ratio of common equity to total assets). Table 12 reports the results. In Column 1, the coefficient on *POST*BENCHMARK* is consistently negative and significant. In Column 2, we implement entropy balancing, and our conjecture holds.[37]

Finally, to assess whether the statistically significant effect that we report for the decrease in bank risk-taking by CTA adopters is obtained by pure chance, we perform a permutation test to assess how likely it is that a significant effect on bank risk-taking is reported when the CTA option is randomly assigned. To do so, we closely follow the methodology applied by Nagler et al. (2020) and use the randomisation inference test developed by Heß (2017). The randomisation inference tests on systematic risk (LRMES) reveal that our estimated coefficient on the interaction term *POST*CTA BANK* is statistically significant at the 1% (5%) level and is larger in magnitude than almost all simulated effect sizes as seen in Figure 1 (Figure 2).

5.2.3. *RWA reporting approach and bank risk-taking*

In Section 3.1, we argue that IRB banks should be better prepared to apply the IFRS 9 ECL model than SA banks. In a supplementary test, we provide evidence that regulatory constrained IRB banks decrease their risk-taking more aggressively compared to regulatory constrained SA banks under the IFRS 9 regime. This result is consistent with the view that IRB banks do manage their risk-taking more actively than the SA banks. A discussion of these results is available in the internet Appendix.

6. Conclusions

The application of the new ECL model under IFRS 9, and the possibility for banks to opt for the CTA policy set out by the BCBS, represent the most important novelties in bank accounting and Basel regulation since the 2007–2009 financial crisis. The implementation of the new ECL models has raised several concerns (BCBS 2017, Giner and Mora 2019), which have motivated regulators to provide banks with an opportunity to delay the full application of the IFRS 9 ECL

[35]In September 2016, the IASB issued an amendment to IFRS 4, introducing a temporary exemption from the adoption of IFRS 9 until 2021 for insurance companies that have not yet applied IFRS 9.

[36]We follow the original sample-selection procedure described in Panel A of Table 1, selecting 30 insurance companies as an alternative control group. We restrict our sample to insurance companies that are located within the 19 European countries analyzed in this paper. As additional criteria, we excluded insurance companies involved with banking through subsidiaries, companies that do not qualify for temporary exemption under IFRS 4, and companies that adopted IFRS 9 early with respect to the temporary exemption.

[37]We tried to match the first and second moment for all firm-specific covariates. However, the entropy balance maximum likelihood routine does not converge. The lack of convergence is primarily driven by the earnings variables, which might highlight structural differences in reported earnings across banks and insurance companies. Consequently, we excluded *ROA*% and *ROA SD* of the matching procedure.

Table 12. Alternative control group.

Dependent Variable:	DID (1) *SYSTEMATIC RISK*	Entropy balancing (2) *SYSTEMATIC RISK*
*POST*BENCHMARK*	−0.26**	−0.28**
	(−2.43)	(−2.22)
CHARTER VALUE	1.32	−3.29
	(0.82)	(−0.45)
MB	−0.24	−0.06
	(−1.06)	(−0.11)
ROA%	−0.05	0.12
	(−1.11)	(1.02)
ROA SD	0.14	0.30
	(1.39)	(1.36)
LEVERAGE RATIO	3.08	0.48
	(1.04)	(0.13)
SIZE	0.43*	0.41
	(1.90)	(1.11)
RISK FREE RATE	0.49***	0.86**
	(2.97)	(2.63)
GDP%	−0.01	0.05
	(−0.24)	(0.65)
SSM	0.33**	0.51**
	(2.43)	(2.50)
Constant	−4.93**	−0.64
	(−2.06)	(−0.11)
Time FE	yes	yes
Bank FE	yes	yes
Adj. R^2	0.69	0.65
N	258	258

Note: Columns 1–2 of the table report the estimation of variations of Equation (4) investigating changes in bank risk a consequence of the CTA adoption (by employing entropy balancing in Column 2). Bank risk exposure is measured as *SYSTEMATIC RISK*. Note that the main effects of *BENCHMARK*and *POST* are not included because the fixed effect structure encompass the variation in *BENCHMARK* and *POST*, preventing estimation of their coefficients. The sample comprises all available bank-year observations of 38 CTA adopters and 30 insurance companies from 2016 to 2019. *BENCHMARK* takes the value 1 for CTA adopters and 0 for insurance companies. *LEVERAGE RATIO* is the ratio of common equity over total assets. 'FE' denotes fixed effects. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01 (two-tailed), respectively. Robust *t*-statistics clustered by bank are shown in parentheses. See Appendix 1 for variable definitions.

model through the CTA policy. The aim of this paper is to investigate whether banks exercise a strategic choice over the adoption of the CTA.

