Essays on Financial Accounting and Prudential Banking Regulation

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Vorwort

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Chapter 1

Motivation and research questions

1.1 Research framework

The development of financial accounting and its underlying objectives has a long history. In 1494, the Italian monk Fra Luca Pacioli wrote the book titled *Summa de Arithmetica Geometria Proportioni et Proportionalita* (Review of Arithmetic, Geometry and Proportions). It was the first document to elaborate the concepts and practices of the double-entry accounting system, which continues to be applied in modern international accounting (Godfrey et al., 2006). Along with the development of the accounting system, also the objective of accounting evolved over time. The overarching purpose of the first accounting system was to enable merchants, who were commonly the owners and managers of their businesses, to keep record of their businesses and to control their operations (Schroeder et al., 2014). The emergence of stock corporations, beginning with the founding of the Dutch East India Company in 1602, reformed the traditional ownership structure and resulted in a separation of a company's ownership and control. This economic development led to an analogous transition of the accounting objectives towards the provision of information to shareholders and external investors about the entities' profitability (Schroeder et al., 2014; Scott, 2015), which has remained the main objective of international accounting until today. According to the Conceptual Framework (CF) of the International Accounting Standards Board (IASB), the main objective of financial reporting is to provide information to investors and creditors that is useful to make investment decisions (IASB, 2018, par. 1.2). In accordance with Demski's (1973) impossibility theorem, which concludes that no accounting system can satisfy the information needs of all user groups of financial reports simultaneously, the standard-setters define the group of investors and creditors as the primary target group to whom financial reporting is directed (IASB, 2018, par. 1.5). Thereby, the IASB explicitly rejects the prioritisation of regulatory information needs (IASB, 2018, par. 1.10).

The presentation of the history of accounting clearly shows that the evolution of financial accounting was not an isolated process, disconnected from the environment in which it is embedded. Rather, the development of international accounting and its objectives is a continuous process that is permanently influenced by the various environmental forces, which are of social, cultural, political, and economic nature (Mellemvik et al., 1988; Scott, 2015). Notably, the experience of the financial crisis of

2007-2009 and the subsequent political pressure on the IASB to also consider financial stability implication in its standard-setting decisions, had a major impact on the development of current international accounting standards for financial instruments (Bushman & Landsman, 2010; FCAG, 2009; G20, 2009). Despite the standard-setters' assertion that safeguarding financial stability is the primary objective of prudential regulators that should not fall within the IASB's remit (IFRS Foundation, 2017), the introduction of an expected credit loss (ECL) impairment approach under IFRS 9 in the wake of the financial crisis illustrates a convergence process of accounting concepts for credit risk with prudential requirements (EBA, 2015; FCAG, 2009; Novotny-Farkas, 2016). However, a turn towards prudential objectives and conservative valuation requirements would contradict a neutral depiction of financial information as required by the CF (IASB, 2018, par. 2.15).

Notwithstanding their diverging objectives, accounting and prudential regulation share a number of common features. As the average loan portfolio represents up to 60% - 70% of banks' total assets (EBA, 2016; O'Hanlon et al., 2015), accounting and provisioning for credit risk is at the heart of bank accounting and prudential regulation. Moreover, both disciplines operate in a principal-agent relationship (Jensen & Meckling, 1976), which is characterised by a potential information advantage of the agent (i.e. the bank manager) over the principal (i.e. investors). These information asymmetries may lead to non-cooperative behaviours such as adverse selection (Akerlof, 1970) or moral hazard (Holmström, 1979), according to which the agent exploits its information advantages at the expense of the principal. The transparency and monitoring tools brought by accounting information and prudential requirements, such as the capital adequacy requirement of Pillar 1 or enhanced disclosure requirement under Pillar 3 of Basel III, provide mechanisms to control the agency problems (Bushman & Smith, 2001; Dewatripont & Tirole, 1994; Watts & Zimmerman, 1990). Finally, there is a close interrelationship between accounting and prudential regulation. Literature has shown that accounting interacts with each of the three pillars of the Basel III framework (Bischof et al., 2019; Novotny-Farkas, 2016). As the 'functions which accounting fulfils are dependent on its context' (Mellemvik et al., 1988, p. 114), not only investors rely on financial reporting as a basis of information (IASB, 2018, par. 1.5), but also prudential regulators employ accounting information provided in banks financial statements as a foundation for their capital adequacy calculations under Pillar

1 of Basel III. In particular, accounting loan loss provisions built under IFRS 9 are key quantitative inputs for the calculation of the minimum regulatory capital requirements (EBA, 2015). In this way, loan loss provisioning under IFRS 9 has an impact on the level and composition of banks' regulatory capital and thus on the financial stability as a whole.

This thesis consists of four essays, which discuss the implication of the continuous developments and interactions of accounting and prudential regulation. The first paper *Analysing the growing interplay of accounting and regulatory capital: A state-of-the-art review* provides an overview of the advancing convergence between the concepts of accounting standards and Basel capital requirements in the wake of the financial crisis of 2007–2009. Financial statement information is an essential component in the calculation of banks' regulatory capital under Basel III. The paper shows that the expected credit loss approach of IFRS 9 and the prudential filter for unrealised fair value losses form the central link between accounting and regulatory capital. They result in an alignment of loss recognition and measurement methods between both disciplines. The still existing methodological differences between prudential requirements and accounting, however, may induce negative consequences for financial stability and the real economy. On this basis, the existing empirical findings on the effects of prudential filters and loan loss provisioning under IFRS 9 on banks' capital adequacy and risk behaviour are discussed in order to deepen the understanding of the positive as well as negative effects of this convergence process. As a synthesis of the theoretical and empirical overview, the survey article contributes to the discussion on a decoupling approach to resolve the conflicting objectives of accounting and regulation and derives fruitful avenues for future research. The paper is single-authored and thus created entirely under my sole responsibility. The paper was submitted to Accounting in Europe in 2021 and received a revise & resubmit decision. In addition, it was presented in a doctoral seminar at the University of Cologne.

The second paper *Does IFRS 9 increase Financial Stability?* addresses the research gap identified in the first paper and empirically assesses the procyclical implication of the IFRS 9 expected credit loss model in the context of financial stability. The study examines the impact of the two opposing forces triggered under IFRS 9 on bank resilience and capital adequacy, namely the mitigation of the cliff effect at the costs of

the front loading of expected credit losses. The study is joint work with Arndt-Gerrit Kund, research assistant at the Department of Bank Management, University of Cologne, and thus represents the result of this joint work. The joint work was characterised by close cooperation and a continuous exchange of ideas. Among other things, I contributed to developing the research questions and the theoretical framework, providing a literature overview and developing the hypotheses. Moreover, I participated in interpreting the results, deriving the conclusions, and writing. The study was presented at the 7th FRIC Research Retreat, the 9th International Conference of Financial Engineering and Banking (FEBS), 26th Global Finance Conference (GFC), 6th Conference on International Finance (INFINITI), 6th Young Finance Scholars Conference, 8th EIASM Workshop on Accounting and Regulation, 20th Meeting of the European Financial Management Association (EFMA), 59th Southern Finance Association (SFA) Annual Meeting, 49th Meeting of the Financial Management Association (FMA), and in doctoral seminars at the University of Cologne.

The third paper *From "inappropriate" to "reasonable pragmatic" – Revisiting the discussions about the incorporation of day-one losses into IFRS 9* takes up the normative question identified in the first paper as to whether standard-setters should take financial stability implications of their standards into account. By analysing the entire documentation surrounding the due process of IFRS 9, the paper evaluates whether the IASB adapted to prudential objectives with the introduction of an expected credit loss model in IFRS 9. Building on this, the commonly accepted remit of standard-setting with respect to financial stability in the wake of the financial crisis is deducted. The paper is joint work with Selina Orthaus, research assistant at the Department of Business Administration and Auditing, University of Cologne, and represents the result of this joint work. The joint work was characterised by a continuous and complementary work. As part of the cooperative work with Selina Orthaus, I was involved in the preparation of all parts of the work. In particular, I contributed to the conceptualization, the development of the theoretical framework and methods specification, collecting the data, designing and executing the data analyses, deriving the conclusions and writing. The paper was submitted to *Accounting in Europe* in 2019 and received a *revise & resubmit* decision in the first and second review process round. The article contained in this dissertation is the second revised and resubmitted version. Furthermore, the study was presented at the 14th Workshop on European Financial Reporting (EUFIN) in

Stockholm, the British Accounting and Finance Association 2019 Annual Conference (BAFA) in Birmingham, the 35th Annual Conference of the French Finance Association (AFFI) in Paris, the 42nd Annual Congress of the European Accounting Association (EAA) in Paphos, the 81st Annual Meeting of the Verband der Hochschullehrer für Betriebswirtschaft e.V. (VHB) in Rostock, the 8th EIASM Workshop on Accounting and Regulation in Siena and in doctoral seminars at the University of Cologne.

The fourth paper *The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution* addresses the dilemma which prudential regulators face in a rapidly advancing technological and digital environment, to ensure a sound regulation without creating market entry barriers for innovative financial technology companies (FinTechs). Similar to financial accounting, also banking regulation is influenced by the environment and technological developments in which it operates. Regulatory sandboxes, which imply a temporary liberalisation of regulations to facilitate FinTechs to test their innovative services, provide a promising solution. Based on a comprehensive analysis of existing sandbox models worldwide, the paper develops a sandbox approach specifically for the German regulatory environment that is able to overcome the occurring trade-off without compromising regulatory objectives. The paper was co-authored by Johannes M. Gerlach, research assistant at the Chair of Financial Services, Heinrich-Heine-Universität Düsseldorf. The joint work was characterised by a great and efficient cooperation. Among other things, I contributed to developing the theoretical foundation and the research question, providing a literature overview, collecting and evaluating the data on international regulatory sandboxes, deriving the recommendations in the regulatory context and writing. The study was presented at the 5th Academic International Conference on Law, Economics and Finance, held at the University of Cambridge, United Kingdom. The paper was published in *Credit and Capital Markets* in 2019.

1.2 Analysing the growing interplay of accounting and regulatory capital: A state-of-the-art review

1.2.1 Research question and design

Despite the different objectives of standard-setters and prudential regulators, accounting standards and prudential requirements are often perceived as complementary concepts that serve financial stability. Indeed, both disciplines are closely interrelated due to the fact that banks' regulatory capital adequacy calculations under Basel III are largely based on financial statement information (Barth & Landsman, 2010; BCBS & IFRS Foundation, 2017). In the wake of the latest financial crisis, notably the potentially adverse implications of the interplay of accounting and regulatory requirements for financial stability became a cause of concern (BCBS, 2017; Bischof et al., 2019).

Against this background, the first paper *Analysing the growing interplay of accounting and regulatory capital: A state-of-the-art review* provides an overview of growing interconnection of accounting standards and regulatory capital requirements and discusses the extant empirical findings on the behavioural and economic implications of the interrelations. The focus is on the loan loss provisioning requirements under the IFRS 9 expected credit loss model as well as on prudential filters for unrealised fair value losses. These two aspects form the central link between both disciplines and highlight the increasing convergence of loss recognition and measurement methods in the wake of the financial crisis. The existing empirical evidence is analysed to investigate whether the remaining conceptual and methodological differences between accounting and Basel capital requirements impair the resilience of the financial system and trigger novel procyclical effects on banks' capital and the real economy.

Under Basel II, the accumulated other comprehensive income (AOCI) prudential filter was used to adjust the financial statement information by excluding temporary fair value losses on available-for-sale (AFS) debt securities from regulatory capital (BCBS, 2015). The filter was abolished under Basel III. The paper first explains the rationale and the practical mechanisms of the AOCI filter. Subsequently, the empirical findings on the filter's impact on banks' capital adequacy and risk behaviour during the financial crisis and after its removal are reviewed. As a second aspect, loan loss provisioning

under the IFRS 9 ECL model forms an essential part of a banks' capital adequacy calculations under the internal ratings-based (IRB) approach of Basel III (EBA, 2015; Hashim et al., 2019). A numerical example is used to demonstrate how accounting loan loss provisions affects regulatory capital. Even though regulatory and accounting measurement requirements are converging, the still existing methodological differences may adversely affect banks' resilience during an economic downturn. On this basis, current studies on the resulting economic consequences are discussed, followed by an evaluation of dynamic provisioning as an alternative approach.

1.2.2 Results and research contribution

The paper contributes to the research by demonstrating the various interconnections between accounting standards and regulatory capital calculations in order to deepen the understanding of the potential implications of the convergence process for financial stability. Empirical evidence shows that the filter approach has proven to be an obstacle to an earlier identification of the emerging financial crisis of 2007-2009. It enabled banks to delay corrective actions as a response to their deteriorating financial assets and provided a wrong picture of their capitalisation to absorb losses. The potential use of the filter approach to engage in regulatory capital management contradicts the filter's original aim to foster financial stability (Bischof et al., 2019). Those empirical studies that analysed the implication of the AOCI filters' removal under Basel III indicate that banks reduced their exposures in risky AFS securities and increased their capital buffers in course of the removal (Chircop & Novotny-Farkas, 2016). These results indicate the potential benefits of an increased application of fair value accounting in regulatory capital calculations (Laux, 2012).

Although the concepts of regulatory capital calculations and loan loss accounting have increasingly converged in the wake of the financial crisis, the studies on the economic consequences of the interplay of ECL provisioning under IFRS 9 and regulatory capital calculation show that the new standard still entails procyclical elements. In particular, at the beginning of an economic downturn, elements such as the "cliff effect" resulting from the transition from Stage 1 to Stage 2, will have a negative impact on banks' earnings, regulatory capital, and lending (ESRB, 2017). The adverse impact of increasing loan loss provisions (LLPs) under the forward-looking ECL model on banks'

earnings and regulatory capital potentially results in a reduction in the loan supply that further aggravates the downturn. Extensive empirically evidence shows that banks primarily cut back their lending business and sell their assets as a response to capital pressure (Mishkin, 1999). The original purpose of the new impairment model of IFRS 9 to mitigate procyclicality may thus not have been achieved. However, the final consequences for credit supply and financial stability are not yet clear, as the forward-looking impairment model of IFRS 9 also has positive effects on financial stability. Empirical evidence on the Spanish dynamic provisioning model as a solution to the identified procyclical effects of IFRS 9 indicates that the approach is not capable to overcome the drawback of an ECL approach during a severe and prolonged crisis such as the latest financial crisis (Fillat & Montoriol-Garriga, 2010).

Overall, the paper shows that the concepts and methodologies of accounting standards and regulatory capital are converging. The alignment, however, reveals several conceptual concerns. In particular, the add-back of LLPs to Tier 2 capital in the event that total accounting provisions exceed the regulatory EL under the IRB approach, contradicts the regulators' proposition that capital only serves to cover unexpected losses. Since LLPs are built to cover expected losses, they are by definition not available to absorb unexpected losses. The loss-absorbing quality of regulatory capital might thus be overstated, since the accounting LLPs are only available to absorb ex ante specified expected credit losses and thus do not possess the same loss-absorbing characteristics as shareholder equity (Beatty & Liao, 2014).

Moreover, the analysis reveals that the methodological differences between IFRS 9 and the IRB approach of Basel III result in hidden capital buffers. Thereby, the paper contributes to the normative discussion on whether the standard-setters should consider prudential objectives such as financial stability as part of their remits. So far, no consensus on the normative adequacy of this development has emerged in the accounting literature. However, it is indisputable that the creation of regulatory capital buffers by means of accounting standards and an alignment to regulatory needs would contradict the decision usefulness and neutrality of accounting information (Riepe, 2019). Finally, based on the remit discussion, the paper proposes a decoupling approach that removes the need for regulators to adapt accounting information to their prudential requirements. A clear decoupling of regulatory capital calculations from accounting

standards, whereby the regulator would have to develop an own regulatory accounting system, would allow both parties to fulfil their mandates independently while achieving their respective objectives (Borio & Tsatsaronis, 2005).

1.3 Does IFRS 9 increase Financial Stability?

1.3.1 Research question and design

The paper *Does IFRS 9 increase Financial Stability?* empirically assesses the research gap identified in the first paper and investigates the implications of the change from incurred loss to expected credit loss accounting in the context of financial stability. The IASB implemented the ECL approach under IFRS 9 after the previous backward looking incurred loss model was widely criticised for delaying the credit loss recognition and for aggravating the financial crisis of 2007-2009 (Barth & Landsman, 2010; BCBS, 2016; G20, 2009). The change in the impairment methodology is a paradigm shift in the recognition of credit losses. Two key elements of the new approach are particularly relevant in assessing whether IFRS 9 is an improvement over IAS 39 in terms of financial stability, as both trigger opposing procyclical forces.

First, the staging approach under IFRS 9, which gradually recognises the deterioration of a loan's credit quality in a three stages model. This approach is expected to mitigate the procyclicality resulting from the cliff-effect, i.e. the sudden and abrupt increase of impairments in the course of an emerging crisis, which originally occurred under IAS 39. However, the stage transfer from stage 1 to stage 2 and the associated switch from the 12-month to the lifetime ECL calculation still results in a strong increase in loan loss allowances (LLAs) (EBA, 2016; Hashim et al., 2016). Accordingly, the cliff-effect is mitigated under IFRS 9, but the issue is not completely solved.

Second, IFRS 9 requires reporting entities to recognise an instruments' ECL immediately at the date of initial recognition. Although the earlier recognition of ECL reduces the cliff-effects, it also induces a second source of procyclicality. The front-loading of credit losses reduces banks' retained earnings, which are an essential component of their common equity tier 1 (CET1) under Basel III. The expected sharp increase in LLAs in the wake of a timelier recognition of ECLs will presumably result in a reduction in banks' regulatory capital. The increased pressure on banks to

recapitalise in order to meet the Basel III capital adequacy requirements could create novel procyclical effects. Empirical evidence shows that banks predominantly sell their assets and scale back the lending activities to strengthen their capital base (ESRB, 2017). However, doing so potentially aggravates the crisis. The downside of a weakened capital adequacy of banks must be set off against the benefit of a mitigated cliff-effect under the new model.

Only a few studies have examined the impact of IFRS 9 on banks' resilience. However, its implications for financial stability remained ambiguous until to date. The aim of the paper is to fill this research gap and to explore whether the conjunction of both effects constitutes a net benefit for financial stability compared to the former IAS 39 model. In order to assess the implication of a reduced cliff-effect at the cost of front-loading credit losses, the following three hypotheses are formulated.

- Hypothesis 1: The gradual recognition of impairments under the staging model of IFRS 9 reduces the volatility of impairments over time (i.e. the "cliff-effect").
- Hypothesis 2: The "front-loading" effect impedes banks' ability to retain earnings.

The third hypothesis investigates the conjunction of both effects. As the front-loading of credit losses jeopardises banks' capital adequacy, the associated increase of a banks' probability of default (PD) should be particularly strong at the outset of a crisis. This impact should decrease in the long run due to the alleviation of the cliff-effect.

- Hypothesis 3: The introduction of the IFRS 9 ECL model diminishes capital adequacy through "front-loading" losses and hence increases banks' PD.

In the fixed-effects regression model, the z-Score is used as the dependent variable to examine the impact of the ECL model on banks' PD. To account for heteroscedasticity, standard errors are clustered on the bank-level. The eigenvalue test of Belsley (1991) is employed to test for multicollinearity. To ensure that the variables included in the panel are stationary, the advanced Dickey-Fuller test is used. In the absence of empirical data, the paper employs the results of the European stress test in order to test the hypotheses. The stress test results provide data on the impact of a simulated macroeconomic baseline and adverse scenario on the resilience of the largest EU banks (Acharya et al.,

2014; Borio et al., 2012). To simulate a crisis, the stress test methodology defines exogenous shocks to four macroeconomic variables, which are included as control variables in the regression model. The sample consists of empirical data of 43 banks from 15 European countries from 2014 until 2018. Moreover, the dataset contains forecasts until 2020, which allows an early assessment of the two effects under IFRS 9 and IAS 39.

1.3.2 Results and research contribution

The results of the study confirm the three hypotheses. Regarding the first hypothesis, the results show a significant reduction in the volatility of impairments in the wake of the introduction of IFRS 9. This validates the presumed mitigation of the cliff-effect by means of the staging approach and indicates the advantage of the ECL approach over the IAS 39 approach to enhance financial stability in the future. Consistent with the second hypothesis, impairments exhibit a strong increase at the beginning of a crisis due to the front-loading of ECLs under IFRS 9. During this period, banks are impeded from retaining earnings and strengthening their capital levels. Notably, the findings in the adverse scenario clearly indicate the severe consequences of the front-loading effect during a crisis. However, the impact decreases as time progresses. The findings of the third hypothesis confirm the predictions that, despite the strong increase of impairments at the outset of a crisis and the associated increase of banks' PD, the procyclical effects are gradually reduced over time, indicating the advantage of the new model for banks' resilience in the long run. Impairments react less cyclical to economic fluctuation, making banks less vulnerable to economic downturns. The robustness tests employed in the study, such as the Jackknife method or the execution of a pseudo-treatment study, document a high robustness of the results.

Overall, the analysis shows that the front-loading of credit losses decreases banks' capital in the short run. As a result, asset quality and borrowers' credit ratings will become more important since more secure loans incur lower costs on banks under the new approach. However, the reduced procyclicality in the form of the mitigated cliff-effect has a positive effect on financial stability in the long run, indicating a net benefit of the new standard compared to the incurred loss model.

The application of stress test results in conjunction with accounting requirements represents an innovative research approach to early assess the impact of new accounting standards on banks' resilience in the absence of reliable archival data. This paper contributes to the literature by providing the first empirical evidence on the procyclical impact of IFRS 9 during a simulated crisis. The same approach can be applied to study the impact of the FASB's current expected credit loss (CECL) model using the stress test results of the Federal Reserve. As the FASB decided in favour of a single-measurement approach that requires a full lifetime ECL recognition, the cliff-effect is completely eliminated. However, this comes at cost of an even higher front-loading of credit losses compared to the IASB approach.

The results not only provide various insights for research but are also relevant for the regulatory policy discussion. The findings suggest that while the timelier loss recognition may have positive effects on financial stability, the procyclical implications of the cliff-effect are not completely resolved. It indicates the need to actively use the countercyclical capital buffer (CCyB) as required under Basel III to absorb the still remaining cliff effect (ESRB, 2017). This is especially important since by now only a fraction of the 28 European countries fully enforced the buffer up to 2.5% of the bank's risk-weighted assets.

1.4 From "inappropriate" to "reasonable pragmatic" – Revisiting the discussions about the incorporation of day-one losses into IFRS 9

1.4.1 Research question and design

The paper *From "inappropriate" to "reasonable pragmatic" – Revisiting the discussions about the incorporation of day-one losses into IFRS 9* analyses normatively whether prudential objectives have entered the standard-setters' remit with the introduction of the IFRS 9 expected credit loss model. The revised impairment approach for financial instruments may have significant implications for the stability of the financial system, as shown in the first and second paper. While there is agreement in the literature that the objectives of accounting and regulators differ, little consensus has emerged on whether accounting standard-setters should consider financial stability implications in their standard-setting decisions.

After the financial crisis of 2007-2009, the political pressure was strong on the IASB to develop a conservative impairment model that would promote financial stability and cushion for economic downturns (FCAG, 2009). However, the approval of regulatory objectives in standard-setting would contradict the IASB's remit to provide unbiased information to a variety of financial statement users and would furthermore threaten the independence and integrity of the international standard-setters. Correspondingly, the IASB insisted that the objective to ensure financial stability should exclusively be pursued by the prudential regulator. The primary objective of the standard-setter remains to promote transparent and decision-useful financial reporting (IASB, 2018, par. 1.2, SP1.5). On the other hand, the IASB acknowledged that the objectives of the two disciplines partly overlap (Hoogervorst, 2011; IASB, 2018, BC1.26), since transparency brought by accounting information fosters market discipline and enhances market confidence. This would indirectly serve financial stability (Hoogervorst, 2015; Hoogervorst & Prada, 2015). Moreover, in the course of the financial crisis, increased cooperation between the IASB and the regulatory authorities became apparent (BCBS & IFRS Foundation, 2017).

The focus of the study is on the introduction of so called 'day-one losses' under IFRS 9, that is the standards' requirement to recognise expected credit losses at an instruments' inception, regardless of an identifiable loss event. If the conservative requirement of day-one losses proves to serve prudential aims, this would contradict the IASB assertion to only "portray economic reality, rather than shape it" (Hoogervorst & Prada, 2015, p. 5) and would furthermore undermine the IASB's independence in standard-setting. The aim of the study is to examine how the inclusion of the day-one loss approach under IFRS 9 has been discussed by the IASB and its constituency groups in the context of financial stability in order to deepen the understanding of whether and to what extent prudential objectives have become an accepted part of the standard-setters' remit.

The analysis is designed as a case study (Cooper & Morgan, 2008; Yin, 2014) to scrutinise the IASB's decision to incorporate the feature of day-one losses into IFRS 9. Therefore, the entire body of official documentation issued by the IASB and FASB during the due process of IFRS 9 from 2008 to 2014 is examined. This includes all published Discussion Papers and Exposure Drafts as well as related staff papers and

audio recordings of Board meetings. Moreover, all 751 comment letters which the IASB received during the drafting process were included in order to obtain a deeper understanding of how constituents discussed the introduction of day-one losses. The comment letters were analysed using a content analysis method (Holsti, 1969) and coded with respect to their position towards the ECL approach. The comment letters were evaluated independently by the two authors to ensure reliable results.

1.4.2 Results and research contribution

The results of the study provide valuable insights on how the IASB and its constituents interpret and define the remit of standard-setting in the international financial system with respect to financial stability. Moreover, it deepens the understanding of the interrelations between financial reporting and prudential regulation. The analysis reveals that constituents largely welcomed the adoption of an ECL approach, yet the requirement to recognise expected credit losses of an instrument from day-one encountered strong resistance for several reasons.

In particular, constituents expressed conceptual concerns that day-one losses would result in a double-counting of losses as the fair value of a financial instrument already includes all expected credit losses, provided the loan is priced at market conditions. Accordingly, the double-counting contradicts the faithful representation of the economics of lending and fails to provide transparent and decision-useful information, potentially misleading users of financial statements in making investment decisions (IASB, 2013, AV3). With regard to the research question, constituents interpreted day-one losses as an unwarranted emphasis on financial stability, causing the IASB to exceed its mandate and pursue prudential responsibilities instead. Even though the IASB clearly rejected the creation of secret reserves via accounting standards (Hoogervorst, 2015; Hoogervorst & Prada, 2015), the highly conservative requirement was accused for creating additional capital-like buffers, which could negatively affect banks' lending behaviour.

Overall, the IASB constituency could not reconcile the recognition of day-one losses with the objectives set out in the conceptual framework. Consistent with IASB's view, the constituents accepted the consideration of regulatory objectives in standard-setting

only to the extent that they do not compromise the provision of transparent and decision useful information. This can be deducted as the commonly accepted remit of the IASB to pursue regulatory objectives. Accounting standards should not be understood as another tool of prudential regulation to promote financial stability. Instead, accounting standards and financial reporting should only serve financial stability by providing transparent accounting information.

Throughout the due process of IFRS 9, the IASB positioned itself as an independent standard-setter, pursuing the objective in accordance with the conceptual framework. The analysis shows that the IASB made great efforts to build the expected credit loss model on a sound theoretical foundation while underlining its independence. However, with the introduction of day-one losses under IFRS 9, prudential objectives have entered the standard-setting decision that go beyond the generally accepted remit of the IASB. The evaluation of the official documentation published during the due process indicates that the IASB finally accepted the day-one loss approach for two main reasons. First, it represented an operational simplification to the complex expected credit cash flow approach discussed in 2009. Second, it was finally accepted for the sake of convergence with the FASB, which developed a comparatively more conservative day-one loss approach.

The debate on the creation of additional capital buffers via IFRS 9, which are similar to the Basel III capital requirements, also extends to the discussion on the role of conservatism in IFRS. The study shows that constituents largely welcome the adoption of conservative ECL approach. However, the day-one loss recognition clearly exceeded the acceptable range of conservatism and was instead deemed as a tool of prudential regulators to ensure the adequacy of loss allowances in a crisis. Finally, the study contributes to the discussion on the politicisation of the standard-setting process in course of the financial crisis (Bengtsson, 2011; Kusano & Sanada, 2019) and stresses the value of the conceptual framework as well as the mission statement as theoretical guidance documents, that ensure the IASB's independency and shelters standard-setting from unwarranted influences (Botzem, 2012; Burlaud & Colasse, 2011).

1.5 The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution

1.5.1 Research question and design

The paper *The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution* contributes to the current regulatory discussion on how to facilitate innovative technologies in rapidly advancing digitalisation of traditional financial services without jeopardising regulatory objectives. The digitalisation and the rapid development of novel financial innovations driven by "Financial Technology-companies" (FinTechs) are transforming the financial services industry worldwide. Notably, they pose considerable challenges for prudential regulators to ensure regulatory compliance and financial stability. FinTechs are start-ups and established entities that offer the entire range of financial services using new technologies and already represent a significant segment within the financial services industry (Arner et al., 2017). Consequently, they must meet the same regulatory requirements as incumbent banks (FSB, 2017). However, there is still uncertainty among regulators and supervisors about how to apply the core regulatory standards such as capital and licensing requirements, without simultaneously creating significant barriers for young FinTechs to enter the markets (FSA, 2013; Michaels & Homer, 2018). Economic growth and increased customer welfare through enhanced efficiency and competition within the market would yet be restricted (BIS, 2017).

With the aim to provide clear regulatory guidelines within the new setting of innovative financial technologies, governments and regulatory authorities worldwide developed different approaches to facilitate the promotion of innovative technologies without threatening regulatory objectives. So-called regulatory sandboxes provide a sound solution to the occurring trade-off, as they allow FinTechs to test their products and services under relaxed regulatory requirements and direct regulatory supervision (He et al., 2017). The new regulatory approach reduces the regulatory market entry barriers and thereby the time-to-market for FinTechs while ensuring the core principles of consumer protection and financial stability. Moreover, the ongoing dialogue between the FinTech and the regulators during the time-limited sandbox period facilitates a mutual knowledge exchange between both parties (BIS, 2017; Maume, 2017).

Pioneered by the UK's regulator in 2015 (FCA, 2017), the novel approach was advanced and further tested in various countries worldwide (FSB, 2017). As a result, the sandbox approaches vary in their designs and stages of development (BIS, 2017), but share key characteristics (Zetzsche et al., 2017).

Despite the benefits of the already successfully operating sandbox approaches worldwide, no comparable solutions exist in Germany to date. Even though the German regulator is aware of the importance to provide a clear regulatory guidance to FinTechs to maintain the status of Germany as one of the major FinTech markets and to ensure its international competitiveness (BaFin, 2017), no local sandbox approach was initiated so far. Against the background of the relevance of the FinTech segment for the competiveness of Germany as a financial center and the importance of a co-evolution of the regulatory framework with the digitalisation, the aim of the paper is to develop a sandbox model that is applicable in the German regulatory environment. By systematically deriving and analysing the five key international sandbox models in operation within the major FinTech markets, an own set of recommendations and guidelines is developed which may form the basis for an applicable and sustainable sandbox implementation in Germany without compromising the local regulatory requirements. To enable a systematic analysis of the relevant regulatory sandbox concepts, the analysis is separated in the application phase, testing phase, and exit phase during a sandbox period.

1.5.2 Results and research contribution

The analysis of the various sandbox models worldwide indicates that the regulators remained strict on core regulations such as consumer protection and anti-money laundering, so that the core mandate of financial regulation to ensure financial stability is not compromised during sandbox period. The results of the analysis serve as the basis for a specially developed sandbox framework. To demonstrate the benefits of the resulting sandbox guidelines, the traditional principal-agent theory is used where FinTechs are the opportunistic agents and the regulator the uninformed principal. The typical principal-agent problems arising from adverse selection and moral hazard are reduced through the design of the sandbox approach which provides a screening and

monitoring process. Similar to the analysis section, the suggestions are divided into three phases, i.e. the application phase, testing phase, and exit phase.

Accordingly, the German sandbox approach should be applicable to start-ups as well as incumbents to ensure a level playing field among market participants. The screening process of a FinTech performed by the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) to enter the sandbox represents an effective instrument for the uninformed principal to reduce the ex-ante hidden information of the applicant. Potentially arising adverse selection issues as part of the principal-agent problem would be diminished (Akerlof, 1970). During the testing phase, the FinTechs are subject to close supervisory monitoring, enabling the principal to reduce moral hazard issues resulting from post-contractual opportunistic behaviour in the form of hidden actions (Holmström, 1979). Only if the FinTech complies with all required regulations by the end of the sandbox period, it may exit the sandbox as a fully-fledged financial institution. Otherwise, it does not receive permission to continue operations.

The paper represents the first study that conducted a detailed analysis of the key sandboxed worldwide to systematically highlight the key features of the various approaches to regulating FinTechs that have been developed to date. The proposed guidelines of the paper contribute to the solution of the dilemma between ensuring compliance to regulations and encouraging innovation in the highly regulated German financial sector. It created a level playing field for all market participants and lowers regulatory barriers for FinTechs to enter the market while safeguarding the stability of the financial system. The FinTechs are enabled to test their innovative business models in a controlled environment supervised by the BaFin, which finally accelerates their time-to-market. The paper contributes to the literature by developing a flexible and effective regulatory approach applicable in the new setting of innovative FinTechs. It introduces a promising solution to the challenges which regulators as well as FinTechs face in the environment of traditional bank regulations. Although the guidelines are focused on the German financial sector, the findings may also serve as a basis for other jurisdictions to develop their own solution. Moreover, the paper adds to the literature by demonstrating the evolution of the FinTech market and contributes to the general understanding of the business models and operations of FinTechs. Thereby, the paper highlights the importance of keeping the evolution of FinTechs in the focus of academic

literature to ensure the sustainability and efficiency of the financial services industry in the future. The analysis can be used as a basis for further research to empirically investigate whether and in which way the different designs of the sandbox approaches influence the efficiency and success of a FinTech.

1.6 Research results

To conclude, this thesis aims at a better understanding of the interrelations between accounting standard setting and prudential regulation. A profound understanding of this relationship is indispensable for the development of future accounting and regulatory standards. The results of the studies provide insights into the tremendous financial stability implications of this interplay and highlight the need for further research on the various interactions between both disciplines. Thereby, the thesis contributes to the discussion about the accepted remit of international standard setting in the regulatory field after the latest financial crisis. Moreover, it contributes to the ongoing debate about the importance of the standard setters' independence in a highly political environment. Despite the procyclical elements still existing under IFRS 9, the thesis finds evidence suggesting that banks become more resilient to crises under the ECL approach. The remaining procyclicality of IFRS 9 highlights the need of banks to actively utilise the countercyclical capital buffer (CCyB) of Basel III to contain these adverse effects. Although the studies show that the lessons learned from the financial crisis have been incorporated in the current regulatory and accounting requirements, banks are already facing new challenges and risks in the digital age of FinTechs. By proposing an own set of recommendations for a sandbox approach, the thesis provides a regulatory framework that meets the requirements of both, the regulator and the FinTechs.

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Chapter 2

Analysing the growing interplay of accounting and regulatory capital:

A state-of-the-art review

Analysing the growing interplay of accounting and regulatory capital: A state-of-the-art review

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Abstract

Accounting standards and prudential regulation are key elements of the financial system and are increasingly seen as complementary concepts despite their divergent objectives. This paper examines the growing convergence of accounting and Basel capital requirements in the wake of the latest financial crisis and reviews the empirical evidence on the risk behavioural and economic implications arising from the interactions. Loan loss provisioning under the IFRS 9 expected credit loss model as well as the prudential filter for unrealized fair value losses form the central link between accounting and regulatory capital as they align loss recognition and measurement methods. The remaining conceptual and methodological differences may trigger procyclical effects on banks' capital and lending with negative consequences for financial stability. Based on the findings, the paper contributes to the discussion about a strict decoupling of the two systems to reconcile the conflict between accounting and regulatory objectives and identifies avenues for future research.

JEL Classification: G01, G21, G28, M41, M48

Keywords: Basel, Expected Credit Loss Model, Fair Value, Financial Stability, IFRS 9, Prudential Filters, Prudential Regulation

2.1 Introduction

> 'Prudential and accounting authorities have come to realize their mutual interdependence.'
>
> (Borio, 2005, p. 282)

The financial crisis of 2007–2009 triggered a many-faceted debate across regulatory and supervisory bodies on how to ensure the resilience of the financial system henceforth (BCBS, 2017b; Beatty & Liao, 2014). The scope of the debate included the perceived role of accounting standards as a contributing factor to the gravity of the crisis (BCBS, 2015b; Burlaud & Colasse, 2011; Bushman & Landsman, 2010). Major criticisms primarily concerned the alleged procyclical effects of fair value accounting (FVA) as well as the delayed loan loss recognition under the IAS 39 incurred loss model (FCAG, 2009; G20, 2009; Hoogervorst, 2014). Notably, the interrelationships of accounting and prudential requirements and their implications for financial stability became a growing cause of concern (BCBS, 2017b; Bischof et al., 2019b; Laux, 2012). While the basic tenor of the empirical literature could not root the cause of the financial crisis primarily in accounting requirements (Acharya & Ryan, 2016; Barth & Landsman, 2010; Tweedie, 2018), its outcome clearly demonstrated their far-reaching implications for the financial system (IMF, 2008; Plantin et al., 2018). Moreover, the crisis reopened the debate on the role of accounting standards in strengthening financial stability, an objective that is primarily pursued by prudential regulators (Bengtsson, 2011; Giner, 2014).

Despite their diverging objectives, accounting standards and prudential regulation are increasingly seen as 'mutually supportive pillars of the international financial architecture' (Borio, 2005, p. 282) that should be used in combination. The paper contributes to the stream of literature focusing on the interactions between accounting standards and regulatory capital calculations (BCBS, 2017b; Bischof et al., 2019b; Krüger et al., 2018). It examines the growing convergence of accounting and regulatory capital requirements in the wake of the financial crisis and reviews the empirical evidence on the behavioural and economic implications arising

from these interrelations. The close interaction between accounting and prudential regulation results from the fact that accounting standards and financial statement information form the basis for regulatory capital calculations under Basel III (Barth & Landsman, 2010; Beatty & Liao, 2014). Furthermore, the paper contributes to the extant literature on the discussion regarding whether standard setters should consider prudential objectives such as financial stability as part of their remit (Acharya & Ryan, 2016; Orthaus & Rugilo, 2020; Plantin et al., 2018) or whether a clear decoupling of regulatory and accounting systems is the preferred solution (Borio, 2005; Herz, 2010).

The focus of this paper is on the new IFRS 9 expected credit loss (ECL) model as well as on prudential filters, as these aspects have received less attention in the recent accounting literature (BCBS, 2015b; Bischof et al., 2019b) yet represent the central link between accounting and regulatory capital. In particular, the paper analyses the way in which the new ECL model of IFRS 9, an approach originally adopted by the Basel framework (O'Hanlon et al., 2018), interacts with the capital adequacy requirements of Basel III and demonstrates the role of accounting loan loss provisioning for regulatory capital calculations. Although the concepts of regulatory capital calculation and loan loss accounting have increasingly converged under the ECL model of IFRS 9, the empirical evidence suggests that the still-existing methodological and conceptual differences in valuation may amplify the procyclicality in regulatory capital and bank lending, with negative consequences for financial stability (BCBS, 2017a; ESRB, 2017; Hoogervorst, 2018). The recent literature has also examined the role of so-called "prudential filters" in aggravating the crisis. As these filters were introduced by the prudential regulator to limit the potential procyclical effects on regulatory capital caused by accounting requirements (BCBS, 2015b; Bischof et al., 2019b; EBA, 2013b), their alleged adverse effect appears counterintuitive at first sight. During the latest financial crisis, the regulator applied the so-called "AOCI-filter" to exclude unrealized fair value losses on available-for-sale debt securities

from regulatory capital. This filtering approach proved to be an obstacle to the earlier identification of deteriorating financial assets during the crisis, enabling banks to delay corrective actions (Argimón et al., 2018; Bischof et al., 2019b; Laux, 2012). Although the prudential filter has been removed under the current Basel III framework (BCBS, 2015b), the scarce literature on its impact on banks' capital adequacy and risk behaviour before and especially after the removal requires a comprehensive analysis. Overall, the paper shows that the concepts of accounting and regulatory capital are converging. As Dewatripont et al. (2010, p. 8) argued that regulatory changes often merely serve to 'fight the previous crisis', the aim of the analysis is to determine whether the revised regulatory and accounting approaches can withstand future crises or whether their growing interrelations instead impair the resilience of the financial system.

The remainder of this paper is structured as follows. Section 2 introduces the concept of capital regulations under the Basel accords and discusses the differing objectives of standard setters and prudential regulators, which extend to the composition of accounting equity and regulatory capital. Section 3 explains the mechanism of the AOCI filter and reviews the extant empirical research on its risk behavioural and capital effects during the financial crisis and after the filters' removal. Section 4 outlines the interlinked concepts of loan loss provisioning under IFRS 9 and the Basel III capital requirements. Based on this, the study results on the economic consequences of these interactions are discussed, followed by an assessment of dynamic provisioning as an alternative approach. Section 5 concludes and suggests avenues for further research.

2.2 Accounting and Prudential Regulation: Interdependencies Despite Diverging Objectives

The rationale for prudential regulation is to prevent market failure caused by information asymmetries and systemic risks (Baudot, 2013; Dewatripont & Tirole, 1994; Diamond &

Dybvig, 1993; Rochet, 2010) to ensure the orderly functioning of the banking sector and to maintain financial stability (FSA, 2009; Llewellyn, 1999; Tirole, 2010).[1] Accordingly, the latter objective constitutes the main mandate of the Basel Committee on Banking Supervision (BCBS) as the primary global standard setter for prudential regulations (BIS, 2018b). The capital adequacy regulations governed by the BCBS form a key element of the regulatory toolkit to assess banks' resilience and to ensure the safety and soundness of the banking industry as a whole (FDIC, 2003; Tian, 2017). The capital requirements fulfil two functions: firstly, capital buffers serve as a cushion to absorb losses, reducing the likelihood of bank insolvencies (El Khoury, 2009; Goodhart, 2011); secondly, risk-based capital requirements effectively mitigate excessive leveraging and reduce banks' risk-taking incentives, as shown by Admati and Hellwig (2013), Jensen and Meckling (1976), and Myerson (2014).

