Can Accounting Regulation Strengthen Resilience? The Impact of IFRS 9 Adoption on Loan Loss Provisioning and Bank Behavior

Abstract:

Traditionally, academic research on loan loss provisions and thus on the ICL model has a long history in the literature and has been the subject of a large number of empirical studies (see for example for an overview Beatty and Liao, 2014; Ozili and Outa, 2017). The objective of this paper is to extend the research field with an empirical contribution to the buildup of LLPs based on the Expected Credit Loss model. By using an experimental research design, the paper aims to investigate the impact of accounting standard changes on behavioral management and, consequently, on the resilience capacity of bank institutions. The paper thus provides early empirical evidence of the IFRS 9 transition for bank supervisors, governments, and financial analysts.

Keywords: IFRS9, Risk Disclosure, Asset Quality, Loan Loss Provisioning

JEL-Classification: G21, G28, G32, G38, M48

1. Introduction

In the course of the replacement of International Accounting Standard 39 Financial Instruments: Recognition and Measurement (IAS 39) by International Financial Reporting Standard 9 Financial Instruments (IFRS 9), risk reporting under accounting law is also undergoing a fundamental revision. The transition from the backward-looking incurred loss model to the forward-looking expected credit loss model of IFRS 9 has increased the spotlight on credit risk disclosure. With the revised impairment model, the IASB is responding to ongoing criticism of the existing impairment model (Barth and Landsman, 2010) and is replacing it with a three-stage expected credit loss model for loan loss provisioning as of the 2018 financial year (IASB, 2014a).[1] The previous accounting approach for loan loss provisioning under IAS 39 was too low in the recognition of changes in credit risk and did not kick in until the loss event occurred ("too little, too late"), which had an amplifying procyclical effect, especially in times of crisis (BCBS, 2021, 2015; Laeven and Majnoni, 2003).

Early normative analyses of the IFRS 9 expected credit loss model indicate an earlier recognition and higher loan loss provisions to be expected overall (Novotny-Farkas, 2016). Preliminary surveys by the European Banking Authority (EBA) in 2016 also have confirmed this, stating that income volatility will also be higher (EBA, 2016a). Due to the amendment of the International Financial Reporting Standard 7 Financial Instruments Disclosure (IFRS 7) and extended regulatory disclosure requirements of the supervisory authority, there is still an enhanced opportunity for market discipline and thus improved financial market stability despite the IFRS 9-related options of the ECL model (Novotny-Farkas, 2016). Indeed, the Basel Committee on Banking Supervision (BCBS, 2018, 2016a, 2016b) and the European Banking Authority (EBA, 2018, 2016b) have provided guidance for model specific risk disclosure and the design of the accounting-related control system. [2] Further extensive guidance on the initial disclosure of the ECL model and the associated adjustment of risk governance processes has been published by the Enhanced Disclosure Task Force of the Financial Stability Board of the G20 (EDTF, 2015).

[1] In the European Union in particular, the first-time application of IFRS 9 was accompanied by an endorsement procedure by the European Parliament lasting several years. For a comprehensive overview of the endorsement process for IFRS 9, see the remarks by (Bischof and Daske, 2016).
[2] These include, among others, transition matrices and options for the amortization of the first-time adoption effect.

Traditionally, academic research on loan loss provisions and thus on the ICL model has a long history and has been the subject of a large number of empirical studies (see for an overview esp. Beatty and Liao, 2014; Ozili and Outa, 2017). The objective of this paper is to extend the field of research with an empirical contribution to loan loss provisioning based on the Expected Credit Loss Model. Employing an experimental research design using a difference-in-differences approach over the period 2016-2019, this paper aims to investigate the impact of accounting standard changes on bank behavior and on bank resilience. The paper thus provides early empirical evidence of the IFRS 9 transition for bank supervisors, governments, and financial analysts. We also provide comparable evidence on the impact of ECL provisioning, especially in the light of the upcoming CECL application in the United States.

In the first part of the paper, the effect of the IFRS 9 adoption on the earnings management and the forward-looking characteristics of LLPs due to a timely recognition will be considered. In particular, the effects of income smoothing, and discretionary loan loss provisions discussed in the ICL literature will be addressed. As a subsequent research question, the effect of the IFRS 9 transition on the resilience of the financial institution will be investigated. As key determinants of a resilient financial system, we follow the regulatory debate and use risk taking behavior and determinants to measure asset quality as a proxy to illustrate resilience. Loan loss provisions represent an essential information source, especially for the addressee, to assess the credit risk of a bank. In the context of our third research question, we will subsequently investigate the capital market reaction to the IFRS 9 transition on the basis of a market-based valuation model.

The remainder of this paper is structured as follows: Chapter 2 will first provide a brief overview of the technical characteristics of the IFRS 9 impairment model. In addition, a brief literature review of the current state of IFRS 9 research will be given and initial hypotheses derived. Chapter 3 is devoted to the empirical research design and the data set used. Chapter 4 presents the empirical results. The paper concludes with a discussion and a conclusion.

2. IFRS 9 Impairment Model, Literature Review and Hypotheses Development

2.1 Technical ECL Accounting and Disclosure Policy according to IFRS 9

As a direct consequence of the criticism of the previous accounting standard IAS 39 (FSB, 2009), the International Accounting Standard Board published the newly revised accounting standard IFRS 9 in July 2014 (IASB, 2014b). The standard is divided into the three parts *Classification and measurement*, *Impairment* and *Hedge Accounting*. In the following chapter,

the new Expected Credit Loss (ECL) model will be briefly explained and the disclosure requirements under IFRS 7 will be presented.[3]

Financial assets, lease receivables, contract assets or loan commitments, and financial guarantees must generally be classified in Stage 1 of a three-stage impairment model upon initial recognition (IFRS 9.5.5.1). In stage 1, the loss allowance for expected credit losses is measured based on a default event within the following 12 months (12-m ECL).

The measurement of expected credit losses at reporting date t can be calculated by multiplying the exposure at the time of default (EAD) with the loss given default (LGD) and the probability of default (PD) discounted with the effective interest rate to capture the time value of money (EY, 2018; KPMG, 2018, 2017):

$$\text{Stage 1:} \qquad LLP_t = PD_t^{12m} \times LGD_t \times EAD_t \tag{1}$$

At each reporting date, a risk assessment must be performed to determine whether there has been a significant increase in credit risk since the loan was granted (IFRS 9.5.5.9), which would trigger a transfer to Level 2 and an estimation of the loan losses with the liftetime ECL (LTEL) (IFRS 9.B5.5.43).

$$\text{Stage 2:} \qquad LLP_t = \sum_{k=t}^{T} PD_k^{\text{Remaining LT}} \times LGD_t \times EAD_t \tag{2}$$

For the transition from Stage 1 to Stage 2, the significant increase in credit risk is determined based on the change in the cumulative probability of default over the remaining lifetime, whereby a threshold is to be determined that can be derived from historical data of internal credit risk management (KPMG, 2017).

However, the regulatory PD migration matrices cannot be used in their entirety. Instead, the regulatory through-the-cycle estimates must be adjusted accordingly, as IFRS 9 explicitly relies on a point-in-time estimate of PD (KPMG, 2014; Novotny-Farkas, 2016). If objective indications and indications of a need for impairment, such as insolvency or payment default of 90 days or more, are observed, the transfer to Stages 3 takes place (IFRS 9.X)

[3] The following chapter is a revised version of our paper Scharpe et al (2017): Effects of IFRS 9 on risk reporting in banks with a capital market focus published in FIRM Yearbook 2017.