Drawing on a sample of publicly traded European banks from 2016 to 2019, we provide four novel empirical analyses. First, we specify a determinant model to examine which bank-specific factors affect the CTA adoption choice. We provide consistent evidence that banks using the IRB approach under the SSM are more likely to opt out of the CTA. Second, we report that the CTA adoption choice is determined by regulatory constraints that would arise with the application of the IFRS 9 ECL model. This result raises red flags to regulators, as it could be consistent with opportunistic motives that drive the CTA adoption choice (i.e. to benefit temporarily from reduced capital charges without committing to decrease risk exposure). Third, we find that CTA adopters decreased their exposure to systematic risk and tail risk during the transitional period. This result provides an encouraging sign that CTA adopters do commit to decreasing their risk-taking as they aim to meet the regulatory requirement targets. Finally, we show that

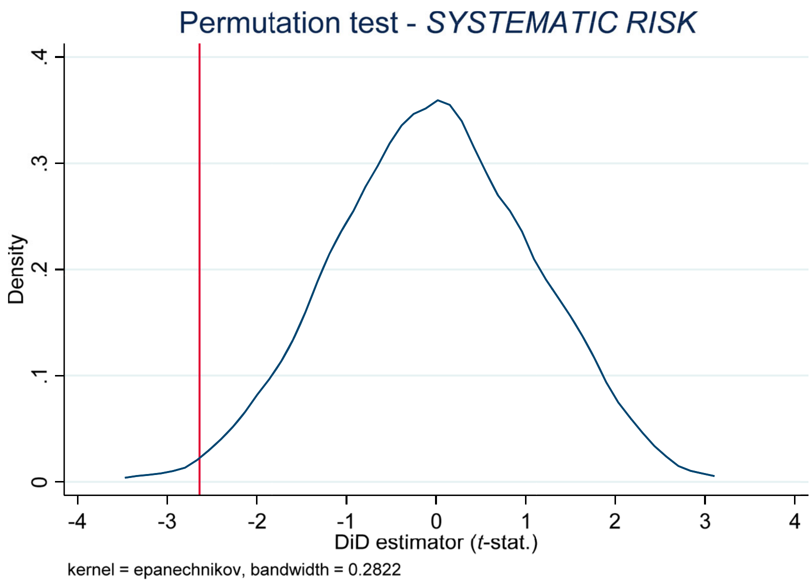

Figure 1. Placebo test – systematic risk. Shown is a kernel density plot of a randomisation inference test for simulated CTA adoption effect on systematic risk using 500 repetitions. The vertical line shows the CTA adoption effect (the robust *t*-statistic clustered by bank associated to the coefficient *POST**CTA BANK*) from Column 3 in Table 5.

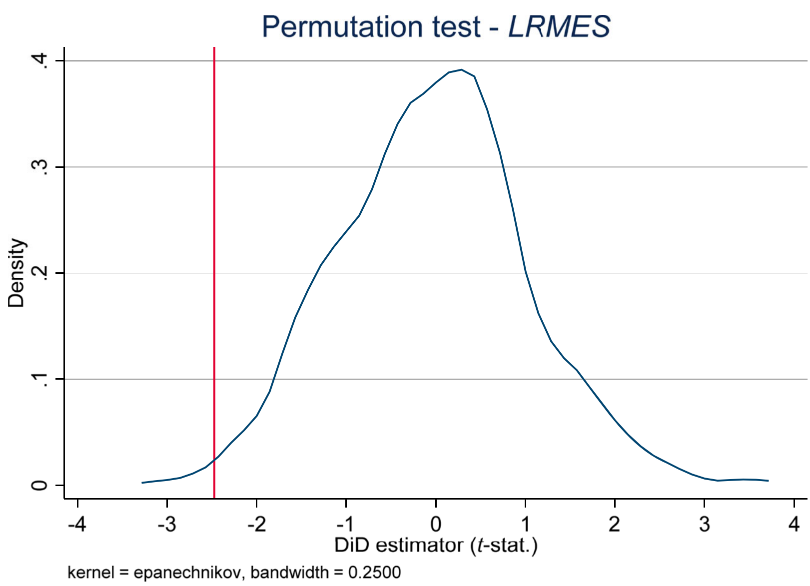

Figure 2. Placebo test – long-run marginal expected shortfall. Shown is a kernel density plot of a randomisation inference test for simulated CTA adoption effect on LRMES using 500 repetitions. The vertical line shows the CTA adoption effect (the robust *t*-statistic clustered by bank associated to the coefficient *POST**CTA BANK*) from Column 2 in Table 8.