A comparison of the role of prudential regulation with the accounting perspective reveals that not only the objectives but also the respective stakeholder groups differ (Riepe, 2019). According to the International Accounting Standards Board's (IASB's) conceptual framework, financial reporting primarily serves to provide information that is useful to a wide range of financial statement users when making economic decisions (CF 2018, par. 1.2). Accounting standards are not exclusively designed for a specific stakeholder group and therefore may not meet the conservative information needs of prudential regulators. Moreover, the presentation of financial information shall be unbiased (CF 2018, par. 2.15) so that economic decisions are not influenced in favour of a specific (prudential) objective, such as financial stability (ESRB, 2017). Despite the IASB's assertion that accounting standards and financial reporting are neither primarily directed to the information needs of prudential regulators nor designed for

[1] Although no generally accepted definition of financial stability exits in the literature (Galati & Moessner, 2012), Schinasi (2004, p. 8) summarized the principal elements, defining a financial system as being 'in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and of dissipating financial imbalances that arise endogenously or as a result of significant adverse and unanticipated events'.

prudential requirements (CF 2018, par. 1.10), the effectiveness of prudential regulation is highly dependent on accounting. This central link between the two disciplines results from the fact that financial statement information is a key input factor in banks' capital adequacy calculations under Basel III (BCBS & IFRS Foundation, 2017; FCAG, 2009; Hoogervorst & Prada, 2015).

In particular, accounting equity is a fundamental element in the calculation of regulatory capital, but their respective definitions and compositions are not identical due to the diverging objectives (BCBS, 2017b; Chircop & Novotny-Farkas, 2016).[2] The IASB defines equity as 'the residual interest in the assets of the entity after deducting all its liabilities' (CF 2018, 4.63-4.64), which consists of elements such as share capital and retained earnings (CF 2018, 4.66). A discussion on the regulatory definition of capital requires a brief synopsis of the Basel regulatory framework. Before the introduction of the Basel capital standards, no globally uniform numerical capital requirements existed for banks. The composition of regulatory capital varied from country to country (Beatty & Liao, 2011; Herring, 2007). For instance, the German regulator almost exclusively permitted shareholders' equity to be included in the calculation of regulatory capital, while long-term debt instruments also qualified as capital components in France (Herring, 2007). Likewise, in the U.S., loan loss provisions (LLPs) counted as primary capital and increased banks' regulatory capital ratios (Beatty & Liao, 2014; Kim & Kross, 1998). With the aim of achieving an 'International Convergence of Capital Measurement and Capital Standards', the BCBS (1988) formulated the first Basel Accords in 1988, commonly referred to as Basel I. Basel I provided a generally applicable capital adequacy framework to ensure an international level playing field (Dewatripont et al., 2010; FDIC, 2003; White, 2013). It introduced the concept of minimum capital requirements and required banks to hold minimum total capital equal to 8% of their total amount of assets (Ahmed et al., 1999;

[2] In the accounting context, the term "shareholders' equity" or "equity" is used, whereas the term "capital" is used in the regulatory context of the Basel accords.

Repullo et al., 2010). The banks' total assets were weighted by predefined coefficients relative to their inherent credit or market price risks, that is, risk-weighted assets (RWAs) (Ahmed et al., 1999; Beattie et al., 1995). Basel I divided regulatory capital into two tiers according to their loss-absorbing capacity. Tier 1 capital consisted of core capital, which mainly, but not exclusively, compromised shareholders' equity and retained earnings. Tier 2 capital contained, among others, debt instruments such as long-term subordinated debt, undisclosed reserves, and loan loss provisions to a limited extent (BCBS, 1988; Beattie et al., 1995).

In 2004, Basel II was released with the objective 'to arrive at significantly more risk-sensitive capital requirements' (BCBS, 2004, par. 5). The revised framework adopted a mutually supporting three-pillar structure, with Pillar 1 defining the regulatory minimum capital requirements (Bushman & Landsman, 2010; Repullo et al., 2010). The minimum capital adequacy ratio of 8% remained unchanged under Basel II. However, the determination of the RWAs for the assessment of banks' capital adequacy ratio was fundamentally revised to increase the risk sensitivity of the capital requirements (FDIC, 2003). Depending on the sophistication of its credit risk management competences, a bank could choose between two approaches (Blundell-Wignall et al., 2013; Repullo et al., 2010). Under the standardized approach (SA), the derivation of risk weights was refined and risk assessments by external rating agencies were taken into account (IMF, 2008; Repullo et al., 2010). Under the internal ratings-based (IRB) approach, however, banks were allowed to employ their own estimates to evaluate the risk level of an asset or asset portfolio (Tirole, 2010). The IRB approach was further divided into a foundation (FIRB) and an advanced internal ratings-based (AIRB) approach. Under the AIRB approach, a bank could base its credit risk measurement on internally generated estimates of the credit risk drivers, that is, the one-year probability of default (PD), the loss given default (LGD), the exposure at default (EAD), and the effective maturity (M), to assess its capital charges. Instead, under the FIRB approach, all the parameters except for the

PD were provided by the regulator (BCBS, 2004, par. 245; Herring, 2007; Repullo et al., 2010; Rochet, 2010).

The financial crisis exposed several shortcomings of the Basel II framework. The regulatory amendments culminated in the publication of Basel III in 2010 (BCBS, 2010), which is still in force today.[3] Basel III maintained the three-pillar structure as well as the SA and IRB approaches to credit risk. However, by revising the composition of the capital tiers, the loss-absorbing quality of capital was raised considerably (BCBS, 2010; Beatty & Liao, 2014). Basel III breaks Tier 1 capital down further into Common Equity Tier 1 (CET1) and Additional Tier 1 (AT1) capital. Banks must meet a minimum CET1 ratio of at least 4.5% of their RWA. The Tier 1 capital ratio increased from 4% to 6% of RWAs compared with Basel I and II, however, the total capital ratio remained at 8% of RWAs. The increase in CET1 enhanced the role of shareholders' equity as an element of regulatory capital after the financial crisis revealed that the previous Basel II capital components did not sufficiently absorb losses (Blundell-Wignall et al., 2013; Schoenmaker, 2015). With common shares, retained earnings, and other disclosed reserves, CET1 is the regulatory capital with the highest loss-absorbing capacity (Bellini, 2017). For a capital component to qualify as CET1, a number of criteria must be met. In particular, common shares need to meet a catalogue of 14 criteria to classify as regulatory capital (BCBS, 2010, par. 53). Moreover, several regulatory adjustments and deductions of accounting items are necessary to match the conservative requirements of CET1 (BCBS, 2010, pars. 66-89).

Regulators use so-called "prudential filters" to adjust the accounting information to their conservative needs to ensure the quality of the capital as a reliable loss buffer (BCBS, 2015b; ESRB, 2017; Matherat, 2018). An example of prudential filters is the derecognition of deferred tax assets (DTAs) as well as unrealized gains and losses resulting from changes in the fair value

[3] In the EU, the Basel III framework was implemented through the Capital Requirements Regulation (CRR) 575/2013) and the Capital Requirements Directive (CRD) 2013/36/EU.

of liabilities due to changes in a bank's own credit risk, in the calculation of CET1 (BCBS, 2010, pars. 69, 75). Of particular relevance is the so-called "accumulated other comprehensive income (AOCI) filter", which was applicable under Basel II and removed under Basel III. Empirical studies have shown that this filter had a considerable impact on banks' regulatory capital and risk behaviour during the financial crisis (Argimón et al., 2018; Bischof et al., 2019b; Laux, 2012), which is discussed in the following section. Finally, the regulatory adjustments in the case of a shortfall or excess of loan loss provisions to regulatory expected losses calculated under the IRB approach (BCBS, 2010) form the second close link between the accounting and the Basel capital requirements (Bellini, 2017; Elliot, 2010). Figure 1 illustrates the general relationship between the balance sheet items and the regulatory requirements of asset risk weighting as well as the assignment of accounting equity and liabilities to the capital tiers under Basel III.

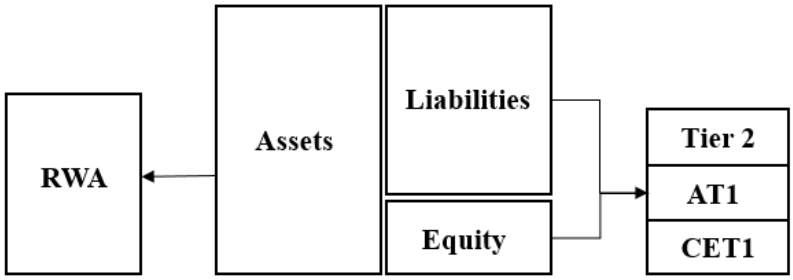

Figure 1: General interrelations between accounting and prudential regulations
Source: Adapted from Bellini (2017)

The depiction of the Basel capital adequacy requirements clearly shows a profound discrepancy in the definition of capital from an accounting and from a regulatory perspective. In contrast to the accounting definition of equity capital, regulatory capital Tier 2 also contains debt instruments like subordinated debt. Thus, from an economic perspective, only CET1 can be defined as "equity", while the other tiers contain hybrid forms of equity (AT1) or debt instruments (Tier 2). The gradual modification of the composition of regulatory capital from Basel I to Basel III, however, shows a clear shift of regulatory capital away from debt

instruments and towards a greater emphasis on core accounting equity capital in the form of CET1. The regulatory deductions of accounting items like goodwill, DTA, and investments in own shares, however, depict a stricter definition of the concept of CET1 compared with accounting equity, which can be attributed to the divergent objectives of both disciplines (BCBS, 2015b; Schoenmaker, 2015).[4]

2.3 Fair Value Accounting and Regulatory Capital under the AOCI Filter

2.3.1 Evaluation of the Extant Empirical Research on the AOCI Filter during the Crisis

Fair value accounting (FVA) was already the subject of controversial debates in the savings and loan crisis of the 1980s and later in the financial crisis of 2007–2009 (Barth & Landsman, 2010; Beatty & Liao, 2014). It has been criticized for aggravating the financial crisis by triggering a negative spiral of market value losses, fire sales, and regulatory capital constraints (BCBS, 2017b; Bushman & Landsman, 2010). Notably, the debate on the role of FVA focused on available-for-sale debt securities, which accounted for the largest share of fair-valued instruments on banks' balance sheet during that period (Argimón et al., 2018; Barth et al., 2017; Laux & Leuz, 2010).[5] They were subject to a prudential filter approach under Basel II, which presumably shielded banks from considerable regulatory capital losses (Laux, 2012).

To understand the link between available-for-sale securities and regulatory capital, this section first provides a brief overview of relevant accounting policies applicable under IFRS and US GAAP during the financial crisis. IAS 39 followed a "mixed-attribute" model that classified financial instruments into four categories: held-for-trading (HFT) and available-for-sale (AFS) financial assets, which were measured at fair value, and held-to-maturity (HTM) instruments and loans and receivables, measured at amortized cost (IAS 39 par. 9). The latter category was

[4] The Deutsche Bank's Pillar 3 Disclosure Report (2019) showed 22 regulatory adjustments of reported equity that resulted in CET1 being 22% lower than the equity reported in the balance sheet (Deutsche Bank, 2019).
[5] Instead, instruments measured at fair value of which the unrealized fair value gains and losses were recognized in net income, for example trading securities and derivatives, made up only a small portion of banks' assets (Acharya & Ryan, 2016).

not employed under U.S. GAAP (Kim et al., 2019).[6] In the AFS category, unrealized gains and losses arising from fair value changes deemed to be temporary were recognized in a subaccount of shareholders' equity called accumulated other comprehensive income (AOCI) and thus were excluded from the income statement (Chircop & Novotny-Farkas, 2016; Laux & Leuz, 2010; SEC, 2008). Only in the event that an AFS instrument was sold or deemed to be other than temporarily impaired (OTTI), that is, when its fair value did not appear to recover until maturity or prior to sale, the resulting gains or losses were recognized in the income statement (Badertscher et al., 2012; Barth et al., 2017).[7]

The existing empirical evidence on FVA and AFS securities as major driving factors of the severity of the crisis is scarce (BCBS, 2015b; Bischof et al., 2019b; Li, 2017). In contrast, several studies have provided evidence that the effect of FVA on banks' regulatory capital ratios was rather insignificant for two main reasons. First, compared with loans recognized at amortized cost, which is commonly the largest asset group on banks' balance sheet, fair value measured financial assets accounted only for a small proportion of banks' total assets (Acharya & Ryan, 2016; Georgescu & Laux, 2015; Greenberg et al., 2013). Second, the regulatory requirements under Basel II did not demand recognition of all fair value losses in regulatory capital. Instead, unrealized fair value gains or losses on AFS debt securities recognized in AOCI were excluded from the calculation of Tier 1 capital by means of a prudential filter. This filter, commonly referred to as the "AOCI filter", shielded banks' regulatory capital from temporary fair value losses on AFS debt securities to preserve the loss-absorbing function and permanence of regulatory capital (Chisnall, 2001; Heaton et al., 2010; Laux, 2016). Only in the event that the securities were sold or deemed to be other than temporarily impaired (OTTI) did AFS debt

[6] ASC 320 became effective in 2009 and essentially comprised SFAS No. 115. As such, the literature prior to 2009, which will be discussed in this review, refers to SFAS No. 115 (Kim et al., 2019).
[7] Under US-GAAP, the OTTI rules were amended by FASB Staff Position (FSP) FAS 115-2 and FAS 124-2. For reporting periods after 15 June 2009, only the credit loss portion of the OTTI charges are to be recognized in the income statement. The loss amount related to all other market factors is still recognized in AOCI (FASB, 2009). The regulatory treatment, however, did not change in course of the amendments.

securities have a direct impact on regulatory capital (Chircop & Novotny-Farkas, 2016; Shaffer, 2010).[8] Several studies, however, have shown that the OTTI charges were rather limited during the financial crisis.

In their examination of the pre-crisis period from 2004 to 2006, Laux and Leuz (2010) reported that loans and leases measured at amortized cost accounted for approximately 50% of U.S. bank holding companies' total assets.[9] Accordingly, a substantial proportion of losses during the crisis occurred in banks' loan portfolios, not measured at fair value. The second-largest asset class was AFS securities, which constituted roughly 15%–18% of bank holding companies' assets. However, since prudential filters excluded temporary fair value changes of AFS debt securities from the calculation of regulatory capital, the impact of FVA on banks' regulatory capital was rather limited compared with the credit loss charges in banks' loan portfolio.

In addition to the descriptive evidence from Laux and Leuz (2010), Shaffer (2010) examined the quantitative impact of FVA on banks' regulatory capital levels. Using a sample of the 14 largest U.S. bank holding companies, which represents 65% of the total assets of the top-tier bank holding companies in 2008, he found that the impact of OTTI charges on Tier 1 capital was negligible compared with loan impairments. While the capital reductions induced by OTTI charges ranged from 0.1% to 3.9% for all but one bank,[10] the contribution of loan impairments to the decline in US banks' Tier 1 capital was considerably larger. For instance, loan loss provisioning depleted 20.8% of the Bank of America's Tier 1 capital compared with the -3.9%

[8] Similar to AFS debt securities, unrealized fair value gains on AFS equity securities were excluded from regulatory capital calculations. Unrealized losses, however, were fully subtracted from regulatory capital (Laux, 2012). Since AFS equity securities generally made up a minor proportion of banks' balance sheets, their effect on regulatory capital was rather negligible (Badertscher et al., 2012; Shaffer, 2010; Barth et al., 2017) and are therefore not investigated further in this paper.

[9] Their sample covered 27 large bank holding companies with total assets greater than $100 billion and 412 small bank holding companies with assets between $1 billion and $100 billion (Laux & Leuz, 2010).

[10] The percentages also include OTTI charges from HTM securities.

induced by fair value effects. Based on the results, Shaffer (2010) concluded that a causal link between FVA and regulatory capital decline during the crisis is not evident.

Similar, Badertscher et al. (2012) provided quantitative evidence that OTTI had only minor effects on the depletion of banks' regulatory capital. Their sample consisted of 100 US bank holding companies examined over a time period from 2004 to 2008, allowing them to compare the quarterly OTTI charges during the crisis with those before the crisis unfolded. They found that, in the pre-crisis period from 2004 to 2006, the OTTI charges were relatively low and did not reach USD 1 billion until the fourth quarter of 2007. Only in the last two quarters of 2008 did they experience a strong increase to about USD 14 billion. Although the OTTI charges totalled USD 19.3 billion from September 2007 to December 2008, almost 20 times the pre-crisis level, Badertscher et al. (2012) showed that they accounted for only an imperceptible share compared with the bad debt expenses of USD 214.1 billion in the same period. Moreover, the authors assessed the effect of the OTTI charges on banks' regulatory capital ratios. An add-back of OTTI charges to Tier 1 capital shows that the mean (median) Tier 1 ratio rose from 10.5% to 10.8% (9.9% to 10%) in the third quarter of 2008, indicating that the OTTI charges did not significantly deplete banks' regulatory capital at the peak of the crisis. The evidence rather suggests that the main reason for regulatory capital depletion was bad debt expenses.

What is striking about the results obtained by Badertscher et al. (2012), however, is the fact that bad debt expenses had already begun to rise sharply in the last quarter of 2007, when the OTTI charges were still unremarkable. This indicates that the AOCI filter potentially enabled the top 100 U.S. bank holding companies to delay the effect of fair value losses on AFS debt securities on their regulatory capital by almost a year, long after the financial crisis began (Laux, 2012). High unrealized losses could thus be excluded from regulatory capital calculations, giving banks the opportunity to engage in 'regulatory arbitrage' (Riepe, 2019, p. 19) and to mask their 'actual solvency position' (Argimón et al., 2018, p. 200). Referring to this issue, the BCBS

(2015b) cited an unpublished study by the Accounting Task Force, which found that, if the AOCI filter had been removed during the financial crisis, the unrealized fair value changes would have had the greatest overall impact on banks' Tier 1 capital volatility. Similar evidence was provided in the study by Chircop and Novotny-Farkas (2016), who documented that Citigroup and State Street Corporation reported unrealized losses on AFS securities of USD 9.6 billion (USD 5.2 billion) in the fourth quarter of 2008, representing 8.1% (36.9%) of their Tier 1 capital, which yet remained unaffected due to the AOCI filter.

Thus, the prudential filter approach may have hindered the earlier detection of the emerging financial crisis, possibly delaying the necessary regulatory interventions (Argimón et al., 2018; Bushman & Landsman, 2010). Laux (2012, p. 249), moreover, concluded that the AOCI filter 'provided banks with incentives to downplay impairments as temporary to avoid an impact on regulatory capital'. Only recently has the accounting literature begun to study the potentially adverse effects of prudential filters, having recognized their impact on financial stability. So far, only Bischof et al. (2019b) have investigated the potential adverse incentives induced by the AOCI filter to retain deteriorated assets on the balance sheet rather than taking early corrective actions. In their regression model, which was based on a sample of 740 banks from 38 countries worldwide over a period from 2001 to 2016, they documented that, in countries with a filter approach, the incentive of banks' management to take corrective actions as a response to AFS losses was reduced or completely eliminated.[11]

2.3.2 Basel III – Removal of the AOCI Filter

In light of the identified downsides of the filter approach and with the aim of improving the quality of CET1 (Argimón et al., 2018; BCBS, 2015b), the BCBS decided to remove the AOCI filter in the Basel III framework. As a result of the removal, unrealized gains and losses on AFS

[11] As shown by Argimón et al., (2018) and Bischof et al. (2019a), AOCI filters for fair value losses on debt securities differ among countries.

securities must also be included in CET1 capital (BCBS, 2010, par. 52; BCBS, 2017b).[12] In Europe, the Capital Requirements Regulation (CRR) (Article 35 CRR) provided for the stepwise removal of the prudential filter until the end of 2017 (Articles 467–468 CRR). As such, even though the FV-OCI category still exists for debt instruments under IFRS 9 (IFRS 9 par. 4.1.2A), which was implemented in 2018, instruments in this category are not subject to prudential filters under the CRR (EBA, 2015). In the U.S., the Final Rule (Federal Reserve, 2013) on the elimination of the AOCI filter was issued in 2013. The Federal Reserve granted all but advanced approach banks (AA banks), that is, banks that use advanced approaches to measure RWAs[13], a one-time opportunity to retain the regulatory treatment of AFS securities and keep the AOCI filter (Barth et al., 2017; Laux, 2016), which was widely selected by eligible banks (Kim et al., 2019). As a result, since the beginning of 2014, AA banks must include unrealized gains and losses reported in AOCI in their regulatory capital calculations.

The regulatory decision on AOCI filters raised concerns among U.S. and European banks that the additional recognition of unrealized fair value changes could lead to increased volatility in CET1, forcing them to hold larger capital buffers to counter capital fluctuations and avoid breaching the minimum capital requirements (ABA, 2012; EBF, 2012). In contrast, proponents have argued that the removal may encourage conservative capital behaviour among banks (Chircop & Novotny-Farkas, 2016; Laux, 2016). The additional recognition of unrealized losses on AFS securities may have similar effects on regulatory capital as the earlier recognition of expected credit losses under IFRS 9, as discussed in section 4 below. Accordingly, the accumulation of unrealized fair value losses during an economic downturn may result in

[12] Transitional arrangements apply to unrealized losses. The treatment of unrealized gains is still under review (BCBS, 2010, p. 13, footnote 10).

[13] AA banks are required to apply their internally developed ratings-based approach and further methodologies when calculating their risk-based capital requirements for credit risk. AA banks are defined as "large, internationally active banking organizations […] with at least $250 billion in total consolidated assets or at least $10 billion in total on-balance sheet foreign exposure […]" (Board of Governors of the Federal Reserve System, 2017)

significant reductions in banks' CET1 capital, potentially increasing procyclicality (BCBS, 2015b; CFA Institute, 2013). On the other hand, as shown by Beatty and Liao (2011) and Bushman and Williams (2012), earlier loss recognition is associated with lower risk taking, potentially improving financial stability and regulatory discipline.[14]

Three empirical studies analysed the implication of the AOCI filter removal in the U.S. and Europe. They provided valuable insights into whether the removal is associated with an improved risk-taking behaviour among banks, which may offset the potential downsides of increasing capital fluctuations. Chircop and Novotny-Farkas (2016) took advantage of the differing regulatory treatment of unrealized fair value on AFS securities for AA banks and non-AA banks in the U.S. In their study, they empirically investigated whether AA banks, affected by the removal of the AOCI filter, altered their investment strategy and risk behaviours relative to banks that retained the filter approach. Using a sample of 259 banks from 2009 to 2014, they found evidence that banks without the filter approach reduced their exposure to risky AFS securities.[15] Based on the result, the authors concluded that the filter removal and the resulting increased use of fair value accounting in regulatory capital calculations mitigates banks' ex ante risk-taking incentives and improves their regulatory discipline.

Similar to Chircop and Novotny-Farkas (2016), Kim et al. (2019) examined the economic consequences of the AOCI filter removal for AA banks as well as adjustments in their risk-taking behaviour. Using financial statement data from 793 U.S. bank holding companies during the period 2011–2016, they posited that AA banks alter their asset portfolio by reducing the portion of AFS securities to avoid increasing fluctuations in regulatory capital after the filters' removal. In line with their hypothesis, the authors found that, compared with non-AA banks,

[14] Both studies focused on loan loss provisioning.
[15] The authors defined illiquid Level 3 AFS securities, which include 'complex structured investments such as collateralized debt or loan obligations, non-agency mortgage-backed and other asset-backed securities', as risky compared with treasury bonds and agency-backed securities, which represent the largest part of the AFS portfolio (Chircop & Novotny-Farkas, 2016).

AA banks increase their HTM portfolio measured at amortized cost and reclassify their existing assets from AFS to HTM since, for these instruments, temporary value changes do not affect regulatory capital.

Argimón et al. (2018) were the first to use a sample of European banks to examine changes in risk-taking behaviour and capital volatility in the course of the revised requirements of Basel III. The data set used consisted of consolidated annual results for 140 banks in 17 European jurisdictions from 2005 to 2013, shortly before the complete removal of the AOCI filter in the EU. This sample selection allowed the authors to take advantage of the heterogeneous regulatory treatment of unrealized fair value changes on AFS securities in the observed jurisdictions under Basel II. The authors provided evidence that the volatility in banks' regulatory capital ratios increased significantly under the new regulatory regime. In particular, they adjusted banks' capital ratios of 2005 to 2013 by the amount of the unrealized gains and losses during the same period and showed that, if the AOCI filter had been removed during that time period, ceteris paribus, the capital ratio fluctuations would have been considerably stronger than those actually observed. Banks concerned about breaching the minimum capital adequacy requirements in the course of the increased volatility adjusted their investment behaviours and accumulated higher capital buffers ex ante. In line with Chircop and Novotny-Farkas (2016) and Kim et al. (2019), the authors showed that banks tend to hold lower proportions of AFS debt securities in relation to total assets. From this empirical evidence, they expected that, under Basel III, banks will not only reduce their investments in risky securities but possibly also reduce their entire AFS portfolio, including less risky long-term AFS debt securities such as sovereign bonds.

The evidence above shows that, instead of the AOCI filter's original aim of reducing volatility in banks' regulatory capital and fostering financial stability, the filter approach may also entail adverse effects. It potentially provided a wrong picture of the amount of regulatory capital

available to absorb losses and distorted banks' incentive to recognize losses of deteriorated assets early in a crisis (Bischof et al., 2019b; Laux, 2012). The results indicate that banks took advantage of the favourable regulatory treatment of temporary gains and losses in AFS securities to 'mask' (Argimón et al., 2018, p. 200) their true capital position and delay further corrective regulatory actions. However, banks that were adapting to the higher risk sensitivity imposed by the earlier and full recognition of unrealized losses in regulatory capital under Basel III invested in less risky securities and increased their capital buffers. Overall, the evidence on the behavioural effects of the filter removal suggests that FVA should increasingly be used in regulatory capital calculations (Laux, 2012). Finally, the removal of the AOCI filter results in further convergence of accounting equity and CET1 since both may include unrealized fair value gains and losses recognized in AOCI. To conclude, in the case of AFS securities, regulatory capital requirements have adapted to accounting standards, further aligning 'accounting and bank regulation' (Novotny-Farkas, 2016, p. 207).

2.4 Loan loss Accounting and Regulatory Capital

2.4.1 Transition from Incurred Loss to Expected Loan Loss Accounting

Loan loss accounting standards require reporting entities to recognize deteriorations in the credit quality of loans via loan loss provisions (LLPs), an expense account in the income statement (Beattie et al., 1995; Gebhardt & Novotny-Farkas, 2011).[16] In addition to reducing reported earnings, the recognition of LLPs can also have a strong impact on banks' regulatory capital under the Basel III framework. This second close link between accounting and regulatory capital results from the fact that loan loss provisioning under the new IFRS 9

[16] In the U.S. accounting terminology, LLPs are also referred to as allowance for loan and lease losses (ALLL) (Covas & Nelson, 2018; Beattie et al., 1995). Increases as well as decreases in LLPs are accumulated on the balance sheet via loan loss allowances (LLAs) (Gebhardt & Novotny-Farkas, 2011), also referred to as loan loss reserves (LLRs) (Balla & McKenna, 2009; Beattie et al., 1995).

expected credit loss (ECL) model forms an integral part of the capital adequacy calculations under Basel III (EBA, 2015; Gebhardt & Novotny-Farkas, 2011; Hashim et al., 2019).

Following criticism of the former incurred loss model in the course of the financial crisis, loan loss provisioning has become a key topic in the accounting literature (Acharya & Ryan, 2016; Novotny-Farkas, 2016). The incurred loss model of IAS 39 allowed banks to recognize losses only in the case of objective evidence that a loan or group of loans is impaired. The consideration of future expected credit losses was excluded (IAS 39 par. 59). Similarly, under U.S. GAAP no loan losses could be recorded unless they were deemed to be "probable" (FASB, 2016, p. 1). The requirement of a loss event and the backward-looking nature of the impairment models was criticized for delaying the recognition of loan losses until 'too late' (Hoogervorst, 2014, p. 3), preventing banks from already building up LLPs during economic upturns (BCBS, 2017b; Kanodia & Sapra, 2016). The resulting sudden increases in LLPs during the crisis drove the procyclicality of banks' earnings and regulatory capital (Gebhardt & Novotny-Farkas, 2011).[17]

In response to the criticism, both standard setters introduced a forward-looking ECL model to mitigate the procyclical effects and enhance financial stability (Bernanke, 2009; Hashim et al., 2019; Löw et al., 2019). Under the U.S. GAAP and IFRS 9 ECL approaches, the requirement of objective evidence to record loan losses is removed. Instead, reporting entities are required to include all relevant information concerning past events and current conditions as well as reasonable forecasts about future macroeconomic conditions in the measurement of ECLs (FASB, 2016, par. 326-20-30-7). The recognition of ECLs at an earlier point in the economic cycle is expected to enhance the ability of banks to withstand economic crises and to mitigate the procyclical effects associated with the incurred loss model (Borio, 2003; Cortavarria et al.,

[17] Bushman & Williams (2012) and Bischof et al. (2019a) showed that, contrary to the criticism, the incurred loss model provided sufficient discretion for timely loan loss recognition. However, this discretion has been used for earnings management purposes.

2000; Domikowsky et al., 2014; Hoogervorst, 2018). However, the two ECL models are not identical. While the FASB's current expected credit loss (CECL) impairment model requires banks to recognize the lifetime ECLs at a loan's initial recognition (FASB, 2016, pars. 326-20-30-1, 326-20-35-1), the IASB opted for a staging approach, classifying financial assets according to their credit quality. In Stage 1, which includes all performing financial assets, the 12-month ECL is recognized via LLPs (IFRS 9 par. 5.5.5). Stages 2 and 3 include financial assets that have been exposed to a significant increase in credit risk since the initial recognition or are credit impaired, respectively. For these assets, the lifetime ECL is recognized (IFRS 9 pars. 5.5.3–4).

Given the novelty and recency of the accounting change, only limited empirical work has been conducted on the effects of the ECL models on procyclicality and financial stability so far. However, the experiences of the latest financial crisis have led the empirical literature to analyse the benefits of forward-looking ECL recognition already during the incurred loss accounting regime (BCBS, 2017b; Hashim et al., 2019). This research stream has examined the consequences of delayed loan loss recognition for banks' lending (Beatty & Liao, 2011; Bushman & Williams, 2015) and risk-taking behaviour (Bushman & Williams, 2012; Huizinga & Laeven, 2012). Beatty and Liao (2011) analysed the impact of delayed expected loss recognition (DELR) under the incurred loss model on banks' lending behaviour. By exploiting cross-sectional variations in the discretionary application of the former loss accounting model across 1,370 U.S. banks in the period 1993–2009, they documented that timelier loan loss recognition via provisions is positively associated with loan growth during recessions. The authors argued that delays in the recognition of expected losses during recessions increase the sensitivity of bank lending to regulatory capital constraints. During an economic downturn, when the LLPs built under the incurred loss model turn out to be too low to cover all materializing credit losses, the required strong increase in LLPs results in a decrease in

regulatory capital, which further dampens banks' willingness to lend. This procyclical impact on bank lending when capital requirements become binding during a recession is called the "capital crunch" effect. Beatty and Liao (2011) empirically showed that this effect is stronger for banks with longer delays in the expected loss recognition. Moreover, the authors documented that banks with timelier recognition of expected losses build higher capital buffers already during economic upturns, allowing them to maintain their lending activities in recessionary periods.

Likewise, Bushman and Williams (2015) showed for a sample of U.S. commercial banks that timelier expected loss recognition is associated with greater willingness of banks to lend. Furthermore, their risk of capital shortfalls during an economic downturn is lower than that for banks that tend to delay the recognition of losses. Finally, Laeven and Majnoni (2003), who analysed an international sample of banks from 45 countries, as well as Bikker and Metzemakers (2005) and Bouvatier and Lepetit (2008), who used bank data from 29 OECD countries and 15 European countries, respectively, confirmed the adverse effects of delayed loan loss recognition under the incurred loss model on banks' lending activities and regulatory capital. Overall, the study results indicate that timelier ECL recognition under IFRS 9 may have a positive impact on financial stability.

2.4.2 ECL Measurement under IFRS 9 and BASEL III

The introduction of an ECL model in IFRS 9, a concept originally applied in the calculation of banks' regulatory capital under Basel II (Hashim et al., 2019; O'Hanlon et al., 2018), further aligns the regulatory and accounting measurement requirements (FCAG, 2009; Novotny-Farkas, 2016). Under the internal ratings-based (IRB) approach as well as under IFRS 9 (EBA, 2016), banks calculate expected losses[18] as the product of the three credit risk parameters

[18] Unlike the accounting terminology of expected credit losses (ECLs), the regulatory discipline uses the concept of expected losses (ELs).

probability of default (PD), loss given default (LGD), and exposure at default (EAD) (Gaston & Song, 2014; IMF, 2008). As only the IRB approach of the Basel III framework requires the calculation of expected losses (BCBS, 2016; BCBS, 2017a; BIS, 2018a), the standardized approach (SA) of the Basel framework will not be discussed further in this paper. Even though the IFRS 9 and IRB approaches use similar concepts to measure credit risk, it is possible to identify several methodological differences in the measurement of expected losses and the estimation of credit risk parameters, which are due to the diverging objectives of accounting and regulation (Novotny-Farkas, 2016).

First, as shown in Figure 2, the IRB approach does not provide for a three-stage approach. Accordingly, the IRB expected loss is calculated over a 12-month horizon for all non-defaulted loans, while IFRS 9 already requires recognition of the lifetime ECL in the case of a significant increase in credit risk (i.e., Stage 2). For defaulted loans, both approaches similarly require recognition of the lifetime ECL (BCBS, 2016; Novotny-Farkas, 2016).

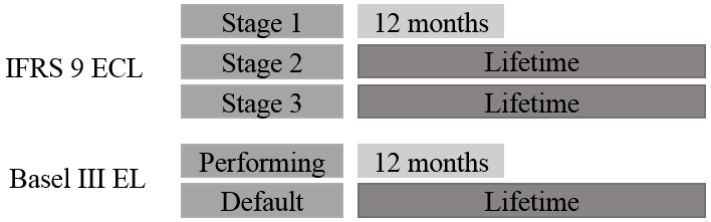

Figure 2: Difference between regulatory and IFRS 9 expected losses by time horizon
Source: Adapted from Deloitte (2013)

Further conceptual differences exist in the determination of the PD. Banks commonly use a through-the-cycle approach (TTC) for their PD estimation under Basel III (BCBS, 2015a; EBA, 2015). The application of long-term average default rates under the TTC approach neutralizes the effects of economic fluctuations in the PD estimation (ESRB, 2017; Gordy & Howells, 2006). In contrast, the IASB prescribes a point-in-time (PIT) estimation of the PD (IFRS 9 BC 5.282). Due to the considerably shorter time horizon used in the PIT approach (e.g. a year), the PD reacts more sensitively to cyclical movements and can fluctuate considerably over the

business cycle (Moody's, 2016; Novotny-Farkas, 2016). Finally, the estimation of the LGD and the EAD differs under the two approaches. The capital adequacy framework prescribes that financial institutions should estimate both risk parameters based on economic downturn conditions, also referred to as downturn LGD and EAD. In contrast, the IASB demands a neutral estimation of both risk parameters (BCBS, 2015a; Cohen & Edwards, 2017; IMF, 2008).

Table 1 presents the main differences between the accounting ECL model of the IASB and the Basel IRB EL approach. Due to these differences in measurement, the accounting ECL may exceed or fall short of the regulatory EL, depending on the current economic cycle (BCBS, 2016; BCBS, 2017a). To date, only minor research is available on the excess/shortfall mechanism under the Basel III IRB approach (BCBS, 2015b), which is discussed in the following section.

		IFRS 9	Basel
PD	Time horizon	12 months (Stage 1) Lifetime (Stage 2)	12 months
	Cycle sensitiveness	Point-in-time	Through-the-cycle
LGD/ EAD	Measurement	Neutral estimate	Downturn estimate

Table 1: Main differences between IFRS 9 and the Basel IRB approach
Source: Adapted from BCBS (2016); BCBS (2017a)

2.4.3 Interplay of Regulatory Capital and Loan Loss Provisioning

The recognition of LLPs affects the level of regulatory capital in two ways (BCBS, 2017b; Ng & Roychowdhury, 2014). First, the recognition of LLPs reduces banks' retained earnings, which are a key component of CET1 and thus have a direct impact on their regulatory capital (ESRB, 2017; Krüger et al., 2018). In a second step, the LLPs are included in the regulatory capital calculations (BCBS, 2017b), whereby an increase in the LLPs has opposing effects on total capital, as part of the LLPs may be added back to the Tier 2 capital (Ahmed et al., 1999; Ng & Roychowdhury, 2014). Under the IRB approach, the amount of total eligible provisions,

that is, the sum of all provisions recognized under the IFRS 9 ECL model, must be compared with the total expected loss amount as calculated under the IRB approach (BCBS, 2004, par. 384; BCBS, 2010, par. 61). The comparison allows the regulator to assess whether the accounting provisions are sufficient to absorb all expected losses as calculated for regulatory purposes (Bellini, 2017), consistent with the regulatory logic that expected losses should only be absorbed by LLPs while unexpected losses are supposed to be covered by regulatory capital (BCBS, 2017b; EBA, 2015). Two scenarios can result from the comparison, as shown in Figure 3:

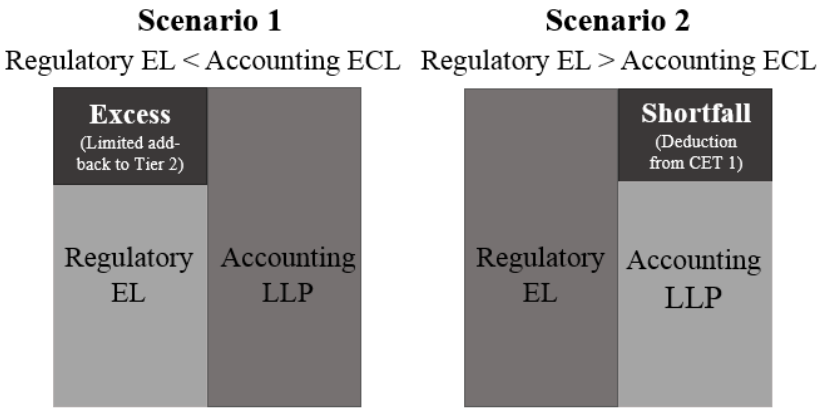

Figure 3: Excess/shortfall mechanism of the IRB approach
Source: Adapted from Deloitte (2013); Kund and Rugilo (2020)

If the total eligible provisions exceed the regulatory EL (Scenario 1), banks may add back the surplus to their Tier 2 capital up to a limit of 0.6% of the credit RWA (i.e. Tier 2 add-back) (BCBS, 2010, par. 61). By allowing the difference to be counted as capital, the regulator rewards the excess of accounting provisions. LLPs higher than expected losses (ELs) are freely available from a regulatory perspective and may thus serve to absorb unexpected losses (UELs). In contrast, to the extent that the amount of the LLPs is lower than the regulatory EL (Scenario 2), the shortfall has to be deducted fully from CET1 (BCBS, 2010, par. 73). Figure 4 illustrates the economic reasoning behind the regulatory treatment of a shortfall. If the LLPs do not suffice to cover all expected losses, a gap is created between ELs and UELs that is covered neither by the LLPs nor by regulatory capital since the latter only cover UELs. Consequently, this shortfall

must be covered by CET1, representing the last line of defence (EBA, 2013a; Wall & Koch, 2000).

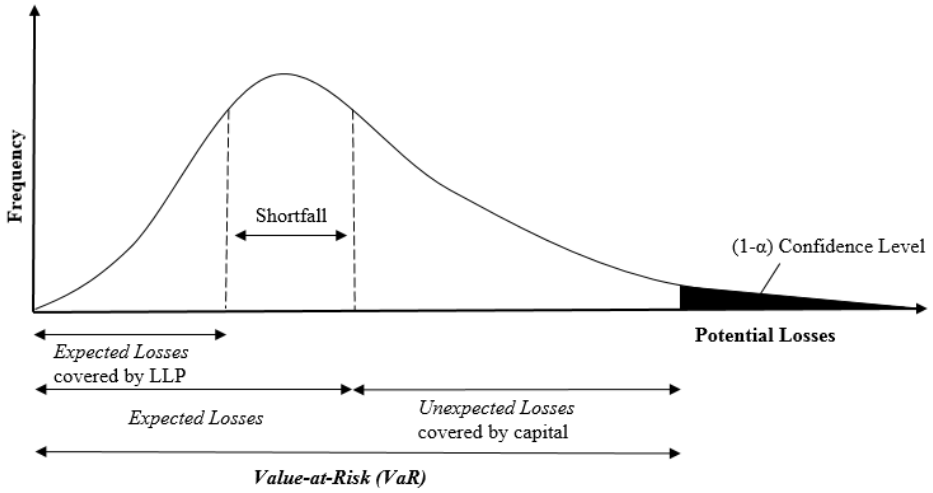

Figure 4: Shortfall under the IRB approach
Source: Adapted from BCBS (2005); Bellini (2017)

The following numerical example (see Table 2, in EUR billion) demonstrates the excess/shortfall mechanism under the IRB approach.[19] Assume that a bank has EUR 400 billion of CET1, EUR 500 billion of Tier 1 capital (including EUR 100 billion AT1 capital), and EUR 200 billion of Tier 2 capital. It is assumed that, in both scenarios, the EL calculated under the IRB approach is EUR 30 billion. In scenario 1, the total eligible provisions recognized under IFRS 9 add up to EUR 35 billion, resulting in an LLP excess of EUR 5 billion. In scenario 2, the total eligible provisions are EUR 25 billion, producing a shortfall of EUR 5 billion. As already noted, any increase in the amount of LLPs directly lowers a bank's CET1 by the same amount (Krüger et al., 2018). Likewise, Tier 1 drops from 500 to 465 (scenario 1) and 475 (scenario 2). In scenario 2, the shortfall of EUR 5 billion must also be deducted from CET1. The final amount of CET1 after provisioning (and shortfall) is EUR 365 billion in scenario 1 and EUR 370 billion in scenario 2. The excess amount of EUR 5 billion in scenario 1 may be added back to Tier 2 up to a limit of 0.6% of the credit RWAs. Granted that this limit is not yet exhausted, the full amount can be added back to Tier 2.

[19] The example is based on the illustrations of Bellini, 2017; Krüger et al., 2018.