Stage 3: $$LLP_t = \sum_{k=t}^{T} PD_k^{\text{Remaining LT}} \times LGD_t \times EAD_t \quad (3)$$

where $r_{eff.} = \sum_{t=1}^{T} \frac{\overline{CF_t}}{(1+r_{eff.})^t}$ – gross carrying amount = 0

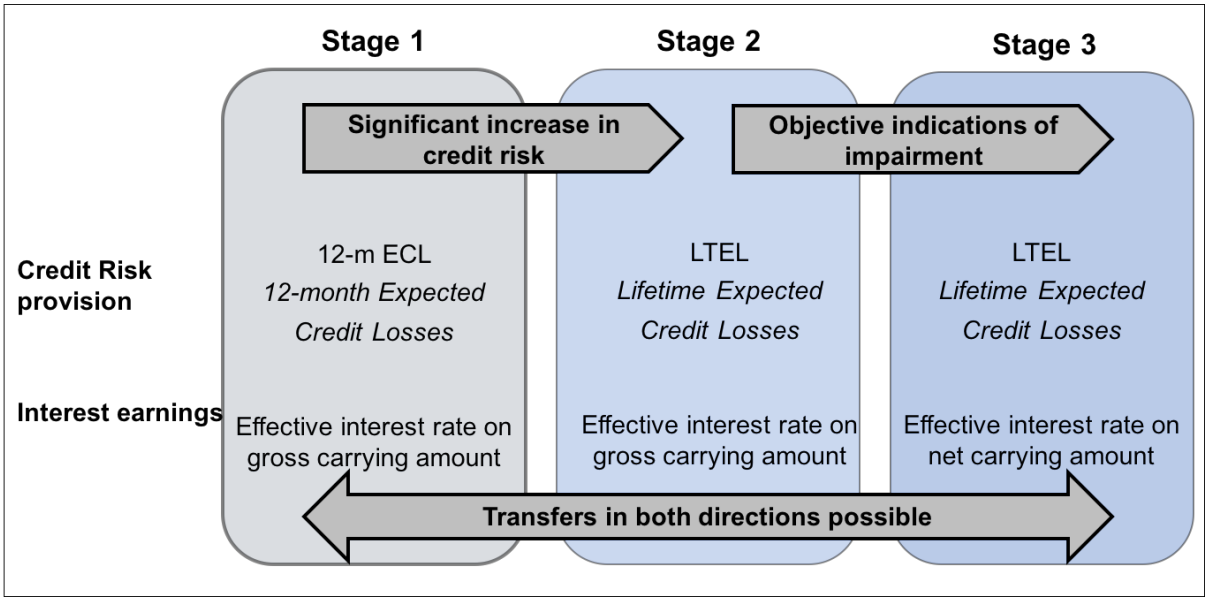

Figure 1: IFRS 9 Impairment Model, illustration in accordance with Scharpe et al. (2017).

2.2 Literature Review and Hypotheses Development

State of the Art of Empirical IFRS 9 Research

Albrahimi (2020) analyzed the adoption of the IFRS 9 ECL model and found evidence of reduced market discipline, especially in income smoothing countries. Kim et al. (2021) showcased that the shift to the ECL model significantly improved the timeliness of loan loss provisioning and that the adoption of IFRS 9 mitigates the procyclicality of bank lending and risk-taking behavior. Kund and Rugilo (2021) draw similar findings based on the European stress test dataset. In the short term, the introduction of IFRS 9 will lead to an increase in impairments due to the so-called "front-loading effect", however "financial stability benefits from the reduced "cliff-effect" in the long run" (Kund and Rugilo, 2021, p. 3). In a further study based on the EBA stress test dataset, Kund und Neitzert (2020) found evidence of regulatory earnings and capital management and an increase in impairments of stress test participants.

López-Espinosa et al. (2021) showed based on a sample of systemically important banks, "that ECL provisions are more predictive of future bank risk than ICL provisions" (López-Espinosa et al., 2021, p. 757). Additionally, they found that the effect of first-time adoption leads to lower stock returns and higher variations in CDS spreads. Oberson (2021) also found evidence

of enhanced timeliness in loan loss recognition under IFRS 9, and increased incentives for income smoothing. Based on CDS spreads, Oberson (2021) showcased that decision usefulness was increased by future expected credit losses, but earnings smoothing reduced information utility. In addition, he found evidence that strong corporate governance has an impact on LLPs and market valuation.

Forward-Looking Loan Loss Provisioning, Income Smoothing and Capital Management

Earnings management[4] emerges through the intentional use of accounting discretion with the aim of misleading the addressee "about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (Healy and Wahlen, 1999, p. 368). In the banking literature, the discretionary use of loan loss provisions is alleged to favor earnings management in particular by income smoothing (Kanagaretnam et al., 2003) and capital management (Ahmed et al., 1999; Collins et al., 1995).

There is empirical evidence that the accruals of Loan Loss Provisions are comparatively higher in economic downturns and lower in economic upturns – so called booms (Bikker and Metzemakers, 2005; Laeven and Majnoni, 2003). To mitigate this effect, banks smooth earnings by accruing income in prosperous periods and using it to smooth earnings in less prosperous times (Bikker and Metzemakers, 2005; Kanagaretnam et al., 2003). In addition to mere accounting cosmetics, there is a wide consensus, that, especially in the context of the financial crisis in 2007-2009, the recognition of loan losses was reported too slowly, with negative consequences for overall financial market stability (Bischof et al., 2021b). Furthermore, the low amount of accounting write-downs in the disclosed bank balance sheets of corporate and investment banks reflected a discrepancy with the risk exposures presented in credit indices with subsequent misinformation of market participants (Vyas, 2011).

In response to the observed weaknesses of the accounting standards in the delayed recognition of credit losses, the Financial Stability Board decided in 2009 on behalf of the Group of Twenty (G 20, 2009) to instruct accounting standard setter to fundamentally revise the incurred loss model (FSB, 2009). To which the IASB responded with the publication of the new accounting standard IFRS 9 (IASB, 2014b, 2014a) . In addition to improving the usefulness of the model for decision-making, the aim was to provide users of financial statements with an improved presentation of forward-looking loan loss provisioning. This leads to the following hypothesis:

[4] Earnings management is also known as "big bath accounting" (Kirschenheiter and Melumad, 2002) or "cookie jar reserves" (Beck and Narayanamoorthy, 2012, p. 42) in the literature.

***H1a**: The adoption of IFRS 9 has a significant impact on the timeliness of Loan Loss Provisions.*

In addition to management discretion (Kirschenheiter and Melumad, 2002; Lobo et al., 2001) or macroeconomic factors (Bikker and Metzemakers, 2005), esp. country-specific regulatory conditions influence earnings management (Leuz et al., 2003) or the risk-taking behavior and market discipline of banks (Bushman and Williams, 2012). For instance, Leventis et al. (2011) found evidence for a significant decrease in earnings management and an improvement in earnings quality due to the introduction of IFRS accounting standards in the European Union. In addition, they showed that riskier banks engage in more earnings management than less risky ones. Shen and Chih (2005) and Fonseca and González (2008) came to similar conclusions based on global studies of earnings management and the investigation of determinants influencing income smoothing. Both studies showed that, in addition to prudential regulation and supervision (Fonseca and González, 2008), accounting-related disclosure in especially had an impact on to lower earnings management (Shen and Chih, 2005) or income smoothing (Fonseca and González, 2008). Based on a sample of 231 European banks, Peterson and Anrun (2018) obtain slightly different results. They argued that stronger capital regulation generates incentives for income smoothing, especially for G-SIBs. This leads to the following hypothesis:

***H2**: The adoption of IFRS 9 has a significant impact on the decrease in earnings management (income smoothing).*

Impact of IFRS 9 on Asset Quality and Bank Resilience

The financial resilience of credit institutions has increased because of numerous macroprudential regulatory measures since the financial crisis (Committee on Banking Supervision, 2020). In addition to strengthening the capital base under capital adequacy, measures to enhance bank resilience also include bolstering the leverage ratio (LR) and the liquidity coverage ratio (LCR), as well as introducing supranational recovery and resolution mechanisms (KPMG, 2020).

The impact of loan loss provisioning on capital management has been the subject of academic debate in various jurisdictions since the ICL model (Ahmed et al., 1999; Collins et al., 1995). Ahmed et al. (1999) showed based on a U.S. sample that banks use loan loss provisions to engage in active capital management. The authors argued that "the relation between loan loss

provisions and capital is more negative for banks with above average loan growth" (Ahmed et al., 1999, p. 3). The timely recognition of loan loss provisions also has a significant impact on capital management. Beatty and Liao (2011) showed that banks with a lower delay in loan loss recognition are also less likely to curtail lending during recessions, which reduces a recession-induced capital shortage for the financial system.

Based on a global sample from 27 jurisdictions, Bushman and Williams (2012) showcased that discretionary use of LLPs in the form of income smoothing has a negative impact on disciplining banks' risk taking. The authors argued that the reduced transparency resulting from earnings management reduces regulatory market discipline and makes it more difficult for market participants to assess banks' risk exposure (Bushman and Williams, 2012).

In the academic literature, there is still a consensus that the enforcement of accounting standards has a significant negative effect on banks' risk-taking behavior (Dal Maso et al., 2020).