the decrease in bank risk-taking is more evident when the relevant banking authority holds more power. In contrast, in countries characterised by less powerful banking authorities, CTA adopters tend to exercise higher levels of discretion over loan impairments during the transitional period. Overall, our study contributes to the literature investigating the impact of the institutional context on banks' opportunistic choices and risk-taking.

Our findings that (1) banks that are more constrained by regulation are more likely to adopt the CTA, and that (2) in countries with more powerful banking authorities, CTA adopters decreased their risk-taking after the adoption of the CTA, provide timely evidence for the debate on the implementation of the new ECL model. Our hand-collected data on the CTA adoption choice reveal that European banks, in particular non-IRB-SSM European banks, have signalled their inability to absorb a capital shock upon the application of ECL under IFRS 9. This finding supports the need for the transitional policy set out by the BCBS (i.e. the CTA).

Our results on the consequences of the CTA adoption on bank risk-taking provide two main messages to policy makers. First, the CTA policy, in conjunction with IFRS 9, has significantly incentivised banks to decrease their exposure to systematic risk. Second, more scrutiny over bank activities should be prioritised for CTA adopters operating in weak supervisory environments.

Ultimately, our findings are relevant with respect to several policies recently promulgated by banking authorities in reaction to the current COVID-19 crisis that aim to avoid excessive procyclicality of banks' regulatory capital. In March 2020, U.S. regulators authorised U.S. banks to delay for two years in implementing the new expected loss model (e.g. CECL) and extend the CTA duration.[38] Within its prudential remit, the ECB also took relief measures that give further flexibility to banks in provisioning loan losses. In addition to the CTA option, the ECB recommended that banks opt for the IFRS 9 transitional rules.[39] Our study suggests that, as long as banking authorities hold effective supervisory power, the increased tolerance through IFRS 9 for regulatory capital purposes will not necessarily incentivise banks to engage in opportunistic behaviour.

As the present study is the first attempt to investigate bank CTA adoption choice, our empirical analysis is subject to several caveats. First, our institutional setting focuses on the IASB and the BCBS. We do not extensively address the role and function of other regional (i.e. European Banking Authority, [EBA]) and national regulators (e.g. FINMA [Swiss Financial Market Supervisory Authority] for the Swiss banks). For instance, the EBA intends to monitor the use of transitional provisions (EBA 2018), which will add one more layer of regulatory scrutiny. Second, our analysis addresses the CTA option only as a dummy variable without examining other CTA data, such as the magnitude of the actual transitional adjustment, as mandatorily disclosed under the Pillar 3 framework. For CTA adopters, we do not further distinguish their CTA reporting approach between static, dynamic, or a combination of these two approaches. Third, this study is the first to specify a model conveying neutral (non-opportunistic) and opportunistic determinants to explain the CTA adoption choice. While our model includes bank-specific factors that are both theoretically justified and empirically consistent, it likely omits other (un)observable determinants.

Our study suggests several opportunities for future research. First, researchers could extend the CTA study by mitigating our caveats. Using disaggregated data on IFRS 9 application might provide more insights on banks' incentives to adopt the CTA. Second, as claimed by the EBA, ' … given the complexity of the new standard and the challenges still being faced by banks (in

[38]This Interim Final Rule permits U.S. banks that were required to implement the CECL model before the end of 2020 to have a five-year CTA period: https://www.occ.treas.gov/.

[39]https://www.bankingsupervision.europa.eu/.

particular during the first periods after implementation), it is expected that data accuracy will increase over time' (EBA 2018, p. 4), giving researchers the opportunity to assess how bank risk-taking and risk management evolve over time in light of this new accounting paradigm. In addition, the recent COVID-19 crisis has led to several policy changes, and it would be interesting to investigate bank reactions to critical events under the new IFRS 9 standard. Our results are built upon a 'normal' period and cannot accommodate such a crisis. Nevertheless, we are confident that our results can provide valuable insights into the effectiveness of the CTA policy.

