MARKET REACTIONS TO LOAN LOSS ACCOUNTING

AN EMPIRICAL ANALYSIS OF THE IMPLEMENTATION EFFECTS OF IFRS 9 ON MARKET PERCEPTIONS AND INVESTOR BEHAVIOR

CAROLINA GUSTAVSSON MARTINETTI

TILDE HOLMGREN

Master Thesis

Stockholm School of Economics

2025

Market reactions to loan loss accounting: An empirical analysis of the implementation effects of IFRS 9 on market perceptions and investor behavior

Abstract

This study investigates the impact of the regulatory transition from IAS 39 to IFRS 9 on the relationship between market reactions and recognized changes in loan loss reserves among publicly listed European banks. Using panel data covering both the pre- and post-implementation periods of IFRS 9, the analysis compares market responses to changes in loan loss reserves under the two accounting frameworks. The post-implementation period is further examined to provide deeper insights into the dynamics of this relationship under IFRS 9 reporting. First, the results indicate a significant difference in market reactions, with investors responding more positively to changes in loan loss reserves under IFRS 9 compared to IAS 39. Second, the findings provide robust evidence that increases in loan loss reserves are positively associated with market returns under IFRS 9, with changes in stage 3 reserves emerging as the primary driver of this relationship. The additional analysis suggests that the observed effect may be driven by increases in loan loss reserves signaling robust current earnings. Third, the positive market reaction to increases in loan loss reserves is found to be significant only among large banks and those operating in low credit risk countries, suggesting that institutional characteristics influence how investors interpret changes in loan loss reserves.

Keywords:
IFRS 9, Expected Credit Loss (ECL), Loan Loss Reserves, European Banking Sector, Market Reaction

Authors:
Carolina Gustavsson Martinetti (24921)
Tilde Holmgren (25218)

Tutor:
Milda Tylaite, Assistant Professor, Department of Accounting

Acknowledgements:
We would like to express our gratitude to our supervisor Milda Tylaite for valuable guidance, support and insights throughout the work with this thesis.

Master Thesis
Master Program in Accounting, Valuation and Financial Management
Stockholm School of Economics

Carolina Gustavsson Martinetti and Tilde Holmgren, 2025

Table of contents

1. Introduction **3**
2. Literature review **6**
2.1 Transition from IAS 39 to IFRS 9 6
2.2 Effects on the banking sector 8
2.3 Market reaction implications from regulatory shift 10
2.4 Hypothesis development 13
3. Data and Methodology **15**
3.1 Data collection and cleaning 15
3.1.1 Scope 15
3.1.2 Sample selection 16
3.2 Methodology 17
3.2.1 Dependent variable 17
3.2.2 Independent variable 18
3.2.3 Control variables 19
3.2.4 Model specification 21
4. Results **23**
4.1 Descriptive statistics 23
4.2 Correlation matrices 26
4.3 Regression results 28
4.3.1 Regression results for model (1) 28
4.3.2 Regression results for model (2) 32
4.3.3 Regression results for model (3) 34
4.4 Additional analysis 37
4.4.1 Loan loss recognition and current earnings 38
4.4.2 Loan loss recognition and future earnings 39
4.5 Robustness of results 41
4.5.1 Multicollinearity 41
4.5.2 Heteroskedasticity 41
4.5.3 Autocorrelation 41
4.5.4 Economic significance of changes in loan loss reserves 42
4.5.5 Balanced sample 42
4.5.6 Proxies for market reaction 42
5. Discussion **43**
5.1 The impact of the regulatory shift on the market reaction to loan loss recognition 43
5.2 Market reactions under the ECL framework 44
5.2.1 Market reactions to disaggregated changes in loan loss reserves 46
6. Conclusion **47**
References **49**
Appendix **53**

1. Introduction

Accounting standards issued by the International Accounting Standards Board (IASB) are developed and evaluated over prolonged periods of time before their implementation. The release of changes to these regulations not only impacts the organizations which report under the standards, but also other stakeholders. These include regulators who must update enforcement mechanisms, auditors who need to acquire the necessary knowledge and change their audit procedures accordingly, and investors who need to grasp what the changes mean for their valuation practices. A recent example of such a change is the replacement of IAS 39 with IFRS 9, coming into effect on 1 January, 2018. The regulatory shift marked a significant change in one of the banking sector's core reporting practices - the recognition of credit losses. Under the old standard, banks recognised loan losses based on the incurred credit loss (ICL) model, where losses were only recognized once the loan taker had defaulted (Frykström & Li, 2018). In contrast, the new standard requires banks to recognize all expected future losses under the expected credit loss (ECL) model, thus providing a more comprehensive image of the credit quality of banks' financial assets (Basel Committee on Banking Supervision, 2017). The change from the ICL to the ECL model served as a response to the old standard's delayed recognition of loan losses, criticised for generating procyclicality (Barth & Landsman, 2010; Bischof et al., 2020; Frykström & Li, 2018; Gaston & Song, 2014).