	Scenario 1 EL 30 < 35 LLP => **Excess** 5	Scenario 2 EL 30 > 25 LLP => **Shortfall** 5
CET1 before deduction of LLP	400	400
CET1 after deduction of LLP	**365**	375
CET1 after deduction of the shortfall	-	**370**
Tier 1 before deduction of LLP	500	500
Tier 1 after deduction of LLP	465	475
Tier 1 after deduction of the shortfall	-	470
Tier 2	200	200
Tier 2 after add-back	**205**	-
Total capital (Tier 1 + Tier 2)	670	670

Table 2: Numerical example of the excess/shortfall mechanism

The example shows that the reduction of CET1 is particularly strong in the case of an excess of LLPs, which will primarily occur in economic downturns, considering the more cyclical-sensitive PIT approach under IFRS 9 and the fact that the lifetime ECL is already recognized in Stage 2 (Krüger et al., 2018; Novotny-Farkas, 2016). The strong impact of the IFRS 9 impairment model on CET1 during a crisis will put additional pressure on banks to recapitalize to avoid breaching the minimum capital ratios.

2.4.4 Economic Consequences of the Interplay

Despite the broad consensus among empirical studies on the positive implications of forward-looking provisioning, the expected strong increase in LLPs under the ECL approach of IFRS 9 and the close interaction with regulatory capital could trigger novel procyclical effects with negative implications for financial stability and the real economy (Hoogervorst, 2018; Seitz et al., 2018). Under IFRS 9, in particular the transition from Stage 1 to Stage 2 and the associated shift from the 12-month to the lifetime ECL recognition, might cause a "cliff effect", similar to the former IAS 39. The abrupt and sharp increase in LLPs caused by the stage transfer will be particularly strong in an economic downturn, when the credit quality of the entire loan portfolio deteriorates (ESRB, 2017; Novotny-Farkas, 2016). The macroeconomic consequences of an industry-wide increase in LLPs during a crisis for banks' earnings and capital may be immense, particularly when the regulatory capital requirements become binding. Banks can respond to

decreasing capital ratios by issuing additional equity capital or by deleveraging through lending cutbacks and asset sales (Benston & Wall, 2005; Tirole, 2010). However, since issuing capital during a crisis is considered to be too costly, extensive empirically evidence indicates that banks largely choose the second option to deleverage in response to capital pressures (Berger & Udell, 1994; Hanson et al., 2011; Mishkin, 1999). The limited access of the real economy to finance as a result of lending cuts may further aggravate the economic downturn (EBF, 2016; Kashyap & Stein, 1995). As historical data on ECL provisioning is not yet sufficiently available, most existing studies have employed quantitative model approaches to simulate how IFRS 9 and U.S. CECL affect banks' earnings, regulatory capital, and lending (ESRB, 2017; ESRB, 2019). However, the validity of the results is subject to caveats as the quantitative models are largely based on simplified assumptions (ESRB, 2017). Furthermore, given the accounting discretion offered by the ECL models, the results of the studies cannot accurately predict their actual impact (Bischof et al., 2019b; ESRB, 2019). Nevertheless, they provide important information on whether an ECL approach has a positive impact on financial stability.

Abad and Suárez (2017) examined the procyclical implications of IFRS 9 using a portfolio of European corporate loans. In their quantitative model-based setting, they found that the impact of the ECL model on banks' earnings and CET1 will be most pronounced at the onset of a recession, when exposures are increasingly transferred from Stage 1 to Stage 2. Overall, their analysis revealed a high degree of responsiveness of the ECL model to fluctuations in the economic cycle. LLPs will be larger and show timelier reactions to changes in credit risk, resulting in higher volatility of banks' earnings and capital throughout the cycle than under IAS 39. Furthermore, the recursive model of Abad and Suárez (2017) allows a comparison of the effects of IFRS 9 with the U.S. CECL model both in the steady state and in a simulated crisis. Their results show that, during benign economic conditions, that is, in the steady state, the LLPs under the full lifetime CECL model exceed those under the staging model of IFRS 9. At the

onset of a crisis, however, the impact of increasing LLPs on banks' earnings and regulatory capital is larger under IFRS 9, which can be attributed to the cliff effect.

In their counterfactual analysis, Krüger et al. (2018) quantified the extent of CET1 reductions under IFRS 9 and CECL for a portfolio of U.S. bonds between 1991 and 2013. In line with Abad and Suárez (2017), the authors found that the impact of the IFRS 9 model on CET1 will be concentrated at the beginning of a downturn. As expected, the cyclical shift from expansion to recession causes a cliff effect, which ultimately results in higher procyclicality than under the CECL model. In quantitative terms, CET1 declines on average by 56 bps (= 0.56% of RWA) in an expansion and by 145 bps (1.45% of RWA) in a recession under IFRS 9. Under the CECL model, CET1 declines by 126 bps (=1.26% of RWA) in an expansion and by 198 bps (1.98% of RWA) in a recession. The figures indicate that the CET1 reduction during the course of a crisis is stronger under IFRS 9. However, in absolute terms, the impact of the CECL model on regulatory capital is stronger both in an expansion and in a recession, contrasting the results of Abad and Suárez (2017). Finally, the authors found that, had both models already been applied during the latest financial crisis, the CET1 ratio under the CECL approach would have been reduced on average by 246 bps (= 2.46% of RWA) and 221 bps (= 2.21% of RWA) under IFRS 9, which is about the half of the required minimum CET1 ratio of 4.5% of RWA.

Covas and Nelson (2018) used a top-down model to estimate the impact of the CECL model on banks' regulatory capital. They found that the U.S. approach would have induced high procyclical effects if it had been applied during the financial crisis. Notably, the strong increase in LLPs during the crisis would have resulted in a decline in U.S. banks' regulatory capital ratios of an additional 1.6 percentage points in the third quarter of 2008 relative to the incurred loss model. Based on these results, Covas and Nelson (2018) quantified the impact of increasing capital pressure on lending. The authors estimated that, in the course of the capital reduction, bank lending would have been reduced by an additional 9 percentage points during 2009, which

translates into an additional USD 600 billion decrease in banks' total loan portfolio. They concluded that this reduction in the loan supply would have further amplified and prolonged the downturn.

Buesa et al. (2019) modelled the impact of loan loss provisioning under IAS 39, IFRS 9, and the CECL model on banks' profits using a database of Italian mortgage portfolios over the years 2006–2018. Their results suggest that IFRS 9 exerts stronger procyclical effects than the CECL model due to the required staging approach. However, the advantage of lower procyclicality under the CECL model comes at the expense of an overall higher level of LLPs, as already shown by Krüger et al. (2018).

Kund and Rugilo (2020) employed a novel approach to examining the procyclical implications of IFRS 9. For their empirical study, the authors used the European bank stress test results from 2014 to 2018. In addition to archival banking data, the stress test dataset provided forecasts up to the year 2020 for a hypothetical baseline and crisis scenario defined by the regulator. This enabled the authors to compare the implications of IAS 39 and IFRS 9 in a severe economic downturn. In the absence of balance sheet data from an economic crisis since the introduction of IFRS 9, this approach offered the first opportunity to examine the procyclical effects empirically. Kund and Rugilo (2020) revealed opposing effects of IFRS 9 on financial stability. On the one hand, the "front-loading" effect arising from the earlier recognition of ECL at an instrument's inception will have a negative impact on banks' resilience by lowering their regulatory capital levels in the short run. On the other hand, the cliff effect is reduced due to the gradual loss recognition of IFRS 9 compared with the former incurred loss model, which enhances financial stability in the long run. In line with previous studies, the results indicate that the impact of increasing LLPs will be the strongest at the outset of a crisis and will then decrease over its course. Finally, Chae et al. (2019) and Gruenberger (2012) revealed that both the FASB and the IASB approach do not remove the procyclicality of banks' income and credit

supply unless the bank management and risk model assumptions are able to anticipate a crisis well in advance.

In summary, the study results indicate that the intended purpose of the new accounting standard to mitigate procyclicality may not have been achieved due to the still-existing procyclical elements of IFRS 9. The results contradict the findings of Beatty and Liao (2011) and Bushman and Williams (2015) on the beneficial effects of timelier loss recognition. Even though the results show that the ECL model of IFRS 9 might introduce additional procyclicality into banks' earnings and regulatory capital, it remains to be seen whether the impact on the credit supply will ultimately be sizable (ESRB, 2017).

2.4.5 Dynamic Provisioning as a Potential Solution

The so-called "dynamic" or "statistical" provisioning model (FASB & IASB, 2009) represents a potential solution to the identified procyclical effects of the ECL approach.[20] The Spanish banking supervisor, which is authorized to set accounting rules for the banks that it supervises, adopted the approach in July 2000 (FASB & IASB, 2009; Saurina, 2009). The basic idea of dynamic provisioning is gradually to accumulate LLPs already during an economic boom, which can be released in an economic downturn to absorb the losses incurred and to counteract the amplification of a crisis (Fernández de Lis et al., 2001; Saurina, 2009). For this purpose, a third category of provisions, called statistical provisions, was implemented in addition to the existing specific provisions and general provisions in the Spanish accounting system (Fernández de Lis et al., 2001; Jiménez & Saurina, 2006). The statistical provisions serve to recognize future loan losses. However, in contrast to the estimation of ECLs under IFRS 9, the estimation of future losses under the dynamic provisioning approach is based on historical long-

[20] The approach was also discussed during the revision process of IAS 39; see FSF (2009).

term average loss rates. Accordingly, the Spanish approach is not an ECL model (Balla & McKenna, 2009; FASB & IASB, 2009).

Under the dynamic provisioning model, specific and statistical provisions are inversely linked throughout the economic cycle. In economic upturns, when specific provisions for impaired assets are low, banks are required to build up statistical provisions to account for gradually accumulating credit risks. During a downturn, the related increase in specific provisions is charged to the fund of statistical provisions rather than to the banks' P&L account to smooth banks' earnings and regulatory capital throughout the cycle (Jiménez et al., 2017; Saurina, 2009). Moreover, the subdued volatility of the stock of LLPs over time decreases the likelihood of a cliff effect and reduces the pressure on banks to raise additional capital at unfavourable times. The ensuing adverse effects on lending behaviour would also be dampened. Overall, the countercyclical nature of the dynamic provisioning approach would potentially mitigate the procyclical effects associated with IFRS 9 and enhance the stability of the financial system as a whole (Balla & McKenna, 2009; Fillat & Montoriol-Garriga, 2010).

However, the empirical evidence on the effectiveness of dynamic provisioning is mixed. Jiménez et al. (2017) examined the impact of dynamic provisioning on the lending activities in the Spanish banking sector before and during the financial crisis. They found that the provisioning rules curtailed excessive lending during boom periods and stabilized banks' loan supply during the crisis. Pérez et al. (2008) investigated the impact of dynamic provisioning on banks' incentives to engage in earnings smoothing and capital management. Their results show that Spanish banks commonly use dynamic provisioning for earnings' management. Finally, Fillat and Montoriol-Garriga (2010) transferred the Spanish dynamic provision model to the U.S. context to explore whether banks would have weathered the latest financial crisis better if they had built up additional statistical provisions. They showed that U.S. banks would have been better positioned to absorb loan losses at the beginning of the crisis. However, by the first

quarter of 2009, the additional buffer would already have been completely exhausted. The results presented by Fillat and Montoriol-Garriga (2010) highlight an important limitation of the approach. They suggest that the ability of dynamic provisioning to generate sufficient buffers to withstand a financial crisis depends largely on the severity and duration of the crisis not exceeding the average historical loss rates. Accordingly, dynamic provisioning may not be an adequate approach to overcome a severe and prolonged crisis with higher loss rates than the historic average. When the stock of accumulated provisions turns out to be insufficient during a crisis, the abrupt increase in specific provisions will again result in a cliff effect, decreasing bank' earnings and regulatory capital (Acharya & Ryan, 2016; Borio et al., 2001). As such, the model does not completely overcome the limitations of the IFRS 9 ECL model.

2.5 Conclusion and Suggestions for Further Research

Despite their diverging objectives, there is a growing consensus that accounting standards are a key element of the financial system alongside prudential regulation (Borio, 2005; Knight, 2004; van Mourik, 2013). Accounting and regulatory requirements are increasingly seen as 'complementary policy tools' (Bertomeu et al., 2018, p. 3) that should be used in combination. The alignment of the two disciplines results from the fact that financial statement information forms the basis for the calculation of capital under the Basel framework. However, while the assertion of the IASB that the '(…) Basel capital requirements tell banks how much capital they should have, IFRS Standards are '*merely'* designed to show how much capital a bank actually has' (Hoogervorst & Prada, 2015, p. 5) is conceptually sound, it neglects their various interactions, which can have a considerable impact on banks' capital.

This paper examines the increasing interrelations between accounting and regulatory capital requirements as a result of the revision processes of the Basel framework and IFRS 9 following the financial crisis. Thereby, it aims to deepen the understanding of the potential implications of this convergence for financial stability and the real economy. Overall, it can be concluded

that the post-crisis development narrows 'the differences between the requirements of accounting standards and regulatory standards', as demanded by the Financial Crisis Advisory Group (2009, p. 8). However, conceptional and methodological differences between prudential regulation and accounting in the areas of fair value loss recognition and loan loss provisioning, which extend to the composition of equity and capital (BCBS, 2015b), may have a negative impact on banks' capital adequacy and lending behaviour. In particular, two elements form the strong link: the prudential AOCI filter and ECL accounting. The AOCI filter was originally introduced under the Basel framework to reduce the volatility of banks' regulatory capital caused by fair value accounting requirements. However, the review shows that the filtering approach may have been an obstacle to the early detection of the financial crisis (Bischof et al., 2019b; Laux, 2012). With the abolishment of the AOCI filter under Basel III, the role of FVA in calculating regulatory capital has increased (Laux, 2016). Moreover, the compositions of CET1 and accounting equity converged with the filter removal. Overall, the evidence on the positive behavioural effects associated with the filter removal suggests that FVA should increasingly be used in regulatory capital calculations (Laux, 2012).

The use of an ECL approach under IFRS 9 provides the most recent example of a growing interconnection between the two disciplines that brings accounting valuations closer to the prudential requirements (EBA, 2015). Notably, the impact of IFRS 9 on banks' regulatory capital has moved to the centre of interest (Borio & Lowe, 2001; Laeven & Majnoni, 2003) since LLPs are included in the calculation of regulatory capital under Basel III (EBA, 2015; Hashim et al., 2019). The final consequences of the IFRS 9 ECL model for financial stability are not yet clear. On the one hand, the forward-looking recognition of LLPs at an earlier stage in the economic cycle potentially increases the stability of the financial system. On the other hand, the analysis shows that the interactions with regulatory requirements may trigger

procyclical effects and fluctuations in regulatory capital with negative implications for financial stability.

With regard to the aligning concepts of accounting equity and regulatory capital, the regulators' allowance to include LLPs in regulatory capital highlights a significant difference between the two concepts.[21] Furthermore, the clear distinction between LLPs to cover expected losses and capital to absorb unexpected losses has been softened with the inclusion of LLPs in regulatory capital. The add-back of LLPs to Tier 2 capital dilutes the loss-absorbing quality of regulatory capital, especially during economic downturns (Hashim et al., 2019; Wall & Koch, 2000). LLPs built under IFRS 9 cover ex ante specified expected credit losses and are thus not available to absorb unexpected losses ex post. As a result, LLPs do not possess the same loss-absorbing characteristics as shareholder equity or retained earnings (Beatty & Liao, 2014). Consequently, the inclusion of LLPs in regulatory capital could result in an overstatement of the loss absorption capacity of capital to cover unexpected losses, which calls the efficiency of capital ratios to assess banks' financial stability into question. In contrast to the conclusion of Novotny-Farkas (2016) that the earlier recognition of loan losses under IFRS 9 can reduce the overstatement of regulatory capital, the regulatory use of LLPs under Basel III may instead increase the likelihood of overstating regulatory capital.

In addition to the observable use of LLPs as capital buffers, the interplay of the IRB and IFRS 9 requirements also creates hidden capital buffers. LLPs built for Stage 2 exposures using the lifetime ECLs under IFRS 9 exceed the 12-month time horizon of the regulatory ELs for the same exposures, as shown in Section 4.2. As also recognized by the BCBS (2017a) and the banking industry (EBF, 2016; GBIC, 2017), this excess amount can be considered as a freely available buffer to absorb unexpected losses. 'Given their primary, capital-like loss-absorbing

[21] By definition, LLPs cannot be considered as an accounting equity component since they are an income statement expense. LLAs are booked to the asset side of a balance sheet as a contra asset account to the total loans.

function', Comptroller of the Currency for the United States Department of the Treasury John Dugan (2009) even called for greater recognition of LLPs in regulatory capital. However, as concluded by Acharya and Ryan (2016), Balla and McKenna (2009), and Orthaus and Rugilo (2020), the creation of regulatory capital buffers by means of accounting rules would exceed the accounting standard setters' remit.

While the interrelations between prudential requirements and accounting standards have grown over time, little consensus has emerged in the accounting literature on the normative adequacy of this development. The key question arising from the discussion on the close interactions between accounting and regulatory requirements is whether accounting standard setters should consider financial stability implications and procyclical effects in their standard-setting decisions. As already discussed, accounting standard setters do not define their primary task as ensuring financial stability. Their objective of providing a variety of financial statement users with neutral and decision-useful information may consequently conflict with the regulators' demand for a conservative measurement. From a normative perspective, procyclical effects and other financial stability concerns should exclusively be resolved by the regulator (FCAG, 2009; Giner & Mora, 2019). The decision usefulness and neutrality of accounting information would be at risk if accounting standards align with regulatory needs (Riepe, 2019). Prudential regulators have various tools to make adjustments to the neutral balance sheet information and to instil their desired degree of conservatism into capital calculations (Barth & Landsman, 2010; Tweedie, 2018).

Instead of the need to adapt accounting information to the regulatory requirements and regard the relationship of dependency between the two as an irresolvable 'dilemma' (Wall & Koch, 2000, p. 15), a sharper distinction between the two disciplines could be an alternative approach. In 2010, Robert H. Herz, previous Chairman of the FASB, presented a possible solution when he called for a "decoupling" of regulatory capital calculations from accounting standards (Herz,

2010). This decoupling solution would require the regulator to develop its own regulatory accounting system that meets the prudential needs (Borio, 2005; Borio & Tsatsaronis, 2005). Stress testing as part of Pillar 2 under Basel III represents a suitable tool that the regulator can use to set up regulatory accounting standards and generate financial information directly from the supervised banks (Jiménez & Saurina, 2006; Riepe, 2019). The stress test requires banks to value balance sheet items on the basis of the stress test methodology developed by the supervisory authority (EBA, 2019). The financial data generated from the stress test meet the desired conservative valuation requirements for regulatory purposes. In this way, two separate financial reporting regimes could coexist, allowing both parties to fulfil their respective mandates independently (Borio & Tsatsaronis, 2004; Jiménez & Saurina, 2006; Knight, 2005). The reduced interactions potentially mitigate the undesired implication for financial stability. Future research should investigate whether decoupling is a feasible solution or make alternative proposals to reconcile the 'natural conflict between accounting and regulatory objectives' (BCBS, 2015b, p. 16).

Reviewing the empirical evidence reveals fruitful avenues for future research. So far, only minor research exists on the various interactions between accounting and prudential regulation; however, their economic consequences highlight the importance of the topic. The continuous revisions to the Basel framework and accounting standards offer ample opportunities for future research to explore the interplay. The existing literature on the use of LLPs for earnings and capital management is largely based on U.S. data under the incurred loss and Basel II regime (BCBS, 2015b). With financial statement data available three years after the implementation of IFRS 9, future studies may provide the first valid results on the behavioural implications of an ECL approach using European data panels. This could reveal whether the managerial incentives are mitigated or rather intensified against the background of the effects of ECL accounting on regulatory capital. Future studies should use the available empirical data to explore whether the

new IFRS 9 model represents an improvement over the former standard in terms of procyclicality and financial stability. Moreover, future research on banks' lending behaviour could provide important insights into whether the diverging methods of the U.S. GAAP and IFRS 9 ECL models have different effects on the lending business of U.S. and European banks. Researchers are encouraged to test the hypothesis of the ESRB (2019) that lending in favourable economic times is less constrained under the IFRS 9 staging approach, giving a competitive advantage to EU-based banks.

Finally, despite the removal of the AOCI filter, research on prudential filters remains a relevant literature stream. Further prudential filters are still applicable under Basel III, and their procyclical implications have not yet been explored (BCBS, 2015b). In particular, the filter to derecognize unrealized gains and losses due to changes in own credit risk on fair-valued financial assets (BCBS, 2010, par. 75) might amplify procyclicality. The argument is as follows: when a bank's credit risk increases during an economic downturn, its liabilities lose value. The resulting gains increase bank's equity. The derecognition of this effect by means of the filter leads to a decrease in regulatory capital, which might further amplify the economic downturn (Barth & Landsman, 2010; ESRB, 2017). Future research on the removal of the AOCI filter could provide important insights into whether the associated higher risk sensitivity of regulatory capital affects banks' risk management. Furthermore, since non-advanced approaches banks in the U.S have largely retained the AOCI filter (Kim et al., 2019), its effects on banks' risk-taking behaviour remain an ongoing issue in the U.S. and emphasize the need for further research on this topic.

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Chapter 3

Does IFRS 9 increase Financial Stability?

Does IFRS 9 increase Financial Stability?

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Abstract

IFRS 9 substantially affects the financial sector by changing the impairment methodology for credit losses. This paper analyzes the implications of the change from IAS 39 to IFRS 9 in the context of financial stability. We shed light on two effects. First, the "cliff-effect", which refers to sudden increases in impairments. It occurred under IAS 39, as credit losses were only recognized with hindsight, and thus late and abrupt. IFRS 9 was designed to mitigate this issue through a staging approach, which gradually recognizes expected credit losses (ECL). These anticipated impairments, however, constitute a significant "front-loading", which is the second effect we investigate. The earlier recognition of losses may adversely impact bank resilience through lower capital levels. In absence of archival data of IFRS 9 we use the European bank stress test results as a natural experiment, in which all banks are subject to the same regulations and exogenous shocks. This characteristic allows us to isolate otherwise immeasurable effects and empirically investigate, whether the conjunction of both effects constitutes a net benefit for the financial sector. Furthermore, the vigorousness of procyclicality under IFRS 9 can be compared to IAS 39 by contrasting a hypothetical baseline and an adverse scenario.

JEL Classification: E58, G21, G28, M41, M48
Keywords: Bank Stress Test, CET1, Financial Stability, IAS 39, Impairment, IFRS 9, Procyclicality

3.1 Introduction

In retrospect, the subprime crisis revealed fundamental drawbacks in the incurred loss accounting of IAS 39 (Barth and Landsman (2010); Gebhardt (2016); Hashim et al. (2016)). Particularly criticized for its late and incomplete recognition of impairments ("too little, too late"), regulators around the globe have called for changes (G20 (2009); BCBS (2015b)). Responding to this criticism, the IASB urged a comprehensive revision of the accounting standard for financial instruments, which culminated in the release of IFRS 9 (IASB (2014b)). It constitutes a paradigm shift in the calculation of impairments for financial institutions by recognizing deteriorating credit quality in an expected credit loss (ECL) instead of an incurred loss model. Where impairments were previously only realized when a loss event had been identified (IAS 39.59), IFRS 9 introduced a forward looking staging model, which gradually realizes them over time (IFRS 9.5.5). This adjustment is intended to lessen the severity of sudden jumps in losses ("cliff-effect"), and to diminish procyclicality. That is the positive correlation between the economic cycle and the lending activity of banks. As a result, banks have excessive capital during the expansion, while they have a shortfall during contraction (Daníelsson (2019)). The changes from IFRS 9 are expected to address these concerns, and to increase financial stability, for which only broad definitions exist (Gadanecz and Jayaram (2009); Hakkio and Keeton (2009)). For the purpose of this paper, we will look at the interaction between capital adequacy and banks' probability of default (PD) in order to quantify financial stability.

Despite its expected positive implications for financial stability, the introduction of IFRS 9 exerts influence beyond a reduction of the "cliff-effect". The earlier recognition of impairments induces a significant "front-loading" of credit losses, which is expected to impede banks' ability to retain earnings. As they are a key component of Common Equity Tier 1 (CET1), not only banks' balance sheet equity, but also their regulatory capital presumably decreases. This reduction of capital adequacy constitutes a noteworthy drawback for financial stability. An impact study by the

European Banking Authority (EBA) estimated an additional need for capital of 47 basis points of CET1 on average (EBA (2018d)), which translates to EUR 5.7 billion for the banks in the stress test. Another issue was raised by Abad and Suarez (2017), who analyze a portfolio of European corporate loans. They find that the impact of IFRS 9 will be most pronounced during an economic downturn, questioning the idea of reducing procyclicality as theorized by Beatty and Liao (2014).

These findings raise concerns, if the new impairment model of IFRS 9 represents an appropriate response to the experiences of the last financial crisis. We look at the European bank stress test results, which provide a first and unique opportunity to empirically investigate this research question. Moreover, they are beneficial for our identification strategy for three reasons in particular. First, they provide two macroeconomic scenarios, which enables us to assess the severity of the methodological changes. Comparing both scenarios further allows us to infer on the theorized reduction of procyclicality. Second, the assumptions of a static balance sheet and model stock isolate the effect we want to measure. Third, they provide sufficiently granular data to address our research question in detail. In doing so, we set ourselves apart from Abad and Suarez (2017) who only analyze a portfolio of European corporate loans in a model-based setting.

Our approach to the problem necessitates the unification of two strands of literature: financial accounting in the context of capital adequacy and stress testing. Notable contributions are made by Novotny-Farkas (2016) and Krüger et al. (2018), who investigate the interaction between the novel impairment model and capital requirements under Basel III. Despite a manifold growth of the literature on stress testing, it is yet to address the intersection this paper identifies. Two major branches of the literature on stress testing can be discussed. One concerns stress testing as an essential part of the Basel framework (Foglia (2009)) and discusses the development of alternative risk measurement approaches (Hanson et al. (2011); Acharya et al. (2014); Schuermann (2014)) or methodological improvements (Borio et al. (2012)).

The other branch empirically assesses how the publication of stress tests results influences the market value of equity or CDS spreads of banks (Flannery et al. (2017); Ahnert et al. (2018); Sahin et al. (2020)).

Despite valuable contributions from the literature, our research question concerning the effect of IFRS 9 on financial stability remains unanswered at large. Given the implications of financial stability for the economy, it seems appropriate to fill this research gap. We construct a panel of banks from the EBA stress test exercises from 2014 to 2018 in order to address this issue. Doing so yields a sample, in which both accounting standards are present, such that we can contrast them for substantiated inference. Our analysis shows that IFRS 9 increases impairments in the short run due to the theorized "front-loading" effect. At the same time, financial stability benefits from the reduced "cliff-effect" in the long run. Drawbacks surrounding the "cliff-effect" and its contribution to procyclicality have not been fully addressed. We hence argue to increase regulatory buffers against them, as called for under Pillar 1 of Basel III.

The remainder of the paper is structured as follows. Section 2 provides an overview of the conceptual differences between IAS 39 and IFRS 9, and disentangles their interrelation with regulatory stress testing as conducted by the EBA. In line with it we devise hypotheses concerning the effects of IFRS 9 and elaborate on the intended tests in Section 3. We present the analyzed dataset in Section 4 and show the results in Section 5. Section 6 verifies our results by means of robustness tests. This paper concludes in Section 7, where it also gives an outlook on future research.

3.2 Theoretical Background

3.2.1 Differences between IAS 39 and IFRS 9

Under IAS 39, the recognition of expected losses was explicitly precluded by the standard setter. Instead, impairment losses were only incurred as of the balance

sheet date, if there was objective evidence for them resulting from an event that succeeded the initial recognition of the asset (a "loss event") (IAS 39.58 f.). This definition has left plenty of leeway for judgmental factors, concerning what constitutes objective evidence (Dugan (2009)). Furthermore, it delayed the recognition of so called "day-1-losses", which occurred immediately after origination, yet were only realized as of the balance sheet date (IAS 39.AG92, IAS 39.E.4.2).

The latest financial crisis drew attention to this undue timely discrepancy between the loss event and its recognition (Barth and Landsman (2010); Gebhardt (2016); Hashim et al. (2016)). Moreover, the backward-looking nature of the impairment model was criticized for potentially aggravating the crisis situation (Vyas (2011); Kothari and Lester (2012); Marton and Runesson (2017)). Amongst others, the G20 raised concerns that loan loss provisioning of credit losses under the incurred loss method of IAS 39 was achieving "too little, too late" (G20 (2009); Hoogervorst (2014); BCBS (2015b)). Although Bischof et al. (2019) challenge this view, by showing that banks' loss recognition was not constrained under IAS 39, there is substantial empirical evidence concerning the negative effects of an undue delay in loan loss provisioning (Beatty and Liao (2011); Bushman and Williams (2015)). Figure (1) below illustrates the disparity in loan loss provisioning.

Annual Impairments for U.S. and International Banks

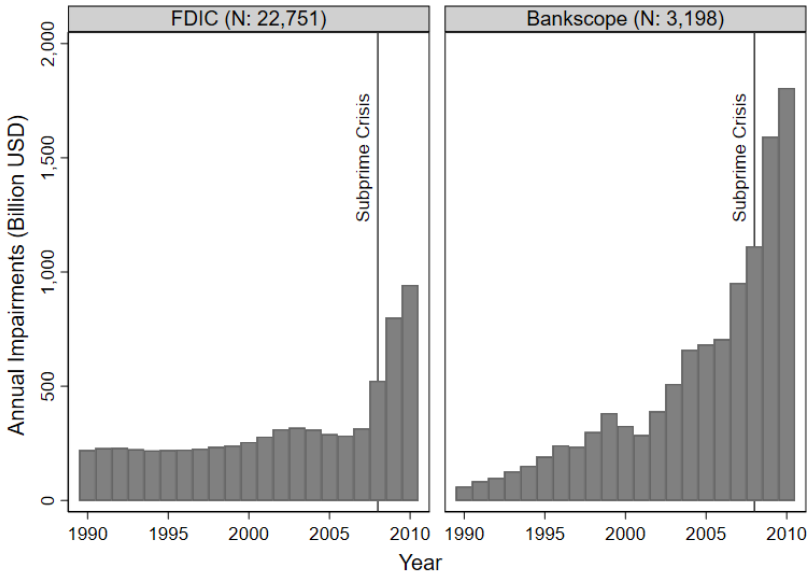

Figure 1: Development of impairments over time for different jurisdictions.

Based on U.S. data from the Federal Deposit Insurance Corporation, the left graph of Figure (1) shows that while impairments increased around the subprime crisis, they only partially reflected the actual losses. The annual loss provisioning in the subsequent years exceeds that of the subprime crisis by a factor of almost two. The right graph of Figure (1) draws a similar image using global bank data from Bankscope. Again, impairments related to the last financial crisis grow twofold after the actual crisis, indicating the incomplete accounting of incurred losses. Responding to this criticism, the IASB urged a comprehensive revision of the accounting standard for financial instruments, resulting in the release of IFRS 9 (BCBS (2015a)).

With the new impairment methodology of IFRS 9 the IASB introduced a forward looking expected credit loss model (IFRS 9.5.5), requiring a more timely recognition of impairments (Landini et al. (2018)). This change was supposed to counteract the weakness of delayed credit loss recognition under IAS 39 (IFRS 9.BC.IN.2). As a consequence, the scope for the recognition of credit losses was extended beyond the static requirement of an incurred loss event as a trigger (Gebhardt (2016); Novotny-Farkas (2016)). Instead, IFRS 9 is predicated on an immediate recognition of ECL directly from a financial instrument's initial recognition (IFRS 9.5.5). The IASB

defines ECL as probability-weighted estimates of credit losses (i.e., the present value of cash shortfalls) (IFRS 9.5.5.17).

Estimations of ECL shall consider all relevant information, including historical data, current conditions as well as supportable forecasts of future events and macroeconomic conditions (IFRS 9.5.5.17). Thus, IFRS 9 significantly extends the information set required to determine credit losses. The scope of the IFRS 9 impairment model includes financial assets measured at amortized cost or fair value through other comprehensive income (FVOCI). Moreover, the ECL model is applied to lease receivables, trade receivables or contract assets as well as all loan commitments and financial guarantee contracts that are not measured at fair value through profit or loss (FVPL) (IFRS 9, 4.1.2, 4.1.2a, 5.5.1, 5.5.2, BC5.118).

A key element of the IFRS 9 impairment model is the so-called three stages approach, which categorizes financial instruments according to their credit quality (i.e. 'Stage 1', 'Stage 2' and 'Stage 3'). It lessens the severity of the "cliff-effect" by gradually recognizing the ECL over the lifetime of the loan and thus reduces procyclical effects. The assignment to the stages depends on the change in credit risk since initial recognition (IASB (2013, 2014c)), and prescribes which methodology must be applied for calculating the ECL.

Stage 1 includes financial assets that were not subject to a significant increase in credit risk since initial recognition or exhibit a low credit risk as of the reporting date (IFRS 9.5.5.5). Their loss allowance is recognized as the 12-month ECL, which is defined as the share of the lifetime expected credit losses resulting from default events, which are possible within 12 months of the reporting date (IFRS 9 Appendix A). Interest revenue is calculated based on the gross carrying amount of the asset that is without deduction of the loss allowance (IFRS 9.B5.5.43).

Stage 2 includes under-performing financial assets, which exhibit a significant increase in credit risk since initial recognition. In this stage, the lifetime ECL has to be recognized (IASB (2014a); IFRS 9.5.5.3-4). It is defined as the expected credit loss from all possible default events over the expected residual life of the financial instrument (IFRS 9 Appendix A). The calculation of interest revenue remains the same as for Stage 1 (IASB (2014c); IFRS 9.5.5.3-4). At each reporting date, the reporting entities are required to evaluate whether a potentially significant increase in credit risk has occurred (IFRS 9.5.5.9). Besides the "rebuttable presumption that the credit risk on a financial asset has increased significantly since initial recognition when contractual payments are more than 30 days past due" (IFRS 9.5.5.11), the IASB provides a list of information that may be used for the assessment of a significant credit risk deterioration (IFRS 9.B5.5.17). In addition to that, the standard setter grants a "low credit risk exemption", which excludes financial assets from the continuous credit-risk assessment and allows them to remain in Stage 1, as long as they exhibit a low credit risk (IFRS 9.5.5.10). An investment grade rating by a major rating agency may serve as such an indicator (IFRS 9.B5.5.22 ff.; IFRS 9.BC5.188 f.).

In case of a further increase in credit risk up to the status of non-performing or credit-impaired assets, the respective financial instrument must be allocated to Stage 3 (IASB (2014a)). The criteria for a financial asset to be considered as such are listed in Appendix A of IFRS 9, and largely match the objective evidences of a loss event according to the former IAS 39.59. As in Stage 2, the ECL of Stage 3 is recognized on a lifetime basis. Interest revenue is calculated based on the net carrying amount of the asset, which is the gross carrying amount less loan loss allowance (IFRS 9.5.4.1). ECL recognized in Stage 3 will likely be larger compared to Stage 2, reflecting the default position of the underlying assets. Table (1) provides a short overview over key implications of the three stages. A more detailed description can be found in Hartmann-Wendels et al. (2019).

	Stage 1	**Stage 2**	**Stage 3**
Classification	performing	under-performing	non-performing
Expected Loss	12 months	lifetime	lifetime
Interest Rate Calculation	gross book value	gross book value	net book value

Table 1: Stages according to IFRS 9.

This new impairment model appears to be a major concern for the banking industry as the initial set-up costs, as well as the adjustments to loan loss allowances are expected to increase compared to the former IAS 39 model. Since they are recognized through the P&L of the bank (IFRS 9.5.5.8), its ability to retain earnings is initially impeded (Deloitte (2013); Reitgruber et al. (2015); EBA (2016)). This interrelation negatively influences regulatory capital levels in banks (Hashim et al. (2015); Gebhardt (2016); Novotny-Farkas (2016)). Empirical evidence suggests that banks may counteract this pressure by asset sales or scaling back their loan supply with the intent to strengthen capital levels (Abad and Suarez (2017); ESRB (2017); Sánchez Serrano (2018)). However, doing so during a crisis would be diametrical to fostering financial stability, as asset prices would be further depressed and thus exacerbate the economic downturn. While the ECL model does mitigate procyclicality from the "cliff-effect", it does not fully resolve the issue. The transfer from Stage 1 to Stage 2 and the associated transition from the 12 month to the lifetime ECL still constitute an abrupt increase in loan loss allowances (Hashim et al. (2016); EBA (2016); Novotny-Farkas (2016)). In conjunction with the threat of downward spirals in asset prices it necessitates the presence of countercyclical capital buffers (CCyB) as required under Pillar 1 of Basel III to provide a backstop against this cascade (EBA (2017); ESRB (2017)).

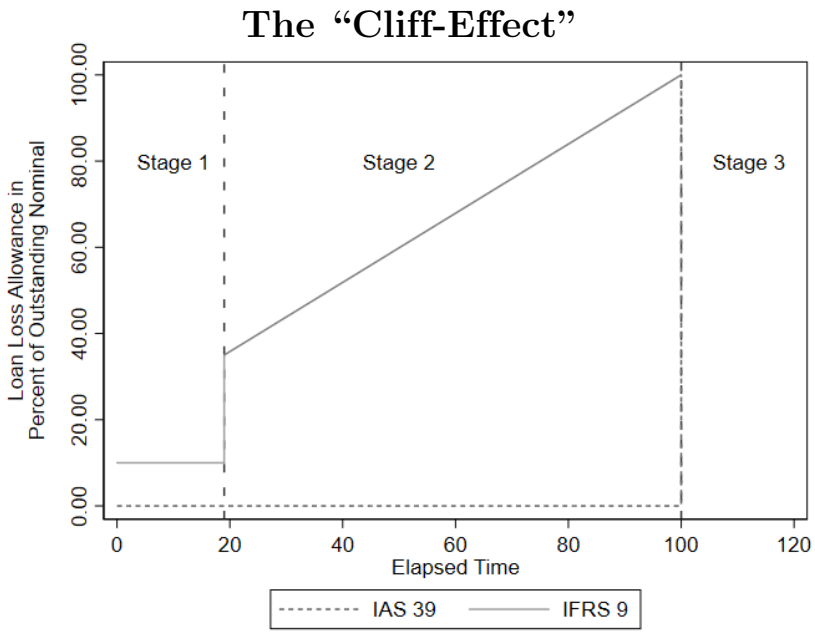

Figure 2: Illustration of the "cliff-effect" in conjunction with "front-loading".

While the discussed "too little, too late" (G20 (2009); Hoogervorst (2014); BCBS (2015b)) problematic of IAS 39 has been addressed by the ECL model, not all issues of IAS 39 have been resolved (Lloyd (2018)). Another short-coming concerns the critique that the backward-looking approach may have amplified the subprime crisis (Barth and Landsman (2010); Gebhardt (2016); Hashim et al. (2016)). IFRS 9 might still be susceptible to this critique. It relies on so called point in time (PIT) estimates for the PD and only considers the last available data point, in order to reflect the economic characteristics of the financial instrument at the reporting date (IFRS 9 BC 5.282). This approach can be related to the general goal of financial reporting that is to provide useful information, which are relevant to the decision making of outsiders of the reporting entity (IASB (2010, 2018)). However, it entails profound consequences, as this individual point may be inflated during crises, respectively deflated during economic expansion (Borio and Lowe (2001)). Consequently, these estimates are subject to cyclical amplifications, and may even contribute to procyclical behavior, which is especially problematic as the PD influences the assignment to the three stages of IFRS 9 (Novotny-Farkas (2016); Vaněk et al. (2017)).

Taking this characteristic into account, the internal ratings based approach (IRB) under Basel III uses through the cycle (TTC) estimates for the calculation of the PD. The TTC approach relies on multiple historic data points, which dilutes the impact of individual points, and hence counteracts procyclicality. This estimation methodology better serves the goal of financial regulation, which strives to prevent bank failures and to safeguard the entire financial system (Laux and Leuz (2009)). Figure (3) illustrates the differences between the two approaches and raises in line with our research question the concern, whether IFRS 9 has contributed to the goal of the FSF (2009) to foster financial stability by reducing the procyclical effects of IAS 39.

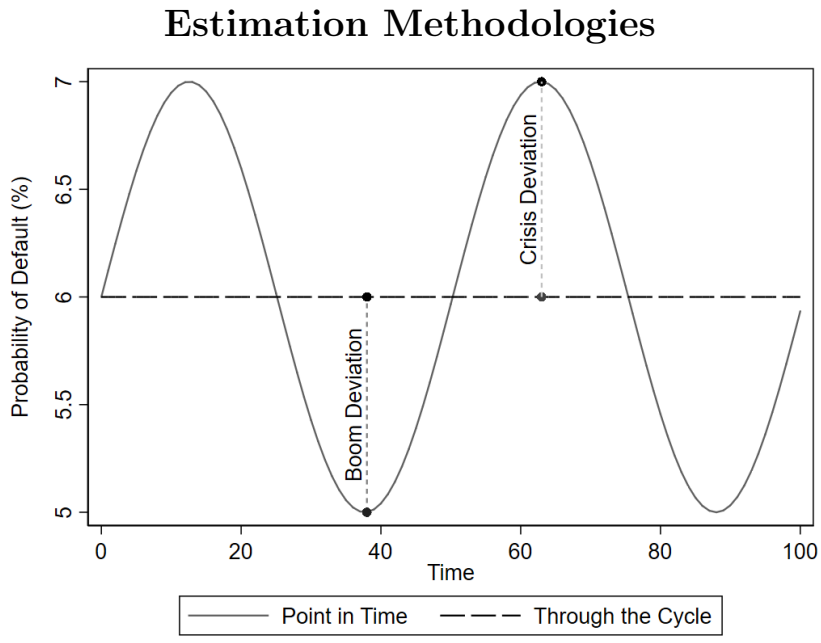

Figure 3: Illustration of the differences between through the cycle (TTC) and point in time (PIT) estimation.

Taken together, IFRS 9 presumingly reduces the "cliff-effect" by introducing a forward looking staging model. Doing so has reduced jumps in impairments, which may have procyclically enforced economic downturns. However, IFRS 9 still employs PIT instead of TTC estimators, and may thus not have gone far enough in addressing the concerns of the FSF (2009) regarding procyclicality. One way of mitigating this drawback is through designated capital buffers. Namely, the capital conservation

buffer (CCB) and countercyclical capital buffer (CCyB) were designed with this intent. They amount to up to 2.5 % of the bank's risk-weighted assets (RWA). Special attention should be drawn to the CCyB, whose required paid in capital is at the discretion of national competence authorities. Out of 28 reporting countries, only one fully enforces the requirements (BIS (2018); ESRB (2019)), hence questioning their adequacy in times of crises. A more detailed discussion of the capital types and buffers can be found in Figure (10) in the Appendix. Another benefit of IFRS 9 concerns the more timely recognition of losses due to the ECL model. These advantages though came at the cost of "front-loading" credit losses. Section 3 will shed further light on these effects and empirically assess, whether the net benefit of IFRS 9 is positive.