Acknowledgements

We thank the IASB/ABR Research Forum 2020 participants, particularly Tadeu Cendon and Araceli Mora (the discussants) as well as Mark Clatworthy, Eric Jondeau and an anonymous referee for helpful comments and suggestions. We also appreciate the research assistance of Jiawei Lu and Cédrine Fuchs. This project was financially supported by a research grant from the University Laval. All errors are our own.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Supplemental data

Supplemental data for this article can be accessed at https://doi.org/10.1080/00014788.2021.1952060.

ORCID

Minyue Dong http://orcid.org/0000-0003-3134-3076
Romain Oberson http://orcid.org/0000-0003-1013-729X

References

Acharya, V.V., Engle, R., and Richardson, M., 2012. Capital shortfall: a new approach to ranking and regulating systemic risks. *American Economic Review*, 102 (3), 59–64. doi:10.1257/aer.102.3.59.

Acharya, V.V., Pedersen, L.H., Philippon, T., and Richardson, M., 2017. Measuring systemic risk. *Review of Financial Studies*, 30 (1), 2–47. doi:10.1093/rfs/hhw088.

Ahmed, A.S., Takeda, C., and Thomas, S., 1999. Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics*, 28 (1), 1–25. doi:10.1016/S0165-4101(99)00017-8.

Alexander, K., 2016. The European Central Bank and banking supervision: the regulatory limits of the single supervisory mechanism. *European Company and Financial Law Review*, 24 (13), 467–494. doi:10.1515/ecfr-2016-5001.

Barth, M.E., and Landsman, W.R., 2010. How did financial reporting contribute to the financial crisis? *European Accounting Review*, 19 (3), 399–423. doi:10.1080/09638180.2010.498619.

Barth, J.R., Caprio, G., and Levine, R., 2004. Bank regulation and supervision: what works best? *Journal of Financial Intermediation*, 13 (2), 205–248. doi:10.1016/j.jfi.2003.06.002.

Barth, J.R., Caprio, G., and Levine, R., 2013. Bank regulation and supervision in 180 countries from 1999 to 2011. *Journal of Financial Economic Policy*, 5 (2), 111–219. doi:10.1108/17576381311329661.

Basu, S., Vitanza, J., and Wang, W., 2020. Asymmetric loan loss provision models. *Journal of Accounting and Economics, Forthcoming*, 1–21. doi:10.1016/j.jacceco.2020.101359.

BCBS, 1996. Amendment to the capital accord to incorporate market risks. In *Bank for International Settlements* (Issue January). https://www.bis.org/publ/bcbs24.pdf [Accessed 15 September 2019].

BCBS, 2004. Implementation of Basel II : practical considerations. In *Bank for International Settlements* (Issue July). https://www.bis.org/publ/bcbs109.pdf [Accessed 15 September 2019].

BCBS, 2009. Guiding principles for the replacement of IAS 39. In *Bank for International Settlements* (Issue August). https://www.bis.org/publ/bcbs161.pdf [Accessed 10 April 2020].

BCBS, 2017. *Regulatory treatment of accounting provisions – interim approach and transitional arrangements* (Issue March 2017). Bank for International Settlements. https://www.bis.org/bcbs/publ/d401.htm.

Beatty, A., and Liao, S., 2014. Financial accounting in the banking industry: a review of the empirical literature. *Journal of Accounting and Economics*, 58 (2–3), 339–383. doi:10.1016/j.jacceco.2014.08.009.

Beatty, A., and Liao, S., 2020. Alternative evidence and views on asymmetric loan loss provisioning. *Journal of Accounting and Economics, Forthcoming*, 1–11. doi:10.1016/j.jacceco.2020.101362.

Beatty, A., Chamberlain, S.L., and Magliolo, J., 1995. Managing financial reports of commercial banks: the influence of taxes, regulatory capital, and earnings. *Journal of Accounting Research*, 33 (2), 231–261. doi:10.2307/2491487.

Beatty, A., Ke, B., and Petroni, K.R., 2002. Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review*, 77 (3), 547–570. doi:10.2308/accr.2002.77.3.547.

Behn, M., Haselmann, R.F.H., and Vig, V., 2016. The limits of model-based regulation. ECB Working Paper, 1928 (July 4, 2016).

Beltratti, A., and Stulz, R.M., 2012. The credit crisis around the globe: why did some banks perform better? *Journal of Financial Economics*, 105 (1), 1–17. doi:10.1016/j.jfineco.2011.12.005.

Bischof, J., Brüggemann, U., and Daske, H., 2011. Asset reclassifications and bank recapitalization during the financial crisis. *SSRN Electronic Journal*, May 31, 2019. doi:10.2139/ssrn.1628843.