***H3**: The introduction of IFRS 9 has a positive effect on asset quality and thus on bank resilience.*

IFRS 9 and Value Relevance

One of the main objectives of International Financial Reporting Standards is to provide users of financial statements with a true and fair view of the financial position, results of operations and cash flows (IASB, IAS 1.15). In line with the regulatory paradigm of market discipline (e.g., Bliss and Flannery, 2002; Flannery, 1998; Stephanou, 2010), the disclosure of credit risk information on loan loss provisions also has a significant influence on the external market valuation of banks (Ahmed et al., 1999; Beaver and Engel, 1996; Wahlen, 1994). Studies on the "signaling effect" of loan loss provisions (Ahmed et al., 1999, p. 1) date back to the late 1980s/early 1990s.[5] By assumption, the market anticipates provisioning as disclosure of managers' private information about the bank's expected future earnings. Market participants use this disclosed information (so-called nondiscretionary information) to estimate the discretionary components in unexpected loan loss provisioning (Wahlen, 1994).

Based on a sample of 86 banks over the period 1984:4 to 1989:3, Wahlen (1994) found evidence that banks raise the discretionary components of disclosed loan loss provisions when the outlook for future cash flows increases. Beaver and Engel (1996) analyzed the capital

[5] First studies already go back to Beaver (1989).

market valuation of loan loss provisions and showed that the non-discretionary component is valued negatively, and the discretionary component is priced positively by the market.

A diverging conclusion is reached by Ahmed et al. (1999) based on a sample of 113 BHCs over the period 1986-1995. In principle, they could verify the positive market valuation of DLLPs by replicating the research design of Beaver and Engel (1996). Nevertheless, using a return-based approach, they state a significant negative association between DLLPs, and the stock returns considered (Ahmed et al., 1999).

Early empirical evidence suggests that first-time adoption of IFRS 9 will lead to improved decision usefulness (Oberson, 2021), but will also induce higher variations in CDS spreads (López-Espinosa et al., 2021). This leads to the following hypothesis:

***H4**: The introduction of IFRS 9 has a positive impact on the valuation of loan loss provisions on the capital market.*

3 Empirical Research Design and Methodology

3.1 Sample and Data

Within the research framework of our empirical study, a sample of global listed banks are to be considered over the sample period 2016-2019. Initially to define the population of the sample, all banks listed in the Refinitiv EIKON "Banks Total World" index are used. On this basis, 531 banks can be identified. In a second step, 53 subsidiaries of Bank Holding Companies are excluded. The final sample includes in total 478 banks from 64 countries. For the empirical analysis, fundamental data from the Refinitiv EIKON Worldscope database and macroeconomic control variables from the World Bank and the OECD were taken. In addition, the Worldwide Governance Indicators (WGI) were used to control for country-specific governance and regulation.

Table (1) about here

3.2 Methodology

3.2.1 Income Smoothing and Forward-Looking Loan Loss Provisioning

The empirical analysis of the IFRS 9 implementation effect will be carried out on several multivariate regressions covering the reporting years 2016-2019. We apply a difference-in-differences approach as "quasi-experimental research design" (Wing et al., 2018, p. 454) to study the IFRS 9 adoption effect. DiD models are particularly suitable for the analysis of

regulatory policies or even the introduction of accounting standards due to their characteristics (Bischof et al., 2021a; Poshakwale et al., 2020).

We define as treatment group all banks that prepare their annual report according to International Financial Reporting Standards (IFRS). As a Control Group, we select all banks that prepare their financial statements according to U.S. GAAP or National GAAP in the period under consideration. [6] As event date, the effective date of IFRS 9 as of January 1, 2018, is to be used. Following Bushman and Williams (2012), we use the following baseline model:

$$LLP_{it} = \alpha + \beta_1 \mathrm{Ebllp_{it}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_2 \Delta\mathrm{NPL_{it+1}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_3 \mathrm{Capital_{it-1}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_4 \mathrm{IFRS} * \mathrm{IFRS9} + \beta_5 \mathrm{IFRS} + \beta_6 \mathrm{IFRS9} + \beta_7 \mathrm{Ebllp_{it}} + \beta_8 \Delta\mathrm{NPL_{it+1}} + \beta_9 \Delta\mathrm{NPL_{it}} + \beta_{10} \Delta\mathrm{NPL_{it-1}} + \beta_{11} \Delta\mathrm{NPL_{it-2}} + \beta_{12} \mathrm{logTotalAssets_{it-1}} + \beta_{13-20} \mathrm{Macro\ Controls_{it}} + \varepsilon_{i,t} \quad (1)$$

The Subscript $i = 1, \dots, N$ describes the analyzed banks over the time periods $t = 1, \dots, N$. Equation (1) regresses LLP_{it} which describes the loan loss provisions scaled by lagged total loans on the following independent variables: As a proxy for income smoothing, we follow previous studies (Bushman and Williams, 2012) and use the variable $Ebllp_{it}$ which measures the earnings before loan loss provisions, defined as earnings before taxes plus loan loss provisions, scaled by lagged total loans. The variable $\Delta\mathrm{NPL_{it}}$ describes the change in non-performing loans scaled by lagged total loans. Following Bushman and Williams (2012), the ratio $\Delta NPL_{it+1}$is suitable for measuring the ability of actual provisions to anticipate future impairments in banks' credit portfolio. $\mathrm{Capital_{it-1}}$ describes the lagged Common Tier 1 Capital Ratio, scaled by Risk Weighted Assets. Following prior studies, we use the Capital Ratio as a proxy for capital management (Ahmed et al., 1999; Collins et al., 1995). As further bank characteristics the logarithmized total assets as a proxy for bank size is included. As macroeconomic control variables, we use the annual GDP Growth, Unemployment Rate, House Price Index and Inflation Rate. To control for country-specific features on regulation, we also use the WGI governance variables Political Stability, Government Effectiveness, Regulatory Quality and Rule of Law.

[6] For this purpose, we follow the classification of the prevailing accounting system in Refinitiv EIKON (WC07536).

The binary variable IFRS is assigned a value of 1 if the bank belongs to the IFRS treatment group and zero otherwise. The dummy variable IFRS 9 is assigned a value of 1 for reporting years starting in 2018, the effective date of the new accounting standard, zero otherwise. As further control variables dummy variables for the years 2016-2019 are added. To avoid measurement errors due to heteroskedasticity, the econometric model uses robust Huber-White standard errors clustered by banks (Petersen, 2009; Wooldridge, 2013, 2010).

3.2.2 ECL Model and Bank Resilience

To test the explanatory quality of provisioning in the wake of IFRS 9 adoption, we are following the reverse approach and the model of Bhat et al. (2019) in Equation (2) and regresses $Bank\ Resilience_{it}$ on loan loss provision and forward-looking non-performing loans:

$$\begin{aligned} Bank\ Resilience_{it} = {} & \alpha + \beta_1 \mathrm{LLP_{it}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_2 \Delta \mathrm{NPL_{it+1}} * \mathrm{IFRS} * \mathrm{IFRS9} + \\ & + \beta_2 \Delta \mathrm{NPL_{it-2}} + \beta_{12} \mathrm{logTotalAssets_{it-1}} + \beta_3 \mathrm{Capital_{it-1}} + \beta_7 \mathrm{Ebllp_{it}} + \beta_7 \mathrm{NCO_{it}} + \\ & \beta_7 \mathrm{LLLR_{it}} + \beta_7 \mathrm{LOANS_{it-1}} + \beta_{13-20} + \mathrm{Macro\ Controls_{it}} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

The Subscript $i = 1, \dots, N$ describes the analyzed banks over the time periods $t = 1, \dots, N$. To measure the impact of the revised ECL Model on bank resilience, we follow the macroprudential regulatory mechanism of the Basle Committee of Banking Supervision and use as proxies to measure bank resilience the asset quality and the effect on financial stability. In this paper, we follow Imbierowicz et al. (2018) to measure banks' asset quality and use the dependent variables $\Delta\mathrm{Capital\ Ratio_{it}}$, $\mathrm{Capital\ growth_{it}}$, $\mathrm{Loans\ growth_{it}}$ and $\Delta\mathrm{Asset\ Risk_{it}}$ as proxies. As an additional measure for banks' soundness and risk-taking behavior – and their contribution to financial stability – we follow prior studies and use the z_score_{it} (Fosu et al., 2017; Laeven and Levine, 2009).

$$z\_score_{it} \frac{ROA_{it} + CAR_{it}}{\sigma(ROA_{it})} \quad (3)$$

ROA_{it} describes the Return on Assets, CAR_{it} is defined as the Ratio of banks total equity to total assets. $\sigma(ROA_{it})$ measures the standard deviation of the return on assets. Following prior studies, we use a rolling window of three years to measure $\sigma(ROA_{it})$.