3.2.2 Introduction to Stress Testing

Stress tests are forward-looking assessments of banks' capitalization (i.e. microprudential stress test) or the stability of the financial system as a whole (i.e. macroprudential stress test) under simulated adverse economic conditions (Hanson et al. (2011); Borio et al. (2012); Acharya et al. (2014); Ahnert et al. (2018); Duffie (2018)). One of their major objectives is to assert bank solvency (Acharya et al. (2014); Schuermann (2014)), after the last financial crisis had revealed severe (qualitative and quantitative) shortcomings in this regard (Ahnert et al. (2018)). Moreover, they facilitate supervisors to assess, whether banks comply with their regulatory capital requirements and are one tool, which European supervisors employ as part of the second pillar Supervisory Review and Evaluation Process (SREP) (BIS (2006); EBA (2018a); Paisley (2017); Ahnert et al. (2018); Riebl and Gutierrez (2018)). Additionally, regulators can test key risks such as credit, market, and liquidity risks under predefined stress scenarios to identify potential needs for capital of individual banks or to assess systemic risks, which may compromise the financial systems' stability (Ahnert et al. (2018)). Ultimately, the final disclosure of regulatory stress testing intents to improve market discipline of financial institutions and alongside increases transparency to the market (de la Lastra and Ramón (2012); Acharya et al. (2014); EBA (2018a,b)).

The first European regulatory stress test exercises were launched in 2009 and 2010 by the Committee of European Banking Supervisors (CEBS). From 2011 onwards, its successor, the EBA, conducted further exercises in the year 2011, and biennially from 2014 forth. Initially, the EBA's stress tests included capital hurdle rates to assess a bank's passing or failing of the test to consider further recapitalization actions in case of a failure (Riebl and Gutierrez (2018)). In the 2014 exercise, this "pass or fail threshold" was abolished. Instead, the results henceforth served as an input to the SREP (EBA (2018a,b); Riebl and Gutierrez (2018)). The effects of the stress test scenarios on banks' capital are reported in terms of the capital ratios required by Basel III (Acharya et al. (2014); EBA (2018b)). One focal item is CET1 capital, lying at the intersection of financial accounting, which this paper discusses.

Overall, the stress test coordinated by the EBA is a comprehensive exercise undertaken in close cooperation with national and EU authorities to assess the resilience of EU banks to severe market developments (de la Lastra and Ramón (2012); EBA (2018a,b); ESRB (2018)). It is conducted as a constrained bottom-up exercise, in which the participating banks apply their own internal models to project the effects of the scenarios, but are limited to the common methodology of the EBA (EBA (2018a,b)). Furthermore, it is conducted at the highest level of consolidation (i.e. group level) to assess the resilience of the largest EU banks to a (simulated) common macroeconomic baseline as well as adverse scenario over a period of three years. While there is no severely adverse scenario, as in the stress tests of the Federal Reserve, the adverse scenario of the EBA methodology can be ranked in between the adverse and severely adverse scenario of the Federal Reserve (Haselmann and Wahrenburg (2018); EBA (2018a)). Along with other divergent assumptions, such as a dynamic balance sheet, a general comparability between the two stress tests is not given. The EBA is responsible for the development of a common methodology, which all examined banks have to adhere. Furthermore, it collects the final data and disseminates it to the public to foster transparency. In devising the methodology, it is aided by the Directorate General for Economic and Financial Affairs of the European

Commission, which provides the baseline scenario. The European Systemic Risk Board (ESRB) is responsible for developing the adverse macroeconomic scenarios (EBA (2018b)), while scenarios for Norwegian banks are developed by the local central bank (Norges Bank) in conjunction with the Financial Supervisory Authority of Norway (Finanstilsynet).

In November 2017 the EBA published its final methodology for the current 2018 stress test, which was launched in conjunction with the release of the macroeconomic scenarios on 31st January 2018. It lays out predefined exogenous shocks to four macroeconomic variables, such as gross domestic product (GDP) and consumer price inflation (CPI), which we include as controls in our following regression model. As in previous iterations, the bottom-up exercise is subject to strict constraints. The methodological note specifies to conduct the stress test on a static balance sheet. This assumption mandates a replacement of assets and liabilities that mature during the exercises' time horizon "with similar financial instruments in terms of type, currency, credit quality at date of maturity, and original maturity as at the start of the exercise" (EBA (2018c)). In relation to the static balance sheet assumption, the EBA stress test interdicts the incorporation of anticipated capital increases by means of raises or conversions (EBA (2018a,b)). Doing so constitutes a noteworthy difference compared to other stress tests, as for example from the Bank of England, which allows capital actions (BOE (2016)). In order to gain a higher degree of transparency and comparability among banks, it is moreover assumed that participating banks maintain the same business mix and model throughout the time horizon. Ultimately, banks are subject to a model stock and can only use the internal models they have devised at the beginning of the simulation (EBA (2018c)).

For the estimation of the capital and P&L impact, the credit risk stress testing framework covers only amortized cost positions and explicitly excludes FVOCI and FVPL positions from the estimation of credit risk losses (EBA (2018a)). Especially the new impairment model of IFRS 9 implicated profound adjustments to the stress

test credit risk methodology. These adjustments, which partly diverge from IFRS 9 requirements, largely concern the single scenario assumption and perfect foresight as well as the stage definitions and transfer specifications.

Under the single scenario assumption, the EBA requires banks to calculate the ECL based on one scenario (i.e. the baseline and the adverse macroeconomic scenario), instead of multiple probability-weighted cases (IFRS 9.5.5.17 (a)). Furthermore, it is assumed that banks know the precise development of the macroeconomic scenarios when calculating the lifetime ECL. It implies that all loan loss provisions for Stage 2 and Stage 3 exposures are accrued in 2018. Provisions in the following years will only be due to stage migration (EBA (2018c)). While the bidirectional transfer between Stages 1 and 2 is allowed, cures from Stage 3 are prohibited (EBA (2018a)). As under IFRS 9.5.5.5, financial instruments, whose credit risk has not increased significantly since initial recognition, are allocated to Stage 1. In line with IFRS 9, the criterion of a significant increase in credit risk (SICR) serves as a transfer criterion to Stage 2. The methodological note clarifies that the same classification criteria may be used as under the IFRS 9 model. Furthermore, the EBA defined an additional SICR-trigger, which transfers exposures with a threefold increase over their initial lifetime PD to Stage 2. Similar to IFRS 9, a low credit risk exemption may be applied. However, the EBA specification diverges from IFRS 9 requirements, as the threshold is independent of a credit-rating. Instead, an instrument can be considered to exhibit a low credit risk, if its probability to move from Stage 1 to Stage 3 within 12 months is less than 0.3 %. Finally, exposures are allocated to Stage 3, if their credit quality decreases further to the point that it is either considered to be credit-impaired as defined under IFRS 9, defaulted as per Art. 178 of the capital requirements regulation (CRR) or classified as non-performing as per EBA Implementing Technical Standard. Banks are permitted to apply their own internal accounting practices and definitions as long as they yield more conservative results (EBA (2018a); Riebl and Gutierrez (2018)).

3.3 Hypotheses and Evaluation Methodology

The previous chapter has covered the theoretical background of the two accounting standards extensively and clearly identified their differences. The introduction of gradual loss recognition under the three stages model of IFRS 9 is expected to reduce the "cliff-effect" at the cost of introducing a "front-loading" of losses. We verify these mechanics in hypothesis one and two, before investigating the conjunction of the two effects in the third hypothesis.

Hypothesis 1 *The gradual recognition of impairments under the staging model of IFRS 9 reduces the volatility of impairments over time (i.e. the "cliff-effect").*

We test this hypothesis by comparing the variance of impairments under IAS 39 and IFRS 9. If our hypothesis is correct, we expect variance heterogeneity as the variance under IFRS 9 will be lower than under IAS 39. At the same time, the "front-loading" component should reduce the potential of banks to retain earnings, which constitute amongst other paid up instruments CET1 (Art. 28 CRR). Hence, we assume that banks cannot strengthen their regulatory capital base as measured by CET1, through retained earnings and posit:

Hypothesis 2 *The "front-loading" effect impedes banks' ability to retain earnings.*

Furthermore, we want to investigate how the introduction of IFRS 9 has influenced the dynamics between impairments and financial stability. We focus on the transmission channel of capital adequacy and hence the likeliness of bank failure to occur. We hypothesize that the "front-loading" effect will deplete the banks' capitalization and hence increase their PD.

Hypothesis 3 *The introduction of the IFRS 9 ECL model diminishes capital adequacy through "front-loading" losses and hence increases banks' PD.*

We test this hypothesis by computing the bank-level PD using the z-Score as in Goetz (2018). In line with the seminal work of Roy (1952), our values are normally distributed. Hence, we do not apply the standardization as suggested in Laeven and

Levine (2009) or Houston et al. (2010).

$$z_{i,t} = \frac{ROA_{i,t} + CA_{i,t}}{\sigma(ROA_{i,t})} \tag{1}$$

The nominator of the equation above consists of the return on assets (ROA) and the capital adequacy (CA), which is measured as the ratio of equity to assets. The denominator of Equation (1) is the standard deviation of the ROA. The subscript t denotes time, while i refers to the bank.

We use the z-Score as our dependent variable in a subsequent fixed-effects regression model, where we investigate the impact that impairments have on our proxy for bank PD under IAS 39, and the new IFRS 9 standard. The relationship between the likelihood of bank failure and the z-Score is inverse, such that we expect a negative coefficient on our variable of interest, impairments (IMP). We standardize impairments by total assets, in order to prevent a size bias, as large banks will naturally incur more impairments. The detailed model can be obtained from Equation (2).

$$\begin{aligned} z_{i,t} = \beta_1 IMP_{i,t} + \underbrace{\beta_2 LR_{i,t} + \beta_3 RISKDIV_{i,t} + \beta_4 ROID_{i,t}}_{\text{bank controls}} \\ + \underbrace{\gamma_1 HPI_{c,t} + \gamma_2 CPI_{c,t} + \gamma_3 UNEMP_{c,t} + \gamma_4 GDP_{c,t}}_{\text{macro controls}} + \alpha_i + \mu_t + \epsilon_{i,t} \end{aligned} \tag{2}$$

We incorporate multiple explanatory variables in our model. Our control variables for bank characteristics include the leverage ratio (LR), the risk diversification (RISKDIV), and the income diversification (ROID). Controls for bank size are obsolete for two reasons in particular: First, the static balance sheet assumption replaces maturing assets and liabilities with comparable assets and liabilities and thus keeps total assets fixed, which would make it conceptually difficult to incorporate them in a fixed-effects model. Second, the significance assumption of the EBA makes sure that only banks with assets in excess of EUR 30 billion are part of the stress test (SSM (2013)). Hence, the interquartile range of assets is rather small and has

little variation in the cross section. The LR is defined as the ratio of Tier 1 capital to total assets, while RISKDIV is a Herfindahl-Hirschman-Index, where the squared sum of the respective risk category is scaled by total RWA as shown in Equation (3):

$$\begin{aligned} \text{RISKDIV}_{i,t} = &\Big(\frac{\text{RWA(Credit Risk)}_{i,t}}{\text{RWA(Total)}_{i,t}}\Big)^2 + \Big(\frac{\text{RWA(Market Risk)}_{i,t}}{\text{RWA(Total)}_{i,t}}\Big)^2 \\ &+ \Big(\frac{\text{RWA(OpRisk)}_{i,t}}{\text{RWA(Total)}_{i,t}}\Big)^2 \end{aligned} \tag{3}$$

In order to measure the degree of income diversification (ROID), we employ the technique of Laeven and Levine (2007) and derive an index that assumes values between zero and one. It captures the distribution between net interest income (NII) and net non-interest income (NNII), relative to their sum, the total net operation income (NOPI). The higher the value, the higher the income diversification.

$$\text{ROID}_{i,t} = 1 - \left|\frac{\text{NII}_{i,t} - \text{NNII}_{i,t}}{\text{NOPI}_{i,t}}\right| \tag{4}$$

Our second set of control variables includes four variables from the macroeconomic scenario, whose influence is measured by γ_i. As they are on a country-level, we introduce the subscript c to differentiate between the respective countries. We include them in order to account for the different macroeconomic scenarios, as well as structural differences between the heterogeneous countries, in which the assessed banks operate. Doing so renders the usage of country-fixed effects obsolete, as they would induce multicollinearity. Furthermore, all of them influence repayment behavior and thus the likeliness of a loan to be impaired. Especially rising unemployment (UNEMP) should severely increase the probability of delinquency, respectively default, and thus negatively influence CET1. Contrarily, a high level of GDP can be associated with a sound economic environment, in which late payments or the absence of payments occur seldom. As a result, CET1 should be high, when GDP is high. The same relationship can be attested for the House Price Index (HPI). When housing prices are high, default rates should be low, as consumers can easily refinance existing loans by borrowing against the higher value of their real estate. The

influence of Consumer Price Inflation (CPI) is ambiguous. Given that wages adjust in parallel to inflation, impairment rates should decrease because the debt payments on fixed interest loans become more affordable to the consumer. To the contrary, if wage growth cannot keep up with inflation, people have less available income to allocate to debt service. We thus refrain from making an a priori assumption about the possible influence of CPI. A comprehensive list of the variables can be found in Table (2) in the Appendix.

Since we are interested in explaining the differences of an observed bank over time, a fixed-effects model is appealing from an econometric perspective. In particular, we apply bank and time fixed-effects, which are denoted by α, respectively μ in Equation (2). Applying the Hausman test deems the usage of such a model appropriate. Standard errors are clustered on the bank-level in order to account for heteroskedasticity. We evaluate the equation four different times, for all combinations of IAS 39 and IFRS 9 and the baseline, respectively adverse scenario. We look at the estimated coefficients in order to validate our hypothesis.

We employ the eigenvalue test of Belsley (1991) to test for multicollinearity, and disperse this concern as all condition indices are below ten. We chose this test, as it performs better for fixed-effect models, and allows to conclude on the drivers of multicollinearity, unlike e.g. the variance inflation factor (VIF). Furthermore, discarding either of the variables in our model could potentially constitute an econometrically more severe endogeneity problem due to an omitted variable. We thus proceed with the initial model, as shown in Equation (2). Lastly, we investigate whether the variables in our panel are stationary, using the advanced Dickey-Fuller test and generate evidence against the presence of a unit root.

The proposed methodology benefits from the stress test framework. Under the static balance sheet assumption, exposures are fixed and replaced with comparable assets at maturity. Hence, there is no inference to control for. Likewise, the prohibition of

changes to the business model and capital structure exclude immeasurable effects from the model. We control for the different macroeconomic scenarios by incorporating them in our estimation model. Our methodology is thus compliant with Appendix B5.5.17 (f) of IFRS 9, which stipulates that the transition between the stages of IFRS 9 can be justified by the expectation of negative economic conditions. Moreover, the model stock assumption enables us to compare IFRS 9 models as of their inception, thus depleting the model of further biases. Consequently, we argue that, ceteris paribus, deviations in the results should be attributable to the enactment of IFRS 9.

3.4 Dataset

Our dataset covers all publicly available stress test results from the EBA, respectively the European Central Bank (ECB). We merge the individual results to obtain a joint dataset with 43 banks from 15 different European countries. The panel consists of empirical data from 2014 until 2018, as well as forecasts until 2020. We do not intend a counterfactual analysis, but instead try to contrast IAS 39 and IFRS 9, in order to assess the implications of the change in accounting. Although earlier stress tests are available, they were not incorporated in this paper, as they only disclose whether a regulatory hurdle rate has been exceeded or not. Our full sample represents approximately 70 % of all exposures in the Eurozone and can thus be considered representative. Two notable mergers occurred during the analyzed time. Banco Santander acquired Banco Popular Español, so that the latter was dropped from our panel. Moreover, Banco Popolare - Società Cooperativa and Banco Popolare di Milano merged. Although information for Banco Popolare are included in all three stress tests, we discontinue the time series, as Banco Popolare di Milano was not subject to previous iterations of the stress test and would thus bias the results.

Because of overlapping time frames, we have two observations for the year 2016, which is included in the 2014 and 2016 stress test. Untabulated results show that the values are equal to a confidence level of 99.9 %, when regressed on another. We thus kept the value from the 2014 stress test, in order to keep the time series intact for as

long as possible. The dataset also contains information on transitory adjustments that might arise from the new accounting standards or other regulatory influences. We decided to not incorporate them in our model for two reasons. First, only a limited number of banks makes use of them. Second, if they are being used, they are negligibly small. Because the stress test is calculated for a baseline and an adverse scenario, we have two observations in the time dimension on the bank-level. We address this issue by conducting our analyses individually for the respective scenarios. The descriptive statistics for the baseline scenario are tabulated in Table (4), whereas the results for the adverse scenario can be found in Table (5). Both tables have been further disaggregated, with the upper panel showing IAS 39 and the lower panel depicting IFRS 9.

3.5 Results

3.5.1 Discussion of Hypothesis 1

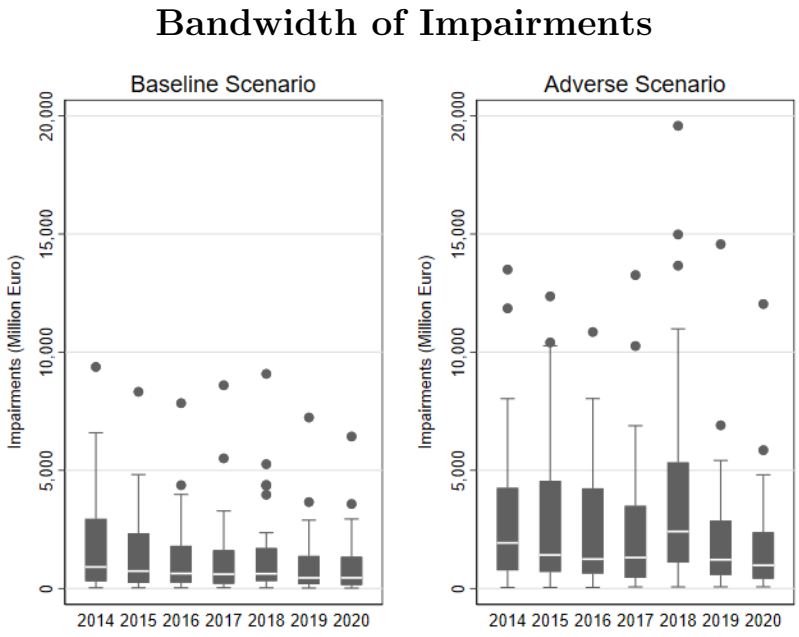

Figure 4: Visualization of Impairments over the analyzed time frame.

Figure (4) depicts the bandwidth of impairments over the analyzed stress test horizon. We chose a box-plot in order to visualize multiple dimensions of our data in an easily

understandable way. The position of the 25^{th} (75^{th}) percentile corresponds to the lower (upper) end of the box, whereas the median is indicated by the white line within the box. The adjacent lines refer to values that are not considered outliers, as they are 1.5 times the interquartile range away from the lower and upper percentiles of our box-plot. Values exceeding this distance metric are indicated by full dots. The small box size in the baseline scenario makes it obvious to the eye, that the impairments lie narrowly together, with only little variance, as postulated by our first hypothesis. A small jump in the absolute number of outliers can be observed with the introduction of IFRS 9 at the beginning of 2018 and is in line with the theorized "front-loading", which we will discuss in more detail in the subsequent chapter. The variance under the adverse scenario is noteworthy higher. The larger body is illustrative of a wider interquartile range, which in turn further extends the adjacent lines. In accordance with our prediction, one can observe a significant reduction in volatility after the introduction of IFRS 9 in 2018, which corroborates the "front-loading" hypothesis.

We proceed to empirically investigate the graphic evidence in favor of our first hypothesis by testing for variance homogeneity with Levene's test. Under our hypothesis, we expect the null hypothesis of equal variances to be rejected, as the volatilities of IAS 39 and IFRS 9 differ significantly.

Table (6) about here

Table (6) shows the differences between the baseline (Panel A) and adverse (Panel B) scenario for all three periods during which IFRS 9 is applicable. Using Levene's test, we calculated a test statistic in column four and computed the probability of the test statistic under variance homogeneity in column five. We find for the baseline scenario, that the initial variance homogeneity transitions into heterogeneity as time progresses. At the same time the inverse is true for the adverse scenario. We thus conclude that the impact of the new accounting standard is most pronounced under the adverse scenario, where the variances under IAS 39 and IFRS 9 converge as a result of the initial "front-loading".

3.5.2 Discussion of Hypothesis 2

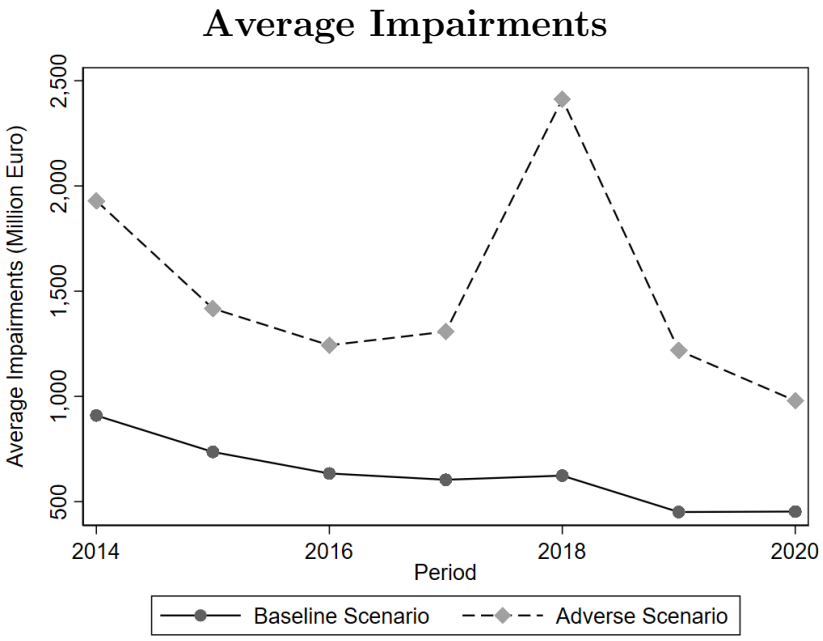

Figure 5: Evolution of the average height of Impairments.

Figure (5) yields graphic evidence of our second hypothesis. It shows that the introduction of IFRS 9 in 2018 has coincided with a massive "front-loading" of impairments. While this observation may partially be explained by the perfect foresight approach from the stress test, it also shows that the immediate loss recognition yielded high initial impairments, yet smooths out with increasing time. In line with our second hypothesis, we proceed to empirically test the impact of this distortion on retained earnings and depict the results in Table (7).

Table (7) about here

As can be inferred from the table above, the "front-loading" effect is not statistically significant for the baseline scenario. Through all analyzed time frames, banks are able to retain earnings in order to foster their capital levels. However, in case of an economic downturn, as depicted by the adverse scenario in Panel B, a very pronounced difference occurs at the onset of the crisis. Throughout the economic contraction banks are impeded in their ability to build up capital. It is only over the course of the economic contraction, that the difference narrows, and roughly

vanished in the last year of observations. This finding is in line with the graphical evidence of Figure (5) and illustrates the severity of the "front-loading" effect, which is most pronounced during the economic downturn. We thus conclude in line with our second hypothesis that structural differences between IAS 39 and IFRS 9 exist, and that they are most pronounced at the beginning of the conversion period.

3.5.3 Discussion of Hypothesis 3

Table (8) about here

Concerning our third hypothesis, we have tabulated the results of the regression in Table (8). They are separated by the two accounting standards, which are divided into the baseline and adverse scenario. Our findings regarding impairments are in line with our predictions. When comparing the baseline scenarios, we find that the coefficient of impairments has grown under IFRS 9. It suggests that impairments exert a stronger influence on bank PD under the new accounting standard. A possible transmission channel opens up from the theorized capital adequacy hypothesis. Due to the "front-loading" effect, banks' capitalization is negatively impacted, which in turn increases their PD as proxied through the z-Score. Figure (6) illustrates these deliberations by showing that banks are initially profitable in 2017, and then take a substantial hit with the introduction of IFRS 9 in the following year. This finding confirms our third hypothesis, and is in line with the results from our second hypothesis.

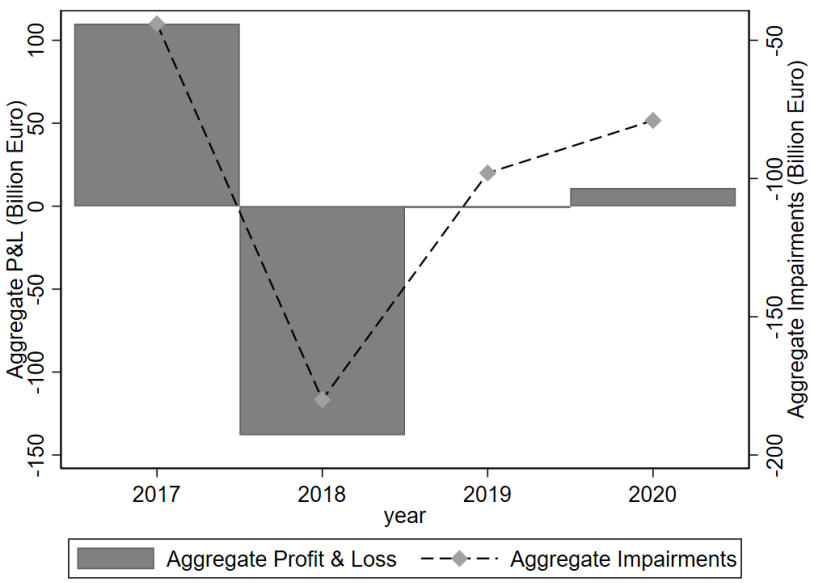

Figure 6: Aggregate Impairments not measured at Fair Value through P&L.

At the same time, we find evidence in favor of the mitigation of the "cliff-effect". The gap between the baseline and adverse scenario has narrowed under IFRS 9, compared to IAS 39. As a result, banks are less vulnerable during economic downturns, as their impairments are less cyclical, and hence do no longer amplify market fluctuations. Again, this observation compliments the findings from our first hypothesis. Another notable observation concerns the leverage ratio, which is only significant under IAS 39. Our results thus suggest, that the mere importance of capitalization has been reduced under IFRS 9, while the importance of profitability in light of the z-Score has grown.

Taken together, we find that IFRS 9 has an ambiguous influence on financial stability. While undesired procyclicality in the form of the "cliff-effect" has been reduced, this was achieved at the cost of "front-loading" expected losses. Impairments thus become more important for bank stability in normal times (baseline scenario), while their importance grows less under distress (adverse scenario). Our findings complement early conjectures made by the EBA (2018b).

3.6 Robustness

Due to the research setting, it was not feasible to conduct some common robustness checks. We employ subsampling as part of our identification strategy in order to differentiate between the baseline and the adverse scenario. Therefore, a further disaggregation would only lead to inconclusive subsets with no meaningful data. Likewise, the limited sample size has depleted winsorization or truncation of meaning. To the contrary, the volatile observations under macroeconomic stress actually contain significant information for our research question in light of the "cliff-effect". It may seem appealing to understand the introduction of IFRS 9 as a treatment effect, and to hence employ a difference in difference approach for the identification strategy. However, since there are no banks in the stress test that are not subject to the new accounting standard, the required control group cannot be constructed. Likewise, an event study appears appealing, but is not feasible as the event is clustered around the introduction of IFRS 9 (MacKinlay (1997)).

Against this background we revert to the Jackknife method in order to assess how individual banks drive our underlying results. We successively re-estimate our model from Equation (2), leaving out one bank at a time. We then proceed to plot the coefficient of interest (here: bank resilience as proxied with the z-Score) for each of the subsets. Doing so allows us to identify banks that bias our results by driving the observed results single-handedly.

Coefficient of Interest in the Baseline and Adverse Scenario

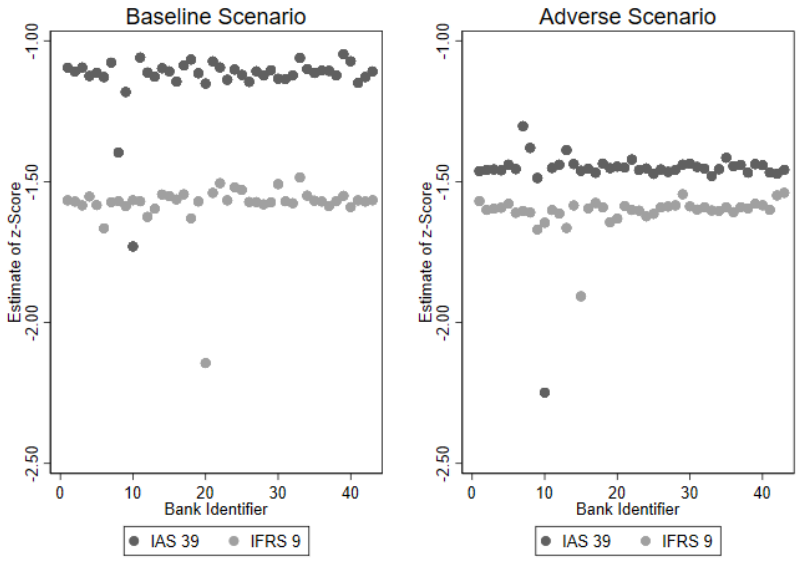

Figure 7: Results after applying the Jackknife Method.

Figure (7) shows the magnitude of our coefficient of interest on the ordinate, vis à vis the bank that was left out in the estimation ot abscissa. We differentiate between the baseline scenario on the left hand side of the figure, and the adverse scenario on the right hand side. Each subfigure is further divided in the effect under IAS 39 in dark grey, respectively IFRS 9 in light grey. In this regard, we find that the observed effect is not driven by individual outliers in the dataset. To the contrary, the effect size remains within a very narrow band for both IAS 39 and IFRS 9. Taken together, the exclusion of individual banks does not drive our results. Instead, we cannot only demonstrate the robustness of results, but also visualizes in unparalleled ways the shift we discuss in our third hypothesis.

Another approach of testing our results stems from Art. 159 of the CRR. In order to ensure consistency between regulatory and economic capital, it mandates the comparison of the calculated ECL for general and specific credit risk adjustments in line with IFRS 9 to the regulatory ECL according to the CRR. From this comparison, two scenarios can arise, as shown in Figure (8). Either, an ECL shortfall, when IFRS 9 provisions are short of CRR provisions, or a surplus in the reciprocal case.

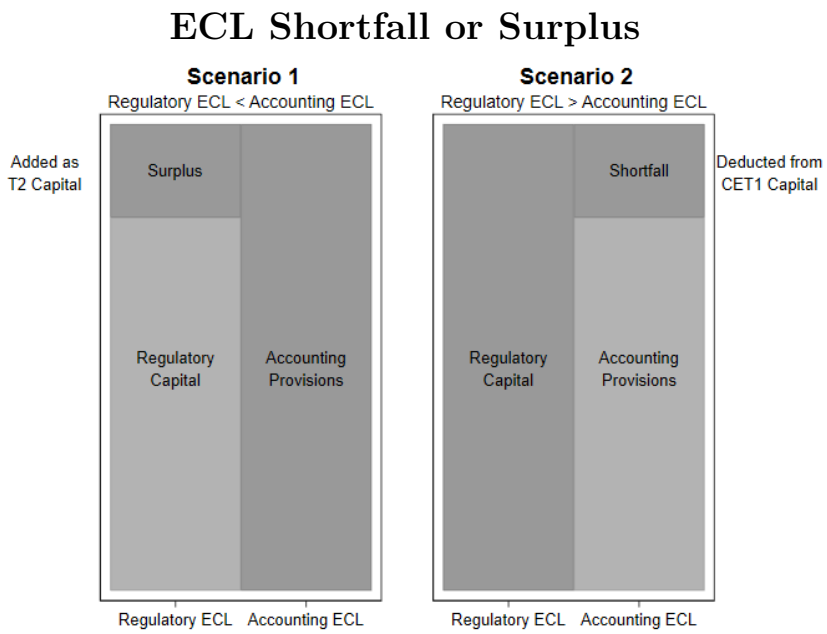

Figure 8: Possible constellations when comparing the ECL.

Under real world conditions, surpluses as in the second scenario of Figure (8) can be considered Tier 2 capital up to a maximum of 0.6 % of RWA. However, the methodological note of the European stress test interdicts this attribution, in order to yield more conservative results (EBA (2018c)). In line with Art. 36 (1) (d) CRR, a shortfall will be deducted from the Tier 1 capital and thus relates to a section of the equity, which also contains the focal point of our analysis: retained earnings. A detailed numerical example can be found in Krüger et al. (2018), while the economic reasoning behind it is explained in Figure (11) in the Appendix. We consider our first and second hypothesis robust, if we can observe with this proxy that IFRS 9 initially yields higher loan loss provisions than IAS 39 due to the "front-loading" effect. As a result, the number of observed shortfalls should decrease. Furthermore, we expect the nominal amount of the shortfall to lessen due to the expected loss framework.

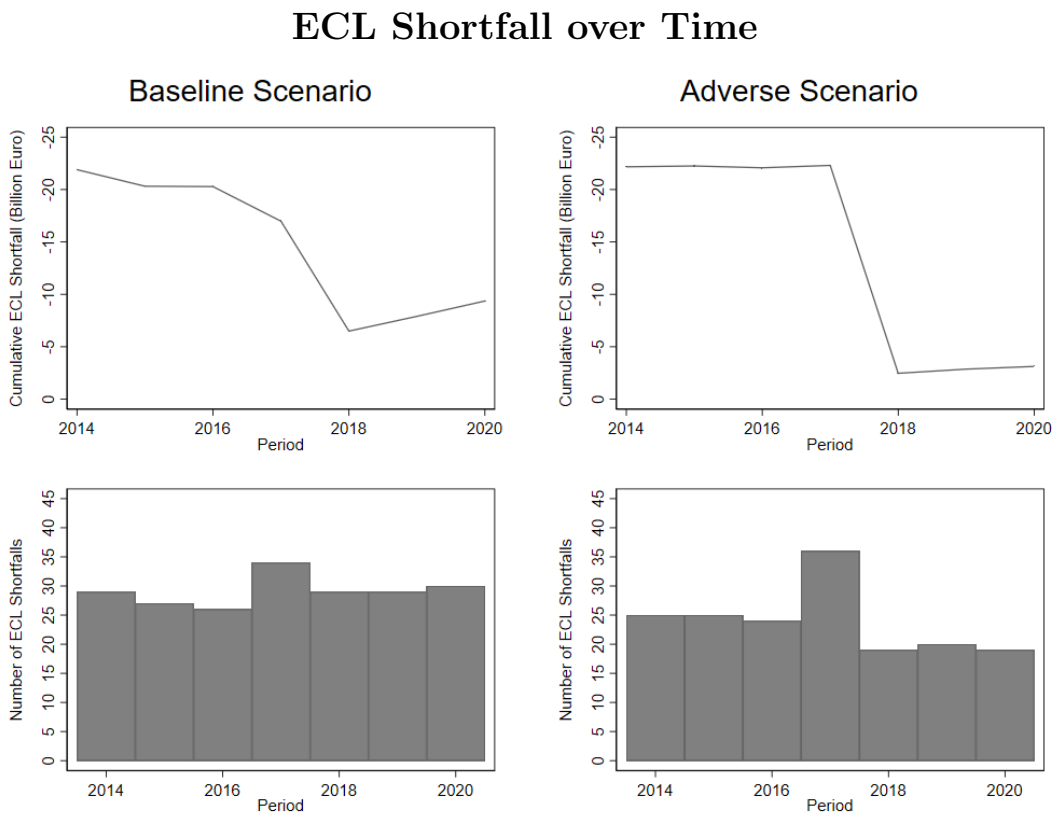

Figure 9: Evolution of the ECL shortfall in the baseline and adverse scenario.

Figure (9) depicts the cumulative nominal shortfall in the first row of the panel, and the absolute number of shortfalls in the second row. The graphs in the first column relate to the baseline scenario, whereas the second column contains the adverse scenario. The aggregate shortfall drops sharply with the introduction of IFRS 9 in 2018. This drop can arguably be attributed to the discussed "front-loading" effect, which has increased impairments, and hence narrowed the gap between both ECL measures. We thus interpret it as further evidence for our second hypothesis. The impact is most pronounced for the adverse scenario, where a steep decline can be observed in contrast to the steady reduction under the baseline scenario. Likewise, the number of banks with an ECL shortfall is elevated for both scenarios prior to 2018, giving further credibility to the "front-loading" explanation. Furthermore, it can be seen that the number of banks with a shortfall under IFRS 9 is almost 20 % below the number reported under IAS 39. In relation to the question of reduced procyclicality, this observation might be understood as an indication that under macroeconomic stress banks are no longer subject to self-enforcing amplifications.

We furthermore challenged the robustness of our model by conducting a pseudo-treatment study, where we estimated Equation (2) under the assumption that the introduction of IFRS 9 did not occur in 2018, but in any other year. We find in untabulated results that the observed mechanisms are only significant for the year of the de facto introduction. Lastly, our results are valid for fully loaded, respectively transitory reported numbers.

3.7 Conclusion

This paper sets out to generate novel insights regarding the implications of the new IFRS 9 impairment model for financial stability. The shift from an incurred to an expected credit loss model has released two opposing forces, whose net effect remains ambiguous ex ante. While the more timely recognition of losses under IFRS 9 fosters financial stability by mitigating procyclical effects, it also weakens capital adequacy, potentially setting off this benefit. We investigate this impact, using the z-Score as a proxy for the likelihood of a bank to fail. It is an especially suitable measure in this context, as it emphasizes the transmission channel between capital adequacy, which is impacted by IFRS 9, and probability of default.

We posit three main hypotheses in connection with the advent of IFRS 9. First, the gradual loss recognition of the ECL model should decrease the volatility of impairments. The "cliff-effect" of the incurred loss model of former IAS 39 represented a major source of procyclicality, which should be mitigated by the gradual loss recognition under IFRS 9. Although a dampened version of the "cliff-effect" still persists in the shift from Stage 1 to Stage 2, it should be attenuated by the CCB and CCyB. Second, initially impairments under IFRS 9 should be higher compared to IAS 39 due to the earlier recognition of impairments under the ECL approach and the resulting "front-loading" effect. Third, the impact of impairments on capital adequacy and, subsequently, on the probability of bank failure, should be the strongest at the outset of the crisis. In the further course of the crisis, this impact should decrease.

In order to test our hypotheses, we draw on the empirical data of the ECB banking stress test results. They allow us to investigate the implications of the new ECL impairment model on bank resilience and financial stability based on the entire loan portfolios of major European banks. In the absence of archival data from actual crises, the specified stress test scenarios offer a first and unique opportunity to explore the implications of IFRS 9 on banks' reported results. We can investigate whether procyclicality was indeed reduced by comparing the baseline and adverse scenario of the stress test. Furthermore, all banks adhere to the same assumptions and methodologies. We could thus exclude noise from immeasurable effects and are confident to have measured the true implications of IFRS 9.

With regards to our first hypothesis, our analysis reveals that the "cliff-effect" of IAS 39 has been weakened under IFRS 9, which indicates the potential of the staging model to enhance financial stability of the banking sector in the future. We proceeded our investigation by assessing whether the reduction of the "cliff-effect" came at the theorized cost of "front-loading". Consistent with our second hypothesis, we find that impairments grow excessively at the beginning of the adverse scenario. However, the gap between the two accounting standards narrows as time progresses. The findings of our third hypothesis confirm the previous results. Impairments exert a stronger influence on financial stability, when proxied as banks' PD through the z-Score. The gap between an economic downturn and the status quo though has been reduced. This observation suggests that the procyclicality of impairments has been decreased, which in turn would benefit financial stability.

Although, the results of our paper indicate that the introduction of IFRS 9 has successfully diminished the severity of the "cliff-effect", this goal was achieved at the cost of "front-loading" expected credit losses. As a result, less secure loans incur higher costs at their initial recognition, which might lead to a credit supply shock from banks, and deter bank managers from acquiring such loans in the sec-

ondary market. Consequently, asset quality becomes more important under the new accounting standard. Our findings do not only concern the management of financial institutions, but can also be extended to regulatory and supervisory policy discussion. While the timelier recognition of expected credit losses under the IFRS 9 approach may have positive effects on financial stability and bank resilience, not all issues of the preceding IAS 39 have been resolved. Our results highlight the need to pay in the new regulatory capital buffers, in order to contain the remaining "cliff-effect" inherent in IFRS 9 during crises. Only then, the desired stabilization of the financial system will truly be achieved. The recent announcement of the German regulator to raise the CCyB to 0.25 % as of Q3 2020 can be seen as a step in this direction.

The combination of stress test results and accounting requirements opens up a plurality of new research questions. While the usage of forecasted data allows us to give an early assessment of the implications of IFRS 9, future research should try to assert our findings using actual data. Moreover, it seems prudent to repeat this study with coming stress test results, in order to increase the power of our tests. It also seems appropriate to assess how the differences between IAS 39 and IFRS 9 manifest under the standard and internal ratings based approach of the Basel accords. Lastly, it would be advisable to compare the ECL staging model to the upcoming current expected credit loss (CECL) model of the FASB. Unlike IFRS 9, all eligible exposures are immediately recognized with their lifetime ECL under the CECL model. Doing so eliminates the "cliff-effect" and thus further reduces procyclicality, which only stems from the usage of PIT estimates under the proposal of the FASB. However, at the same time, the "front-loading" effect will be even more pronounced, necessitating a further investigation into the implications in the context of financial stability.