Bischof, J., Laux, C., and Leuz, C., 2020. Accounting for financial stability: bank disclosure and loss recognition in the financial crisis. *SSRN Electronic Journal*. doi:10.2139/ssrn.3644284.

Bonfim, D., 2009. Credit risk drivers: evaluating the contribution of firm level information and of macroeconomic dynamics. *Journal of Banking & Finance*, 33 (2), 281–299. doi:10.1016/j.jbankfin.2008.08.006.

Brownlees, C., and Engle, R., 2017. SRISK: a conditional capital shortfall measure of systemic risk. *Review of Financial Studies*, 30 (1), 48–79. doi:10.1093/rfs/hhw060.

Buch, C.M., Krause, T., and Tonzer, L., 2019. Drivers of systemic risk: do national and European perspectives differ? *Journal of International Money and Finance*, 91 (March 2019), 160–176. doi:10.1016/j.jimonfin.2018.11.005.

Bushman, R.M., and Williams, C.D., 2012. Accounting discretion, loan loss provisioning, and discipline of banks' risk-taking. *Journal of Accounting and Economics*, 54 (1), 1–18. doi:10.1016/j.jacceco.2012.04.002.

Bushman, R.M., Hendricks, B.E., and Williams, C.D., 2016. Bank competition: measurement, decision-making, and risk-taking. *Journal of Accounting Research*, 54 (3), 777–826. doi:10.1111/1475-679X.12117.

Chen, M., and Garriott, C., 2020. High-frequency trading and institutional trading costs. *Journal of Empirical Finance*, 56 (March 2020), 74–93. doi:10.1016/j.jempfin.2019.12.002.

Chen, W., Hribar, P., and Melessa, S., 2018. Incorrect inferences when using residuals as dependent variables. *Journal of Accounting Research*, 56 (3), 751–796. doi:10.1111/1475-679X.12195.

Costello, A.M., Granja, J., and Weber, J., 2019. Do strict regulators increase the transparency of banks? *Journal of Accounting Research*, 57 (3), 603–637. doi:10.1111/1475-679X.12255.

Cucinelli, D., Di Battista, M.L., Marchese, M., and Nieri, L., 2018. Credit risk in European banks: the bright side of the internal ratings based approach. *Journal of Banking & Finance*, 93 (August 2018), 213–229. doi:10.1016/j.jbankfin.2018.06.014.

Curcio, D., De Simone, A., and Gallo, A., 2017. Financial crisis and international supervision: new evidence on the discretionary use of loan loss provisions at Euro area commercial banks. *The British Accounting Review*, 49 (2), 181–193. doi:10.1016/j.bar.2016.09.001.

De Jonghe, O., 2010. Back to the basics in banking? A micro-analysis of banking system stability. *Journal of Financial Intermediation*, 19 (3), 387–417. doi:10.1016/j.jfi.2009.04.001.

EBA, 2018. First observations on the impact and implementation of IFRS 9 by EU Institutions. In *European Banking Authority* (Issue December). https://eba.europa.eu/sites/default/documents/files/documents/10180/2087449/bb4d7ed3-58de-4f66-861e-45024201b8e6/Report on IFRS 9 impact and implementation.pdf?retry=1 [Accessed 10 April 2020].

ECB, 2017. *SSM thematic review on IFRS 9* (Issue November 2017). European Central Bank. https://www.bankingsupervision.europa.eu/press/letterstobanks/shared/pdf/2017/ssm.reportlsi_2017.en.pdf.

ECB, 2018. Status update on TRIM: overview of outcome of general topics review and interim update on preliminary results of credit risk on-site investigations. In *European Central Bank* (Issue June). https://

www.bankingsupervision.europa.eu/press/letterstobanks/shared/pdf/2018/ssm.letter_on_targeted_review_of_internal_models_TRIM.en.pdf [Accessed 11 September 2020].

Engle, R., Jondeau, E., and Rockinger, M., 2015. Systemic risk in Europe. *Review of Finance*, 19 (1), 145–190. doi:10.1093/rof/rfu012.

Ernst & Young, 2018. IFRS 9 expected credit loss: making sense of the transition impact. *EY*. https://www.ey.com/Publication/vwLUAssets/ey-ifrs-9-expected-credit-loss/$File/ey-ifrs-9-expected-credit-loss.pdf [Accessed 10 April 2020].