In the context of further robustness checks, we follow Fosu et al. (2017) and use the following variations of the Z-Score as risk variables:

$$z\_score(ROA)_{it} \frac{ROA_{it}}{\sigma(ROA_{it})} \quad (4)$$

$$z\_score(CAR)_{it} = \frac{CAR_{it}}{\sigma(ROA_{it})} \quad (5)$$

The Net Charge offs ($\mathrm{NCO_{it}}$) are scaled by lagged loans. Loan Loss Reserves ($LLLR_{it}$) are defined as Reserves for loans losses scaled by lagged total Loans. $LOANS_{it-1}$ measures the lagged loans. The additional independent and control variables are defined in equation (1) and in a higher level of detail with data origin in appendix A1.

3.2.3 Discretionary LLP and Bank Valuation

In our analysis of the value relevance of IFRS 9, we follow the approach of Beaver and Engel (1996) and use the Ohlson model (1995) as a market based valuation model. Following previous studies (Beaver and Engel, 1996), we differentiate the loan loss provisions into a discretionary and a non-discretionary component. Based on Beaver and Engel (1996), this leads to the formation of the following econometric model:

$$MVS_{it} = \alpha + \beta_1 \mathrm{BVS_{it}} + \beta_2 \mathrm{EPS_{it}} + \beta_3 \mathrm{GBV_{it}} + \beta_4 \mathrm{LLP_{it}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_5 \mathrm{DLLP_{it}} * \mathrm{IFRS} * \mathrm{IFRS9} + \beta_6 \Delta\mathrm{NPL_{it}} + \beta_7 \mathrm{NPL_{it}} + \varepsilon_{i,t} \quad (6)$$

The Subscript $i = 1, \dots, N$ describes the analyzed banks over the time periods $t = 1, \dots, N$ Equation (6) regresses the Market Value per Share MVS_{it} on the following independent variables: $\mathrm{BVS_{it}}$ describes the Book Value Per Shares; $\mathrm{EPS_{it}}$ measures the Earnings per shares and GBV_{it} describes the Gross Book Value of Common Equity.

The discretionary loan loss provisions $\mathrm{DLLP_{it}}$ are obtained as the residuals $\varepsilon_{i,t}$ of the following OLS regressions:

- Beaver and Engel (1996) Model:

  $$LLP_{it} = \alpha + \beta_1 \mathrm{GBV_{it}} + \beta_2 \mathrm{NCO_{it}} + \beta_3 \Delta\mathrm{Loans_{it}} + \beta_8 \Delta\mathrm{NPL_{it+1}} + \beta_9 \Delta\mathrm{NPL_{it}} + \varepsilon_{i,t} \quad (7)$$

- Collins et al. (1995) Model:

  $$LLP_{it} = \alpha + \beta_1 \mathrm{LLR_{it-1}} + \beta_2 \mathrm{NPL_{it-1}} + \beta_3 \Delta\mathrm{NPL_{it}} + \varepsilon_{i,t} \quad (8)$$

An overview of all model variables, including definition and data source, is presented in Table 2. Table 3 and Table 4 also provide an overview of the descriptive statistics and a pairwise correlations matrix of the sample.

Table (2), Table (3) and Table (4) about here

4. Results

4.1 Income Smoothing and Forward-Looking Loan Loss Provisioning

Table 5 summarizes the results of the baseline regression to measure the impact of IFRS 9 on loan loss timeliness income smoothing and capital management. In this context, Model (1-3) describes the results for DiD-Regression over the period 2016-2019 and Model (4-6) over the period 2017-2018. The coefficient β_1 of the interaction term $\Delta \mathrm{NPL}_{it+1} * IFRS * IFRS9$ has a highly significant positive effect on the LLPs at the 1% level, suggesting an improvement in LLP timeliness due to the implementation of IFRS 9. The results support the initial empirical findings of previous studies. (Kim et al., 2021; Oberson, 2021).

However, unlike Oberson (2021) our study implies a reduced income smoothing due to the introduction of IFRS 9. The coefficient β_1 of the interaction term *EBP * IFRS * IFRS 9* has a highly significant negative effect at the 1% level. The positive coefficient β_1 still suggests that banks practice earnings management. It seems, that the introduction of IFRS 9 has made banks more sensitive to this practice. We find no empirical evidence for an increased use of capital management in the wake of IFRS 9 adoption. Thus, our results also differ from the evidence of Kund and Neitzert (2020). Based on the EBA stress test data set, they show evidence for regulatory capital management in the wake of the IFRS 9 amendment (Kund and Neitzert, 2020).[7]

Table (5) and (6) about here

4.2 Asset Quality and Risk-Taking Behavior

Table 7 represents the results for testing the explanatory quality of provisioning in the wake of IFRS 9 adoption on bank resilience. Following Imbierowicz et al. (2018) we used proxies for

[7] In contrast to the EBA stress test dataset in the study of Kund and Neitzert (2020), we use real accounting data in this paper.

banks' asset quality in Model 1-3. In Model 4-6 we used variations of Z-Score to determine banks' risk-taking behavior. All variables are winsorized at the 1% and 99% level, with the exception of the binary variable and the macroeconomic and governance control variables.

To answer Hypothesis 3, the interaction effect of IFRS 9 Adoption on LLP_{it} and ΔNPL_{it+1} and its impact on banks' Asset Quality will be analyzed.
The interaction term LLP_{it}*IFRS*IFRS9 has a significant negative effect on Loan Growth and Capital Growth at 10% level. In addition, the coefficient of the interaction term has a significant negative effect on d.AssetRisk at 5% level. The results suggest that banks are granting fewer loans in the context of the introduction of IFRS 9, with the result that they have to hold less regulatory capital as a risk buffer. This effect is also supported by the negative impact on d.Asset Risk. Lower lending reduces the risk-weighted assets in the bank balance sheet, with the result that capital adequacy improves.
The interaction term ΔNPL_{it+1} * *IFRS* * *IFRS 9* has a high significant positive effect on Loan Growth at 1% level and a significant positive effect on Capital Growth at 5% level. The improved forecasting quality of forward-looking nonperforming loans thus has a positive impact on bank lending. In particular, by using ECL methods, banks can better estimate impending impairments and take this into account in the lending process.

The coefficient of LLP_{it} and ΔNPL_{it+1} is positive in Model 4, suggesting that the introduction of IFRS9 decreases banks' soundness for risk-taking. This effect is also robust using variations of the Z-score

Table (7) about here

4.3 Discretionary and Non-Discretionary LLP and Bank Valuation

In this subsection, we display the results the market-based valuation model of Non-Discretionary and Discretionary Loan Loss Provisions in the context of IFRS 9 adoption. Table 8 describes the descriptive statistics of the variables used. Following previous studies, we determine the DLLP based on the residuals of LLP models. Table 9 describes the regressions of the Beaver and Engel (1996) and Collins et al. (1995) LLP model to derive the Discretionary LLPs.

Table 10 summarizes the results of the valuation model to measure the impact of LLPs and DLLP at IFRS 9 adoption on the Market Value of Shares. The interaction term LLP * *IFRS* * *IFRS 9* has a highly significant positive effect on MVS at the 1% level (Model 1 and 2). In contrast, the Discretionary LLPs has a significant negative effect at 10% level (Model 1) and a high significant negative effect on 1 % Level on MVS.

Table (8), Table (9), Table (10) about here

5. Conclusion and Suggestions for Future Research

The objective of this paper was to extend the research branch with an empirical contribution to the formation of LLPs based on the expected credit loss model. By using an experimental research design, we analyzed the impact of IFRS 9 transition on earnings management and timeliness.

It can be stated that the introduction of IFRS 9 has led to an improvement in the timely recognition of loan loss provisions. In particular, the change from the ICL model to the ECL model provides an improvement in the presentation of forward-looking non-performing loans. Based on our DiD regression, we also found that IFRS 9 provides incentives for reduced income smoothing.

In our analysis of the impact of the amended accounting standard on asset quality and risk behavior, we find that IFRS 9 has a negative impact on banks' lending behavior. Vice versa, this effect leads to a reduction in asset risk, as fewer RWA have to be held in the course of the economic capital concept. Based on the analysis of risk behavior, it can also be stated that the introduction of IFRS 9 has a sensitizing effect on the risk behavior of IFRS accounting. The introduction of the accounting standard thus has a positive effect on improving the resilience of the banks under scrutiny and thus has a positive impact on financial market stability.

Using a market-based valuation model, we further investigated the market reaction of discretionary and non-discretionary LLPs. It can be shown that the market has a positive connotation of the increased transparency in LLPs' accounting data. In contrast, DLLPs possess a negative effect on market valuation. It can be concluded that the market continues to anticipate that banks will make greater or lesser use of the IFRS 9 options in the formation of the LLP model. The resulting opacity leads to a reduced capital market valuation.

This paper thus provides the first empirical evidence of the IFRS 9 transition for bank supervisors, governments and financial analysts. In particular, against the background of the

upcoming CECL application in the United States, comparable insights of the impact of ECL provisioning can be derived.