3.8 Appendix

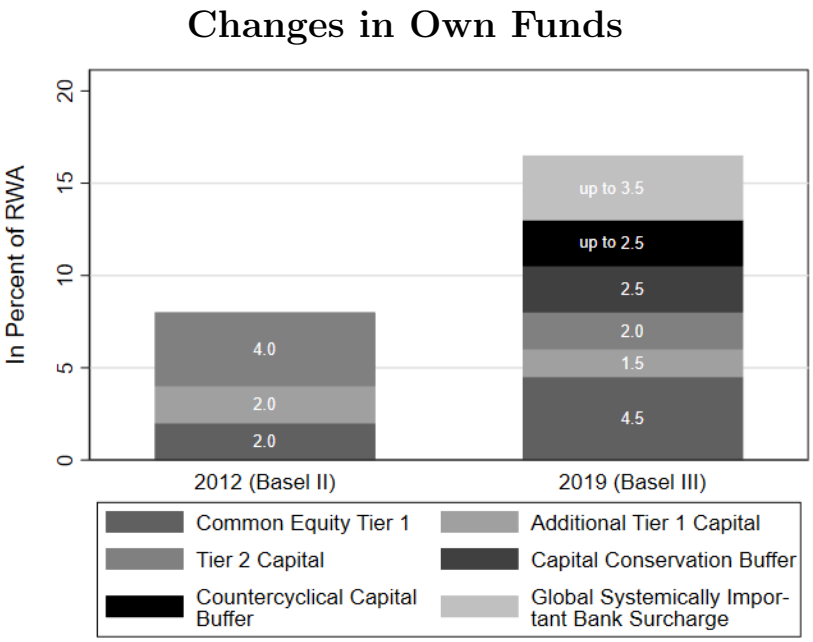

Figure 10: Illustration of the differences between Basel II and Basel III.

The introduction of Basel III has yielded significant changes to the own funds of banks. Not only has the composition of equity changed, but also have other items been added, in order to make banks more resilient. Large, systemically relevant banks (GSIB) for example are now subject to individual capital surcharges based on their perceived riskiness, as measured in so called buckets. A pivotal element in the context of this paper is the Countercyclical Capital Buffer (CCyB). It is intended to increase the resilience of the banking sector by means of an additional capital accumulation in periods of excessive credit growth. In downturns, when losses materialize, this buffer shall be used to mitigate impairments, reducing the risk of an extenuated credit supply constrained by regulatory capital requirements. To this day, only one out of 28 reporting countries fully enforces the requirements (BIS (2018); ESRB (2019)). The CCyBs adequacy in times of crises may consequently be questioned. Our study on the impact of the ECL model in a crisis scenario may thus be useful in the regulatory debate to actively use the additional loss-absorbing buffer and set the CCyB rate above 0.0 % to strengthen the capitalization of banks in good times.

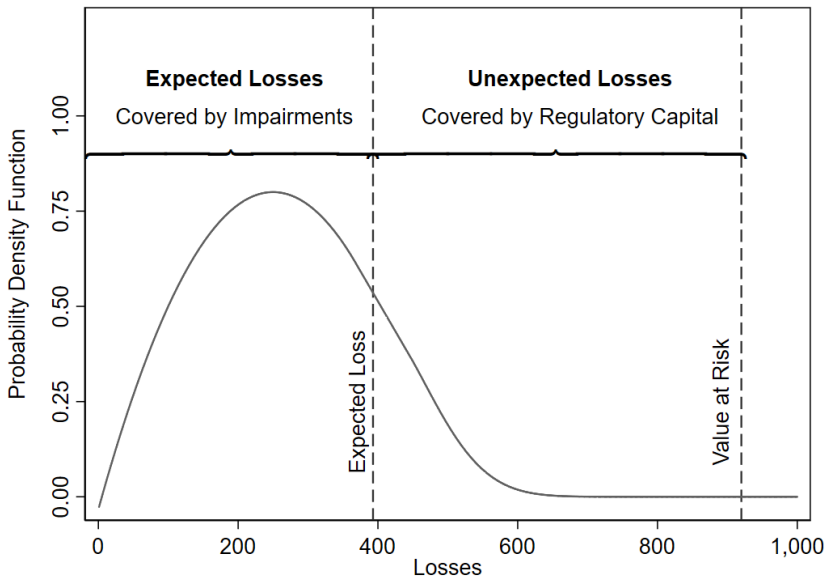

Figure 11: Illustration of expected and unexpected losses.

Figure (11) explains the economic intuition behind the ECL shortfall comparison in more detail. It was argued that two cases can occur: either a shortfall or a surplus. While the shortfall is deducted from CET1 capital, the surplus can be added as T2 capital. The reason for this unequal treatment becomes obvious, when constructing an example. Consider the first case, a shortfall. It occurs, when the impairments do not suffice to cover the expected losses. As a result, an area between expected and unexpected losses arises, where losses are not covered by neither accounting nor regulatory capital. Hence, the deduction from CET1 to cover these losses. In the contrary cases of a surplus, the losses covered by impairments extend into the losses covered by regulatory capital. As a result, a part of the losses is covered by both, impairments and regulatory capital. In order to prevent the bank from being charged twice, the idea is to offset the negative implications from this welcomed conservatism by allowing the addition of the double covered capital to T2 capital.

Table 2: Used variables and their sources

Variable	Description	Source
ASSETS	Total Assets	Own Computation: ASSETS $= \frac{\text{T1 Capital}}{\text{Leverage Ratio}}$
NI	Net Income	Item 993014[1], Item 1690715[2], Item 183615[3]
ROA	Return on Assets	Own Computation: ROA $= \frac{\text{Net Income}}{\text{Total Assets}}$
z	z-Score	Own Computation: $z = \frac{\text{ROA} + \text{CA}}{\sigma(\text{ROA})}$
IMP	Amortized Impairments	Item 993007[1], Item 1690710[2], Item 183610[3]
LR	Leverage Ratio	Item 1690858[2], Item 183112[3]
RISKDIV	Risk Diversification	Own Computation: RISKDIV $= \sum_{j=1}^{3} \text{Risk } (\%)_{itj}^2$
NII	Net Interest Income	Item 993001[1], Item 1690701[2], Item 183601[3]
NNII	Net Non-Interest Income	Item 993002[1], Item 1690705[2], Item 183605[3]
NOPI	Net Operating Income	Item 993005[1], Item 1690709[2], Item 183609[3]
ROID	Income Diversification	Own Computation: ROID $= 1 - \left\lvert \frac{\text{NII}-\text{NNII}}{\text{NOPI}} \right\rvert$
ECL	ECL Shortfall	Item 993416[1], Item 1690815[2], Item 183716[3]
HPI	Housing Price Inflation	ESRB[4]
CPI	Consumer Price Inflation	ESRB[4]
UNEMP	Unemployment Rate	ESRB[4]
GDP	Gross Domestic Product	ESRB[4]

Note: (1) as obtained from the 2014 Stress Test Results website. (2) as obtained from the 2016 Stress Test Results website. (3) as obtained from the 2018 Stress Test Results website. (4) as obtained from the macroeconomic scenario diffused by the ESRB. Total Assets for 2014 were extrapolated from the actual values, in line with the "static balance sheet" assumption of the bank stress test.

Table 3: Correlation Matrix of Regressand and Regressor

	z-Score	IMP (%)	LR (%)	RISKDIV ($\in \{0,1\}$)	ROID ($\in \{0,1\}$)	HPI (%)	CPI (%)	UNEMP (%)	GDP (%)
z-Score	1.0000								
IMP (%)	-0.1119	1.0000							
LR (%)	0.7780	0.2688	1.0000						
RISKDIV ($\in \{0,1\}$)	0.1404	0.2272	0.2049	1.0000					
ROID ($\in \{0,1\}$)	0.0034	-0.1754	-0.0823	0.0519	1.0000				
HPI (%)	0.3466	-0.2290	0.0754	0.0621	0.0907	1.0000			
CPI (%)	0.1571	-0.1194	0.0244	-0.0075	0.0820	0.5741	1.0000		
UNEMP (%)	-0.0923	0.2871	-0.0831	0.2429	-0.0662	-0.1984	-0.3393	1.0000	
GDP (%)	0.2235	-0.1801	0.0247	0.0594	-0.0516	0.6971	0.4627	-0.0938	1.0000

Note: The table above shows the correlations between the regressand and regressors from Equation (2). The dimension of the respective variable has been added in parenthesis, where applicable. The strongest positive correlation can be observed between the leverage ratio and the z-Score. Given that a slight modification of the leverage ratio influences the numerator of the z-Score as a measure of capital adequacy, this observation appears unproblematic. Given the size of the correlations, no pair raises concerns for the empirical analysis of our paper.

Table 4: Descriptive Statistics of the Baseline Scenario

	Panel A: IAS 39						
	Obs.	*Min.*	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	*Max.*	σ
z-Score	172	-0.55	0.70	1.14	1.63	14.36	1.88
IMP	172	0.02	0.13	0.20	0.37	2.07	0.31
LR	172	1.69	4.07	4.87	6.07	24.95	15.81
RISKDIV	172	0.38	0.63	0.68	0.74	0.86	0.10
ROID	172	0.00	0.00	0.00	0.00	0.98	0.31
HPI	172	-4.30	1.50	4.00	5.60	8.70	2.98
CPI	172	0.30	1.15	1.40	1.70	2.80	0.42
UNEMP	172	3.80	5.50	7.40	10.40	25.70	4.47
GDP	172	0.20	1.50	1.85	2.40	4.50	0.69

	Panel B: IFRS 9						
	Obs.	*Min.*	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	*Max.*	σ
z-Score	129	-0.12	0.94	1.39	1.90	3.69	0.77
IMP	129	0.01	0.09	0.13	0.23	0.99	0.18
LR	129	3.31	4.86	5.55	6.61	12.14	1.95
RISKDIV	129	0.42	0.66	0.72	0.75	0.86	0.09
ROID	129	0.02	0.47	0.65	0.91	0.99	0.27
HPI	129	-1.60	2.90	3.80	4.80	12.60	1.94
CPI	129	0.70	1.40	1.70	2.00	2.90	0.42
UNEMP	129	2.90	3.90	5.00	8.80	14.80	3.09
GDP	129	1.30	1.60	1.70	2.30	4.30	0.66

Note: The table above depicts the descriptive statistics of IAS 39 (Panel A) and IFRS 9 (Panel B) in the baseline scenario. Notable variables include the income diversification (ROID), which is highly skewed, and shows that the banking sector in the EU is highly dependent on interest income.

Table 5: Descriptive Statistics of the Adverse Scenario

Panel A: IAS 39

	Obs.	*Min.*	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	*Max.*	σ
z-Score	172	-3.49	-0.57	-0.09	0.39	14.36	2.06
IMP	172	0.03	0.31	0.40	0.83	3.53	0.57
LR	172	1.60	3.49	4.17	4.97	24.95	15.87
RISKDIV	172	0.36	0.61	0.67	0.73	0.86	0.10
ROID	172	0.00	0.00	0.00	0.76	1.00	0.31
HPI	172	-19.20	-9.90	-5.50	-3.50	9.20	4.42
CPI	172	-3.90	-0.50	0.35	0.90	2.40	1.14
UNEMP	172	4.60	7.20	9.50	11.10	26.80	4.48
GDP	172	-4.10	-1.60	-1.10	-0.70	0.90	0.79

Panel B: IFRS 9

	Obs.	*Min.*	$Q_{0.25}$	$Q_{0.50}$	$Q_{0.75}$	*Max.*	σ
z-Score	129	-3.01	-0.92	-0.16	0.36	1.96	1.08
IMP	129	0.05	0.23	0.40	0.65	2.23	0.41
LR	129	1.88	3.90	4.61	5.45	11.23	1.89
RISKDIV	129	0.40	0.65	0.70	0.75	0.86	0.09
ROID	129	0.00	0.37	0.60	0.82	1.00	0.31
HPI	129	-31.10	-11.60	-7.20	-2.40	10.00	7.92
CPI	129	-1.80	0.10	0.40	1.10	2.70	0.89
UNEMP	129	3.80	6.10	8.10	10.20	15.90	3.08
GDP	129	-31.00	-2.20	-1.20	0.00	1.90	5.48

Note: The table above shows the descriptive statistics of IAS 39 (Panel A) and IFRS 9 (Panel B) in the adverse scenario. We can reinstate the description from Table (4) at large. Again, the high skewness in terms of diversification characterizes the European banking market.

Table 6: Comparison of Variances

	Panel A: Baseline			
	IAS 39	IFRS 9	Levene	Prob.
2018	1,771.33	1,751.49	0.3397	0.5606
2018 – 2019	1,771.33	1,555.90	3.4738	0.0635
2018 – 2020	1,771.33	1,449.13	5.0408	0.0255

	Panel B: Adverse			
	IAS 39	IFRS 9	Levene	Prob.
2018	2,983.38	4,436.15	7.8529	0.0055
2018 – 2019	2,983.38	3,746.46	1.2456	0.2654
2018 – 2020	2,983.38	3,356.01	0.0348	0.8522

Note: The table above compares the variances of impairments under the two accounting standards. The first column depicts the length of the analyzed forecasting horizon, relative to IAS 39. Columns two and three show the variance of IAS 39, respectively IFRS 9. We statistically investigate this hypothesis by comparing Levene's test statistic and reporting the coefficient in the fourth column. Column five shows the probability of computing the value of the test statistic, if the hypothesis of variance homogeneity is true. We find that the variance is different in most instances. The gap widens under the baseline scenario, whereas it narrows under the adverse scenario. This observation is in line with our hypothesis. The gradual recognition of losses under the ECL model lessens the severity of the "cliff-effect", whereas "front-loading" seems to be more dominant in the adverse scenario, and initially superimposes the decline in volatility.

Table 7: Comparison of Average Change in Retained Earnings

	Panel A: Baseline			
	IAS 39	IFRS 9	Difference	Prob.
2018	875.75	1,098.74	222.99	0.3708
2018 – 2019	875.75	1,152.73	276.98	0.1452
2018 – 2020	875.75	1,164.58	288.82	0.0807

	Panel B: Adverse			
	IAS 39	IFRS 9	Difference	Prob.
2018	-517.30	-3,087.57	-2,570.27	0.0004
2018 – 2019	-517.30	-1,617.75	-1,100.48	0.0052
2018 – 2020	-517.30	-1,084.63	-567.33	0.0424

Note: The table above shows the mean change in retained earnings, under the assumption of unequal variances, in line with our insights from our first hypothesis. We find that the baseline scenario is quite optimistic, as it allows banks to increase their capital levels by retaining earnings. Surprisingly, this effect is more pronounced for IFRS 9 than IAS 39. In line with our second hypothesis, the average bank sustains losses in the adverse scenario, and hence cannot foster its capital base through retained earnings. The effect is especially strong for the first year of the analyzed horizon, which can be attributed to the discussed "front-loading". However, the longer the assessed period, the less severe the effect. This observation can be related to the gradual loss recognition, which eases the severity of initial losses over time, and is in line with our first hypothesis.

Table 8: Comparison of the Accounting Standards with y = z-Score

	IAS 39		**IFRS 9**	
	Baseline	Adverse	Baseline	Adverse
IMP (%)	-1.1186**	-1.4581**	-1.5720***	-1.6033***
LR (%)	-0.1287***	0.1545***	-0.2570	0.3279
RISKDIV (%)	0.5936	-0.8073	-4.6357	-6.7390
ROID ($\in \{0, 1\}$)	0.0033	-0.1118	1.2683	2.4033***
HPI (%)	0.6800	0.0206	-0.0088	0.0015
CPI (%)	0.5273	-0.1202**	-0.0228	-0.0811
UNEMP (%)	-0.4724	0.0013	0.0856	0.1598
GDP (%)	0.9091	-0.1305**	-0.0647	-0.7718
Cluster	Bank	Bank	Bank	Bank
N	172	172	129	129
R^2_{within}	0.9315	0.8912	0.4580	0.8027

Note: The table above shows the results of Equation (2). It can be seen that impairments (IMP) are highly significant in all models. While the importance has grown under IFRS 9, when measured in terms of the coefficient, the gap between the baseline and adverse scenario has been narrowed. Taken together, the two effects yield ambiguous implications for financial stability, which we have addressed for clarification in Section (6). Significance is denoted at the 5 %, 1 %, and 0.1 % level.

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Chapter 4

From "inappropriate" to "reasonable pragmatic"[1] – Revisiting the discussions about the incorporation of day-one losses into IFRS 9

[1] Comment letter 89 on the SD 2011, p. 2; Comment letter 45b on the ED 2013, p. 3.

From "inappropriate" to "reasonable pragmatic"[2] –

Revisiting the discussions about the incorporation of day-one losses into IFRS 9

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[2] Comment letter 89 on the SD 2011, p. 2; Comment letter 45b on the ED 2013, p. 3.

Abstract

The incorporation of day-one losses into the IFRS 9 impairment requirements caused considerable controversy among the IASB and its constituents. This study provides a detailed analysis of the discussions held in the comment letters received by the IASB during the drafting process. We show that only a relatively small proportion of respondents supported day-one losses. Most constituents took a more critical stance, rejecting day-one losses as conceptually unsound and/or as inappropriately affecting investors' and preparers' decision making. In this light, some constituents criticised day-one losses as stemming from unwarranted prudential motives encroaching on international standard setting. Remarkably, a high number of constituents still expressed significant concerns about day-one losses, although they eventually accepted their incorporation as a pragmatic approximation in the absence of superior alternatives. Based on our findings, we reflect on the role of the Conceptual Framework and on the accepted remit of standard setting after the financial crisis.

JEL Classification: G01, G21, G23, G28, M41, M48

Keywords: conceptual framework, day-one losses, expected credit loss model, financial stability, IFRS 9, standard-setting

4.1 Introduction

The development of theoretically and conceptually sound accounting standards is regarded as a key precondition for well-functioning global capital markets (Larson, 2008, p. 27) and thus forms an essential factor for the legitimacy of the International Accounting Standards Board (IASB) (Pelger & Spieß, 2017; Richardson & Eberlein, 2011). In this spirit, the IASB generally pursues a technical expertise-based approach by relying on experienced board members, evidence from scientific research, and its Conceptual Framework (CF) when making standard-setting decisions (Botzem, 2012, 2014; Tarca, 2018). Nevertheless, the previous literature has outlined standard setting as both a technical and a political process (Larson, 2008; Morley, 2016; Young, 2014). Consequently, standard-setting outcomes do not necessarily represent the best technical alternative but frequently rather reflect a trade-off solution that best reconciles the special needs of various interest groups participating in the development process of accounting standards (Chatham et al., 2010; Gilfedder & Ó hÓgartaigh, 1998).

Recently, the twofold nature of standard setting could arguably have been witnessed in the revision process of international impairment requirements for financial instruments that were redrafted in the aftermath of the financial crisis (Pucci & Skærbæk, 2020). In an extensive development process (2008–2014), temporarily conducted in cooperation with the US standard-setter, the Financial Accounting Standards Board (FASB), the IASB decided to replace the incurred loss model of IAS 39 with a more forward-looking expected credit loss (ECL) methodology in IFRS 9. As a novelty, the staged impairment model of IFRS 9 (IASB, 2014b, pars. 5.5.1–8) requires the provision of an allowance for credit losses that are expected to occur within the next 12 months for every financial instrument, which has not significantly increased in credit risk since initial recognition (Stage 1). Thereby, IFRS 9 obliges preparers to recognise ECLs "starting from when they first lend money or invest in a financial instrument" (IASB, 2014a, p. 1), resulting in the recognition of so-called "day-one losses",

that is, the mandatory recognition of ECLs from the inception of a financial instrument. During the drafting process of IFRS 9, the incorporation of day-one losses represented one of the most controversially discussed issues that encountered strong resistance from the IASB's constituency and even divided the members of the IASB itself (see in detail Hashim et al., 2019; O'Hanlon et al., 2018), particularly on the grounds of their arguably conceptually "impure" character (Pucci & Skærbæk, 2020, p. 14).

Given the heated debates preceding the final incorporation of day-one losses, the aim of this study is to revisit how they became part of IFRS 9 and to provide a structured analysis of the accompanying discussions held in the comment letters (CLs) received by the IASB during the revision process. For this purpose, we scrutinised the entire body of documentation issued by the IASB over the course of the due process as well as the broader public discussions that surrounded the drafting of IFRS 9. An in-depth study of the positions and the reasoning on day-one losses adopted in the CLs is of particular interest as it provides insights into the level of acceptance of the IASB's proposals within its constituency, which is an essential factor for the IASB's legitimacy (Richardson & Eberlein, 2011). Moreover, it gives some indications of how constituents influence the standard-setters' decision making (Giner & Arce, 2012; Jorissen et al., 2012). Our comprehensive overview of constituents' reasoning about day-one losses should also be of interest if the standard setters decide to revisit the impairment requirements in the future.

In line with its "technical" approach to standard setting, the IASB was initially reluctant to include day-one losses due to their conceptual shortfalls. However, the first IASB proposal of 2009, while conceptually sound, evoked harsh criticism within the constituency for being overly complex. Furthermore, the FASB insisted on the incorporation of day-one losses during the joint deliberations by deeming them to be an effective instrument to ensure loss allowance adequacy. Reflecting the political nature of standard setting, day-one losses

thus became incorporated into the IASB's revised impairment requirements as a sort of compromise: first due to convergence endeavours with the FASB and afterwards as an operational approximation of the IASB's original conceptually pure proposal that was particularly justified on the grounds that day-one losses were limited to a period shorter than the lifetime horizon prescribed by the FASB approach.[3]

Our CL analysis shows that constituents adopted three basic positions regarding day-one losses as they (1) supported them, (2) rejected them or (3) accepted day-one losses with concerns. We find that only a relatively small proportion of CLs supported day-one losses. The vast majority of constituents expressed a more critical view. This is reflected in the high share of respondents who strongly objected to day-one losses respectively accepted them but *still* voiced substantial concerns regarding their appropriateness. Our analysis of the reasoning employed by the constituents reveals that active supporters shared the FASB's view and regarded day-one losses as a suitable tool to ensure timely and sufficient provisioning for ECLs. Objectors, in turn, echoed the IASB's initial concerns and rejected day-one losses for their "conceptually flawed" nature (CL 73, 2011, p. 1),[4] particularly as those losses are already reflected in the fair value and hence accounted for twice on the initial reporting date. Furthermore, day-one losses were accused of distorting investment decisions and inappropriately affecting preparers' behaviour. On this basis, some constituents were unable to align day-one losses with the mission of standard setters but rather deemed them to be inspired by prudential objectives. Remarkably, these critical issues were also raised very prominently by constituents who finally accepted day-one losses as an operational simplification in the absence of superior alternatives.

Our findings contribute to several strands of the literature. First, we add to the research

[3] For comprehensive overviews of the IFRS 9 drafting process, see Hashim et al. (2016, 2019), Pucci and Skærbæk (2020).
[4] In the Appendix, we provide an overview of the details of the CLs cited in this paper.

that focusses on specific standard-setting processes to deepen our understanding of the dynamics that shape the decision making of standard setters in consultation with their constituents (e.g., Giner & Arce, 2012; Larson, 2008). In the specific context of the drafting of impairment requirements for IFRS 9, the previous literature has examined the diverging standard-setting decisions of the IASB and the FASB against the background of underlying theoretical and practical underpinnings (Hashim et al., 2016, 2019) and their interrelationship with prudential regulatory objectives and requirements (Giner & Mora, 2019; Novotny-Farkas, 2016). Our study is most closely related to that of Pucci and Skærbæk (2020), who elucidated the role of financial economics in the approximation process in which the IASB adapted its initial (conceptually sound) "ideal-type" impairment approach towards a tolerable, operational solution. We complement their findings by providing an in-depth view of the discussions of day-one losses held in the CLs, which were analysed on a more general basis by Pucci and Skærbæk (2020). In particular, our study shows that, even though a substantial number of constituents finally accepted the incorporation of day-one losses, they did not stop raising fundamental criticism regarding them. The resulting somewhat "flawed" reasoning adopted by these constituents gives rise to the question of how the IASB should deal with such feedback and whether this forms an appropriate basis for standard-setting decisions.

Furthermore, our study deepens our understanding of how constituents consider the Conceptual Framework in their responses during the due process (Dennis, 2018; Kabir & Rahman, 2018; van Mourik & Walton, 2013). On the one hand, our analysis shows that the vast majority of constituents deemed it important to develop sound accounting standards and actively referred to the standard setter's core values set out in its Conceptual Framework to substantiate their view. On the other hand, our study indicates that a substantial number of constituents were willing to sacrifice theoretically sound proposals in favour of other interests, such as simplicity in application or convergence. Nonetheless, they seemingly attached great

importance to indicating explicitly the resulting deviations from the Conceptual Framework. Our observations point to the risk that constituents might become inclined to tolerate Conceptual Framework overrides more generally, which calls the status of the Conceptual Framework as a meaningful theoretical foundation of IFRS into question.

Finally, the insight generated by our paper contributes to a broader debate about standard setters' responsibilities regarding financial stability in the wake of the financial crisis (e.g., André et al., 2009; Barth & Landsman, 2010; Bengtsson, 2011; Kusano & Sanada, 2019). Our analysis of the CLs reveals that underlying the debate about day-one losses is the question of whether it is appropriate for standard setters to target loss allowance adequacy intentionally. While the constituents overall welcomed the general shift towards an ECL-based impairment methodology as a reasonable response to the financial crisis, a variety of constituents could not align day-one losses with the mission of standard setting as they allegedly "shape" preparers' and investors' decision making by incorporating a "quasi-capital reserve methodology" (CL 51, 2013, p. 4) into financial reporting. Against this background, constituents cautioned against unwarranted prudential motives encroaching on the IASB's decision making and critically discussed the stance and influence of the FASB during the Boards' convergence endeavours. In this light, our study yield insight into how concerned constituents were about the IASB's mission and independence in the post-crisis environment. To the best of our knowledge, this is the first CL-based study to deal with constituents' views about the accepted remit of standard setting.

The paper proceeds as follows. Section 2 introduces the relevant institutional background. Section 3 presents the methodology and data. Section 4 provides a structured overview of the CLs' positions on day-one losses. The paper concludes in section 5 with a

discussion of the main findings and suggests avenues for further research.

4.2 Institutional background

In the aftermath of the global financial turmoil in the late 2000s, the IASB operated in a "highly politicized" environment (Pucci, 2017, p. 22). Under the impact of the financial crisis, political as well as regulatory bodies urged the IASB to revisit its standards as some requirements had been harshly criticised for having aggravated the economic downturn (Council of the European Union, 2009; FSF, 2009, pp. 20–21; Hoogervorst, 2011; Tweedie, 2008). Among the most criticised features of IFRS were the impairment requirements for financial instruments (Barth & Landsman, 2010) as the incurred loss methodology of IAS 39 was frequently deemed to achieve "too little, too late" (Hoogervorst, 2014, p. 3).

The overarching aim of redrafting the impairment requirements was therefore to overcome the perceived delay in the recognition of credit losses under IAS 39 (IASB, 2014a, p. 1), which restricted the booking of impairment losses to those already incurred on the reporting date (IAS 39.59). With strong support from the political and regulatory sphere (Council of the European Union, 2009, p. 11; Department of the Treasury, 2009, p. 87; FSF, 2009, pp. 20–21; G20, 2009, pp. 5–6), the IASB decided to adopt an impairment methodology based on ECLs. In particular, the ECL model was said to enhance the decision usefulness of accounting information for investors (e.g. IASB, 2013b, BC186–191, 2014c, BC5.83) by providing more forward-looking and hence more relevant information about changes in the quality of financial assets, including credit risks (IASB, 2009c, par. 33).

As the IASB and FASB noticed "the importance of working cooperatively and in an internationally coordinated manner to consider accounting issues emerging from the crisis" (IASB & FASB, 2008), the IASB's redrafting of the impairment requirements was temporarily conducted as a joint project with the FASB. Even though convergence was ultimately not achieved, the joint endeavours strongly influenced the IASB's design of the impairment

methodology in IFRS 9, in particular with respect to the incorporation of day-one losses (see in detail Hashim et al., 2016, 2019). Figure 1 provides an overview of the IFRS 9 due process on the impairment requirements for financial instruments, which also considers the FASB's proposals.

Insert Figure 1 around here

The IASB's first Exposure Draft (ED) of 2009 presented the expected cash flow (ECF) approach, which proposed gradual recognition of the initial ECLs over the lifetime of a financial asset via a credit-adjusted effective interest rate (IASB, 2009a, 2009b). The basic assumption of the ECF model was that "financial assets are priced so that the interest rate being charged compensates for the initial estimate of future expected credit losses" (IASB & FASB, 2011a, BC70). As initial ECLs would have been accumulated proportionally over time by reducing the interest revenues for the expected losses, the ECF model intended to ensure that the carrying amount of financial assets measured at amortised cost "would always equal the cash flows expected from the asset over its expected life […], discounted at the original effective interest rate" (IASB & FASB, 2011a, BC15).

The ECF model explicitly *rejected* the recognition of day-one losses at the inception of a financial instrument (Hashim et al., 2019, pp. 698–700; IASB, 2009a, BC25, 2009c, par. 32), which the IASB regarded as being "inconsistent with rational lending decisions" (IASB, 2009c, par. 32). In the view of the IASB, the recognition of day-one losses would have distorted the link between the pricing and the expected losses of financial assets (IASB & FASB, 2011a, B32, BC70, IN5) because "the pricing includes a component that compensates the lender for expected losses" (IASB, 2009c, par. 26) if the financial instrument was adequately priced at origination (IASB, 2009c, pars. 26, 32). In this vein, the IASB, for instance, noted that

> […] recognising a loss on initial recognition of the financial asset for financial reporting purposes even though there is no economic loss

> from the asset in question *would result in unfaithfully representing the underlying economic phenomenon*. (IASB, 2009a, BC24, emphasis added)

Aiming for convergence, however, the IASB found itself confronted with the position of the FASB. Attaching far greater importance to the adequacy of loan loss allowances on the balance sheet, the FASB's first ED of 2010 proposed the *immediate* recognition of all ECLs that are predictable over an asset's lifetime (measured as contractual cash flows not expected to be collected), regardless of the probability of their occurrence (FASB, 2010, par. 51, BC173; IASB & FASB, 2011a, BC19, IN6–7). The FASB was adamant about the feature of recognising day-one losses (Hashim et al., 2019, pp. 701–704), which it considered to ensure sufficient reserves "when they are most needed at the beginning of a downward-trending economic cycle" (IASB & FASB, 2011a, IN6).

Jointly, the IASB and FASB proposed the "good-book/bad-book" (GB/BB) approach (IASB & FASB, 2011a), which envisioned a two-tier loss allowance based on the uncertainty about the (future) collectability of an asset's cash flows (IASB & FASB, 2011a, pars. B2–B3). By acknowledging "the importance of reaching a common solution" (IASB & FASB, 2011a, IN13), the standard setters crafted the compromise that the recognition of day-one losses should be incorporated into the "good book" – albeit to a limited extent, measured as the higher of the time-proportional ECLs for an asset's remaining life and the losses expected to occur (at least) within the next 12 months (the "floor concept") (IASB & FASB, 2011a, par. 2(a), BC62–63). For financial assets with increased credit risk, when belonging to the "bad book", an entity should recognise the entire lifetime amount of ECLs (IASB & FASB, 2011a, par. 2(b)).

Scrutinising at length the diverging starting points underlying their initial proposals in the EDs of 2009 and 2010 (IASB & FASB, 2011a, BC14–BC24, IN4–7), the IASB and FASB stated that the common proposal partly satisfied the main objectives of both standard setters:

while the floor concept (resulting in day-one losses) would ensure the loss allowance adequacy targeted by the FASB, the time-proportional accumulation of allowances corresponded to the IASB's aim to reflect faithfully the interrelationship between the ECLs and the pricing of financial assets (IASB & FASB, 2011a, IN5–6, 12). Consequently, the controversial feature of day-one losses found its way into the IASB impairment approach at the instigation of the FASB (Hashim et al., 2019, p. 710; IASB, 2012b, minute 18; IASB & FASB, 2011a, BC32).

In the subsequent deliberations, the standard setters further elaborated the so-called three-bucket approach, which also included the staged recognition of ECLs from initial recognition by categorising financial assets according to their deterioration in credit quality (IASB & FASB, 2011b, par. 7). Finally, however, the joint project was discontinued as the FASB rejected any form of "two-measurement approach" that would not require the immediate recognition of allowances sufficient to cover the *lifetime* ECLs from the inception of a financial asset (FASB, 2012, BC11–22). The FASB's return to the lifetime approach can partially be explained by the fact that prescribing a 12-month-based day-one loss allowance might actually have decreased the level of loss allowances built up by US banks compared with the amount of loss allowances that was provided under the then-existent impairment requirements applicable in the US (Hashim et al., 2019, pp. 703–704).[5] In this regard, Pucci and Skærbæk (2020, p. 11) asserted that anything smaller than the immediate recognition of lifetime ECLs was simply "politically unacceptable" in the US.

In contrast to the IASB, the FASB did not problematise conceptual flaws in the recognition of day-one losses (Hashim et al., 2019, pp. 709–710).[6] It stipulated that the immediate recognition of lifetime ECLs would provide users of financial statements with more

[5] Furthermore, a shorter average time-horizon for lending in the US (compared to European banks) might have driven the FASB's preference for the immediate recognition of lifetime ECLs (Pucci & Skærbæk, 2020, p. 10).
[6] An exception is provided by a dissenting opinion on the final US impairment standard of two FASB members, who criticised day-one losses for basically the same conceptual shortfalls as the IASB (FASB, 2016, pp. 235–240).

useful information (FASB, 2015, p. 2) by faithfully reflecting the entity's exposure to credit risk (FASB, 2013, pp. 3–4). Proclaiming that anything smaller than the initial recognition of lifetime ECLs would still delay the loss recognition and thus would repeat the weaknesses of the incurred loss model identified during the financial crisis (FASB, 2013, p. 13), the FASB regarded it as being of the upmost importance to require entities to provide for the "management's *full* estimate" (FASB, 2013, p. 4) of all credit losses that can be "reasonably expected" in a portfolio of financial assets, even when the ECLs are not yet specifically identifiable (FASB, 2013, p. 3). The recognition of only an "arbitrary" portion of credit losses at the inception of a financial asset (such as the commonly proposed floor solution of the SD 2011) would not provide the transparency desired by investors (FASB, 2013, p. 4). As a consequence, the FASB sided with the Current Expected Credit Loss (CECL) impairment model, which prescribes the immediate recognition of lifetime ECLs on the initial reporting date, irrespective of any trigger event (FASB, 2016).

The IASB, in turn, decided to refine the three-bucket model, apparently because it did not want to delay the standard-setting process by returning to alternative ECL approaches (Hashim et al., 2019, p. 705). In an ED of 2013, as well as in the final IFRS 9 of 2014, the IASB developed a dual measurement impairment approach that classifies financial assets into three stages depending on the respective deterioration of their credit quality since their initial recognition (IASB, 2013b, 2014b). While, for financial instruments belonging to Stage 1, the 12-month ECL is booked via a day-one loss allowance, a subsequent transfer into Stages 2 and 3 entails the recognition of lifetime ECLs (IASB, 2014b, pars. 5.5.1–5.5.5, 2014d, p. 16).

The incorporation of day-one losses, however, continued to form a focal point of discussions during the IASB's deliberations, mainly due to its conceptual shortfalls. An Alternative View on the ED 2013, presented by the IASB member Stephen Cooper, is indicative of the main conceptual concerns discussed by the IASB with respect to day-one

losses:

> […] the loss allowance at an amount equal to 12-month expected credit losses is *contradictory* to the IASB's own *Conceptual Framework*, given that the result is *not neutral and it fails to faithfully represent the transaction*. In no other area of financial reporting is an allowance immediately established to reduce the value of an asset that is purchased or originated on market terms. (IASB, 2013b, AV2, emphasis added)

> […] the loss allowance at an amount equal to 12-month expected credit losses results in unjustifiable double-counting because the effect of credit risk at the initial recognition is already reflected in the carrying value of the financial asset. (IASB, 2013b, AV3)

Despite the lack of "conceptual justification" (IASB, 2013b, BC61), the IASB finally considered the staged approach building on day-one losses to provide an adequate approximation for the conceptually sound but operationally overly complex ECF approach of the ED 2009 (IASB, 2013b, BC61, BC190). The IASB described this decision as "a consequence" of the Boards' attempt to "balance the benefits of faithful representation with the costs of application" (IASB, 2013c, par. 7). In particular, the IASB stressed that the staged approach to IFRS 9, including day-one losses, would make the *deterioration process* in credit quality more transparent for the users of financial reporting as "an investor will receive information about expected credit losses that distinguishes between loss expectations at origination or purchase and changes from those original loss expectations" (Finnegan, 2013). Furthermore, the IASB particularly highlighted that it limited the extent of recognised day-one losses, in contrast to the FASB (IASB, 2013b, BC190). Tellingly, IASB Chairman Hans Hoogervorst pointed out in an IASB meeting in December 2012 that:

> […] I do recollect that the whole board had a severe hiccup about this 12-month day-one loss. […] We didn't like it because it is conceptually flawed, […] and it was not very simple to come up with a simple and better solution for this issue […]. There are conceptual issues. Fortunately, quantitatively our conceptual flaw is a lot smaller than the current FASB […] proposal. (IASB, 2012b, minutes 18–19)

Overall, we can observe that the IASB was initially reluctant to include day-one losses

but finally sided with their incorporation over the course of the IFRS 9 drafting process, first due to convergence endeavours with the FASB and later as a pragmatic operational simplification of the 2009 ECF model. Thereby, the IASB repeatedly argued that, in its own proposals, day-one losses were limited to the time horizon of twelve months, compared with the FASB's approach, which prescribes the recognition of lifetime ECLs from the inception of a financial instrument. Given that introducing a "smaller" conceptual flaw does not overcome the fundamental conceptual shortfalls of day-one losses, the following sections analyse how the decisions of the IASB were commented on and evaluated by its constituents.

4.3 Research method and data

This study provides a detailed analysis of the CLs that the IASB received during the due process of the impairment requirements of IFRS 9, lasting from 2008 to 2014. The official documents published by the IASB include an IASB Discussion Paper (DP) in 2008, an IASB ED in 2009, a joint Supplement Document (SD) of the IASB and FASB in 2011, an IASB ED in 2013, the final standard, and the accompanying Basis for Conclusions. We analysed all the CLs received in response to these documents, in total 750 CLs (DP 2008: 162 CLs; ED 2009: 192 CLs; SD 2011: 212 CLs; ED 2013: 184 CLs).[7] In addition, we took into account all the related staff papers and audio records of Board meetings available from the IASB online archive.

The CLs were analysed in a systematic manner to scrutinise the reasoning for and against day-one losses expressed by the constituents. In line with previous research (e.g., Chatham et al., 2010; Giner & Arce, 2012; Jorissen et al., 2012), we classified respondents according to their professional background, clustering them into groups of academic institutions, auditing and accounting professionals, the financial sector (banks and others),

[7] We analysed the responses to the DP 2008 to gain a comprehensive understanding. As the IASB did not propose a specific impairment methodology in the DP, we excluded it from the numerical overviews for reasons of consistency.

(non-financial) preparers, national standard setters, regulators and authorities, users, and others to identify specific patterns in their reasoning.

First, the CLs submitted in response to the ED 2009, joint SD 2011, and ED 2013 were coded with respect to their position towards the switch to an ECL-based methodology in general. Overall, we distinguished between the categories "support", "rejection", and "non-classifiable". Second, the CLs received in response to the SD 2011 and the ED 2013[8] were categorised with respect to their position held on day-one losses along the dimensions of "support", "acceptance with concerns", "rejection", and "not classifiable". This allowed us to provide a nuanced depiction of the views expressed in the CLs. The category "acceptance with concerns" indicates that the CL has raised concerns regarding day-one losses but nevertheless accepted their incorporation. On this basis, we inductively clustered the main arguments in favour of and against day-one losses that were employed in the CLs.

4.4 Reflections on day-one losses during the drafting of IFRS 9

4.4.1 Overview of constituents' positions

The redrafting of the impairment requirements evoked high resonance in the IASB's constituency. Providing an overview of the professional background of the commenting constituents, Table 1 reveals that the largest proportion of respondents came from the financial sector – 45% of all CLs received – which underlines the high significance of IFRS 9 for the banking and insurance industry.

Insert Table 1 around here

Overall, the constituents strongly welcomed the *general* decision to adopt an ECL model (Table 2) by agreeing with the IASB that an ECL methodology would provide investors with better information on credit risks (CL 5, 2013, pp. 3–4; CL 81, 2013, p. 1). In particular,

[8] To ensure a consistent analysis, we limited our examination to those IASB proposals that incorporated day-one losses, that is, the joint SD of 2011 and the ED of 2013.

the adoption of a more forward-looking impairment approach was welcomed as a reasonable response to the experiences of the financial crisis (CL 170, 2011, pp. 1–2; CL 91, 2013, p. 1; CL 174, 2013, p. 1).

Insert Table 2 around here

Summarising our findings with respect to day-one losses, Table 3 shows that the constituents intensively debated their incorporation: in 2013, around 93% of the CLs expressed a position on day-one losses, supporting them, rejecting them, or accepting them with concerns. Overall, we observe that supporters of day-one losses represented the minority, while the vast majority of CLs adopted more critical positions. Comparing the CLs received in response to the SD 2011 and the ED 2013, Table 3 reveals that the proportion of constituents who (unconditionally) supported the recognition of day-one losses under IFRS 9 remained rather stable (28% in 2011 and 21% in 2013).[9] Likewise, the proportion of constituents explicitly rejecting day-one losses only decreased slightly from 37% of the CLs in 2011 to 31% in 2013. Remarkably, however, the number of constituents who accepted day-one losses but simultaneously expressed considerable concerns about their adequacy increased significantly from 10% in 2011 to 41% in 2013. This reflects the compromising character of the consensus reached about incorporating day-one losses as seemingly a substantial portion of constituents who ultimately accepted the inclusion of day-one losses in 2013 were still not (fully) convinced of their adequacy.

Insert Table 3 around here

To deepen our understanding of the rationales underlying the debate, we inductively clustered the main arguments used by constituents when substantiating their view on day-one losses. Table 4 presents our findings by distinguishing between arguments employed by

[9] Beyond *active* supporters (explicitly referring to day-one losses), we also classified CLs as supportive of day-one losses if they basically agreed with the immediate recognition of lifetime ECLs (CECL model), the floor (SD 2011), or the 12-month allowance (ED 2013) and did not raise any explicit concerns about day-one losses.

constituents who supported day-one losses, rejected them, or accepted them with concerns. For the category "acceptance with concerns", Table 4 only explicitly lists the arguments used by constituents to agree with the incorporation of day-one losses. The concerns raised by these constituents can be found in the "rejection" category.

Insert Table 4 around here

In the following, we illustrate the main arguments that constituents raised in favour of and against day-one losses in more detail.[10]

4.4.2 Support for day-one losses

Constituents advocating the inclusion of day-one losses either favoured the FASB's position to recognise lifetime ECLs at the inception of a financial instrument or argued in favour of the proposals of the SD 2011 and ED 2013, which foresaw the recognition of day-one losses limited to a shorter time horizon as part of the floor (SD 2011) or in Stage 1 (ED 2013).