Ferreira, E., and Orbe, S., 2018. Why are there time-varying comovements in the European stock market? *The European Journal of Finance*, 24 (10), 828–848. doi:10.1080/1351847X.2017.1339622.

Fiechter, P., Landsman, W.R., Peasnell, K., and Renders, A., 2017. The IFRS option to reclassify financial assets out of fair value in 2008: the roles played by regulatory capital and too-important-to-fail status. *Review of Accounting Studies*, 22 (4), 1698–1731. doi:10.1007/s11142-017-9419-x.

Fiechter, P., Halberkann, J., and Meyer, C., 2018. Determinants and consequences of a voluntary turn away from IFRS to local GAAP: evidence from Switzerland. *European Accounting Review*, 27 (5), 955–989. doi:10.1080/09638180.2017.1375418.

Flannery, M.J., and James, C.M., 1984. The effect of interest rate changes on the common stock returns of financial institutions. *The Journal of Finance*, 39 (4), 1141–1153. doi:10.1111/j.1540-6261.1984.tb03898.x.

Flannery, M.J., and Rangan, K.P., 2008. What caused the bank capital build-up of the 1990s?*. *Review of Finance*, 12 (2), 391–429. doi:10.1093/rof/rfm007.

FSB, 2009. *Addressing procyclicality in the financial system* (Issue April 2009). Financial Stability Forum. www.fsb.org/wp-content/uploads/r_0904a.pdf.

Gaffney, E., and Mccann, F., 2019. The cyclicality in SICR: Mortgage modelling under IFRS 9. European Systemic Risk Board. Working Paper Series, May(92), 1–26. doi:10.20955/r.85.67.

García Osma, B., Mora, A., and Porcuna-Enguix, L., 2019. Prudential supervisors' independence and income smoothing in European banks. *Journal of Banking & Finance*, 102 (May 2019), 156–176. doi:10.1016/j.jbankfin.2019.03.001.

Gebhardt, G., and Novotny-Farkas, Z., 2011. Mandatory IFRS adoption and accounting quality of European banks. *Journal of Business Finance & Accounting*, 38 (3–4), 289–333. doi:10.1111/j.1468-5957.2011.02242.x.

Giner, B., and Mora, A., 2019. Bank loan loss accounting and its contracting effects: the new expected loss models. *Accounting and Business Research*, 0 (0), 1–27. doi:10.1080/00014788.2019.1609898.

Gruenberger, D., 2012. A rating migration model for loan loss provisions and credit cycles. Working Paper, Issue January 2013. doi:10.2139/ssrn.2187515.

Hainmueller, J., 2012. Entropy balancing for causal effects: a multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, 20 (1), 25–46. doi:10.1093/pan/mpr025.

Hainmueller, J., and Xu, Y., 2013. Ebalance: a Stata package for entropy balancing. *Journal of Statistical Software*, 54 (7), 1–18. doi:10.18637/jss.v054.i07.

Haq, M., and Heaney, R., 2012. Factors determining European bank risk. *Journal of International Financial Markets, Institutions and Money*, 22 (4), 696–718. doi:10.1016/j.intfin.2012.04.003.

Hashim, N., Li, W., and O'Hanlon, J., 2016. Expected-loss-based accounting for impairment of financial instruments: the FASB and IASB proposals 2009–2016. *Accounting in Europe*, 13 (2), 229–267. doi:10.1080/17449480.2016.1210179.

Hashim, N., Li, W., and O'Hanlon, J., 2019. Reflections on the development of the FASB's and IASB's expected-loss methods of accounting for credit losses. *Accounting and Business Research*, 49 (6), 682–725. doi:10.1080/00014788.2018.1526665.

Heß, S., 2017. Randomization inference with Stata: a guide and software. *The Stata Journal: Promoting Communications on Statistics and Stata*, 17 (3), 630–651. doi:10.1177/1536867X1701700306.

Hirtle, B., Kovner, A., and Plosser, M., 2020. The impact of supervision on bank performance. *The Journal of Finance*, 75 (5), 2765–2808. doi:10.1111/jofi.12964.

Holod, D., Kitsul, Y., and Torna, G., 2020. Market risk-based capital requirements, trading activity, and bank risk. *Journal of Banking & Finance*, 112 (March 2020), 1–16. doi:10.1016/j.jbankfin.2017.08.019.

Hong, G., and Sarkar, S., 2007. Equity systematic risk (beta) and its determinants. *Contemporary Accounting Research*, 24 (2), 423–466. doi:10.1506/8187-56KM-6511-Q532.