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Table 1: The Composition of the sample

Sample	No. of Banks
Refinitiv „Banks Total World“	531
excluding subsidiaries of a global bank holding company	53
Total Sample	478

Table 1 describes the Composition of the global sample.

Table 2: Description of Variables

Variables	Description	Datasource
Dependent Variables		
LLP (%)	Loan Loss Provisions, LLP / lagged Total Loans	Refinitiv EIKON
MVS	Market Value per Share	Refinitiv EIKON
dAsset Risk	Change in Asset Risk, (d.rwa / totalassets)*100	Refinitiv EIKON
dCapitalRatio	Change in Capital Ratio, (d.totaltiercapital / rwa)	Refinitiv EIKON
Capital Growth	Capital Growth, log(totaltiercapital / l.totaltiercapital) * 100	Refinitiv EIKON
Z-Score	Z-Score, (ROA+EQRatio)/sd_3_s	Refinitiv EIKON
Z-Score (ROA)	Z-Score ROA, (ROA)/sd_3_s	Refinitiv EIKON
Z-Score (CAR)	Z-Score CAR, (EQRatio)/sd_3_s	Refinitiv EIKON
Independent Variables		
EBP (%)	Earnings before Loan Loss Provisions, ((ebit-interestexpenseondebt+llp)/l.loanstotal)*100	Refinitiv EIKON
FdNPL(%)	Forward Looking Non Performing Loans	Refinitiv EIKON
NPL (%)	Non-Performing Loans-Ratio, NPL / lagged Total Loan	Refinitiv EIKON
dNPL (%)	Change in Non-Performing Loans-Ratio, dNPL / lagged Total Loans	Refinitiv EIKON
Capital R1 (%)	Tier 1 Capital / Risk Weighted Assets	Refinitiv EIKON
logAssets	Logarithm of Total Assets	Refinitiv EIKON
NCO (%)	Net Charge Off, Loans-Charge Off / lagged Total Loans	Refinitiv EIKON
LLLR (%)	Lagged Loan Loss Reserves, Reserves for Loan Losses / lagged Total Loans	Refinitiv EIKON
loan	Loans, (loanstotal /l.loanstotal)*100	Refinitiv EIKON
perloangrowth	Percentage Loan Growth	Refinitiv EIKON
BVS	Book Value per Share	Refinitiv EIKON
EPS	Earnings per Share	Refinitiv EIKON
GBV	Gross Book Value of Common Equity, 1 / (totalequity + reserveforloanlosses)	Refinitiv EIKON
IFRS ($\in \{0; 1\}$)	Dummy that equals 1 if IFRS is applicable, based on Worldscope Classification (WC07536).	Refinitiv EIKON
IFRS 9($\in \{0; 1\}$)	Dummy that equals 1 if IFRS 9 is applicable, 1 if Year $\geq$ 2018 and 0 otherwise	Own Computations
DLLP Beaver	Discretionary Loan Loss Provisions, Residuals of the LLP Model according to Beaver and Engel (1996)	Own Computations

Variables	Description	Datasource
DLLP Collins	Discretionary Loan Loss Provisions, Residuals of the LLP Model according to Collins et al. (199X)	Own Computations
Macro Controls		
GDP Growth (%)	Annual growth rate of Gross domestic product	World Bank
Inflation	Inflation; (Inflation GDP deflator annua)	World Bank
Unemployment	Unemployment Rate	World Bank
HPI	House Price Index	OECD
Political Stability	Political Stability Estimate,	Worldwide Governance Indicators (WGI)
Government Effectiveness	Government Effectiveness	Worldwide Governance Indicators (WGI)
Regulatory Quality	Regulatory Quality Estimate	Worldwide Governance Indicators (WGI)
Rule of Law	Rule of Law Estimate	Worldwide Governance Indicators (WGI)

Table 2 describes the definition and data sources of the used variables. Dependent Variables comprises the used LLP and Asset Quality Measures, Independent Variables comprises proxies for LLP and Bank Valuation. In addition, Bank Level and Macroeconomic Controls are used.

Table 3: Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
LLP (%)	1746	.998	4.679	-116.015	118.877	-.243	9.271	1.91	470.376
EBP	1444	6.654	88.174	-688.689	2302.841	.034	26.593	24.172	640.615
FdNPL	1166	-.138	6.359	-154.51	69.648	-12.688	10.865	-10.471	321.64
CapitalR1	1422	14.581	7.704	-158.6	55.049	7.878	32.941	-13.482	304.663
dNPL	1542	-.085	5.606	-154.51	69.648	-11.228	10.196	-11.556	403.105
ldNPL	1508	.032	5.255	-154.51	69.648	-9.955	8.979	-15.581	521.27
l2dNPL	1474	.312	2.691	-33.008	43.09	-6.356	8.598	1.28	73.765
llogAssets	1841	17.265	1.881	10.478	22.001	12.496	21.59	.036	3.316
gdpgrowtha~l	1798	2.768	2.189	-4.712	8.256	-2.565	8.17	.334	3.43
unemployment	1822	5.711	4.503	.11	28.47	.14	26.54	2.201	9.169
HPI	1123	3.799	3.319	-6.4	17	-5.3	11.2	-.234	3.865
inflationg~l	1798	2.908	5.144	-8.977	50.623	-6.838	22.933	4.157	32.238
politicals~i	1862	.094	.862	-2.483	1.615	-2.258	1.34	-.796	3.187
government~e	1862	.75	.841	-1.658	2.231	-1.286	2.056	-.31	2.273
regulatory~e	1862	.674	.871	-2.364	2.227	-1.959	2.047	-.464	2.824
ruleoflawe~e	1862	.632	.911	-2.322	2.045	-2.241	1.948	-.357	2.627
ifrs	1882	.564	.496	0	1	0	1	-.257	1.066
IFRS9	1882	.501	.5	0	1	0	1	-.002	1

Table 3 describes the descriptive statistics of the sample in the period from 2002-2018. For the definition and data sources of the used variables see Table 2.

Table 4: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) LLP (%)	1.00																	
(2) EBP	0.34***	1.00																
(3) FdNPL	0.18***	0.02	1.00															
(4) CapitalR1	-0.31***	0.02	0.03	1.00														
(5) dNPL	-0.35***	-0.06**	-0.25***	0.02	1.00													
(6) ldNPL	0.62***	0.17***	0.02	-0.00	-0.23***	1.00												
(7) l2dNPL	0.00	-0.02	-0.18***	0.01	0.02	0.06**	1.00											
(8) llogAssets	-0.11***	-0.03	-0.03	-0.05*	-0.04	-0.05*	-0.10***	1.00										
(9) gdpgrowthannual	-0.00	-0.01	0.04	-0.06**	0.01	0.04	0.03	-0.07***	1.00									
(10) unemployment	0.05**	0.02	-0.06*	0.03	-0.05**	-0.04	-0.02	0.03	-0.19***	1.00								
(11) HPI	0.01	-0.01	0.03	-0.18***	0.02	0.00	-0.14***	0.01	0.48***	-0.09***	1.00							
(12) inflationgdpdef~l	0.08***	0.04	-0.01	-0.00	-0.01	0.06**	0.08***	-0.14***	-0.15***	0.13***	0.23***	1.00						
(13) politicalstabil~c	-0.12***	-0.07***	-0.01	0.06**	-0.03	-0.06**	-0.10***	0.23***	-0.25***	-0.18***	-0.17***	-0.35***	1.00					
(14) governmenteffec~i	-0.17***	-0.12***	-0.01	0.00	-0.02	-0.05*	-0.10***	0.38***	-0.23***	-0.20***	-0.03	-0.38***	0.82***	1.00				
(15) regulatoryquali~e	-0.17***	-0.15***	-0.02	-0.00	-0.03	-0.07***	-0.12***	0.32***	-0.30***	-0.15***	0.01	-0.39***	0.78***	0.95***	1.00			
(16) ruleoflawestimate	-0.18***	-0.14***	-0.01	0.00	-0.02	-0.05**	-0.11***	0.32***	-0.28***	-0.19***	-0.03	-0.38***	0.80***	0.96***	0.95***	1.00		
(17) ifrs	0.00	-0.05*	-0.03	0.04	-0.03	-0.01	0.01	0.05**	-0.22***	0.31***	-0.08***	0.03	0.08***	-0.01	0.08***	0.03	1.00	
(18) IFRS9	0.01	0.03	0.04	-0.00	-0.04*	-0.07***	-0.06**	0.02	-0.08***	-0.06**	-0.10***	0.06**	0.02	-0.00	-0.01	-0.01	0.02	1.00