Following the FASB's motif of ensuring loss allowance adequacy (e.g., CL 173, 2013, p. 1; CL 182, 2013, p. 2), supporting constituents explicitly welcomed the requirement for entities to build "appropriate" (CL 192, 2011, p. 3) and "sufficient" (CL 170, 2011, p. 5) allowances for ECLs from the inception of the financial instrument, in particular for financial assets with "early loss patterns" (CL 12, 2011, p. 9). In the spirit of "better safe than sorry" (CL 140, 2011, p. 3), these constituents, for instance, stipulated that "it is generally 'silly' to assume that no defaults will happen" (CL 1, 2011, p. 4). In this vein, the timely build-up of provisions to absorb ECLs from day one was considered as a sound approach to overcome the too-little-too-late concerns raised with respect to IAS 39 during the financial crisis (CL 6, 2011, pp. 4–5, 11–12; CL 12, 2011, p. 3, CL 170, 2011, pp. 2, 9). For example, it was noted

[10] Note that, for illustrative purposes, we occasionally supplement the results of our CL analysis with additional quotes/sources collected as part of our broader research on discussions about day-one losses.

that:

> […] the model should ensure appropriate building of allowances prior to significant credit deterioration, including losses that were reasonably expected at initial recognition […], in order to mitigate the "cliff effect". (CL 40, 2013, p. 4)

The earlier and forward-looking recognition of ECLs at the instrument's inception was particularly welcomed to align with the "regulators' prudential objectives of safety and soundness" (CL 192, 2011, p. 1) as the built-up allowances increase banks' resilience to future financial turmoil (CL 30, 2011, pp. 7–8):

> For financial institutions, the main focus following the 2008 financial crisis has been on balance sheet health, capital strength and overall solvency. As such, constituents continue to place great emphasis on the overall adequacy of cumulative provisions […]. (CL 173, 2013, p. 1)

In addition, day-one losses were advocated for conceptual reasons. On the one hand, constituents argued that, on a portfolio basis, ECLs can also be expected at initial recognition (CL 52, 2013, p. 5), which makes it necessary to recognise them immediately, "in line with the principle of prudence" (CL 82, 2011, p. 4):

> Financial institutions manage credit losses of the portfolio of financial instruments. It is very natural to expect a certain amount of credit losses within one year for the portfolio of young vintage, even if the credit risks of the individual financial instruments are reflected in the initial effective interest rate. If so, we believe the economic fundamentals are best represented by recognizing the certain amount of expected credit losses at initial recognition. (CL 172, 2013, p. 2)

Furthermore, constituents stated that, in light of the high subjectivity occasionally involved in measuring fair values, "it would not be unreasonable to expect that initial expectations of credit losses may not have been accurately priced into financial assets at origination/purchase", which "would warrant the recognition of certain amount of economic losses on day-one as a valuation adjustment" (CL 182, 2013, p. 2).

On the other hand, constituents supported day-one losses on the basis that "most

investors would prefer to know about expected losses earlier than later" (CL 124, 2013, p. 4) and argued that the tool of day-one losses helps to provide investors with decision-useful information about the deterioration of credit quality (CL 52, 2013, p. 5; CL 110, 2013, p. 2). In this regard, day-one-loss-based approaches were promoted as providing a *convincing*[11] conceptual approximation of the original IASB ED of 2009 (CL 127, 2013, p. 5), which was harshly criticised for its inherent complexity, leading to huge operational challenges and cost-intensive implementation (CL 88, 2009, p. 1; CL 93, 2009, p. 2):

> Recognition of loss allowances on the basis of 12-month PD in Stage 1 is both acceptable and operationally feasible. It constitutes a significant operationalization improvement in comparison to the 2009 ED while maintaining its philosophical gist. (CL 74, 2013, p. 5)

> We conceptually support the approach to recognize the allowance for credit losses proposed in the exposure draft and it is a reasonable proxy between the pricing of financial instruments and the credit quality at initial recognition. (CL 49, 2013, p. 2)

In particular, the banking sector welcomed the day-one-loss-based approach due to its conceptual proximity to the Basel III capital requirements, which also stipulate the recognition of the 12-month expected losses at the inception of a financial instrument (Novotny-Farkas, 2016). Thus, constituents appreciated this alignment for leading to cost reductions in the implementation of the approach (CL 49, 2013, p. 4; CL 98, 2013, p. 3).

4.4.3 Criticism of day-one losses

Since their initial introduction in the joint SD 2011, day-one losses have evoked harsh criticism among the IASB's constituency. In the following, we structure the main arguments against day-one losses along the dimensions of conceptual criticism, unwarranted effects on preparers and investors, regulatory and political influences, and pro-cyclicality. This criticism was expressed with respect to day-one losses as part of the FASB's lifetime approach and the

[11] In contrast to constituents who accepted day-one losses with concerns, supporters of day-one losses drew on the approximation argument *without expressing any reservation*.

floor (SD 2011) as well as Stage 1 (ED 2013) and was raised both by constituents who rejected the recognition of day-one losses and by respondents who finally accepted day-one losses with concerns.

4.4.3.1 Conceptual criticism

In line with the initial ED 2009 of the IASB, constituents heavily criticised the incorporation of day-one losses into IFRS 9 for lacking a sound theoretical foundation. As constituents perceived day-one losses to conflict with the standard setters' theoretical core principles set out in their Conceptual Framework[12] (CL 19, 2011, p. 2; CL 39, 2011, p. 2), they did not regard them as providing decision-useful information (CL 4, 2011, p. 4; CL 20, 2011, p. 3; CL 89, 2011, p. 5).

Most harshly, constituents objected to the fact that the immediate recognition of an allowance results in double counting of ECLs, which writes down the asset to a value below fair value as the initial ECL carrying amount of the financial asset already comprises credit risk effects (CL 89, 2011, pp. 2, 5; CL 28, 2013, p. 9; CL 133, 2013, p. 3). On this basis, it was argued that "the recognition of a day-one credit loss […] is not consistent with the economics of the lending activity (at market rate)" (CL 22, 2011, p. 2; see also CL 142, 2011, p. 2). In the US context, a representative from the US House Committee on Financial Services reached the heart of the matter when noting:

> They are going to turn to banks and say the day you make a loan that you think is a good loan, you have lost money. That is crazy. If it were true you wouldn't make the loan. (Sherman, cited in Committee on Financial Services, 2018, p. 3)

In this light, constituents deemed day-one losses to violate the qualitative characteristic of faithful representation (CL 42, 2011, p. 6; CL 8, 2013, pp. 3–4; CL 32, 2013, p. 1) with

[12] In the development of IFRS 9, the Conceptual Framework of 2010, which was drafted jointly by the IASB and FASB, served as the theoretical basis for standard setting.

respect to "the effect of the asset on the reporting entity's operating results" (CL 125, 2013, p. 2). The concerns are, for instance, documented in the following quote:

> We believe that recognising a portion of expected credit losses at initial recognition does not reflect the economic link between the pricing of a financial instrument and the credit quality at initial recognition when the financial instrument is priced at market terms because it ignores the pricing mechanism of the transaction and potentially leads to double counting of such losses. (CL 19c, 2013, p. 1)

Furthermore, constituents critically assessed day-one losses because anticipating credit losses at origination but associated credit-premium-inclusive interest later understates the revenue during the first period while overstating it during later periods (CL 4, 2011, p. 4; CL 25, 2011, p. 3; see also IASB, 2010c, par. 20). Along this line, day-one losses were criticised for discarding the matching principle between interest revenue and ECLs (CL 27, 2011, p. 2; CL 74, 2011, p. 3). Moreover, respondents criticised day-one losses as being "overly conservative rather than neutral" (CL 45a, 2013, p. 3) and argued that they "do not see any reason to violate the concept of neutrality of initial recognition" (CL 28, 2013, p. 10).[13]

Finally, constituents regarded day-one losses as a conceptual anomaly in the IASB's overall loss recognition logic, which builds on a "sharp distinction between past and future events" (CL 39, 2011, p. 5). As the anticipation of day-one losses does not require a past event, constituents were concerned that the recognition of day-one losses for financial assets causes inconsistency with the impairment methodology of non-financial assets according to IAS 2, IAS 16, or IAS 36 (CL 12, 2013, p. 1).[14] Likewise, constituents criticised day-one losses for

[13] Note that the joint Conceptual Framework of 2010 officially rejected prudence to form a desirable characteristic of financial reporting and emphasised the merits of neutrality for accounting information to be useful (IASB, 2010a, QC12, QC14, BC3.27–29).

[14] Building on the dichotomy of ex-ante and ex-post conservatism (Mora & Walker, 2015), the feature of day-one losses can be conceptually assigned to ex-ante conservatism because the recognition of ECLs from the outset unconditionally understates the economic value of financial assets irrespective of any triggering event (Giner & Mora, 2019, p. 739; Hashim et al., 2019, p. 709), while non-financial asset impairment basically follows ex post conservatism (Barker & McGeachin, 2015, p. 194). The incurred loss model of IAS 39 was (more) consistent in this regard with the impairment requirements for non-financial assets as it was similarly based on a threshold for recognising impairment, that is, objective evidence of a loss event and thus also represented ex-post conservatism (Barker & McGeachin, 2015; Mora & Walker, 2015).

diverging from the provisioning according to IAS 37, which requires a past loss event as well as a probability criterion to be fulfilled before recognising any expected loss in scope (IAS 37.14–15) (CL 5, 2011, p. 3; CL 39, 2011, pp. 4–7). Consequently, the required verifiability and the timing of loss recognition differ depending on the underlying type of asset/transaction, leading constituents to wonder "what is so different about loans and securities that is causing inconsistency in accounting treatment with other assets on the balance sheet" (CL 12, 2013, p. 1).

4.4.3.2 Unwarranted effects on market participants

Beyond conceptual criticism, constituents raised concerns that the incorporation of day-one losses might entail significant negative "impacts on the wider economy" (CL 123, 2013, p. 4) by inappropriately affecting investors' and preparers' decision making. Due to the larger amount of recognised day-one losses, constituents criticised the "lifetime" approach of the FASB most harshly (e.g., CL 4b, 2013, p. 10; CL 10, 2013, p. 2; CL 112, 2013, pp. 6–7; CL 115, 2013, p. 4; CL 131, 2013, p. 4; see also IASB, 2012a, par. 18) but also tackled the limited recognition of day-one losses, as included in the SD 2011 and ED 2013 (CL 177, 2011, p. 9; CL 16, 2013, p. 2; CL 123, 2013, p. 4).

Emphasising that day-one losses fail to provide decision-useful information (CL 25, 2011, p. 3; CL 33, 2011, pp. 7–8; CL 39, 2011, pp. 2, 7; CL 88, 2011, p. 2), respondents warned that day-one-loss-based financial reporting could easily "confuse or even mislead" (CL 39, 2011, p. 2) market participants, which might entail "serious negative consequences" (CL 157, 2011, p. 19) with respect to investment efficiency. Stressing that "financial reporting should tell it like it is" (CL 39, 2011, p. 3), concerns were raised that a "disguised form of capital held in the allowance account, rather than in the capital accounts" (CL 157, 2011, p. 19) could harm the function of "financial reporting […] as a means for communicating with

[…] investors" (CL 41, 2011, p. 1).

In particular, a variety of constituents considered it as "counterintuitive" for investors that growth in or the acquisition of (healthy) loan portfolios results in rising loss allowances and thus would "generate negative returns" (CL 42, 2011, p. 6; see also CL 26, 2011, p. 1). In this vein, constituents, for instance, were afraid that "day-one losses may even be seen by shareholders as a sign of poor management" (CL 153, 2013, p. 5). Furthermore, constituents worried that the immediate upfront recognition of ECLs could induce "a high degree of P&L volatility, which is not justified by the underlying rationale of loan transactions" (CL 33, 2011, pp. 7–8, see also CL 20, 2011, p. 1; CL 26, 2011, p. 1).

Constituents were further troubled that the mandatory recognition of day-one losses would unduly affect preparers' decision making. In particular, in the context of financial institutions, respondents raised concerns that day-one losses might unduly affect banks' lending behaviour due to their interaction with banks' capital requirements (CL 12, 2013, p. 3). As the recognised day-one ECLs directly depress the banks' P&L and thus the regulatory common equity tier 1 (CET1) (CL 33, 2011, p. 2; CL 4b, 2013, p. 10),[15] it was criticised that day-one losses would lead "to a reduction in equity even if business activities do not change" (CL 20, 2011, p. 1; see also CL 73, 2011, p. 4), which "penalises loan granting" (CL 33, 2011, p. 7; see also CL 4b, 2013, p. 13). In this vein, respondents outlined that "the timing of credit loss recognition should not, in theory, affect the economic decision to originate a loan" (CL 10, 2013, p. 2) and urged the IASB to "avoid negative economic effects on lending activity which result purely from the accounting model adopted" (CL 123, 2013, p. 4).[16]

Cautioning that day-one losses might "distort the profitability of the lending activities" (CL 174, 2011, p. 6), constituents feared that the "artificial day-one impact […] on annual

[15] For an in-depth analysis of the interaction of IFRS 9 and prudential capital requirements, see Novotny-Farkas (2016).
[16] Similar concerns were raised with respect to the insurance industry (CL 68, 2013, p. 4).

results of the lender" (CL 25, 2013, p. 3) fosters "business selection" as lenders are likely to consider the "day one loss issue as part of their future lending criteria" (CL 138, 2013, p. 14). In particular, constituents were concerned that the introduction of day-one losses could create disincentives for the long-term and higher-risk lending of banks, which includes "lending to the SME sector" (CL 123, 2013, p. 4) or "retail customers with a higher risk profile and who have no access to financial markets" (CL 153, 2013, p. 5) and thus might "impair the financial institutions' capacity to finance the real economy" (CL 153, 2013, p. 5). Moreover, they warned that the recognition of day-one losses is likely to discourage financial institutions from entering new markets or growing their business (CL 25, 2013, p. 3; CL 177, 2011, p. 9).[17]

Non-bank respondents, in turn, stressed that the requirements of IFRS 9 are applied by all IFRS preparers and not only by financial institutions, for which the recognition of day-one losses is already implemented as part of the fulfilment of the Basel requirements (e.g., CL 37, 2011, p. 1; CL 38, 2013, p. 8; CL 125, 2013, p. 2). Against this background, constituents were concerned that the staged model of IFRS 9 would not be operational and would be difficult to implement (CL 17, 2013, p. 2) for "industrial and commercial entities" as the "overwhelming majority of IFRS issuers" (CL 24, 2011, p. 1; see also CL 29, 2011, p. 2; CL 32, 2011, p. 1).

4.4.3.3 Regulatory and political influences after the financial crisis

Based on the criticism described above, constituents rejected day-one losses as an unduly conservative accounting requirement that de facto creates a *capital lock-up* by intentionally building up "capital buffers for prudential purposes" (CL 138, 2013, p. 7; see also CL 41, 2011, pp. 1–2; CL 68, 2011, p. 2) in the balance sheets of reporting entities. In their commentary on the GB/BB approach, many constituents highlighted that "sufficient reserving as prioritized through the floor for the 'good book' [and thus by day-one losses] […]

[17] Shortened lending horizons and higher pricing of higher-risk assets and very long-term financing were also mentioned by banks, participating in a field test study on IFRS 9 conducted by EFRAG, as potentially arising negative consequences (EFRAG, 2015, p. 5).

is a prudential responsibility enforced by regulators and financial reporting should not incorporate this as a primary concern" (IASB, 2011, par. 38). Thus, constituents questioned whether the aim to ensure loss allowance adequacy (originally introduced by the FASB) is appropriate in the accounting context. For example, the following points were noted:

> We are also concerned about the objective of the current proposal to increase recognized losses, presumably to mitigate a financial crisis such as the one we recently experienced. The stated goal of increasing recognized losses is not an accounting principle and does not provide a basis for a financial reporting model, as such, there is no conceptual basis for constructing a financial reporting model intended to serve this objective. (CL 28, 2011, p. 2)

> […] we sense that a regulatory agenda underlies some of the current thinking on impairments of financial assets, an agenda that has larger reserves as its goal. This agenda may be appropriate from a public policy perspective, but it is not a good development for financial reporting. (CL 39, 2011, p. 3)

> Prudential buffers and floors designed to prevent banks from becoming insolvent is a task for the regulators and not for the IASB. We hope that the Board continues to issue high quality accounting standards based on the objectives as described in the Framework and leave the prudential aspects of the banking industry to the relevant regulators. (CL 25, 2011, pp. 3–4).

To substantiate their view that the objectives of prudential regulators and standard setters differ, these constituents referred to the potential effects on preparers' lending behaviour (as depicted in the previous section), which they could not align with the standard setters' mission (e.g., CL 4b, 2013, p. 10; CL 125, 2013, p. 2; CL 173, 2011, pp. 9–10). In particular, outside the banking context, the day-one loss allowance was harshly criticised for establishing a "quasi-capital reserve methodology" […] in a "fundamental accounting model that applies to *all entities*", which "comingles the concepts of income and performance measurement with capital adequacy" (CL 51, 2013, p. 4). In this regard, it was noted that the financial assets typically held by non-bank institutions did not cause the financial crisis (IASB,

2010b, par. 18).

Furthermore, constituents were concerned that the IASB aims to "address an issue that was not created by inadequate accounting and reporting standards but rather by weaknesses in corporate governance and risky business endeavors" (CL 137, 2011, p. 1). They emphasised that financial reporting should not (and cannot) create a remedy for what has been undertaken with it by market participants (CL 137, 2011, p. 1) and urged the Board "in this post-crisis scramble not to overreact" (CL 159, 2011, p. 2) by prescribing "too much too soon" (CL 34, 2011, p. 3).

Along these lines, constituents critically discussed the lobbying influences of the regulatory and political sphere exercised on the IASB after the financial crisis (CL 20, 2011, p. 3; CL 171, 2011, pp. 9–10; CL 125, 2013, p. 2). Fearing that "accounting for the impairment of financial assets […] is politically charged", constituents worried about the "independence and integrity of the accounting standards setting process" (CL 39, 2011, p. 2). Similar concerns have been already raised in the context of the ED 2009, in which it was, for instance, emphasised that:

> […] financial reporting should not be used as a tool to achieve financial stability and that the aim of the IASB […] should not be compromised by allowing *political aims* to influence the standards. (CL 19, 2009, p. 1, emphasis added)

In light of the "political pressure being placed on both Boards" to achieve convergence (CL 45, 2011, p. 1), likewise, the influence of the FASB on the IASB's standard setting during the joint deliberations was assessed critically by the constituents (CL 40, 2011, p. 1; CL 97, 2011, p. 9; CL 171, 2011, p. 9). Even though the IASB's proposals mitigated the day-one effect in comparison with the CECL model, constituents complained that they would have "favoured the quality of accounting standards to convergence objective" (CL 117, 2011, p. 2) and insisted that "the resulting model should be of a high quality and not distorted by conflicting concepts due to political pressure" (CL 194, 2011, p. 3; see also CL 177, 2011, p.

2). Various constituents felt that the FASB's (historically grown) proximity to the regulatory sphere (IASB, 2014c, BC5.116(b)) places undue prudential emphasis on financial stability in accounting after the financial crisis (IASB, 2012a, par. 17), which indirectly also encroaches on the IASB's decision making when incorporating day-one losses, as, for instance, demonstrated by the following quotes:

> [..] this method of floor is conceptually unjustified and doesn't answer to the objectives of the IASB because the immediate recognition of a loss (day-one-loss) doesn't respect the principle of a coherent recognition between the credit risk premium and the expected losses. […] Therefore, we don't agree with an inconsistent approach just for the convergence between both Boards. On the contrary, we believe that convergence should move to a higher quality standard. (CL 84, 2011, p. 2)

> We fully support the Boards in making pragmatic decisions when the result is an improvement in financial reporting. But those […] pragmatic decisions should not take us backwards. In our view, the joint proposal does just that. It is a compromise that brings the Boards together and perhaps appeases certain prudential regulators but in the process steps back to a time when providing reserves to cover foreseeable or expected rainy days was generally accepted. (CL 39, 2011, p. 2)

4.4.3.4. Pro-cyclicality

Referring to the criticism of the pro-cyclicality caused by IAS 39 after the financial crisis, some constituents cautioned that the recognition of day-one losses could exert even more pro-cyclical effects on the economy than the incurred loss model if the economic conditions deteriorate (CL 68, 2011, p. 3; CL 16, 2013, p. 2). Recalling that day-one losses might significantly reduce banks' regulatory capital, constituents worried that preparers could restrict their investment and lending behaviour when economic conditions worsen and thereby exaggerate economic downturns (CL 12, 2013, p. 3). In terms of day-one losses, this concern was particularly relevant to the FASB's approach, which aims to provide for lifetime ECLs immediately (CL 26, 2011, p. 2; CL 89, 2011, p. 9; CL 12, 2013, p. 3), but was also raised by

constituents with respect to recognised day-one losses limited to a shorter period (CL 33, 2011, p. 2; CL 123, 2013, p. 4).

4.4.4 Acceptance of day-one losses with concerns

Our CL analysis reveals that, from 2011 to 2013, the group of constituents that accepted day-one losses while raising substantial concerns about their appropriateness grew significantly from 10% in 2011 to 41% in 2013. These constituents did not actively support the incorporation of day-one losses. Instead, they expressed considerable criticism of day-one-losses (referring to all the categories of criticism described in Section 4.3) but overall ultimately accepted their incorporation, limited to a time horizon shorter than lifetime, by drawing on the following reasons.

In 2011, constituents mainly accepted the incorporation of day-one losses, as part of the floor, for the sake of convergence with the FASB by outlining the "importance of achieving a consistent approach with FASB [as] a high priority in this area" (CL 18, 2011, p. 6; see also CL 92, 2011, p. 2). Even though these constituents underscored that they generally do not support the introduction of day-one losses, they preferred "the inclusion of a floor over a non-converged IFRS and US GAAP standard on impairment" (CL 88, 2011, p. 7). For example, CL 41 (2011, p. 2, emphasis added) stated:

> Although we do not support inclusion of a floor, we understand that for *convergence* the inclusion of some type of floor mechanism may be a necessary compromise to reflect modelling uncertainty. To that end, […] we would accept a foreseeable loss floor of 12 months.

In 2013, in turn, when it became apparent that convergence would not be achieved, constituents accepted the 12-month allowance at the inception of a financial instrument as a "relatively simple" operational simplification (CL 35, 2013, p. 8) that was particularly welcomed to ease the complexity of the original conceptually sound 2009 ECF approach. Foremost, financial institutions, which are already subject to the Basel regime, welcomed the

closer harmonisation of the requirements due to cost savings (CL 27, 2011, p. 8; CL 131, 2013, pp. 6–7). In the absence of a "superior alternative" (CL 19c, 2013, p. 1), the incorporation of day-one losses, limited to 12 months, was thus seen as a "pragmatic" solution to address "the main concerns of the IAS 39 incurred loss approach" (CL 17, 2013, p. 2; see also CL 93, 2013, p. 3). In particular, the deterioration of credit quality was deemed to be described and approximated on an acceptable basis (CL 27, 2013, pp. 1–2). In contrast to the supporters, who also drew on this "approximation" argument, constituents who accepted day-one losses with concerns were simultaneously very clear about their shortfalls, as shown by the following quotes:

> While we agree with the Alternative View of Mr S. Cooper that the 12-month expected loss allowance does not have a solid conceptual basis and may be overly conservative rather than neutral, and we are also uncomfortable with the justification of recognising a day-1 loss on assets whose interest rate is intended to compensate for the initial level of expected losses, we think that the proposed approach of the ED represents a reasonable pragmatic balance between the faithful representation of the economics of the transaction and the cost of applying the model. (CL 45b, 2013, pp. 3–4)

> Although, we acknowledge that the 12-month expected credit loss is not conceptually sound, nevertheless, in our view, it is a clear measure that will allow entities to use where possible existing credit risk management tools and systems and deal with early losses in a pragmatic way. (CL 183, 2013, p. 8)

In particular, many constituents favoured the incorporation of day-one losses limited to 12 months in comparison with the FASB approach "as this is preferable to the recognition of lifetime expected credit losses at initial recognition" (CL 9, 2013, p. 2).[18] Thus, these respondents advocated the IASB's approach as the proposal in which the "conceptual flaw

[18] Other constituents, in turn, criticised the 12-month period introduced by the IASB as an "arbitrary" proxy (CL 91, 2013, p. 2; CL 133, 2013, p. 2; see also CL 18, 2013, p. 3; CL 21, 2013, pp. 1–2) lacking any conceptual foundation apart from the fact that it broadly aligns with the existent Basel regulatory requirements (IASB, 2014c, BCE.152).

[…] is less pronounced" (CL 97, 2013, p. 3):

> The recognition of expected losses at the date of initial recognition, and the consequent overstatement of performance in following years, distorts the economics of lending relationships as it severs the economic link between the fair value of a loan or debt security on initial recognition and the credit quality of the instrument. Although both proposals contain this flaw, its effect is much more pronounced in the FASB proposal. We […] therefore support the IASB's approach as a compromise as it strikes a better balance between the operational challenges of implementation and the economics of providing credit. (CL 123, 2013, p. 2)

Overall, we observe that these constituents broadly followed the IASB's rationales for introducing day-one losses but still raised substantial concerns regarding their appropriateness. The reasoning employed by the constituents thus might appear to be somewhat "paradoxical" as constituents explicitly accepted the incorporation of day-one losses into IFRS 9 against their better judgement. The implications of our findings are discussed in the next section.

4.5 Concluding remarks

This paper provides an in-depth analysis of constituents' views on the IASB's decision to incorporate the recognition of day-one losses into the impairment requirements of IFRS 9. For this purpose, we conducted an analysis of the CLs received by the IASB, which captured the constituents' positions regarding day-one losses as well as their employed reasoning. While only a relatively small proportion of constituents (28% in 2011; 21% in 2013) (unconditionally) supported the inclusion of day-one losses, the majority of CLs adopted a more critical stance: in 2011 as well as in 2013, a considerable share of respondents (37% in 2011 and 31% in 2013) strongly rejected day-one losses as an inappropriate feature of financial reporting. Particularly noteworthy is the large number of constituents (about 40%) in 2013 who finally accepted day-one losses in the absence of superior alternatives, but still raised *significant* concerns about their appropriateness.

While Pucci and Skærbæk (2020, p. 13) interpreted the fact that only about 30% of

respondents explicitly opposed the ED 2013 as an indicator of a "sense of tolerability" prevailing in the IASB's constituency, our examination provides a more nuanced view. In particular, we shed light on the somewhat "flawed" nature of the reasoning employed by the high number of constituents who ultimately accepted day-one losses but nonetheless expressed fundamental criticism. In this spirit, an IASB member who scrutinised the feedback received on the ED 2013 noted in a board meeting in September 2013 that "pretty much every comment letter I saw, bar one or two, said there is little or no conceptual justification for it [the 12-month allowance]. How a majority of our respondents then agreed with the suggestion is quite beyond me" (IASB, 2013a, minutes 53–54). Summarizing the feedback received by the IASB, he further noted:

> [The constituents] agree because it's simple. Well, that's a great reason to do something. […] And other justifications were, well, it produces this day-one loss, it doesn't reflect the economics, but it's not as bad as the lifetime loss being recognised on day one so therefore go for it because it's not as bad as what the alternative could be, which is foreseeable future, lifetime or whatever. And all of these people sort of end up in the "we agree" category, but it's a very weak agreement to my mind. (IASB, 2013a, Min. 54)

In this light, our findings prompt reflection on how the IASB and its staff should deal with such "flawed" feedback and whether this forms an appropriate basis for (final) standard-setting decisions.[19]

Our case study furthermore yields insight into the constituents' usage of the IASB's Conceptual Framework as a "statement of desire" (Dennis, 2018, p. 388) in concrete standard-setting projects. On the one hand, our analysis shows that the constituents actively scrutinised day-one losses in light of the Framework and thus provides evidence for the importance of the Conceptual Framework for the IASB's constituency. On the other hand, a large proportion of

[19] The staff paper providing the comment letter summary on the ED 2013 did not problematise this reasoning adopted by constituents in detail. The staff outlined that day-one losses were considered by most constituents "to lack a conceptual justification" (IASB, 2013c, par. 14), but were finally accepted as "pragmatic solution" (IASB, 2013c, par. 25) in the absence of better alternatives.

constituents ultimately tolerated the overriding of the Conceptual Framework requirements while apparently considering it crucial to highlight the resulting inconsistencies. This reveals the subordinated status of the "technical" Conceptual Framework, when standard setting becomes "political" (Pucci & Skærbæk, 2020), but also points to a pending threat that constituents might be inclined to pay only "lip service" (Sutton et al., 2015, p. 117) to the Conceptual Framework when commenting during the due process. As the IASB has recently lifted the status of the Conceptual Framework in standard-setting decisions by committing itself to providing an explanation in the Basis for Conclusions whenever a standard deviates from the Conceptual Framework's requirements (IASB, 2018, SP1.3), future research could examine in more detail how frequently "openly communicated" departures from the Conceptual Framework occur and the extent to which they are accepted within the IASB constituency.

In addition, our analysis of the CLs revealed that constituents did not limit their criticism to conceptual aspects but also discussed the, in their view, unwarranted implications of day-one losses, which they rooted in allegedly inappropriate motives underlying their introduction. While the general shift towards a more conservative ECL-based impairment model was almost universally welcomed to overcome the perceived delay ("too little, too late"; Hoogervorst, 2014, p. 3) in the recognition of credit losses under IAS 39, a variety of constituents were unable to align day-one losses with the IASB's mission, perceiving them to unduly influence the behaviour of market participants by distorting investors' decision making and preparers' lending activities. In this vein, the FASB's stated intention to target the adequacy of loss allowances was considered as an original *regulatory* objective, which, in the view of objectors to day-one losses, should not drive standard-setting decisions. Thus, the different positions regarding day-one losses seem to be grounded in different views on the

responsibilities and accepted remit of standard setting.

This echoed a broader debate, ignited in the wake of the financial crisis, on whether "accounting standards should take questions of financial stability […] into account" (Tweedie, 2008, p. 119; see also Danjou & Walton, 2012, pp. 3–4; Lagneau-Ymonet & Quack, 2012; McCreevy, 2009; Zeff, 2012). While political bodies in that time stipulated that, "for financial institutions, accounting and financial reporting should be more biased towards the needs of prudential regulators than the investor" (EU Commissioner for Internal Markets cited in Deloitte, 2009), the IASB insistently emphasised that financial stability represents the task of prudential regulators and should not be mixed up with its own objective to "promote the reporting of unbiased, transparent and relevant information about the economic performance and condition of businesses […] to investors and other financial market participants" (FCAG, 2009, p. 6; see also Tweedie, 2008). Since 2015, likewise the revised mission statement of the IASB (Hoogervorst & Prada, 2015) clarifies the IASB's view that "financial stability should be a consequence of greater transparency, rather than a primary goal of accounting standard-setters" (Hoogervorst, 2011, p. 5).

Even though the IASB strongly emphasised during the development of IFRS 9 that

> "[…] the debate about higher or lower loss allowances or the adequacy of the loss allowance in isolation is primarily a debate for prudential regulators instead of accounting standard-setters. The IASB's objective is not to require higher or lower loss allowances" (IASB, 2014c, BCE.94)

and outlined that day-one losses were introduced as the result of an approximation process (Pucci & Skærbæk, 2020), our analysis of the CLs demonstrates the difficulty to sharply separate the two spheres of prudential regulation and financial reporting in concrete standard-setting decisions and provides general evidence that in the post-crisis environment constituents were highly concerned not to mix these spheres.

In particular, our analysis showed that constituents deemed it of paramount importance

to safeguard the IASB's independency. In this regard, opponents of day-one losses criticised the direct influence of prudential regulators but also the role of the FASB during the standard setters' joint endeavours, which IASB constituents perceived to be too deeply influenced by political and prudential concerns. Indeed, academic research has indicated that the FASB's objective of loss allowance adequacy was – to some extent – driven by pressure exerted by prudential regulators and political bodies after the financial crisis (Giner & Mora, 2019, p. 741; Hashim et al., 2019, pp. 703–704; Pucci & Skærbæk, 2020). Nevertheless, the FASB reported that its model was "overwhelmingly supported" by the users of its own constituency (IASB, 2014c, BC5.115), which was mainly rooted in the historically stronger interaction between the role of prudential regulators and loss allowances in the US, leading US users to place a greater weight on overall loss allowance adequacy (IASB, 2014c, BC5.116). Against this background, future research could examine how the remit of standard setting was discussed in the broader US context. A promising starting point for such an analysis might be a congressional subcommittee hearing in 2018 assessing the CECL model's impact on financial institutions and the economy in which the CECL model was harshly criticised for taking over prudential tasks "under the guise of investor protection" (Luetkemeyer, cited in Committee on Financial Services, 2018, p. 2).

Overall, it remains to be seen whether constituents' concerns about the unwarranted economic implications of introducing day-one losses will actually be of practical relevance or will turn out to be more a "matter of principle". While, in the context of financial institutions, some empirical studies have found evidence that earlier loss recognition indeed influences banks' risk taking and lending decisions (e.g., Beatty & Liao, 2011; Bushman & Williams, 2012; Lim et al., 2014), other studies have argued that the effects on banks' regulatory capital adequacy induced by financial reporting are simply too small to affect banks' decision making (Ryan, 2017). Along this line, the first empirical studies indicated a rather moderate "day-one

loss" effect of IFRS 9 on entities' P&L (Abad & Suarez, 2017; EBA, 2018; Kund & Rugilo, 2020; Loew et al., 2019). This points to the need for further research to deepen our understanding of the impact of financial reporting on real decision making of reporting entities.

4.6 Appendix

Cited CLs on the IASB ED of 2009		
No.	**Name**	**Group**
19	The Institute of Chartered Accountants of Scotland	Auditors & accountants
88	ING Group	Financial sector (bank)
93	Daimler AG	Non-financial preparer

Cited CLs on the joint SD of 2011		
No.	**Name**	**Group**
1	University of Idaho	Academic institution
4	Fédération française des sociétés d'assurance	Financial sector (other)
5	Heads of Treasury Accounting and Reporting Advisory Committee	Regulators & authorities
6	Linus Low	Other
12	Accounting Standards Board	National standard setter
18	Institute of Chartered Accountants in England and Wales	Auditors & accountants
19	KeyCorp	Financial sector (bank)
20	Finance Norway	Financial sector (bank)
22	Autorité des Normes Comptables	National standard-setter
24	BusinessEurope	Non-financial preparer
25	Swedish Banker's Association	Financial sector (bank)
26	Lloyds Banking Group PLC	Financial sector (bank)
27	Zentraler Kreditausschuss	Financial sector (bank)
28	The Financial Reporting Executive Committee	Auditors & accountants
29	Private Company Financial Reporting Committee	Non-financial preparer
30	Bank of New York Mellon Corporation (BNY Mellon)	Financial sector (bank)
32	National Association of College and University Business Officers	Academic institution
33	Commerzbank AG	Financial sector (bank)
34	American Family Life Assurance Company of Columbus	Financial sector (other)
37	Roche Group	Non-financial preparer
39	Financial Reporting Advisors, LLC	Auditors & accountants
40	The Japanese Bankers Association	Financial sector (bank)
41	Barclays PLC	Financial sector (bank)
42	Accounting Standards Council	National standard setter
45	Illinois CPA Society	Auditors & accountants
68	ING Groep N.V.	Financial sector (bank)
73	Institute for the Accountancy Profession in Sweden	Auditors & accountants
74	Banco Bilbao Vizcaya Argentaria	Financial sector (bank)
82	Indian Banks' Association	Financial sector (bank)
84	Groupe Crédit Mutuel (France)	Financial sector (bank)

88	The South African Institute of Chartered Accountants	Auditors & accountants
89	French Banking Federation	Financial sector (bank)
92	PricewaterhouseCoopers, LLP	Auditors & accountants
97	Dexia SA	Financial sector (bank)
117	Mazars	Auditors & accountants
137	Toyota Motor Credit Corporation	Financial sector (bank)
140	IFRS Committee of the International Association of Consultants, Valuators and Analysts	User
142	Société Générale	Financial sector (bank)
157	Grant Thornton International	Auditors & accountants
159	Merrick Bank Corporation	Financial sector (bank)
170	Basel Committee on Banking Supervision	Regulators & authorities
171	Federation of European Accountants	Auditors & accountants
173	European Securities and Markets Authority	Regulators & authorities
174	BNP Paribas	Financial sector (bank)
177	European Banking Federation	Financial sector (bank)
192	US Federal Regulatory Agencies	Regulators & authorities
194	European Savings Banks Group	Financial sector (bank)

Cited CLs on the IASB ED of 2013		
No.	**Name**	**Group**
4b	CFA Institute	User
5	Chris Barnard	Other
8	QBE Insurance Group Limited	Financial sector (other)
9	KPMG	Auditors & accountants
10	PNC Financial Service Group	Financial sector (bank)
12	John Montgomery	Other
16	University of Technology Sydney	Academic institution
17	Institute of Chartered Accountants of Scotland	Auditors & accountants
18	The Institute of Chartered Accountants in England and Wales	Auditors & accountants
19c	Certified General Accountans Association of Canada	Auditors & accountants
21	Institut der Wirtschaftsprüfer in Deutschland	Auditors & accountants
25	Fédération des Experts Comptables Européens	Auditors & accountants
27	Financial Reporting Council	National standard setter
28	Gesamtverband der Deutschen Versicherungswirtschaft	Financial sector (other)
32	Norsk RegnskapsStiftelse	National standard setter
35	Hongkong & Shanghai Banking Corporation Holdings PLC	Financial sector (bank)
38	Confederation of Swedish Enterprise (Svenkst Näringsliv)	Non-financial preparer
40	Basel Committee on Banking Supervision	Regulators & authorities
45a	Association française des entreprises privées (AFEP) and Mouvement des Enterprises de France (MEDEF) and	Non-financial preparer

	Association des enterprises françaises à l´harmonisation comptable international (ACTEO)	
45b	Association française des entreprises privées (AFEP) and Mouvement des Enterprises de France (MEDEF) and Association des enterprises françaises à l´harmonisation comptable international (ACTEO)	Non-financial preparer
49	The Federação Brasileira de Bancos	Financial sector (bank)
51	The Trust Companies Association of Canada	Financial sector (other)
52	The International Association of Insurance Supervisors	Regulators & authorities
68	AIA Group Limited	Financial sector (other)
74	Die Deutsche Kreditwirtschaft	Financial sector (bank)
81	European Banking Authority	Regulators & authorities
91	Grant Thornton International	Auditors & accountants
93	The European Insurance and Occupational Pensions Authority	Regulators & authorities
97	Lloyds Banking Group PLC	Financial sector (bank)
98	Banco Santander	Financial sector (bank)
110	The Zambia Institute of Chartered Accountants	Auditors & accountants
112	European Banking Authority	Regulators & authorities
115	Mazars	Auditors & accountants
123	British Bankers Association	Financial sector (bank)
124	Colin Chau	Other
125	Canadian Accounting Standards Board	National standard setter
127	Commerzbank	Financial sector (bank)
131	European Association of Co-operative Banks	Financial sector (bank)
133	Standard Chartered Bank	Financial sector (bank)
138	Association for Financial Markets in Europe	Financial sector (bank)
153	Autorité des normes comptables	National standard setter
172	The Corporate Reporting Users' Forum Japan	User
173	DBS Bank Ltd	Financial sector (bank)
174	Hong Kong Institute of Certified Public Accountants	Auditors & accountants
182	Monetary Authority of Singapore	Regulators & authorities
183	European Financial Reporting Advisory Group	Regulators & authorities

Tables

Table 1
Overview of the professional background of the constituents

Group of constituents	2009		2011		2013		Total	
	N (∑ 192)	**%**	**N (∑ 212)**	**%**	**N (∑ 184)**	**%**	**N (∑ 588)**	**%**
Academic institutions	2	1	4	2	1	0.5	**7**	**1**
Auditors and accountants	33	17	30	14	32	17	**95**	**16**
Financial sector								
Banks	61	32	83	39	56	30.4	**200**	**34**
Insurers and others	16	8	28	14	23	12.5	**67**	**11**
Non-financial preparers	32	17	20	9	22	12	**74**	**12.5**
Others	3	2	6	3	6	3.3	**15**	**2.5**
Regulators and authorities	13	7	17	8	14	8	**44**	**7**
Standard setters	22	11	18	8	23	12.5	**63**	**11**
Users	10	5	6	3	7	3.8	**23**	**4**

Table 2
Constituents' positions on the general introduction of an ECL model

	Rejection (numbers in %)			**Support** (numbers in %)			**Not classifiable** (numbers in %)		
	2009	**2011**	**2013**	**2009**	**2011**	**2013**	**2009**	**2011**	**2013**
Academic institutions	0	25	0	50	75	0	50	0	100
Auditors and accountants	9	10	3	70	87	97	21	3	0
Financial sector									
Banks	7	1	2	80	80	95	13	19	3
Insurers and others	6	14	35	69	68	65	25	18	0
Non-financial preparers	3	10	0	82	65	87	15	25	13
Others	0	0	0	33	83	100	67	17	0
Regulators and authorities	8	6	7	84	82	86	8	12	7
Standard setters	9	6	4	73	88	87	18	6	9
Users	0	17	0	80	66	100	20	17	0
∑	**6**	**7**	**7**	**76**	**78**	**88**	**18**	**15**	**5**

The table is read as follows: in 2009, of all the commenting academic institutions, 0% rejected day-one losses, 50% supported day-one losses, and 50% were not classifiable with respect to the general introduction of an ECL approach.

Table 3
Constituents' positions on day-one losses

	Rejection (numbers in %)		**Acceptance with concerns** (numbers in %)		**Support** (numbers in %)		**Not classifiable** (numbers in %)	
	2011	**2013**	**2011**	**2013**	**2011**	**2013**	**2011**	**2013**
Academic institutions	50	100	0	0	50	0	0	0
Auditors and accountants	40	31	23.3	50	23.3	16	13.3	3
Financial sector								
Banks	34	21	8	45	26	32	32	2
Insurers and others	39	65	7	22	18	13	36	0
Non-financial preparers	40	32	5	36	20	9	35	23
Others	0	33	0	17	67	33	33	17
Standard setters	50	30	11	52	28	9	11	9
Regulators and authorities	37.5	7	6	43	44	29	12.5	21
Users	0	29	20	43	80	28	0	0
∑	**37.3**	**31**	**10.1**	**41**	**28.2**	**21**	**24.4**	**7**

The table is read as follows: in 2011, of all the commenting academic institutions, 50% rejected day-one losses, 0% accepted day-one losses with concerns, 50% supported day-one losses, and 0% were not classifiable with respect to the incorporation of day-one losses into IFRS 9.