Hoogervorst, H., 2012. *What and what not to expect of the expected loss model*. *June*, 1–15. https://www.ifrs.org/-/media/feature/news/speeches/2012/hans-hoogervorst-ecb-june-2012.pdf [Accessed 15 June 2019].

Hoque, H., Andriosopoulos, D., Andriosopoulos, K., and Douady, R., 2015. Bank regulation, risk and return: evidence from the credit and sovereign debt crises. *Journal of Banking & Finance*, 50 (January 2015), 455–474. doi:10.1016/j.jbankfin.2014.06.003.

Iannotta, G., Pennacchi, G., and Santos, J.A.C., 2019. Ratings-based regulation and systematic risk incentives. *The Review of Financial Studies*, 32 (4), 1374–1415. doi:10.1093/rfs/hhy091.

IASB, 2018. *The Conceptual Framework for Financial Reporting*. London: International Financial Reporting Standards Foundation.

Kanagaretnam, K., Krishnan, G.V., and Lobo, G.J., 2010. An empirical analysis of auditor independence in the banking industry. *The Accounting Review*, 85 (6), 2011–2046. doi:10.2308/accr.2010.85.6.2011.

Kane, E.J., and Unal, H., 1988. Change in market assessments of deposit-institution riskiness. *Journal of Financial Services Research*, 1 (3), 207–229. doi:10.1007/BF00114851.

Kaufmann, D., Kraay, A., and Mastruzzi, M., 2011. The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, 3 (2), 220–246. doi:10.1017/S1876404511200046.

Lim, C.Y., Lim, C.Y., and Lobo, G.J., 2013. IAS 39 reclassification choice and analyst earnings forecast properties. *Journal of Accounting and Public Policy*, 32 (5), 342–356. doi:10.1016/j.jaccpubpol.2013.06.006.

Loipersberger, F., 2018. The effect of supranational banking supervision on the financial sector: event study evidence from Europe. *Journal of Banking & Finance*, 91 (June 2018), 34–48. doi:10.1016/j.jbankfin.2018.04.003.

Lönnbark, C., 2017. Setting scenarios and assessing scenario probabilities under IFRS 9 accounting. *SSRN Electronic Journal*, August 22, 1–11. doi:10.2139/ssrn.3024186.

Mariathasan, M., and Merrouche, O., 2014. The manipulation of basel risk-weights. *Journal of Financial Intermediation*, 23 (3), 300–321. doi:10.1016/j.jfi.2014.04.004.

Merton, R.C., 1974. On the pricing of corporate debt: the risk structure of interest rates. *The Journal of Finance*, 29 (2), 449–470. doi:10.2307/2978814.

Mora, A., and Walker, M., 2015. The implications of research on accounting conservatism for accounting standard setting. *Accounting and Business Research*, 45 (5), 620–650. doi:10.1080/00014788.2015.1048770.

Moyer, S.E., 1990. Capital adequacy ratio regulations and accounting choices in commercial banks. *Journal of Accounting and Economics*, 13 (2), 123–154. doi:10.1016/0165-4101(90)90027-2.

Nagler, M., Piopiunik, M., and West, M.R., 2020. Weak markets, strong teachers: recession at career start and teacher effectiveness. *Journal of Labor Economics*, 38 (2), 453–500. doi:10.1086/705883.

Niu, F.F., and Richardson, G.D., 2006. Are securitizations in substance sales or secured borrowings? Capital-market evidence. *Contemporary Accounting Research*, 23 (4), 1105–1133. doi:10.1506/X652-8M45-1702-7424.

Novotny-Farkas, Z., 2016. The interaction of the IFRS 9 expected loss approach with supervisory rules and implications for financial stability. *Accounting in Europe*, 13 (2), 197–227. doi:10.1080/17449480.2016.1210180.

O'Hanlon, J., 2013. Did loan-loss provisioning by UK banks become less timely after implementation of IAS 39? *Accounting and Business Research*, 43 (3), 225–258. doi:10.1080/00014788.2013.747260.

Orozco, L., and Rubio, S., 2021. Regulatory capital management to exceed thresholds. *SSRN Electronic Journal*, doi:10.2139/ssrn.3234652.

Pagano, M.S., and Sedunov, J., 2016. A comprehensive approach to measuring the relation between systemic risk exposure and sovereign debt. *Journal of Financial Stability*, 23 (April 2016), 62–78. doi:10.1016/j.jfs.2016.02.001.