*** p<0.01, significant on the .01 Level, ** p<0.05, significant on the.05 Level, * p<0.1, significant on the.1 Level

Table 5: Baseline Regression – Earnings Management and Loan Loss Timeliness

	2016-2019		2017-2018	
	(1)	(2)	(4)	(5)
VARIABLES	LLP	LLP	LLP	LLP
c.EBP#c.ifrs#c.IFRS9	-0.104***	-0.104***	-0.154***	-0.154***
	(0.0318)	(0.0251)	(0.0404)	(0.0270)
c.FdNPL#c.ifrs#c.IFRS9	0.124***	0.124***	0.169***	0.169***
	(0.0418)	(0.0330)	(0.0599)	(0.0400)
c.CapitalR1#c.ifrs#c.IFRS9	-0.0167	-0.0167*	-0.0294	-0.0294**
	(0.0121)	(0.00958)	(0.0214)	(0.0143)
ifrs	-0.264*	-0.264**	-0.328	
	(0.154)	(0.122)	(2.067)	
IFRS9	-0.0560	-0.0560	-0.198	-0.198**
	(0.0941)	(0.0743)	(0.133)	(0.0887)
c.ifrs#c.IFRS9	0.546**	0.546***	1.073**	1.073***
	(0.248)	(0.196)	(0.434)	(0.290)
EBP	0.265***	0.265***	0.291***	0.291***
	(0.00908)	(0.00716)	(0.0159)	(0.0106)
FdNPL	-0.00624*	-0.00624**	-0.0698	-0.0698*
	(0.00358)	(0.00282)	(0.0579)	(0.0387)
CapitalR1	-0.00345	-0.00345	0.0202	0.0202
	(0.0222)	(0.0176)	(0.0259)	(0.0173)
dNPL	0.0354***	0.0354***	-0.0210	-0.0210
	(0.0120)	(0.00945)	(0.0679)	(0.0454)
ldNPL	0.0560***	0.0560***	0.00761	0.00761
	(0.0183)	(0.0144)	(0.0451)	(0.0302)
l2dNPL	0.0478	0.0478*	0.0816*	0.0816***
	(0.0337)	(0.0266)	(0.0435)	(0.0291)
llogAssets	0.275	0.275*	0.615*	0.615***
	(0.187)	(0.147)	(0.352)	(0.235)
GDP Growth (%)	-0.0487	-0.0487*	-0.0582	-0.0582**
	(0.0343)	(0.0270)	(0.0418)	(0.0280)
Unemployment	0.0770	0.0770	0.206	0.206**
	(0.0619)	(0.0488)	(0.137)	(0.0916)
HPI	0.000304	0.000304	-0.00978	-0.00978
	(0.0124)	(0.00980)	(0.0205)	(0.0137)
Inflation	-0.00119	-0.00119	0.0439	0.0439
	(0.0164)	(0.0129)	(0.0409)	(0.0273)
Political Stability	0.427*	0.427**	0.384	0.384
	(0.237)	(0.187)	(0.408)	(0.273)
Government Effectiveness	0.543	0.543*	1.454**	1.454***
	(0.376)	(0.297)	(0.716)	(0.479)
Regulatory Quality	-0.0140	-0.0140	0.121	0.121
	(0.464)	(0.366)	(0.917)	(0.613)
Rule of Law	-0.236	-0.236	-1.628	-1.628**
	(0.496)	(0.392)	(1.203)	(0.804)
Constant	-7.313*	-5.704**	-15.07*	-13.13***
	(4.056)	(2.766)	(7.678)	(4.382)
Observations	508	508	341	341
R-squared	0.991	0.984	0.997	0.994
Year Dummies	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes
Number of id		184		178

Table 5 describes the impact of IFRS 9 adoption on Earnings Management and Loan Loss Timelineness in the period 2016-2019. The dependent variable describes the Loan Loss Provisions (LLP). Robust and bank clustered Huber-White Standard errors in brackets. Detailed variable Definitions are given in Table 2. *** p<0.01, significant on the .01 Level, ** p<0.05, significant on the.05 Level, * p<0.1, significant on the.1 Level.

Table 6: Baseline Regression – Earnings Management and Loan Loss Timeliness (winsorized)

	2016-2019		2017-2018	
	(1)	(2)	(4)	(5)
VARIABLES	LLP	LLP	LLP	LLP
c.EBP_w1#c.ifrs#c.IFRS9	-0.103**	-0.103***	-0.123**	-0.123***
	(0.0432)	(0.0341)	(0.0530)	(0.0355)
c.FdNPL_w1#c.ifrs#c.IFRS9	0.111*	0.111**	0.129*	0.129***
	(0.0635)	(0.0501)	(0.0657)	(0.0439)
c.CapitalR1_w1#c.ifrs#c.IFRS9	-0.0155	-0.0155	-0.0190	-0.0190
	(0.0137)	(0.0108)	(0.0216)	(0.0144)
ifrs	-0.273*	-0.273**	0.181	
	(0.146)	(0.115)	(2.876)	
IFRS9	-0.0447	-0.0447	-0.149	-0.149*
	(0.0943)	(0.0744)	(0.132)	(0.0883)
c.ifrs#c.IFRS9	0.493*	0.493**	0.785*	0.785***
	(0.283)	(0.223)	(0.441)	(0.295)
EBP_w1	0.385***	0.385***	0.418***	0.418***
	(0.0455)	(0.0359)	(0.0412)	(0.0275)
FdNPL_w1	-0.0122	-0.0122	-0.0421	-0.0421
	(0.0293)	(0.0231)	(0.0656)	(0.0439)
CapitalR1_w1	-0.00680	-0.00680	0.0215	0.0215
	(0.0207)	(0.0164)	(0.0266)	(0.0178)
dNPL_w1	0.0281	0.0281	0.0149	0.0149
	(0.0238)	(0.0188)	(0.0894)	(0.0597)
ldNPL_w1	0.0595***	0.0595***	0.0741	0.0741
	(0.0195)	(0.0154)	(0.0679)	(0.0454)
l2dNPL_w1	0.0630*	0.0630**	0.0784	0.0784**
	(0.0320)	(0.0253)	(0.0594)	(0.0397)
llogAssets_w1	0.547**	0.547***	0.926**	0.926***
	(0.215)	(0.169)	(0.425)	(0.284)
GDP Growth (%)	-0.0385	-0.0385	-0.0360	-0.0360
	(0.0365)	(0.0288)	(0.0477)	(0.0319)
Unemployment	0.0672	0.0672	0.191	0.191*
	(0.0647)	(0.0510)	(0.161)	(0.107)
HPI	0.00161	0.00161	-0.0189	-0.0189
	(0.0135)	(0.0107)	(0.0227)	(0.0152)
Inflation	-0.00221	-0.00221	0.0504	0.0504*
	(0.0168)	(0.0133)	(0.0440)	(0.0294)
Political Stability	0.396*	0.396**	0.334	0.334
	(0.228)	(0.180)	(0.463)	(0.310)
Government Effectiveness	0.575	0.575*	1.390*	1.390***
	(0.372)	(0.294)	(0.710)	(0.475)
Regulatory Quality	-0.114	-0.114	-0.186	-0.186
	(0.442)	(0.349)	(1.056)	(0.706)
Rule of Law	0.0314	0.0314	-1.158	-1.158
	(0.496)	(0.392)	(1.441)	(0.963)
Constant	-13.82***	-11.14***	-22.20**	-19.18***
	(4.722)	(3.198)	(9.124)	(5.264)
Observations	508	508	341	341
R-squared	0.934	0.664	0.971	0.834
Year Dummies	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes
Number of id		184		178
Firm RE				

Table 5 describes the impact of IFRS 9 adoption on Earnings Management and Loan Loss Timelineness in the period 2016-2019. The dependent variable describes the Loan Loss Provisions (LLP). Robust and bank clustered Huber-White Standard errors in brackets. Detailed variable Definitions are given in Table 2. *** p<0.01, significant on the .01 Level, ** p<0.05, significant on the.05 Level, * p<0.1, significant on the.1 Level.