Table 4
Arguments used by constituents with respect to day-one losses

Support	**Rejection**	**Acceptance with concerns**
Adequacy of reserves • Adequacy of provisions has to be ensured • Best answer to the crisis • Supports prudential objectives **Conceptual reasons** • Initial losses exist on portfolio basis • In line with the prudence principle • Useful information for investors **Operational approach** • Eases the complexity of the IASB's ED 2009 • Conceptual proximity to Basel requirements	**Conceptual concerns** • Double counting of initial ECLs • Misrepresentation of the economics of lending activity/ conflict with faithful representation • Conflict with matching principle • Overly conservative/ conflict with neutrality • Inconsistency with other impairment requirements **Unwarranted effects on market participants** • Investment decisions might be distorted • Artificial volatility in net income induced • Profitability of lending activities might be distorted • Preparers might restrict their lending behaviour • Not operational/costly for non-financial preparers **Regulatory and political influences** • Capital-lock up not within the remit of standard setting • Overreaction to the financial crisis **Pro-cyclicality**	**<u>Accepted on the basis of</u>** • Operational approach/ conceptual simplification • Convergence (in 2011) • Superior to the FASB's approach (in 2013) **<u>Concerns</u>** • See rejection arguments

Figures

Figure 1
ECL models proposed by the IASB and FASB

Proposed ECL models					
Day-one losses not incorporated					
Gradual accumulation of ECLs	IASB (ED 2009) **ECF approach**				
Day-one losses incorporated					
Staged recognition of ECLs		FASB/IASB (SD 2011) **GB/BB approach***	FASB/IASB (2011) **Three-bucket approach****	IASB (ED 2013)	IASB (2014) Final standard **Three-stage model*****
Immediate recognition of lifetime ECLs	FASB (2010)			FASB (ED 2012)	FASB (2016) Final standard **CECL model**

* Day-one losses part of the floor, limited to the higher of the time-proportional ECLs for an asset's remaining life and the ECLs for the foreseeable future (a minimum of 12 months)
** Day-one losses part of Bucket 1, limited to 12-month ECLs
*** Day-one losses part of Stage 1, limited to 12-month ECLs

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Chapter 5

The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution

The predicament of FinTechs in the environment of traditional banking sector regulation – an analysis of regulatory sandboxes as a possible solution

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Abstract

Recently, "Financial Technology-companies" (FinTechs) are increasingly changing the financial services industry worldwide and impose considerable challenges for regulators tasked to solve the arising trade-off between sound regulation and innovation support. In this regard, regulatory sandboxes, which were recently introduced in several jurisdictions, provide a promising solution, as they imply a liberalization of regulatory requirements in order to enable FinTechs to test their innovative services. However, we observe that no comparable initiative exists in Germany, even though the German regulator identified a need for action on this subject in order to maintain its international competitiveness. Thus, based on a detailed analysis of various sandbox models worldwide, this paper develops a set of own recommendations as a basis for the implementation of a sandbox concept which might be applicable in the German regulatory environment. In doing so, we identify current theoretical as well as practical regulatory issues within the context of the rapid FinTech evolution. To the best of our knowledge, this paper represents the first study on key international sandboxes as a basis to design guidelines specifically for the German financial market. Thereby, we contribute to the literature as we evolve an effective regulation within the new setting of innovative financial technologies. Moreover, our findings contribute to the practical solution of current challenges faced by both regulators and affected companies. Even though our derived implications focus on the German financial sector, the results may potentially be applicable in further jurisdictions with similar regulatory requirements.

Keywords: FinTech, financial sector, financial regulation, FinTech regulation, financial stability, regulatory sandbox, financial services industry, digital finance

JEL Classification: G21, G28, M13

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5.1 Introduction

FinTechs are increasingly changing the financial services industry worldwide, as their novel business models do not only result in increasing competition within the financial markets *(McKinsey,* 2016*)*, but also pose considerable challenges to regulators' core mandates to ensure regulatory compliance and financial stability. Through their application of new technologies, FinTechs – comprising both incumbents and start-ups – already provide the entire range of financial services traditionally covered by established banks *(Arner et al.,* 2016; *Arner et al.,* 2017*)* and have become a significant segment within the traditional financial services sector in the meanwhile.

Besides their various opportunities to enhance efficiency and competition within the markets *(Bank for International Settlements,* 2017; *Ernst & Young,* 2017a; *He et al.,* 2017*),* these highly innovative entities may also pose considerable risks to financial stability. This is because there is still uncertainty about how regulators should best apply their strict banking regulations to the novel settings of FinTech business models without simultaneously creating a major hurdle for innovation *(Maume,* 2017; *Michaels/Homer,* 2018; *Gerlach et al.,* 2016; *Herger,* 2016; *Brummer/Gorfine,* 2014*)*. Regulatory Sandboxes, which are recently developed and tested in several jurisdictions, provide a promising solution to the occurring trade-off between sound regulation and innovation support, without threatening financial stability or degrading consumer protection. This new approach typically implies a temporary liberalization or even exemptions from regulatory requirements to facilitate FinTechs to test their new services in a supervised environment *(Financial Conduct Authority,* 2015b; *He et al.,* 2017*)*.

Despite the diversity of successful[2] and potentially beneficial[3] sandbox solutions already elaborated worldwide, we observe that to date no comparable initiative exists in Germany. Therefore, the emigration of entrepreneurs to more dedicated economies could negatively affect the innovativeness and thus competitiveness as well as eventually the national economies' condition. In fact, so far only one legislation, which specifically addresses FinTech concerns, was implemented *(Maume,* 2017*)*. However, Germany's status as one of the major FinTech markets as well as the rapid diffusion of FinTechs in the highly regulated German financial sector *(Dorfleitner et al.,* 2016*)* clearly indicate the growing need for the (local) regulator to provide explicit regulatory guidance for FinTechs by creating a

[2] In terms of usage and successful market entries of participating FinTechs.
[3] In terms of the suitability of sandboxes to reduce market entry barriers for (potential) new entrants.

contemporary and flexible solution. Based on the identified need for action in the German context and the high interest of the federal supervisory authority – the Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin) – in this topic *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*, we aim to develop a sandbox framework that is, from the regulators' point of view, applicable in the German regulatory environment without compromising core regulatory objectives. Building on a detailed analysis of the various sandbox models worldwide, a major objective of this paper is to develop an own set of recommendations as a basis for an accessible and sustainable sandbox implementation for both, the regulator and the FinTechs. Moreover, even though our derived implications focus on the German financial sector, the results may be applicable in further jurisdictions with similar regulatory requirements. Additionally, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets. Finally, emphasized by taking into account the empirically and theoretically discussed implications of market entry barriers as well as potential issues arising from the principal-agent theory, i.e. adverse selection and moral hazard, it seems favorable to address this topic not only from a practical but also from a theoretical point of view.

Several articles have already examined the similarities and differences among national sandbox solutions *(Zetzsche et al.,* 2017; *Jenik/Lauer,* 2017*)*. In contrast, our paper represents to our best knowledge the first study on key international sandboxes as a basis to design guidelines for a regulatory sandbox specifically for the German market. Thereby, we contribute to the current discussion of an optimal design of sandbox concepts from the perspectives of both the regulator and FinTechs. If successfully implemented, the proposed regulatory sandbox framework has the potential to lower regulatory barriers for FinTechs and to create a level playing field while safeguarding the stability of the financial system as a whole. Furthermore, it potentially strengthens the dialog between financial firms and the competent authorities, giving the former the opportunity to clarify (emerging) regulatory questions and the latter to assess the inherent opportunities and risks. In the second place, we add to the recent literature on the evolution of FinTechs and thereby contribute to the general understanding of FinTech services and their various areas of operations *(Arner et al.,* 2016; *Zetzsche et al.,* 2017*)*. Finally, by focusing on the German banking system, we contribute to the literature concerning existing regulatory frameworks and their approaches to govern FinTechs *(Scholz-Fröhling,* 2017; *Maume,* 2017; *World Economic Forum,* 2016*)*.

In order to achieve our objective as well as to emphasize the need for action in the German

context, this paper is structured as follows: Section 2 builds the theoretical framework of this paper. Herein, we firstly discuss our understanding of financial technologies and identify major representative FinTech markets worldwide. In order to explain the trade-off between sound regulation and innovation support, we address theoretical fundamentals of financial services regulation, specifically focusing on the German market and the lack of specialized FinTech regulation and supervision in Germany. After we introduced the regulatory sandbox as a concept that may contribute to the solution of this trade-off, section 2 concludes by systematically deriving relevant countries, which built the scope of our further analysis. From this basis, section 3 then provides a detailed analysis of regulatory sandbox concepts already implemented in those countries, which we identified as relevant for our study. Building on this, section 4 suggests our framework for the implementation of a regulatory sandbox concept in Germany. Finally, the paper concludes by offering deductive remarks, limitations of this study and proposed future research.

5.2 Theoretical Background and Definitions

5.2.1 Digital Finance and FinTech

Regarding the term "FinTech", we observe that so far no unique definition could be established *(Dorfleitner et al.,* 2016; *Ryu,* 2018; *Schueffel,* 2016*)*. Albeit the lack of agreement regarding the terms' meaning there is consensus that "FinTech" is a composition of the words "Financial" or "Finance" and "Technology" *(Arner et al.,* 2016; *Dorfleitner et al.,* 2016; *Gomber et al.,* 2017; *Kim et al.,* 2016; *Kuo Chuen/Teo,* 2015; *Ryu,* 2018*)*. However, regarding the meaning of FinTech some authors propose a functional, product or service oriented definition *(Arner et al.,* 2016; *Kim et al.,* 2016; *Kuo Chuen/Teo,* 2015; *Philippon*, 2016; *Ryu,* 2018*)* whereas others use an institutional oriented definition. Since this paper addresses the regulation of financial institutions as well as new competitors entering the financial services sector, it follows the institutional approach for defining FinTechs. Thus, for the purpose of this study, a FinTech is referred to as a company or entity, both start-up or established, that develops and offers innovative financial services by using new technology. Accordingly, FinTechs usually represent some kind of innovator or disruptor *(Dorfleitner et al.,* 2016; *Gomber et al.,* 2017*)*.[4]

Furthermore, based on offered products and services as well as underlying technological concepts, it is possible to systemize FinTechs. For instance, using the comprehensive

[4] Entities that, by developing revolutionary products and services with powerful displacement potentials, threaten established competitors. For further details see *Deloitte (*2014*); AGV Banken (*2015*); Christensen et al. (*2015*).*

"Digital Finance Cube-theory", *Gomber et al. (*2017*)* systemizes FinTechs regarding the business functions digital financing, investment, money, payments, insurances and financial advice as well as regarding the used technological concepts such as Blockchain, Near Field Communication and Big Data Analytics. In fact, numerous authors propose differing systemization approaches, even though one has to state that all approaches are similar to each other *(Arner et al.,* 2017; *Bank for International Settlements,* 2017; *Maume,* 2017; *Brummer/Gorfine,* 2014; *Clifford Chance,* 2017; *He et al.,* 2017; *Financial Stability Board,* 2017; *Arner et al.,* 2016; *Philippon,* 2016; *Schindler,* 2017; *Dorfleitner et al.,* 2016*).*

From the traditional financial institutions' point of view, there are ongoing discussions on how to deal with these new competitors. In general, both competitive and co-operative strategies are eligible *(Gomber et al.,* 2017*).* However, one thing remains to be sure: Leaving FinTechs or digital movers unchecked could be quite dangerous for traditional financial institutions. Based on a 2016 study this may traditional banks cause to suffer a loss of 5.0% to 15.0% of their customer based interest and fee income within the next five years *(McKinsey,* 2016*).*

5.2.2 Developments and major representative FinTech markets worldwide

The FinTech sector has become a considerable segment within the traditional financial services sector, continuing to evolve rapidly. The development of FinTech markets worldwide can be illustrated by using different kind of data. For instance, the annual global FinTech funding volumes can be used to point out the FinTechs' growth. According to "The Pulse of FinTech", a regular study by KPMG, the annual global FinTech investments grew with a compound annual growth rate (CAGR) of more than 53.0% from 2011 (USD 2.4 billion) to 2017 (USD >31.0 billion), even though slowing down during the years 2016 and 2017 *(KPMG,* 2016; *KPMG,* 2017; *KPMG,* 2018*).* Moreover, the rising interest in FinTechs can be illustrated by using Google Trends' data, which can be used to analyze the relative worldwide frequency of the search term "fintech" within a specific time frame:

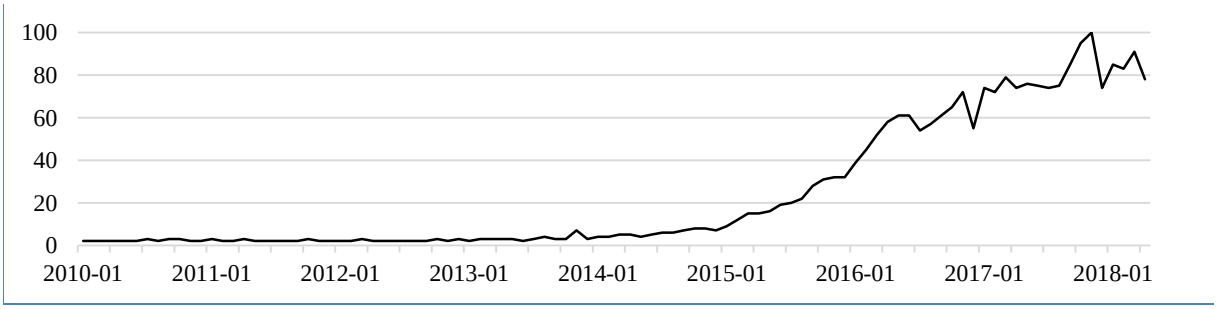

Figure 1: Relative worldwide frequency of the search term "fintech" from January 2010 until April 2018. Source of data (Google Trends, 2018).

Furthermore, since 2015 Ernst & Young publishes the "EY FinTech Adoption Index", which aims at analyzing, comparing and illustrating the worldwide adoption of FinTech services. One key finding of the current 2017 report is that on average 33% of all digitally active consumers across the surveyed 20 markets use FinTech services, compared to 16% in 2015.[5] This development outlines the strong growth and current market penetration of FinTechs, which now achieve levels of market presence that can influence both industry standards and customer expectations. Having a closer look at the 2017 data, one can assert that particularly emerging countries (China, India, Brazil, Mexico and South Africa) have high adoption rates (46.4% on average), which may be due to the facts that these countries are characterized by not only having growing economies and tech-literate populations but also poor financial infrastructures and financially underserved populations *(Ernst & Young,* 2017b*)*. Regarding the anticipated development of FinTechs, *Ernst & Young (*2017b*)* estimates show that global FinTech adoption may increase to 52% on average, with particularly strong developments in South Africa, Mexico and Singapore. However, the following table summarizes and compares the 2015 and 2017 FinTech adoption rates:

	FinTech adoption (%)	
	2015	**2017**
China		69
India		52
UK	14	42
Brazil		40
Australia	13	37
Spain		37
Mexico		36
Germany		35
South Africa		35
US	17	33
Hong Kong	29	32
South Korea		32
Switzerland		30
France		27
Netherlands		27
Ireland		26
Singapore	15	23
Canada	8	18
Japan		14
Belgium & Luxembourg		13
Average	**16**	**33**

Table 1: FinTech adoption rates 2015 and 2017. Source of data (Ernst & Young, 2017b).

Finally, based on the illustrated development of FinTech markets worldwide, it is possible

[5] In 2015, the study covered six markets.

to identify major FinTech markets, which are used as the basis for the further research in this paper. This identification process is conducted according to the following methodology and criteria, in which those countries covered by the EY FinTech Adoption Index represent the universe of potential major FinTech markets:

- Firstly, we classify countries with average and higher-than-average FinTech adoption rates in 2017 as major FinTech markets.[6]
- Secondly, we classify countries with particularly strong expected growth rates for FinTech adoption as major FinTech markets *(Ernst & Young,* 2017b*)*.
- Thirdly, we classify Hong Kong, Japan and South Korea as major FinTech markets, since these countries have a considerable meaning for the global financial industry and are considered as Financial Hubs.[7]

As a result, we identify the following countries as major FinTech markets, thus building the basis for the following research in this paper:

	Major FinTech markets	
Criteria	**Markets**	**Total**
Average and higher-than-average FinTech adoption rates	Europe: Germany, Spain, UK America: Brazil, Mexico, US Asia: China, India Other: Australia, South Africa	10
Particularly strong expected growth in FinTech adoption rates	America: Mexico Asia: Singapore Other: South Africa	3
Financial Hubs	Asia: Hong Kong, Japan, South Korea	3

Figure 2: Major FinTech markets.

5.2.3 Resulting regulatory predicaments

As already noted by the Financial Stability Board (FSB), FinTechs may have a "material effect on financial markets and institutions and the provision of financial services" *(Financial Stability Board,* 2017*)*. In fact, FinTechs already provide the entire range of financial services and products traditionally covered by established banks *(Arner et al.,* 2016; *Arner et al.,* 2017*)*. As well as the widespread adoption of new technologies offers various opportunities, such as contributing to increasing innovation and enhancing

[6] See table 1.

[7] Also financial center, meant as a city or region with a high concentration and variety of major financial institutions, which provide the entire range of high-end banking and financial services on a national or international basis. For further details see *Zhao et al. (*2004*).*

efficiency in the financial services sector *(Maume,* 2017; *Ernst & Young,* 2017a; *He et al.,* 2017; *Bank for International Settlements,* 2017*),* the exceptional rate of development of new business models[8] also poses considerable challenge to regulators, supervisors and policymakers worldwide. Despite the fact that many FinTech activities and business models fall within the scope of traditional banking regulations *(Financial Stability Board,* 2017*),* there are still considerable uncertainties about how to apply the regulatory requirements, i.e. consumer protection, anti-money laundering, compliance and licensing, to FinTechs *(Maume,* 2017; *Michaels/Homer,* 2018*).* Complying with these stringent regulatory requirements would pose not only financial, but also organizational as well as personnel challenges to FinTechs, particularly in the case of start-ups, and thus represent not only significant market entry barriers but also major hurdles for innovations *(Gerlach et al.,* 2016; *Maume,* 2017; *Herger,* 2016; *Brummer/Gorfine,* 2014; *Arner et al.,* 2016*).*

On the other hand, FinTechs also operate in business segments not yet covered by regulatory frameworks, thereby avoiding regulatory costs and oversight *(Bank for International Settlements,* 2017; *Financial Stability Board,* 2017; *Accenture,* 2016; *Michaels/Homer,* 2018*).* The resulting "regulatory gaps" *(Bank for International Settlements,* 2017*)* however, clearly contradict the core mandate of regulation to ensure a level playing field for incumbent firms and newcomers *(He et al.,* 2017*)* and may moreover lead to new risks like the creation of a shadow-banking market.

Governments and regulatory authorities are aware of the need to provide clear regulatory guidance and thus are targeting an "optimal regulation" *(Ernst & Young,* 2017a*)* that promotes beneficial innovations and market competition without threatening financial stability and oversight or degrading consumer protections *(Schleussner,* 2017; *Arner et al.,* 2016; *Bank for International Settlements,* 2017; *Financial Stability Board,* 2017; *Arner et al.,* 2017; *Treleaven,* 2015; *He et al.,* 2017; *Brummer/Gorfine,* 2014; *Zetzsche et al.,* 2017; *Dombret,* 2016*).* Moreover, this regulatory trade-off is not only relevant in the financial services industry, but is also – from an economic point of view – relevant on a national basis: In order to remain competitive, national economies and its politicians should be aware of the positive relatedness between (technological and organizational) innovation and economic growth *(Freeman,* 1995; *Brown et al.,* 2009*).* To address this (economic) trade-off between sound regulation on the one hand and fostering innovation on the other hand, policymakers worldwide are currently developing and testing different approaches.

[8] Largely led by start-ups.

5.2.4 Regulatory requirements of FinTech business models

The banking sector is considered to be one of the most heavily regulated sectors worldwide *(Clifford Chance,* 2017; *Schleussner,* 2017*)*. The fundamental mandates of financial regulation are to ensure the stability of the financial system, to create a level playing field between market participants and to protect consumers and investors *(Arner et al.,* 2016; *Bundesanstalt für Finanzdienstleistungsaufsicht,* 2018b; *Fest,* 2008; *He et al.,* 2017; *Schleussner,* 2017; *Zetzsche et al.,* 2017*)*. With regard to FinTechs, four main types of regulation are of particular importance: Consumer protection, anti-money laundering, compliance and licensing *(Maume,* 2017; *Schneider et al.,* 2016; *Bank for International Settlements,* 2017*)*. From a theoretical point of view, the rationale for consumer protection is based on the assumption that consumers have limited capacity to effectively assess and monitor the safety and soundness of financial institutions and their financial products, which is due to information asymmetries as well as potential moral hazard-issues (i.e. unobservable behavior) in the financial markets *(Goodhart et al.,* 2013; *Kim et al.,* 2013; *Llewellyn,* 1999*)*. Thus, in this context, the purpose of regulation is to adjust the system for market imperfections and to prevent market failures that ultimately would impair consumer welfare *(Llewellyn,* 1999*)*.

Under German law, FinTechs become subject to regulation and supervision, if they operate businesses, which require a permission (i.e. a banking license) by the responsible regulators (§ 32 KWG). Those businesses include the provision of banking businesses (§ 1 sec. 1 KWG) and financial services (§ 1 sec. 1a KWG).[9] To obtain a banking license, an entity is required – amongst others – to comply with specific capital requirements and to meet suitable organizational measures (e.g. internal risk-management) to run operations properly (§ 33 KWG). Subsequent to completed license-granting, ongoing organizational and reporting obligations, e.g. capital and liquidity requirements according to §§ 10, 11 KWG as well as the required adoption of internal safeguards concerning money laundering (§ 25h KWG) and compliance (§ 25a sec. 1 no. 3c KWG), must be complied with.[10] Depending on the business model, a FinTech can also be subject to the license requirements of payment service providers (§ 1 sec. 1 ZAG) and electronic money issuers (§ 1 sec. 2 ZAG) according to §§ 10, 11 ZAG. However, in all cases licensing and supervision is exercised by the BaFin (§ 6 sec. 1 KWG, § 4 sec. 1 ZAG) *(Deutsche*

[9] The requirement of a banking license is linked to the provision of banking businesses and financial services, independently of the use of new technologies and the innovativeness of products and services.
[10] § 2 sec. 1 no. 1-3 GWG.

Bundesbank, 2018*)*.[11] The majority of FinTechs is expected to be subject to licensing in any way. For instance, if a FinTech takes deposits from customers or becomes a contracting party to a credit agreement, it requires a license in accordance to § 1 sec. 1 no. 1 or 2 KWG. For those FinTechs that offer investment advisory as in the case of robo advice, again a license according to § 1 sec. 1a KWG is necessary *(Scholz-Fröhling,* 2017*)*. If, however, a FinTech acts with negligence and provides banking services without the required license, the entity can be fined or the management may even face imprisonment of up to five years (§ 54 KWG). In Germany only § 2a VermAnlG represents a legislation specifically adopted for the FinTech business, which excludes a FinTech in the crowdfunding sector from the publication requirement of an investment prospectus *(Maume,* 2017*)*.

This analysis outlines several regulatory challenges in dealing with FinTechs: The current regulatory framework poses significant market entry barriers for (potential) start-ups in the financial services industry. This is not in line with the BaFins' statement that regulation must neither be exploit as entry barrier for newcomers and to protect incumbents, nor to (constantly) privilege newcomers. Also, the German regulator itself identified the need for action in this regard *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016; *PwC,* 2017*)*.[12] Anyhow, this issue is not only found to be discussed by practitioners but also experiences great relevance within the academic literature: In order to compete and contribute to innovative developments in a market, a new entrant needs to be able to enter it. In general, the conditions to enter a market depend on the height and number of barriers to entry. In the economic literature, numerous definitions of barriers to entry were developed *(Bain,* 1956; *Stigler,* 1968; *Ferguson,* 1974; *Fisher,* 1979; *von Weizsacker,* 1980; *Gilbert,* 1989; *Carlton/Perloff,* 1994; *McAfee et al.,* 2004*)*. Many of these define an entry barrier as a factor beneficial to incumbents, as it makes market entry unprofitable for (potential) new entrants and consequently reduces or limits competition *(Bain,* 1956; *Ferguson,* 1974; *Stigler,* 1968*)*. Generally, barriers to entry are based on conditions that are either of strategic or structural nature. Strategic barriers result from deliberated behavior or tactical actions by incumbents, which have the purpose to hinder the entry of new competitors. In contrast, structural barriers, which arise exogenously, are due to conditions of the industry such as cost and demand structures or technology. Consequently, these are the same for both incumbents and newcomers *(OECD,* 2006; *OECD,* 2007*)*. However, in the context of

[11] Within the Single Supervisory Mechanism (SSM) however, those financial institutions which meet the definition according to Art. 4 sec. 1 no. 1 Capital Requirements Regulation (CRR) and additionally meet the European Central Banks' (ECB) criteria of "significant institutions" (SI), are directly supervised by the ECB. For further details see *European Central Bank (*2014*)*.

[12] In this respect, it is noteworthy, that the increasing regulatory challenges imply an increasing demand for supportive services, which drives the "RegTech" developments. For further information see e.g. *PwC (*2017*)*.

FinTechs, the definition of *Fisher (*1979*)*, which defines a barrier to entry as any condition that hampers entry although it would be socially beneficial, seems to be the most appropriate. For though the addition of FinTechs to the banking industry could promote competition and hence increase consumer welfare, in particular regulatory entry barriers in the form of capital, liquidity and licensing requirements pose a great hurdle for their entry in the industry *(Financial Services Authority,* 2013*)*. Actually, particularly regulatory requirements in terms of capital and licensing requirements[13] are identified as two out of six (structural) regulatory barriers to entry *(Porter,* 1979; *OECD,* 2006*)*, which can distort effective competition and stifle innovation as FinTechs may, due to financial or operational issues, not be able to comply with them *(Financial Conduct Authority,* 2015a*)*. Instead, particularly incumbent banks benefit from these regulations, as they result in a "grandfathering" of their established business models.

Economic growth and customer welfare, increasing supply and thus consumer choice as well as potentially lower prices in the course of an entry of new FinTechs may yet be restricted *(Bennett/Estrin,* 2013; *Schleussner,* 2017*)*. In fact, empirical evidence shows that the number of regulations and the amount of license fees may negatively affect the rate of entry, especially for small and medium firms *(Scarpetta et al.*, 2002; *Bennett/Estrin,* 2013*)*. Moreover, *Molyneux et al. (*1994*)* find a relationship between the number and size of banks and barriers to entry, whereas other authors identify a interrelation between the extent of (regulatory) entry barriers and other market participants' welfare *(Besanko/Thakor,* 1992*)*, the competitive intensity *(Hannan/Prager,* 1998*)* or degree of oligopolistic interaction *(Spiller/Favaro,* 1984*)*. Anyhow, one has to note that concerning the extent and strictness of financial regulation, contrasting views in the academic literature exist: While *Eichengreen/Portes (*1987*)* demand strong regulations to reduce moral hazard problems in the banking sector, *Barth et al. (*2004*)* find evidence that high constraints on bank activities may instead contribute to financial crises. Thus, it is to conclude that regulation necessitates a trade-off between its resulting costs and benefits. An "over-regulation" *(Llewellyn,* 1999*)* that may compromise competition and creates entry barriers needs to be avoided.

Moreover, with regard to academic literature financial regulation in the form of laws and supervisory actions can be understood as a set of contracts within a principal-agent relationship, where financial institutions in general and FinTechs in particular represent the regulated agents. The objective of the principal, i.e. the regulator, is to create incentivizing

[13] In this respect also named "government policy" *(Porter,* 1979*)*.

rules, which induce the agents to comply with the objectives of consumer protection and systemic stability *(Llewellyn,* 1999; *Freixas/Santomero,* 2003*)*. Typical principal-agent problems, like adverse selection and moral hazard, which could arise from informational advantages possessed by the agents, are counteracted through a comprehensive set of regulations. The failure of unregulated firms, on the other side, may have an adverse impact on regulated institutions, inducing a potential cascade of banking failures in the financial system. Therefore, macroprudential banking regulations aim to implement substantial rules (e.g. capital adequacy requirements according to Basel III) and risk management procedures *(Alexander,* 2006; *Neuberger,* 1998*)*.

To conclude, entrant firms certainly need to meet central standards, which prevent risks to customers or the financial system as a whole, and thus have their legitimation. However, those regulations that may inadequately impede market entries must be addressed. Even though regulatory requirements provide a level playing field between incumbents and new entrants as well as they guard against potential issues arising from typical principal-agent-problems, they should not result in a preclusion of FinTechs and thus hindering innovation in the industry.

5.2.5 Regulatory Sandbox as potential solution

In developing new regulatory approaches for FinTech businesses, several jurisdictions, including the UK, Australia, the US, Hong Kong, Singapore, the Netherlands and Canada launched so called regulatory sandboxes *(Accenture,* 2016; *Jenik/Lauer,* 2017*)*. These sandboxes typically imply a temporary liberalization or even exemptions from regulatory requirements to provide a "safe space" for FinTechs to test their new products, services and innovative business models in a live, but monitored environment under direct regulators' supervision *(He et al.,* 2017; *Financial Conduct Authority,* 2015b*)*. While testing their business models under this unburdened regulatory regime, FinTechs are moreover in a constant dialogue with the regulators, facilitating a mutual knowledge exchange *(Bank for International Settlements,* 2017; *Maume,* 2017*)*. The collaborative concept is an attempt to strike a balance between the regulators' competing objectives to promote innovation in financial services while safeguarding the financial regulations' core mandates *(Financial Stability Board,* 2017; *He et al.,* 2017; *Bank for International Settlements,* 2017*)*. Thus, the sandbox concept may be a part of the solution of the above mentioned trade-off between sound regulation and fostering innovation as well as reducing (regulatory) market entry barriers, which ultimately may contribute to sustainable competitiveness and economic

growth.

Besides regulatory sandboxes, innovation hubs represent a second category of "innovation facilitators". These hubs can be understood as a preliminary stage to a more sophisticated sandbox concept and as a first contact point for FinTechs, where they can raise questions to competent authorities and receive elementary, non-binding regulatory guidance *(European Banking Authority,* 2018*)*. To implement a holistic approach for regulators and FinTechs, however, the sandbox concept constitutes an indispensable element and thus represents this papers' focus.[14]

Historically, the theoretical basis of sandbox concepts originates from the information technology (IT) sector. Primarily in the context of software development, sandboxes provide an isolated testing environment for new codes before merging into the "live" system. This approach facilitates the identification of and protection against malfunctions or other changes that could inflict damage to the overall system resulting in potentially high costs *(Oktavianto/Muhardianto,* 2013; *Goldberg et al.,* 1996; *Wahbe et al.,* 1993*)*. The migration of those sandbox concepts into the financial regulatory environment was pioneered by the UK's Financial Conduct Authority (FCA) in November 2015 as a core component of its "Project Innovate" initiative *(Financial Conduct Authority,* 2017b*)*. Afterwards, the application of sandbox concepts spread rapidly across various countries *(Financial Stability Board,* 2017*)*. However, most introduced sandboxes are not constructed uniformly nor are they at the same stage of implementation *(Bank for International Settlements,* 2017; *He et al.,* 2017*)*, reflecting the differing size and maturity of the particular financial sectors and the flexibility of the regulatory frameworks already in place *(Ernst & Young,* 2017a; *Financial Stability Board,* 2017*)*.[15] However, albeit the diversity of existing models, the majority of sandboxes share some key characteristics and design components *(Zetzsche et al.,* 2017; *Bank for International Settlements,* 2017; *He et al.,* 2017; *Jenik/Lauer,* 2017*)*. If successfully implemented, regulatory sandboxes have the potential to lower regulatory barriers and help to speed up the market introduction of a wide range of new services. Furthermore, the gathered information and valuable insights during the test period might assist regulators to gain better understanding of risks and how to adapt current and future regulation to FinTechs without stifling innovation *(Financial Conduct Authority,* 2015b; *Zetzsche et al.,* 2017; *He et al.,* 2017; *Jenik/Lauer,* 2017; *Ernst & Young,*

[14] For further details on Innovation Hubs see *European Banking Authority (*2018*).*
[15] i.e. rule-based vs. principle-based regime; for further details see *Brummer/Gorfine (*2014*).*

2017a*)*.

Despite the benefits, to date no comparable initiative exists in Germany. However, the regularly organized workshops („BaFinTech") and the creation of an internal FinTech task force,[16] clearly express the high interest of the BaFin in this topic *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2017*)*. Moreover, since the German Federal Ministry of Finance identified the opportunities and challenges that financial technologies entail for society, politics and economy, it consequently launched the "FinTechRat" in March 2017. This initiative is composed of FinTechs, banks and scientists and aims at strengthening the dialogue between politics and economy, supervising trends in the financial technologies area, advising the Federal Ministry of Finance and finally establishing Germany as the "FinTech-Hub No.1" within the European Union *(Bundesministerium der Finanzen,* 2017; *Bundesministerium der Finanzen,* 2019*)*. Furthermore, the German Government is recently developing a blockchain-strategy in which it advocates the creation of a flexible regulatory framework for crypto-assets on both a European and international level *(FinTechRat,* 2019*)*.[17] Against this background, one can conclude that these current political efforts once again fortify the relevance of the FinTech markets for the German competitiveness as well as the corresponding urgency and importance to develop a suitable regulatory framework.

Therefore, building on the above derived list of major FinTech markets (see figure 2), a detailed analysis of the respective sandbox solutions shall serve as a foundation to develop a set of recommendations for the concept of a regulatory sandbox specifically for the German market, which is in line with the regulatory framework and objectives. For this purpose the intersection of the above derived major FinTech markets with jurisdictions that already introduced an operational sandbox approach *(Jenik/Lauer,* 2017*)*, represent the scope of this papers' further analysis on the various sandbox designs:

[16] See https://www.bafin.de/SharedDocs/Veranstaltungen/DE/180410_BaFinTech_2018.html for further details (Accessed: 12.07.2018).

[17] See https://www.bundesregierung.de/breg-de/themen/digital-made-in-de/blockchain-strategie-1546662 for further details (Accessed: 08.05.2019).

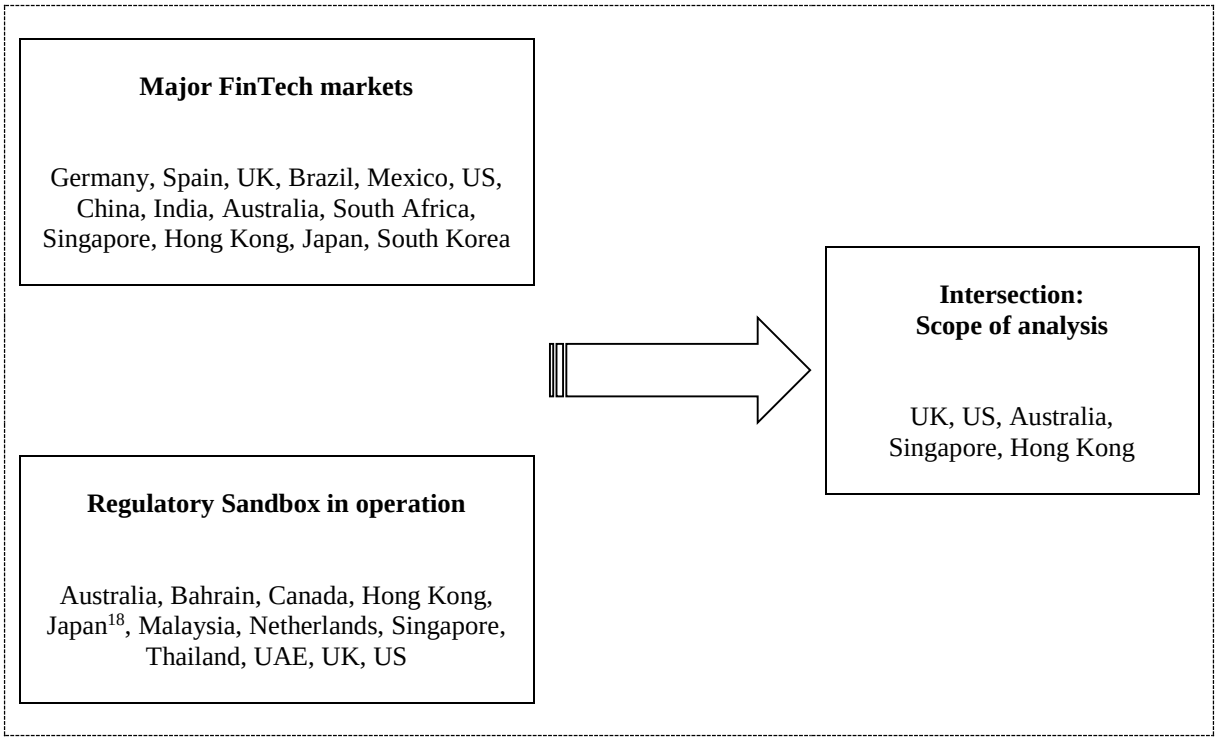

Figure 3: Major FinTech markets in scope of regulatory sandbox analysis.

5.3 Analysis of Regulatory Sandboxes

In order to analyze the as relevant identified regulatory sandbox concepts[19] systematically, we focus on certain assessment criteria: If provided, we focus on the sandboxes' *objective*, the *effective date* and *stage of implementation*. Furthermore, we highlight specifications regarding the *application process*, *eligibility criteria* and *limitations* (e.g. participants, offered services, type and maximum number of clients, restrictions regarding the maximum exposure, customer safeguards, and disclosure). Finally, we emphasize the *duration* of the test as well as *applicable regulatory "tools"* and the questions whether and how the responsible authority provides *assistance* and *collaborates* with participating firms during the test period and when transitioning out of the sandbox. As mentioned above, the following analysis of the respective sandbox solutions serves as a best practice foundation for the development of a set of recommendations for a regulatory sandbox concept specifically for the German market, which is in line with the regulatory framework and

[18] Even though the Government of Japan introduced a sandbox framework in June 2018, it is hardly comparable to other sandboxes in scope, as it is not limited to a specific industry or area of regulation (https://www.jetro.go.jp/ext_images/en/invest/incentive_programs/pdf/Detailed_overview.pdf). Moreover, the official documentation is largely available only in Japanese (http://www.kantei.go.jp/jp/singi/keizaisaisei/regulatorysandbox.html). Consequently, as the paper focusses exclusively on banking sector regulations, Japans' rather unspecific and in foreign-language documented approach is excluded from the following analysis. However, it should be noted that Japans' Financial Services Agency introduced a "FinTech Proof-of-Concept Hub" in September 2017 to provide continuous support (https://www.fsa.go.jp/en/newsletter/weekly2017/262.html). However, its documentation is again in Japanese (https://www.fsa.go.jp/news/29/sonota/20170921/20170921.html). (All links in this footnote were accessed: 08.05.2019).

[19] Scope of analysis, see figure 3.

objectives. Beyond that, a comprehensive table, which – using the above mentioned criteria – both summarizes and compares characteristics of the various sandbox approaches, is provided in the appendix.

5.3.1 Regulatory Sandbox: UK

As mentioned above, the FCA launched a comprehensive "Regulatory Sandbox" concept as a core component of its "Project Innovate". The overall aim of Project Innovate is to foster competition and growth in the financial services industry by supporting small and large businesses that are developing products and services which could improve consumers' experience and outcomes *(Financial Conduct Authority,* 2015b*)*. On this basis, the objective of introducing the regulatory sandbox is to promote competition through (disruptive) innovation. The projected framework shall offer the possibility to test products and services in a controlled environment, thereby reducing the time-to-market at potentially lower cost. Moreover, it strives to support the identification of appropriate customer safeguards for new products and services and achieving better access to finance *(Financial Conduct Authority,* 2015b; *Financial Conduct Authority,* 2018c; *Financial Conduct Authority,* 2017b; *Financial Conduct Authority,* 2018b*)*. In this regard, the FCA developed its sophisticated regulatory sandbox, which was introduced in November 2015 and launched in June 2016 *(Financial Conduct Authority,* 2018a; *Financial Conduct Authority,* 2018c; *Financial Conduct Authority,* 2017b*)*. The sandbox is open to both start-ups and incumbents as well as authorized and unauthorized firms. However, potential companies need to undergo an application process and meet certain criteria to participate in this concept *(Financial Conduct Authority,* 2018c*)*. Moreover, the sandbox works on a cohort basis with two cohorts per year, thus offering two six-month test periods per year. For the first two cohorts the FCA received 146 applications of which 18 firms (cohort 1) and 24 firms (cohort 2) participated in the sandbox. Furthermore, 61 firms applied for participating in cohort 3 of which 18 were accepted by the FCA. Finally, in each case 29 firms participated in cohort 4 and 5, whereas 69 respectively 99 firms applied to participate. *(Financial Conduct Authority,* 2017b; *Financial Conduct Authority,* 2017a; *Financial Conduct Authority,* 2018d; *Financial Conduct Authority,* 2018e; *Financial Conduct Authority,* 2019a; *Financial Conduct Authority,* 2019b*)*.