Ryan, S.G., 2011. Financial reporting for financial instruments. *Foundations and Trends® in Accounting*, 6 (3–4), 187–354. doi:10.1561/1400000021.

Vallascas, F., and Hagendorff, J., 2013. The risk sensitivity of capital requirements: evidence from an international sample of large banks. *Review of Finance*, 17 (6), 1947–1988. doi:10.1093/rof/rfs042.

Zeff, S., 2012. The evolution of the IASC into the IASB, and the challenges it faces. *The Accounting Review*, 87 (3), 807–837. https://doi.org/10.2308/accr-10246.

Appendix 1. Variable definitions

CTA ADOPTION	Equals 1 in the year prior to the adoption of the capital transitional arrangements, and is missing in the years before and after the year of adoption. For non-adopters, *CTA ADOPTION* equals zero throughout the pre-IFRS 9 period and is missing in the post-IFRS 9 period (hand-collected)
TOTAL RISK	Annualised standard deviation of the bank's daily stock return
IDIOSYNCRATIC RISK	Variance of the residuals from the market model multiplied by 100
SYSTEMATIC RISK	Bank's systematic risk, measured as the bank's market beta by regressing the bank's stock daily return on that of the market (MSCI world) over a one-year period (i.e. the market model)
CTA BANK	Takes the value of one through the entire sample period if a bank opts for the capital transitional arrangements, and zero otherwise (hand-collected)
POST	Indicator variable that equals one for years 2018 and 2019, and zero otherwise
IRB	Takes the value of one through the entire sample period if a bank applies the IRB approach, and zero otherwise (hand-collected)
DIFF	(Common equity divided over risk-weighted assets) minus (common equity over total assets)
NPL	Ratio of non-performing loans to total gross loans
COST TO INCOME	Operating expense over operating income
ROA%	Ratio of net income to beginning-of-year total assets in percent
ROA SD	Standard deviation of *ROA%* over the last five years
MB	Price to book value (common equity) per share
LOANS	Ratio of total gross loans to total assets
CHARTER VALUE	(Market value of equity plus the book value of liabilities) divided by total assets
CAPITAL RATIO	Total regulatory capital ratio
SIZE	Logarithm of total assets in € millions
RISK FREE RATE	Money Market Interest Rate (%)
GDP%	Real GDP growth in %
SSM	Indicator variable that equals one for banks categorised as 'significant' institutions under the single supervisory mechanism, and zero otherwise (hand-collected)
SP	Official supervisory power captures the power of the supervisor to demand information and/or to take legal actions against auditors, to restructure troubled banks and to require banks to provision for potential losses (World Bank)
SP NORM	The 'official supervisory power' (*SP*) index that is normalised to take a value between zero and one
ROL	The rule of law index (estimate) from the World Bank, capturing perceptions of the extent to which agents have confidence in and abide by the rules of society. In our analyses, we employ the beginning-of-year estimate.
LI	Ratio of loan impairment to beginning-of-year total gross loans
ΔNPL	Change in non-performing loans scaled by beginning-of-year total gross loans
ΔLOANS	Change in total gross loans scaled by beginning-of-year total gross loans
NCO	Net charge-offs scaled by beginning-of-year total gross loans
GROWTH	Growth of total assets from beginning- to end-of-year
LOSS	indicator variable that takes the value one if the bank reported a loss, and zero otherwise
DCB	Dynamic conditional beta retrieved from V-Lab
LRMES	Long-run marginal expected shortfall retrieved from V-Lab

Note: Data are retrieved from S&P Global Market Intelligence unless explicitly stated otherwise.

Appendix 2. List of acronyms

ASC	Accounting Standards Codification
BCBS	Basel Committee on Banking Supervision
CAR	Capital Adequacy Ratio
CECL	Current Expected Credit Loss
CTA	Capital Transitional Arrangement
DCB	Dynamic Conditional Beta
DiD	Difference-in-Differences
EAD	Exposure At Default
EBA	European Banking Authority
ECB	European Central Bank
ECL	Expected Credit Loss
FASB	Financial Accounting Standards Board
GDP	Gross Domestic Product
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
IRB	Internal Ratings Based
LGD	Loss Given Default
LLA	Loan Loss Allowance
LRMES	Long-Run Marginal Expected Shortfall
NPL	Non-Performing Loans
PD	Probability of Default
RWAs	Risk-Weighted Assets
SA	Standardised Approach
SSM	Single Supervisory Mechanism
TRIM	Targeted Review of Internal Models