Table 7: Asset Quality and Risk-Taking Behavior

VARIABLES	(1) perloangrowth_w1	(2) dAssetRisk_w1	(3) CapitalGrowth_w1	(4) ZScore3s	(5) ZScoreROA3s	(6) ZScoreCAR3s
LLP_w1	1.195	0.00994	0.0876	-5.752	-2.227	-2.907
	(1.823)	(0.00789)	(2.074)	(16.61)	(1.771)	(15.05)
ifrs	-4.209**	-0.0263***	-2.730	-73.96***	-3.767	-69.90***
	(2.002)	(0.00868)	(2.011)	(24.77)	(2.544)	(22.56)
c.LLP_w1#c.ifrs	1.841	0.0114	0.829	14.94	1.430	13.32
	(1.464)	(0.00774)	(2.168)	(12.46)	(1.223)	(11.64)
IFRS9	56.31***	-0.0510***	-11.12***	1.019	20.49	280.7**
	(15.44)	(0.0118)	(2.231)	(27.61)	(13.64)	(123.1)
c.LLP_w1#c.IFRS9	0.575	0.00308	1.417	19.98	2.185	17.76
	(1.497)	(0.00941)	(1.434)	(16.13)	(1.347)	(14.84)
c.ifrs#c.IFRS9	13.10***	0.0845***	11.65***	16.28	1.690	14.50
	(4.176)	(0.0137)	(2.345)	(33.09)	(2.627)	(30.72)
c.LLP_w1#c.ifrs#c.IFRS9	**-5.893***	**-0.0403****	**-4.907***	**92.43****	**7.819***	**84.88****
	(3.458)	**(0.0173)**	**(2.826)**	**(42.60)**	**(4.134)**	**(39.10)**
l2dNPL_w1	-0.474	0.000101	-0.561	-3.535	-0.195	-3.400
	(0.488)	(0.00190)	(0.475)	(3.308)	(0.230)	(3.113)
FdNPL_w1	0.466	-0.00124	-0.579	0.209	0.137	0.0579
	(1.023)	(0.00371)	(0.433)	(3.491)	(0.374)	(3.158)
c.FdNPL_w1#c.ifrs	-0.882	-0.000642	0.236	-1.182	-0.229	-0.934
	(1.163)	(0.00426)	(0.714)	(4.425)	(0.456)	(4.024)
c.FdNPL_w1#c.IFRS9	-3.062**	0.00459	-1.722	-8.163	-1.457**	-6.610
	(1.297)	(0.00705)	(1.094)	(7.198)	(0.628)	(6.663)
c.FdNPL_w1#c.ifrs#c.IFRS9	**3.618*****	**-0.00317**	**3.074****	**23.93****	**3.392*****	**20.42****
	(1.390)	**(0.00764)**	**(1.349)**	**(10.90)**	**(1.027)**	**(9.993)**
L.logAssets_w1	-1.767***	-0.0120***	-1.814***	-0.972	-0.0107	-1.095
	(0.431)	(0.00230)	(0.387)	(5.120)	(0.457)	(4.731)
CapitalR1_w1	-0.844***	-0.00397***	-0.481**	0.966	0.0150	0.859
	(0.192)	(0.000981)	(0.194)	(3.256)	(0.316)	(2.988)
EBP_w1	1.180*	0.00727***	1.482***	-3.194	1.289*	-4.680
	(0.634)	(0.00241)	(0.445)	(6.570)	(0.770)	(5.897)
NCO_w1	-5.537***	-0.0284***	-2.592	-6.087	-0.410	-5.716
	(1.517)	(0.00848)	(2.152)	(7.345)	(0.682)	(6.747)
LLLR_w1	0.117	5.48e-05	-0.00227	-11.91***	-1.248***	-10.70***
	(0.421)	(0.00239)	(0.563)	(3.220)	(0.310)	(2.987)
L.loan_w1	-0.0970	-7.64e-05	0.0170	-0.849*	-0.0541	-0.802**
	(0.0847)	(0.000247)	(0.0453)	(0.435)	(0.0418)	(0.399)
gdpgrowthannual	-0.158	-0.000638	0.604	15.99**	1.776***	14.19**
	(0.517)	(0.00303)	(0.516)	(7.386)	(0.673)	(6.849)

unemployment	-0.135	0.000690	-0.158	2.862	0.182	2.648
	(0.187)	(0.000877)	(0.209)	(2.216)	(0.195)	(2.057)
HPI	0.894***	0.00426***	0.113	-7.267*	-0.731**	-6.589*
	(0.263)	(0.00137)	(0.217)	(3.804)	(0.344)	(3.549)
inflationgdpdeflatorannual	-0.998***	-0.00534***	-0.603**	-5.199	-0.174	-4.979
	(0.297)	(0.00164)	(0.308)	(3.435)	(0.328)	(3.151)
politicalstabilityandabsenceofvi	1.945	0.00425	1.891	23.07	3.042*	20.19
	(1.185)	(0.00567)	(1.351)	(18.52)	(1.652)	(17.12)
governmenteffectivenessestimate	-4.616	0.00703	-0.276	36.25	-2.711	38.65
	(4.558)	(0.0170)	(4.817)	(58.02)	(4.716)	(54.06)
regulatoryqualityestimate	-5.827	-0.0442***	-6.735**	-86.03	-3.768	-82.68
	(3.551)	(0.0159)	(3.353)	(55.54)	(4.811)	(51.48)
ruleoflawestimate	4.498	0.0257	3.790	35.37	3.103	33.04
	(4.656)	(0.0219)	(4.820)	(53.41)	(4.376)	(49.47)
Constant		0.294***	43.91***	295.2**		
		(0.0683)	(10.47)	(137.1)		
Observations	463	460	381	463	463	463
Number of id	168	166	161	168	168	168
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
FIRM RE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared overall	0.316	0.412	0.362	0.171	0.219	0.170

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Descriptive Statistics:

Panel A

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
LLP	2582	1.041	4.178	-116.015	118.877	-.223	8.989	3.278	519.369
DLLP Beaver	1682	0	.879	-5.844	10.92	-2.211	3.111	2.688	32.876
DLLP Collins	2048	0	1.982	-12.055	38.459	-2.776	7.762	6.985	102.914
GBV	2429	0	0	0	0	0	0	19.533	429.519
NCO	2336	.64	5.633	-193.734	84.045	-1.958	7.862	-23.709	831.927
deltaloan	2623	16.598	143.036	-135.247	3895.929	-48.286	126.443	22.05	542.924
dNPL	2258	.09	4.935	-154.51	69.648	-10.799	9.963	-11.412	462.872
FdNPL	1905	.075	5.139	-154.51	69.648	-10.799	10.149	-12.206	463.283
LLLR	2381	3.635	11.405	-334.309	226.355	.094	21.159	-2.765	457.845
NPLt	2308	4.593	26.825	-1155.034	427.844	.094	38.693	-33.201	1541.693
MVS	2583	.536	7.357	0	173.174	0	6.717	19.338	392.81
BVS	2752	2225.7	47583.58	-7.424	1459724	.004	1827.342	24.391	635.053
EPS	2573	23.617	618.94	0	30673.49	0	106.91	47.38	2339.539

Panel B

	LLP				DLLP Beaver and Engel (1996)				DLLP Collins et al. (1995)			
Country	N	Mean	Min	Max	N	Mean	Min	Max	N	Mean	Min	Max
Argentina	24	2.662	0.978	4.719	12	0.089	-0.980	0.994	15	1.319	-0.657	3.958
Australia	36	0.151	0.075	0.322	30	-0.230	-0.780	0.013	36	-0.310	-1.350	0.232
Austria	35	0.214	-3.616	1.670	17	-0.450	-2.115	0.715	20	-0.880	-5.214	0.336
Bahrain	62	2.827	-0.188	118.877	31	0.007	-2.380	3.611	41	0.360	-2.393	8.736
Belgium	7	0.083	-0.143	0.449	0	.	.	.	0	.	.	.
Brazil	26	5.110	1.372	45.721	20	0.413	-2.572	2.986	25	3.332	-2.184	38.459
Bulgaria	11	2.060	0.247	5.196	1	1.552	1.552	1.552	2	3.395	2.055	4.736
Canada	48	0.271	0.104	0.518	40	-0.236	-0.930	0.132	48	-0.187	-0.837	0.363
Chile	6	1.066	0.783	1.317	0	.	.	.	0	.	.	.
China	72	1.165	0.397	2.835	60	0.216	-0.349	1.094	70	0.053	-1.637	2.700
Colombia	42	2.046	-1.805	3.944	0	.	.	.	5	1.669	1.037	2.631