In more detail, applying companies need to explain its proposition, whether it is eligible and how it meets the FCAs' default standards *(Financial Conduct Authority,* 2018a*)*. The required eligibility is based on certain criteria: First of all, firms must be in scope, which

means that the companies' planned innovation is designed for or supports the financial services industry. The new solutions need to be genuine innovations, thus differing significantly from existing ones. Furthermore, directly or indirectly through increasing competition, the companies' innovations must lead to identifiable consumer benefit and the companies need to make clear why there is a "need for sandbox". Finally, in order to be eligible, potential participants need to have done sufficient research regarding its innovation and need to be ready for testing it with real customers in real markets *(Financial Conduct Authority,* 2015b; *Financial Conduct Authority,* 2018a*).*

Applicants must not only meet the required eligibility criteria but also a number of default standards, which were defined by the FCA. These encompass regulations regarding the duration for testing (three to six months), number of clients, customer selection, customer safeguards, disclosure, data and testing *(Financial Conduct Authority,* n/a*)*. Finally, the FCA expects the testing companies to have a clear objective with the intended sandbox test (e.g. reducing costs to consumers) *(Financial Conduct Authority,* 2018c*).*

After reviewing the applications, the FCA decides which companies participate in the following cohort of the sandbox test. For each firm approved, the FCA dedicates a case officer who supports the participating company regarding the designing and implementing of the test. In general, the FCA works closely with participants in order to ensure appropriate customer safeguards being in place and to mitigate potential harm during and after the test-period *(Financial Conduct Authority,* 2017b*)*. Also, the FCA designed multiple tools to provide assistance during the test period and participation in the regulatory sandbox: First, the FCA designed a tailored authorization process specifically for unauthorized firms (restricted authorization). As a result, participating firms are allowed to test the agreed products and services (only), even though they are not able to meet the full requirements for a general, thus unlimited authorization. Moreover, the FCA can provide participating firms with no enforcement action letters, individual guidance or waivers. A no enforcement letter may be issued, if the FCA believes that the participating firms' activities do not breach the FCAs' requirements or harm its objectives and where the FCA is not able to assist with individual guidance and waivers. In this case, the FCA states that, as long as the test period lasts, no enforcement action against the company, respectively its intended activities, will be taken. Moreover, participating firms may often face uncertainties regarding existing regulatory requirements and whether and how they need to be applied in light of the intended activities. In these cases, the FCA gives individual guidance regarding the interpretation of applicable regulations. Finally, in the case of unduly burdensome rules, the

FCA may be able to waive or modify specific rules for testing companies. However, this tool is limited to the FCAs' power and authority regarding the particular, questioned regulation *(Financial Conduct Authority,* 2015b; *Financial Conduct Authority,* 2018c; *Financial Conduct Authority,* 2017c*).* At the end of a sandbox test and before transitioning out of the sandbox, all participants have to submit a final report. The report should summarize the outcomes and findings of the sandbox test as well as the next steps planned (e.g. regarding product development) *(Financial Conduct Authority,* 2017b*).*

5.3.2 Regulatory Sandbox: Australia

In 2015, the Australian Securities and Investments Commission (ASIC) launched an Innovation Hub to support FinTechs in managing the relevant regulatory requirements. To achieve this objective, its key initiative was the creation of the ASIC's regulatory sandbox framework in December 2016 *(Australian Securities and Investments Commission,* 2017b*).* This sandbox approach consists of a licensing exemption allowing FinTechs to test their products or services without the requirement of financial services or credit licenses *(Australian Securities and Investments Commission,* 2017a; *Australian Securities and Investments Commission,* 2018*),* while ensuring adequate consumer protection *(Australian Securities and Investments Commission,* 2017b*).* A further objective of the sandbox is the facilitation of innovation *(Australian Securities and Investments Commission,* 2017a*)* by accelerating time-to-market and access to capital *(Australian Securities and Investments Commission,* 2017b*).* Despite these benefits, by the end of April 2019 only six businesses had used the regulatory sandbox *(Australian Securities and Investments Commission,* 2019*).* Similarly, a current survey reveals that only 1% of Australian FinTechs are currently using the regulatory sandbox, while 9% plan to use it in the next twelve months *(Ernst & Young,* 2017c*).*

To rely on the sandbox exemption, a FinTech must not be banned from providing financial services or from engaging in credit activities. Furthermore, the regulator explicitly excludes license-holders (i.e. established financial institutions) and is consequently eligible to early-stage financial institutions (i.e. start-ups) *(Australian Securities and Investments Commission,* 2017a; *Ernst & Young,* 2017a; *He et al.,* 2017*).* A significant difference between the licensing exemption and the sandbox requirements of other financial regulators worldwide is the Australian "whitelist" approach, implying an automatic admission to the sandbox without an individual review by ASIC *(Australian Securities and Investments Commission,* 2017b*).* According to this, no formal application is required. Instead, the only

requirement is a written notification and provision of certain information to the ASIC, before relying on the licensing exemption *(Australian Securities and Investments Commission,* 2017a*)*. In contrast to this unique and comparatively flexible "whitelist" approach, the regulator prescribes strict qualitative as well as quantitative limitations concerning the operations of certain financial services or credit activities within the sandbox *(Australian Securities and Investments Commission,* 2017a*)*. Amongst others, the ASIC provides a detailed list of financial services and credit activities that FinTechs are allowed to provide when utilizing the licensing exemption. However, issuing financial products or acting as a credit provider is not allowed under the exemption *(Australian Securities and Investments Commission,* 2017a; *Australian Securities and Investments Commission,* n/a*)*.

Besides these product-specific requirements, further conditions have to be met to be able to rely on the relief of the licensing exemption. During the limited testing period of twelve months, the businesses may only provide services to up to 100 retail clients, while there are no limitations for wholesale or sophisticated clients. Yet, the total customer exposure may not exceed AUD 5 million. To maintain consumer trust and avoid systemic risk, the sandbox does not intend to waive any consumer protection requirements. Therefore, it specifies that every participant needs to comply with key consumer protection provisions and meet the disclosure and conduct requirements. In addition, the FinTechs must notify their clients that they rely on the licensing exemption and thus operate without license. Finally, the prescribed arrangement of adequate compensation schemes in case of losses as well as the implementation of dispute resolution procedures shall further ensure consumer protection *(Australian Securities and Investments Commission,* 2017a; *Australian Securities and Investments Commission,* n/a*)*. Despite these strict specifications, the ASIC preserves the possibility to extent the testing period and/or the client limit *(Australian Securities and Investments Commission,* 2017a*)*.

At the end of the sandbox period, the FinTechs can no longer rely upon the exemptions and are no longer allowed to continue operations, unless they have been granted a financial services or credit license. Similarly, they may proceed, if they have entered into an arrangement to provide services on behalf of a financial services or credit licensee, or if the ASIC has given individual relief extending the testing period *(Australian Securities and Investments Commission,* 2017a*)*. Subsequent to the sandbox test, the participants are required to provide a short report of their experiences during the testing period *(Australian Securities and Investments Commission,* 2017a*)*. However, neither does the regulator engage with the FinTechs prior to entering the sandbox, nor is a knowledge exchange

officially stipulated between both parties during the testing *(Zetzsche et al.,* 2017*).*

5.3.3 Regulatory Sandbox: Singapore

Over the past few years, the Monetary Authority of Singapore (MAS)[20] has made some substantial investments to accelerate growth of the FinTech sector and implemented a range of supporting programs, positioning Singapore as a significant FinTech market *(Monetary Authority of Singapore,* 2018b*).* One key initiative was the formation of the FinTech & Innovation Group in August 2015, responsible for the development of regulatory policies and strategies relating to FinTechs *(Monetary Authority of Singapore,* 2018a*).* Finally in November 2016, the MAS released its "FinTech Regulatory Sandbox Guidelines" to provide a safe space for innovative firms to test their products and services while relaxing specific legal and regulatory requirements without deteriorating consumer protection and financial stability *(Monetary Authority of Singapore,* 2016a; *Monetary Authority of Singapore,* 2016b*).* The Sandbox is applicable for trials of new financial services by both (unregulated) FinTech start-ups and large (regulated and licensed) financial institutions *(Monetary Authority of Singapore,* 2016b; *Monetary Authority of Singapore,* n/a; *Monetary Authority of Singapore,* 2016c*).* Moreover, it is open to all interested firms with innovative financial services with no sectorial restriction on financial institutes *(Monetary Authority of Singapore,* 2016a*).* As there is no cohort scheme, applications to the sandbox can be submitted anytime *(Baker McKenzie,* 2017*),* so that by May 2019, two participants were actively using the sandbox whereas two already exited the sandbox without obtaining the relevant regulatory status *(Fintech Singapore,* 2017; *Monetary Authority of Singapore,* 2019*).*

Based on the regulators' precondition to solely offer financial services which include new or emerging technology, or which use existing technology in an innovative way, the temporary relaxation of specific legal and regulatory requirements is conducted on a case-by-case basis *(Monetary Authority of Singapore,* 2016a; *Monetary Authority of Singapore,* 2016b; *Monetary Authority of Singapore,* n/a*).* Examples of those requirements that may be relaxed apply to cash balances, credit rating, financial soundness, fund solvency and capital adequacy. However, the MAS emphasizes that the sandbox should not be understood as a mean to circumvent legal and regulatory requirements and further clarifies that it will not compromise on requirements concerning consumer protection, prevention of money

[20] Singapore's central bank and regulator of the financial services sector (see http://www.mas.gov.sg/About-MAS/Overview.aspx (Accessed: 04.07.2018)).

laundering and financing of terrorism *(Monetary Authority of Singapore,* 2016a*)*. A further criterion, which the regulator will evaluate before granting permission to enter the sandbox, is the applicants' intention and ability to deploy the service in Singapore on a broader scale. To achieve the aspired well-defined space for experimentation, the test scenarios and boundary conditions, as well as the exit and transition strategy have to be clearly defined before entering the sandbox. The applicants are furthermore obliged to assess and mitigate significant risks and shall install appropriate safeguards to limit the consequences of failure for consumers and the financial system in collaboration with the regulator *(Monetary Authority of Singapore,* n/a; *Monetary Authority of Singapore,* 2016a*)*. Similar to the Australian approach, the participants must notify its customers about the sandbox conditions and disclose the key risks, which the customer has to confirm. Despite these strict requirements, detailed specifications of the sandbox like the time frame, the maximum number as well as the type of customer and the maximum exposure are not predetermined by the guidelines. Instead, they are agreed on a case-by-case basis resulting in a cooperative and individually tailored solution *(Monetary Authority of Singapore,* 2016a*)*.

During the testing period, which may optionally be extended, the sandbox can be discontinued by the regulator, if the participants are not capable to fully comply with the legal and regulatory requirements at the end of the sandbox period or in case of a breach of the agreed sandbox conditions *(Monetary Authority of Singapore,* 2016a; *Monetary Authority of Singapore,* 2016b; *Monetary Authority of Singapore,* 2016c*)*. To prevent a forced termination of the sandbox, the participants are required to report to the MAS on agreed intervals *(Monetary Authority of Singapore,* 2016a*)*. At the end of the sandbox period, the relaxation of the legal and regulatory requirements will expire, and the participants must exit the sandbox. However, the participants may proceed to deploy its financial services on a broader scale, if they fully comply with the relevant legal and regulatory requirements and both MAS and the participants are satisfied that the sandbox has achieved its intended outcomes *(Monetary Authority of Singapore,* 2016a*)*.

5.3.4 Regulatory Sandbox: Hong Kong

Hong Kong's regulator and supervisor of the banking business,[21] the Hong Kong Monetary Authority (HKMA), launched its Fintech Supervisory Sandbox (FSS) in September 2016 *(Hong Kong Monetary Authority,* 2019; *Hong Kong Monetary Authority,* 2016*)*. Further initiatives by the HKMA, like the FinTech Facilitation Office, were implemented to enable

[21] See https://www.hkma.gov.hk/eng/key-functions/banking-stability.shtml for further details (Accessed: 04.07.2018).

a solid development of the local FinTech sector and to promote Hong Kong as a major FinTech hub in Asia *(Hong Kong Monetary Authority,* 2018*).*

The HKMAs' sandbox is exclusively eligible for authorized financial institutions (i.e. license holders) and their partnering technology firms and consequently precludes start-ups and non-bank institutions *(Hong Kong Monetary Authority,* 2019; *Hong Kong Monetary Authority,* 2016*).* It allows participants to conduct pilot trials without fully complying with the HKMAs' supervisory requirements. Thereby they can gather real-life data and user feedback within a controlled environment, which furthermore reduces time-to-market of new technology products as well as their development costs *(Hong Kong Monetary Authority,* 2019; *Hong Kong Monetary Authority,* 2016*).* Similar to the Singaporean approach, the HKMA does not release an extensive list of supervisory requirements that may be relaxed. Instead, relaxations will be discussed on a case-by-case basis with every individual applicant. Generally, all innovative FinTech products and services such as mobile payment services, biometric authentication, blockchain, robotics and augmented reality are in the focus of the sandbox, if they are intended to be launched in Hong Kong. In addition to external customers, also company staff members can be in the focus groups of targeted customers during the testing phase. From September 2016 to March 2019, 48 pilot trials were conducted in the sandbox, whereby 32 participants already exited and successfully rolled out their products and services. The tested FinTech products related largely to biometric authentication, application programming interfaces, Regtech and mobile application enhancements *(Hong Kong Monetary Authority,* 2019; *Hong Kong Monetary Authority,* 2016*).*

For the participation in the sandbox, the HKMA requires clearly defined terms concerning the scope, the timing and the termination of the pilot trials. Similarly, the HKMA strictly maintains on sufficient customer protection measures and reasonable risk management controls to mitigate risks that arise from the incomplete compliance with supervisory requirements. Therefore, the HKMA clarifies that the sandbox shall not be understood as a mean to bypass applicable supervisory requirements. Finally, the regulator requires the readiness of the systems and processes for the trial, which is moreover subject to close monitoring. The duration of the sandbox, exit arrangements, client limitations as well as the maximum exposure are not specified by the HKMA, but are instead agreed upon a case-by-case-basis in individual discussions *(Hong Kong Monetary Authority,* 2019; *Hong Kong Monetary Authority,* 2016*).*

Alongside the HKMA's sandbox approach, the Hong Kong Securities and Futures Commission (SFC)[22] (i.e. SFC Regulatory Sandbox) and the Hong Kong Insurance Authority (IA) (i.e. Insurtech Sandbox) each launched their respective sandbox solutions in September 2017 *(Securities and Futures Commission,* 2017b; *Insurance Authority,* 2018*)*. While the HKMA's sandbox only applies to authorized financial institutions, the SFC's sandbox is applicable to both, corporations licensed by the SFC and start-up firms that intend to operate a regulated activity and utilize innovative technologies. Further requirements largely correspond to the HKMA, as also key investor protection requirements are not permitted to be relaxed *(Securities and Futures Commission,* 2017b; *Securities and Futures Commission,* 2017a*)*. Likewise, the SFC can impose licensing conditions that limit the type and maximum exposure of those clients the firms plan to serve. Additionally, it can impose requirements to install adequate compensation schemes for investors, or to submit to periodic supervisory audits, facilitating a closer monitoring and supervision by the SFC *(Securities and Futures Commission,* 2017b; *Securities and Futures Commission,* 2017a*)*. Lastly, the target audience of the IA sandbox are insurers authorized by the IA seeking for a controlled environment to test their Insurtech and other technology initiatives, which they intend to launch in Hong Kong. The IA prescribes analog principles applicable for the sandbox and does not publish an exhaustive list of supervisory requirements that may be relaxed, as each application will be evaluated on a case-by-case basis *(Insurance Authority,* 2018*)*.

5.3.5 Regulatory Sandbox: US

In the US, no comprehensive regulatory sandbox concept as compared to the UK exists. Rather, authors and representatives do not agree whether there is a regulatory sandbox in operation or not *(Bologna,* 2017; *Jenik/Lauer,* 2017; *Accenture,* 2016*)*. However, independently from whether or not a regulatory sandbox exists in the US, one has to state that this issue is not only discussed frequently[23] but also that several regulatory initiatives, addressing innovation in the financial services sector, exist.

First of all, the Consumer Financial Protection Bureau (CFPB), one of many regulatory authorities in the complex and fragmented US financial regulatory system *(Gerlach et al.,* 2016*)*, launched its "Project Catalyst" in November 2012. This initiative is based on the

[22] Regulator of the Hong Kong's securities and futures markets; see: https://www.sfc.hk/web/EN/about-the-sfc/our-role/ for further details (Accessed: 04.07.2018).

[23] For instance, discussions regarding the benefits and downsides of regulatory sandboxes in general and the question whether and how a sandbox should be implemented in the US *(Allen,* 2018*)*.

CFPBs' belief that innovative developments imply markets working better for both consumers and suppliers of financial services and products. The aim of Project Catalyst is to facilitate innovation in order to enable the development of both safe and beneficial products and services in the financial services sector. In this regard, the CFPB announced a threefold strategy, consisting of the establishment of communication channels with stakeholders,[24] the development of programs and policies which support consumer-friendly innovation and finally the engagement in pilot projects as well as research collaborations *(Consumer Financial Protection Bureau,* 2016b*).* As a result, the CFPB developed the "Policy To Encourage Trial Disclosure Programs" and "Policy on No-Action Letters". The rationale of the "Policy To Encourage Trial Disclosure Programs", which became effective in October 2013, is to improve the way consumers receive information (e.g. regarding costs, benefits and associated risks) which are necessary to decide whether or not to use certain financial products or services. This again should increase competition and transparency, imply improved consumer understanding and lead to better-informed decision-making. In this respect, the CFPB has the authority to waive, for a defined time frame, certain disclosure requirements for companies with innovative versions and ideas for disclosures *(Consumer Financial Protection Bureau,* 2016b; *Consumer Financial Protection Bureau,* 2013*)*. Moreover, similar to the FCAs' approach, the CFPB has the authority to issue no-action letters ("Policy on No-Action Letters", issued February 2016). In such a letter, which (following a formal application of potential companies) can be issued by the CFPB, staffs state that there is no intention to recommend enforcement or supervisory action against the company. However, a no-action letter is, for instance, limited to a predetermined period and certain statutes or regulations as well as possibly limitations regarding the volume of transactions. Using this tool, the CFPBs' aim is to prevent the regulatory framework in hindering innovation and to reduce regulatory uncertainties, which ultimately should promote the development of consumer-friendly innovations *(Consumer Financial Protection Bureau,* 2016b; *Consumer Financial Protection Bureau,* 2016a*).* To date, this tool was used once in September 2017, issued to an online lending platform *(Consumer Financial Protection Bureau,* 2017; *Bologna,* 2017*).*

Additionally, the "Financial Services Innovation Act of 2016" was published in September 2016. This initiative implements several actions to be conducted by agencies, whereas "agencies" comprise many regulatory authorities, boards, commissions etc. Each agency shall regularly identify and publish existing regulations, which both apply or may apply to

[24] e.g. entrepreneurs, innovative businesses, other regulators.

financial innovation and which the agency would consider to modify or waive. The act requires the agencies to set up a Financial Services Innovation Office (FSIO) in order to promote and assist financial innovations. In special circumstances and if appropriate,[25] agencies shall, acting through its FSIO, waive existing regulations. The act enables firms that offer or intend to offer financial innovations to submit a petition to an agency. This may result in the agencies' FSIO entering an agreement with the requesting company, which implies modifications or waivers for regulations where the agency has authority. Within the time frame from receiving the petition until the determination, the respective authority may undertake no enforcement actions which are related to the financial innovations that are subjected to the petition ("Safe Harbor") *(Mc Henry,* 2016b*).*

Finally, the U.S. Commodity Futures Trading Commission (CFTC) launched another FinTech initiative in May 2017, named LabCFTC. This initiative, which again is limited to the CFTCs' authorities and overseen markets, has a twofold purpose: Firstly, it aims at increasing regulatory certainty in order to encourage innovation, thus quality, resilience and competitiveness. Secondly, the CFTCs' objective is to identify and utilize new technologies. In order to accomplish this goals, the CFTC fosters a proactive engagement with the innovator community, academia, students and professionals, its participation in studies and research, the collaboration and cooperation among the FinTech industry as well as the CFTF market participants and the financial regulators both at home and overseas *(U.S. Commodity Futures Trading Commission,* 2017*)*

5.4 Proposal of a Regulatory Sandbox Concept for Germany

Despite the variety of successful[26] and promising sandbox approaches worldwide, to date no such solution to the trade-off between sound regulation and promotion of innovation (in the financial sector) in Germany exists. However, as the previous analysis indicates, current regulatory concepts differ in several specifications, thus, there neither seems to be a "one size fits all solution" nor a general assessment regarding benefits and downsides of the applied concepts is possible. Nevertheless, we can use the findings of our detailed analysis as a foundation to develop a set of recommendations for a regulatory sandbox concept specifically for the German market, which is in line with the regulatory framework[27] and objectives. However, the analysis also indicates that despite the discretion in licensing and

[25] e.g a rule being burdensome.
[26] In terms of usage and successful market entries of participating FinTechs.
[27] A possibly implemented regulatory sandbox needs to be in line with relevant national and international law and its scope is limited to the national supervisors' power and authority within the respective legislation.

other supervisory requirements, most of the sandboxes remain strict on fundamental regulations relating to consumer protection and anti-money laundering. Thus, as often challenged by the BaFin *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*, the core mandates of financial regulation to ensure the efficiency and stability of the financial system and to create a level playing field between market participants, are not compromised during the period of a regulatory sandbox.

Meanwhile the German banking supervisor BaFin[28] realized the need for a certain degree of flexibility in the context of FinTech and has henceforth dedicated itself to their diverse concerns. Against the background of the BaFins' objective to create a contemporary supervision without compromising its core mandates[29] *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016; *Bundesanstalt für Finanzdienstleistungsaufsicht,* 2018a*)*, the aim of this section is to develop a sandbox framework which is applicable in the German regulatory environment. Similarly to the scrutiny of the legal and regulatory framework, also the regulators capacity as well as the market conditions of a particular country must be considered when developing a regulatory sandbox *(Jenik/Lauer,* 2017*)*. However, as shown in sections 2.2 to 2.5, both the global and national developments in the FinTech markets as well as Germany being identified as one of the major representative FinTech markets worldwide, clearly provide strong evidence of the need for action in this regard. Moreover, from a theoretical point of view, particularly with regard to market entry barriers and its potential consequences as well as the principal-agent theory with its potential adverse selection and moral hazard issues, it seems favorable to address this topic.

To facilitate the implementation of a regulatory sandbox in practice, the following suggestions are divided into three phases and address the same criteria as used in section 2 to analyze the respective sandbox concepts:

Objectives and scope		
Application phase	Testing phase	Exit phase

Figure 4: Phases of the proposed regulatory sandbox framework.

The first phase concerns the FinTechs' prerequisites to apply for the sandbox. Generally, the sandbox should be applicable for both, start-ups and incumbents respectively licensed

[28] According to § 6 sec. 1 KWG.
[29] In line with § 6 sec. 2 KWG.

and unlicensed companies that intend to operate regulated financial services[30] under the BaFin. This all-embracing approach ensures a level playing field between market participants and thus cannot be confused with an economic promotion, which the BaFin has no mandate for *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*. The proposed services should be innovative in the way that they include new technology or utilize existing technologies in a novel or reinvented way. In addition, the written application must contain clear and concrete information, how the firms plan to operate during the testing phase, which include distinct definitions of the test scenarios, targeted customers, the expected exposure as well as a clear exit and transition strategy. Moreover, the applicants are supposed to have safeguards and risk management controls already in place, which meet the BaFins' requirements to appropriately protect consumers and the soundness of financial system during the sandbox period. Thus, risk identification and mitigation strategies depict important eligibility criteria to be permitted to participate in the sandbox. However, this screening process of the regulator, who represents the uninformed principal, is an adequate instrument to reduce ex ante private information (i.e. pre-contractual opportunism) held by the applicants, which represent the agent. Thus, potential adverse selection issues – driven by hidden information as part of the principal-agent problem – would yet be diminished *(Akerlof,* 1970; *Ross,* 1973; *Rothschild/Stiglitz,* 1976*)*. Finally, there shall not be any application-deadlines as under the cohort-approach in the UK, however, the FinTechs must demonstrate their organizational preparedness to conduct the trials and to enter the market within an adequate time frame before applying.

Secondly, the implementation of the testing-phase shall then be conducted in close cooperation with the supervisor. As the BaFin intends to review each business model individually *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*, a case-by-case evaluation of adequate allowances and potential relaxations of specific regulatory requirements seems to be the most suitable approach in the German context. This facilitates both parties to jointly define clear boundary conditions such as the maximum number and type of clients as well as the maximum exposure and the time frame of the sandbox period. Similarly, an individual relaxation of certain regulations is eligible under this approach. Notably the authorization requirements according to § 33 KWG constitute a potential reference point in this respect, as amongst others the initial capital requirements of § 33 sec. 1 KWG may represent major hurdles especially to young firms. This alternative certainly requires the supervisor to thoroughly assess and balance those regulations that

[30] According to § 1 sec. 1, 1a KWG.

pose concrete issues or barriers to an individual FinTech and thus may be relaxed for a limited time, without putting the trust in the financial system at risk.

Furthermore, this principle-based sandbox approach enables the BaFin to react to each firm in an adaptive way, providing FinTechs with the flexibility they require in their respective stage of development. However, it must be clear that the core principles of consumer protection, anti-money laundering and countering the financing of terrorism policies *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2018a*)* will not be compromised at any time. The achievements of the already operating sandboxes suggest a time frame of participation of at least six month, during which the FinTechs have time to test their innovative products or services and to develop the capability to fully comply with the relevant regulatory requirements before exiting the sandbox. Finally, the trials shall be subject to close monitoring by the responsible supervisor. Therefore, the participants should be requested to provide periodic reports. These reports would represent an effective monitoring tool for the supervisor (i.e. the principal) to reduce the FinTechs' (i.e. the agent) freedom of action for post-contractual opportunistic behavior in terms of hidden action, which potentially may cause moral hazard issues *(Hölmstrom,* 1979*)*. Since the ongoing supervision of institutions by the BaFin is executed in cooperation with the Deutsche Bundesbank,[31] those reports and resulting consultation may also be conducted by the latter.

Thirdly, the exit from the sandbox and the transition to a fully-fledged financial institution represents the final stage of the sandbox-participation, if a FinTech succeeds to fully comply to all relevant regulations and furthermore demonstrates a reliable technology, which can operate under the same supervision requirements as authorized institutions. Otherwise, a FinTech is not allowed to continue operations as the relaxation of regulatory requirements expire. Either way, the participants should be induced to provide a final report of its experiences and suggestions to facilitate a knowledge-exchange, giving the supervisor the chance to learn and continuously improve the approach.

These general suggestions for guidelines, if adequately applied, would not only preserve the trust in the financial system but also counteract the BaFins' concerns that sandboxes could potentially degrade consumer protections by creating a "supervision light" *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*. On the contrary, a sandbox developed on this basis does not contradict any of the supervisors' statutory duties and would moreover create a level playing field for market participants, which is clearly

[31] According to § 7 KWG.

distinctive from a mere economic promotion of young start-ups. It would enable licensed as well as unlicensed start-ups and incumbents to test their innovative services in a controlled environment by the BaFin, thereby accelerating their time-to-market and access to capital. In summary, a German sandbox developed on this basis, could represent a sound solution to the above derived trade-off between encouraging innovation and ensuring compliance to regulations.

5.5 Conclusion

With this study, we aimed at developing a sandbox framework that is applicable in the German regulatory environment without compromising core regulatory objectives. Capital, liquidity and licensing requirements imposed by financial regulations pose a major hurdle for young FinTechs to enter the markets. Economic growth and customer welfare through innovation, increasing consumer choice and lower prices in the course of an entry of new FinTechs would yet be restricted. Through its ability to reduce time-to-market for FinTechs, a regulatory sandbox is a useful approach to overcome the regulatory barriers to entry and to foster competition in the financial markets while ensuring consumer protection and financial stability. Otherwise, young firms may be encouraged to circumvent those regulatory barriers by unauthorized and arbitrary operations, which in turn may cause new costs and sanctioning effort for regulators and supervisors as well as the emergence of shadow-banking markets *(Ringe/Ruof,* 2018*)*. A further consequence may be the emigration of entrepreneurs to alternative and in this regard more dedicated economies. This again may, by affecting the innovativeness within the German financial services sector negatively, worsen its competitiveness and eventually impair the national economies' condition. The implementation of innovation hubs, however, does not represent a holistic approach to this topic and should not be used to justify an omission of an – from our point of view – indispensable and integral regulatory sandbox concept. Finally, it seems favorable to address this topic not only from a practical but also from a theoretical point of view. This may be emphasized by taking into account the both empirically and theoretically discussed consequences of market entry barriers as well as with principal-agent problems. In this respect, we utilized the traditional principal-agency theory in the context of the relationship between the regulators and the FinTechs to demonstrate the capability of a sandbox approach to reduce typical principal-agent problems arising from adverse selection and moral hazard. The agents' (FinTechs) opportunistic behavior to pursue its personal interest at the expense of the uninformed principals (regulators) may be countered by a

comprehensive application process (i.e. screening) as well as a constant dialogue and regular reports (i.e. monitoring). During the sandbox period, the potentially unexperienced FinTechs obtain the opportunity to understand and thereupon meet the regulatory requirements, while the competent authorities can assess the inherent opportunities and risks of the innovation.

Building on a detailed analysis of various sandbox models worldwide, which were systematically identified as relevant, we proposed an own set of recommendations as a basis for an accessible and sustainable sandbox implementation. These recommendations have the potential to contribute to the solution of the trade-off between sound regulation and innovation support. In doing so, we also contribute to different strands of literature regarding the evolution and general understanding of FinTechs and its services, the recent discussions of an optimal design of sandbox concepts and – specifically for the German market – the existing regulatory frameworks and their approaches to FinTech-supervision. In this regard, this study represents to our best knowledge the first study on key international sandboxes as a basis to design guidelines for a regulatory sandbox concept specifically for the German market. Hence, since the responsible regulator itself recognized a "need for action" in this regard *(Bundesanstalt für Finanzdienstleistungsaufsicht,* 2016*)*, we not only contributed to the identified research gap in literature but also to the practical solution of current challenges that both regulators and affected companies face. However, even though our derived implications focus on the Germany financial sector, the results may potentially be applicable in further jurisdictions with similar regulatory requirements. Additionally, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets.

Nevertheless, it is important to mention that this paper neither can provide a detailed regulatory framework for the German FinTech market and nor did we aim at this. Rather, we encourage to interpret this study as a "call for action" regarding the identified "need for action" by providing systematically derived general guidelines as a basis for further discussions and the implementation of a regulatory sandbox concept in Germany. Further limitations concern divergent legal systems (i.e. case law/code law) as well as cultural differences between the considered countries, in which Germany represents a code law country with a high reliance on comprehensive codes and laws *(Zogning,* 2017; *Durand/Tarca,* 2005*)*. It is important to highlight that so far no empirical evidence regarding the assumed contribution of regulatory sandboxes to the trade-off between sound regulation and innovation support exists. Notwithstanding, based on conceptual and qualitative

considerations we expect this causality to most likely exist.

Partly derived from these limitations, we identified needs for future research. Firstly, our analysis of various sandbox models worldwide can be used as a basis for further research, which focuses on other than the German financial markets. Secondly, subjected to accessible data, future research should empirically investigate the assumed interconnection of the existence of regulatory sandbox concepts and the resolutions of the identified trade-off. Additionally, it would be highly interesting to research on the question whether and how differing characteristics in national regulatory sandbox concepts imply differences in the efficiency and performance of those concepts, particularly in respect to the emergence and success of FinTechs. Since these questions are highly relevant for the sustainability and efficiency of financial industries and thus the sustainable and long-lasting competitiveness of national economies, we encourage both practitioners and researchers to further focus on these issues.

5.6 Appendix: Comparison of as relevant identified regulatory sandboxes

Criteria	UK	US	Australia	Singapore	Hong Kong		
					FSS	SFC Regulatory Sandbox	Insurtech Sandbox
General aspects							
Responsible Regulator	FCA	Several	ASIC	MAS	HKMA	SFC	IA
Starting time	Jun. 2016	Several	Dec. 2016	Nov. 2016	Sept. 2016	Sept. 2017	Sept. 2017
Stage of implementation	In operation	Several	In operation	In operation	In operation	In operation	In operation
Objective	The regulatory sandbox aims at delivering more effective competition in the interests of consumers by • the ability to test products and services in a controlled environment • reducing the time-to-market at potentially lower cost • supporting the identification of appropriate consumer protection safeguards • better access to finance The overall aim of "Project Innovate" is to foster competition and growth in the financial services sector by supporting both small and large business, which develop products and services that genuinely improve consumers' experience and outcomes.		The regulatory sandbox aims at assisting and supporting FinTechs to test their products and services in an environment with reduced regulatory requirements whilst safeguarding adequate consumer protection. Moreover, the concept aims at facilitating innovation, accelerating time-to-market and improving flexibility and access to capital.	The regulatory sandbox aims at assisting and supporting FinTechs to test their products and services in an environment with relaxed legal and regulatory requirements, however consumer protection and financial stability must not be deteriorated.	The regulatory sandbox enables financial institutions to conduct pilot trials to gather real-life data and user feedback in a controlled environment. Since there is no demand to fully comply with the regulatory requirements the time-to-market of new products and services as well as development costs should be reduced.	The regulatory sandbox helps to give regulatory certainty regarding risks that are relevant to the entities' regulated activities. It provides a confined regulatory environment before innovative products and services are offered on a larger scale.	The regulatory sandbox aims at facilitating pilot runs to collect sufficient data in order to demonstrate that certain Insurtech applications can broadly meet relevant supervisory requirements. Moreover, before launching a product or service on a large scale, the sandbox firms should obtain real market data and user feedback in a controlled environment.
Scope / Content	Firms in the sandbox may be provided with "sandbox tools" to conduct the test within the regulatory framework, e.g. • restricted authorization • individual guidance • waivers • no enforcement action letters	Policy to Encourage Trial Disclosure Programs: The rational is to improve the way consumers receive information, which are necessary to decide whether to use certain financial products or services. This again should increase competition and transparency, imply improved consumer understanding and lead to	The framework consists of three components: • Existing flexibility or exemptions provided by law • FinTech licensing exemptions applicable to certain products or services • Individual licensing exemptions	Relaxation of specific legal and regulatory requirements for operating MAS-regulated functions on a case-by-case basis. Legal and regulatory requirements that may be relaxed consist e.g. • fund solvency and capital adequacy • license fees	The regulatory sandbox allows banks and their partnering technology firms to conduct pilot trials without fully complying with the HKMA's supervisory requirements. Relaxations will be discussed on a case-by-case basis with every individual sandbox firm.	No relaxation of regulatory requirements, which are key to investor protection. Sandbox firms must comply with the applicable financial resources requirements.	Flexibility in the supervisory requirements on a case-by-case basis.

	Sandbox firms are assigned a dedicated case officer who supports the design and implementation of the test. The FCA works closely with sandbox firms to ensure that sufficient safeguards are in place and to mitigate potential harm during and after the test period.	better-informed decision-making. In this respect, the CFPB has the authority to waive, for a defined period, certain disclosure requirements for companies with innovative versions and ideas for disclosures. Policy on No-Action Letters: The rational is to prevent the regulatory framework in hindering innovation and to reduce regulatory uncertainties, which ultimately should promote the development of consumer friendly innovations. Entities may formally submit a request for a No-Action Letter. In such a letter, the CFPB may state that there is no intention to recommend enforcement or supervisory action against the company. No-Action Letters may for instance be limited to a predetermined period and certain statutes or regulations as well as possibly limitations regarding the volume of transactions. IRS Data Verification Modernization Act of 2016: Initiative that aims to automate and speed up taxpayers' income verification process for legitimate business purposes. The verification process should be conducted entirely automated, electronic, online and close to real-time in order to prevent delays for FinTech companies and banks that rely on leveraging data and technology to make faster, informed decision for consumer and small business lending.	Only licensing requirements are waived, not regulations.	Requirements that must be maintained consist • consumer protection • prevention of money laundering and financing of terrorism • fit and proper criteria particularly on honesty and integrity			

		Financial Services Innovation Act of 2016: This act requires agencies (e.g. regulatory authorities, boards, commissions) to • identify and publish a list of existing regulation that apply or may apply to financial innovation and that the agency would consider modifying or waiving • establish a FSIO in order to promote and assist financial innovations as well as eventually waive existing regulations The act further enables entities that offer or intend to offer financial innovations to submit a petition to an agency in order to reach individual agreements regarding modifications or waivers for certain regulations. LabCFTC: Initiative by the CFTC that aims at increasing regulatory certainty in order to encourage innovation and to identify and utilize new technologies.					
Eligibility to apply for participation	Sandbox is open to • both start-ups and incumbents • authorized and unauthorized firms Applications must • explain proposition • meet the default standards (e.g. duration, number of customers, customer selection and safeguards) • meet the eligibility criteria (firm in scope? Genuine innovation?		Exemption excludes license-holders (established financial institutions) and covers mostly early-stage financial institutions (start-ups).	The regulatory sandbox is applicable for trials of new financial services by both (unregulated) FinTech start-ups and large (regulated and licensed) financial institutions.	The regulatory sandbox only applies to authorized financial institutions (i.e. license holders) and their partnering technology firms, excluding start-ups and non-bank institutions.	The Sandbox is applicable to corporations licensed by the SFC and start-ups that intend to operate a regulated activity under the Securities and Futures Ordinance (SFO).	The regulatory sandbox only applies to insurers authorized by the IA.

	Consumer benefit? Need for a sandbox? Ready for testing? Background research?)						
Targeted customers?	Sandbox firms are expected to source (potential) customers by themselves. The appropriate type of customers is expected.		Retail, wholesale and sophisticated clients. No sectorial restrictions.	Sandbox firms can choose the type of targeted customers. No limitations, specifications or sectorial restrictions. Agreed on a case-by-case basis.	Company staff members or focus group of selected customers. Agreed on a case-by-case basis.	SFC can impose licensing conditions, which limit the types of clients.	External customers, which can give live and real data or selected group of the insurers' staff. Clear definition of targeted users on a case-by-case basis.
Targeted products / services?			Products and services allowed to be tested: • Financial services (giving financial advice and dealing with certain products such as listed Australian securities, deposits and payment products; however, no issuing of financial products allowed) • Credit activities (limited to activities as intermediary or assistant and further limitations such as volume; however, no allowance to act as a credit provider)	Financial services that are not similar to already offered ones. Thus, financial services must include new or emerging technologies or use existing technologies in an innovative and different way.	All innovative FinTech products and services, e.g. mobile payment services, blockchain, robotics, augmented reality, biometric authentication.	All under the SFO regulated activities that utilize innovative technologies.	Innovative Insurtech applications.
Targeted region?				Sandbox firms must have intention and ability to deploy its financial services in Singapore. However, the broader scale deployment is not limited to Singapore.	Technology initiatives must be intended to be launched in Hong Kong.		
Transition plan for full development / actions following the sandbox test	The sandbox firms must submit a final report summarizing the outcomes of the test before transitioning out of the sandbox. The report also should summarize the sandbox firms' findings and next steps.		At the end of the testing period, the sandbox firms are not allowed to continue operations, unless • they granted a financial services or credit license • they entered into an arrangement to provide services on behalf of a financial services or credit licensee • the ASIC has given it individual relief	At the end of the sandbox period, the relaxation of the legal and regulatory requirements will expire and the sandbox firms must exit the sandbox. The sandbox firms may proceed to deploy their financial services on a broader scale, if they can fully comply with the relevant legal and regulatory requirements.	Termination arrangements must be pre-specified.	Sandbox firms can request a removal or variation of some or all of the imposed licensing conditions, once they have demonstrated a reliable technology.	The sandbox firms must have an exit strategy if the pilot run has to be terminated unsuccessfully.

			extending its testing period				
Limitations							
Entry criteria	Sandbox firms are expected to have a clear objective. Tests are expected to be conducted on a small scale. Sandbox firms are expected to have clear testing plans, including • timeline and key milestones • measures to evaluate the success of the sandbox test • testing parameters (e.g. duration, customers, transaction limit) • customer safeguards • risk assessment • exit strategy Eligibility criteria must be met, e.g. • Is the firm in scope? • Genuine innovation? • Consumer benefit? • Need for a sandbox? • Ready for testing? Further criteria: Sandbox firms are • are responsible for securing partners • required to have a significant UK presence • (usually) required to have a UK bank account		To rely on the licensing exemption, the sandbox firms must • have no more than 100 retail clients • have a total client exposure not exceeding AUD 5 million • comply with consumer protection requirements • have adequate compensation arrangements • have both internal and external dispute resolution procedures in place	Sandbox evaluation criteria: • Financial services include new technologies or use existing technologies in an innovative way • Financial services address a problem or brings benefits to consumers and / or the industry • Intention and ability to deploy the proposed financial services in Singapore on a broader scale (after exiting the sandbox) • Clearly defined test scenarios and expected outcomes • Clearly defined boundary conditions, protecting the interests of consumers • Significant risks must be assessed and mitigated • Clearly defined exit and transition strategy	• Clearly defined scope and phases (if any) of the pilot trial, timing and termination arrangements • Sufficient customer protection measures • Reasonable risk management controls • Readiness of the systems and processes for the trial	• SFC can impose requirement to install adequate compensation schemes for investors or to submit to periodic supervisory audits • Sandbox firms may face close monitoring and supervision by the SFC	Principles applicable for the Sandbox: • Well-defined boundary and conditions of the trial • Adequate risk management controls to meet of the relevant supervisory requirements • Adequate safeguards to ensure customer protection • Adequate resources • Development of an exit strategy
Exit criteria / Exit strategy for test failure				The sandbox will be discontinued when • the achievement of the intended purpose is unclear • the sandbox firm is not capable to fully comply with the relevant legal and regulatory requirements at the		The SFC may revoke the license if the sandbox firms fail to meet regulatory requirements.	

				end of the sandbox period • a flaw has been discovered in the financial service, which cannot be resolved within the duration of the sandbox and the risks outweigh the benefits • MAS terminates the sandbox due to breaches of agreed sandbox conditions • the sandbox firm exits the sandbox			
Duration	The sandbox operates on a cohort basis, 2 cohorts per year, each test period 6 months. Long enough to enable statistically relevant data to be obtained from the test.		12 months, extension option for another 12 months.	Limited. Agreed on a case-by-case basis. Extension option available.	Limited. Agreed on a case-by-case basis.		Limited. Agreed on a case-by-case basis.
(Max.) number of customers	• FCA sets a strict limit to the size of the test (small scale testing) • Customer set should be big enough to obtain statistically relevant data Sandbox firms are requested to disclose information regarding the test, e.g. available compensation in the event of failure.		• Retail: maximum of 100 clients • Wholesale: unlimited Extension option for client limit available.	Limited. Agreed on a case-by-case basis.	Limited. Agreed on a case-by-case basis.		
Max. exposure			• The exposure of each retail client to deposit products, simple managed investment schemes, securities, government bonds and payment products in relation to which services are provided must not exceed AUD 10,000 • The amount of credit under a credit contract in relation to which services are provided must not exceed AUD 25,000	Not specified. Sandbox firms have to state and justify quantifiable limits such as transaction thresholds or cash holding limits.		SFC can impose licensing conditions, which limit the maximum exposure of each client.	

			• The sum insured under a general insurance contract in relation to which services are provided must not exceed AUD 50,000 • The total maximum exposure of all clients taking part in the testing must not exceed AUD 5 million				

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