Croatia	16	1.499	0.323	6.890	10	0.180	-1.248	0.863	13	-0.608	-2.460	1.746
Cyprus	12	10.324	0.304	61.841	5	1.768	1.038	2.671	6	-0.309	-3.797	6.167
Denmark	30	0.435	-0.142	4.150	25	0.069	-0.695	2.259	30	0.600	-1.356	18.977
Egypt	12	1.737	0.603	3.367	10	0.757	-1.420	2.522	12	0.712	-1.141	7.950
Estonia	7	0.538	0.346	0.798	0	.	.	.	0	.	.	.
Finland	12	0.076	-0.003	0.167	5	-0.167	-0.274	-0.045	8	-0.437	-1.159	-0.127
France	48	0.205	-0.019	0.775	35	-0.189	-0.541	0.303	42	-0.517	-1.507	-0.124
Germany	32	0.251	-0.095	0.852	12	-0.053	-0.414	0.405	15	-0.152	-0.588	0.694
Greece	36	2.382	-3.013	16.629	25	1.292	-4.185	10.920	30	1.631	-3.122	9.900
Hong Kong	12	0.330	0.059	1.409	10	-0.250	-0.644	0.306	12	-0.228	-1.147	0.204
Hungary	6	2.200	0.482	5.658	5	-1.203	-2.422	0.176	6	-0.442	-2.839	2.343
India	82	1.691	0.000	5.082	0	.	.	.	1	0.140	0.140	0.140
Indonesia	53	1.857	0.006	6.747	40	0.229	-0.918	1.320	48	0.607	-1.187	3.035
Ireland	18	-0.050	-1.192	0.556	15	-1.044	-2.655	0.305	17	-1.081	-4.111	1.541
Israel	36	0.218	-0.046	0.751	25	-0.070	-0.625	0.918	30	-0.385	-1.301	0.564
Italy	71	0.986	-0.099	5.204	42	0.224	-5.844	4.078	50	-0.257	-2.811	2.493
Japan	214	0.068	-0.501	4.479	166	-0.249	-1.437	0.719	200	-0.477	-1.798	1.867
Jordan	60	0.696	-0.163	3.280	47	-0.064	-2.211	1.433	57	-0.307	-3.969	4.116
Kuwait	54	1.295	0.177	3.484	41	0.035	-2.232	1.807	50	0.365	-1.662	4.113
Lithuania	6	1.528	-0.223	4.538	5	-0.021	-0.993	1.158	6	0.999	-1.209	5.067
Malaysia	66	0.283	-0.324	2.113	52	-0.051	-0.655	1.555	63	-0.461	-1.705	0.554
Malta	17	0.818	-0.241	6.791	5	-0.153	-0.886	1.041	5	-0.710	-0.961	-0.488
Mexico	27	3.234	0.542	10.576	21	0.497	-4.103	3.564	25	1.272	-6.666	9.149
Morocco	18	0.765	-0.151	1.583	10	0.426	0.083	0.954	12	-0.470	-2.040	0.304
Netherlands	18	0.149	-0.136	0.575	15	-0.078	-0.345	0.452	18	-0.222	-0.766	0.424
Nigeria	60	1.691	-0.599	9.271	38	0.364	-2.993	5.385	48	0.610	-1.911	7.576
Oman	30	0.635	0.079	4.551	25	-0.090	-0.933	0.802	29	-0.498	-1.278	1.502
Pakistan	48	0.270	-0.851	1.865	38	-0.039	-1.753	3.111	46	-1.535	-5.103	-0.040

Peru	23	2.557	1.381	4.030	15	0.493	-1.055	1.531	18	1.257	-1.360	3.148
Philippines	42	0.473	0.025	2.063	35	-0.182	-1.283	1.192	42	-0.429	-2.464	3.424
Poland	18	1.184	0.347	2.884	10	0.066	-0.327	0.409	13	-0.211	-0.893	2.474
Portugal	6	1.343	0.793	1.975	5	0.639	-0.151	2.671	6	0.742	-0.047	1.968
Qatar	51	0.714	-0.098	10.650	40	-0.139	-3.803	2.400	48	-0.387	-2.139	1.023
Romania	7	3.638	0.442	14.166	4	-0.604	-2.432	1.350	5	-0.308	-1.015	1.006
Russia	18	1.923	0.422	5.819	10	0.262	-1.073	1.783	13	0.159	-2.227	2.644
Saudi Arabia	53	0.615	-0.076	2.312	44	-0.185	-2.997	1.602	52	-0.239	-1.321	1.936
Singapore	18	0.253	0.094	0.563	15	-0.227	-0.423	0.029	18	-0.420	-0.972	-0.074
Slovakia	12	0.476	0.015	1.056	10	-0.050	-0.753	0.896	12	-0.473	-1.003	0.352
Slovenia	6	0.350	-0.498	1.004	0	.	.	.	1	0.218	0.218	0.218
South Africa	30	2.962	0.568	14.413	25	0.701	-0.226	6.100	30	1.642	-0.330	11.754
South Korea	27	0.441	0.000	1.720	13	-0.204	-0.709	0.025	17	-0.237	-1.055	0.492
Spain	40	0.823	0.000	4.993	25	-0.163	-0.980	0.527	32	-0.255	-5.757	0.680
Sri Lanka	30	0.752	0.086	1.640	0	.	.	.	0	.	.	.
Sweden	20	0.066	0.000	0.143	15	-0.217	-0.539	-0.027	18	-0.402	-1.086	-0.056
Switzerland	90	0.194	-0.115	3.090	18	-0.130	-0.479	0.200	25	-0.537	-1.454	-0.024
Taiwan	60	0.990	-0.182	11.851	50	0.063	-0.321	3.243	60	0.243	-1.573	11.222
Thailand	36	1.157	0.337	2.238	30	0.234	-0.858	1.031	36	-0.172	-2.214	1.496
Turkey	33	1.306	0.259	2.737	24	0.286	-0.737	2.454	30	0.781	-0.626	5.949
United Arab Emir	83	1.684	0.120	10.494	61	0.270	-2.093	9.846	76	0.354	-3.313	12.317
United Kingdom	60	0.670	-0.315	3.344	38	-0.204	-1.237	1.559	48	0.007	-1.503	2.481
United States	234	0.154	-116.016	51.589	195	-0.190	-3.267	1.770	234	-0.272	-10.009	14.273
Venezuela	32	5.786	0.002	30.783	14	0.544	-1.002	2.716	18	3.318	-12.055	23.041
Vietnam	83	1.144	0.117	6.138	48	-0.066	-2.192	1.383	55	0.037	-1.221	1.855
Total	2582	1.041	-116.016	118.877	1682	.3.40e-10	-5.844	10.920	2048	.-1.29e-10	-12.055	38.459

Table 9: DLLP Basis Regressions

VARIABLES	(1) Beaver and Engel (1996)	(2) Collins et al. (1995)
GBV	6,841	
	(29,271)	
NCO	0.763***	
	(0.0133)	
deltaloan	0.00730***	
	(0.000178)	
dNPL	0.115***	-0.187***
	(0.00658)	(0.0114)
FdNPL	0.0264***	
	(0.00462)	
L.LLLR		0.308***
		(0.0239)
L.NPLt		-0.242***
		(0.00915)
Constant	0.252***	1.085***
	(0.0307)	(0.0746)
Observations	1,682	2,048
R-squared	0.773	0.398
Year Dummies	Yes	Yes
Firm FE	Yes	Yes

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: IFRS 9 and Bank Valuation

	Beaver and Engel (1996)	Collins et al. (1995)
VARIABLES	(1) MVS	(2) MVS
BVS	0.00321***	0.00196***
	(0.000705)	(0.000390)
EPS	-0.00599***	-0.000236
	(0.00224)	(0.00169)
GBV	-47,279	72,902*
	(62,073)	(43,230)
Provision	-0.130***	-0.0419*
	(0.0341)	(0.0252)
ifrs	-0.128*	-0.0372
	(0.0689)	(0.0330)
c.Provision#c.ifrs	0.125***	0.0116
	(0.0350)	(0.0305)
IFRS9	0.107***	0.0856***
	(0.0289)	(0.0205)
c.Provision#c.IFRS9	-0.189***	-0.118***
	(0.0468)	(0.0369)
c.ifrs#c.IFRS9	-0.0873***	-0.0557*
	(0.0313)	(0.0293)
c.Provision#c.ifrs#c.IFRS9	**0.197*** **	**0.125*** **
	(0.0478)	**(0.0400)**
DLLP	-269.2	-2,009***
	(636.7)	(743.1)
c.DLLP#c.ifrs	128.7	2,949***
	(745.2)	(1,081)

c.DLLP#c.IFRS9	7,032	1,821**
	(4,773)	(793.3)
c.DLLP#c.ifrs#c.IFRS9	**-8,399***	**-3,556*****
	(4,900)	**(1,309)**
dNPL	-0.0260***	-0.00951***
	(0.00678)	(0.00289)
NPLt	0.0289***	0.0155***
	(0.00641)	(0.00376)
Constant	0.271***	0.241***
	(0.0581)	(0.0470)
Observations	991	1,346
R-squared	0.499	0.480
Number of id	348	368
Year Dummies	Yes	Yes
Firm FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1