Despite being less than a decade since the implementation of IFRS 9, research on its implications has been vast, covering effects such as timeliness and informativeness of loan loss reserves, cycle effects, bank risk and earnings management. While these aspects have received considerable attention, less focus has been placed on understanding how the market incorporates and reacts to the additional information provided by the ECL model. The value of understanding how the market integrates accounting information is of particular importance in the banking sector, as the stability of banks is closely tied to overall financial stability. As the implementation of IFRS 9 signifies substantial modifications to the amount of financial disclosure as well as the timing and size of loan losses, factors found to impact market returns (Du et al., 2016; Song, 2017), there is reason to expect a change in the market sentiment towards loan loss reserves as a result of the implementation of IFRS 9. The argument is consistent with previous research demonstrating that the ICL model failed to incorporate all available loss information (Beatty & Liao, 2021) and that investors obtained and incorporated an expectation of future credit losses into their valuation prior to the implementation of the ECL model (Wheeler, 2021). Thus, it is expected that the market reaction towards changes in loan loss reserves differs under the two regulatory frameworks. This study intends to explore this relationship, which to the best of our knowledge, has not been examined by previous research.

Research studying the implementation effects on the market sentiment towards IFRS 9 is scarce and solely covers pre-implementation and day-one effects. Onali et al. (2024) study the pre-implementation market reaction to news releases related to the development of the new standard, and López-Espinosa et al. (2021) provide evidence of the market reaction to

the transitional accounting effect of the IFRS 9 implementation. Building on this research, this study extends the time horizon to cover the post-implementation period, providing a more comprehensive understanding of how the market adopts the information introduced by the new accounting standard. Thus, we aim to build on the findings of López-Espinosa et al. (2021) by determining whether the identified day-one effects persist or change over time.

Although the market reaction towards changes in loan loss reserves under the accounting standard IFRS 9 remains relatively unexplored, this relationship has been extensively studied under previous accounting frameworks, with the literature generally documenting a positive association between discretionary loan loss provisions and both market returns (Beaver et al., 1997; Wahlen, 1994) and market values in commercial banks (Beaver et al., 1989; Beaver & Engel, 1996). That is, despite the adverse effect loan loss provisioning has on financial performance, the argument put forward by previous research is that an increase in loan loss reserves serves as a signal of robust earnings that can withstand the negative effect of loan loss provisions (Beaver et al.,1989). The documented relationship is however not consistent across previous literature, with contrasting evidence suggesting that loan loss provisions are associated with negative market reactions (Ahmed et al., 1999; Beatty & Liao, 2021; Docking et al., 1997). Therefore, this study additionally intends to determine how the post-implementation relationship between changes in loan loss reserves and market reactions relate to that established in previous research.

Building on prior literature on IFRS 9 implementation effects, we aim to provide further evidence of its impact on market behavior by answering the following research question:

How does the market respond to changes in loan loss reserves under IFRS 9, and does it differ from that under IAS 39?

This study is based on data from 107 banks across 32 European countries that report under International Financial Accounting Standards (IFRS) over the period 2013 to 2023, excluding 2018, the year of the IFRS 9 implementation. The full sample, covering both the pre- and post-implementation periods, comprise a total of 830 bank-year observations, of which 469 of these constitute the post-implementation period, representing observations from 2019 to 2023. The empirical analysis employs three ordinary least squares (OLS) regression models to examine differences in market reactions to changes in loan loss reserves under the two accounting regimes (IAS 39 and IFRS 9), as well as to analyze the same relationship specifically within the IFRS 9 post-implementation period. Market reactions are captured using two different dependent variables: *Stock Return*, defined as the 12-month return from holding a bank's equity, and *Market-Adjusted Return (MAR)*, defined as the 12-month return adjusted by the performance of the DJ STOXX Global 1800 Index ex Europe.

For both proxies of market reaction the findings support that the market responses towards changes in loan loss reserves differ under the two regulatory frameworks. Also, the findings of the post-implementation sample reveal that under IFRS 9 reporting the market generally responds positively to increases in loan loss reserves. This finding supports prior research

suggesting that changes in loan loss reserves are interpreted by market participants as indicators of underlying financial strength (Beaver et al., 1989; Beaver et al., 1997; Wahlen, 1994), rather than as an indicator of elevated risk. This interpretation is further corroborated by results from additional analyses, which reveal that banks tend to increase loan loss reserves when earnings are high and reduce them when earnings are low, indicating that loan loss accounting is used as a tool for earnings smoothing. Further examination into the disaggregated components of loan loss reserves by loan stage classification demonstrates that the positive market response is primarily driven by changes in stage 3 loan loss reserves, representing credit-impaired loans. These findings suggest that increases in stage 3 loan loss reserves may be interpreted by investors as a credible signal of financial strength, as the additional analysis reveals that discretionary accounting practices are prevalent in the recognition of stage 3 reserves.

Further analysis through subsample segmentation reveals that the relationship observed in the full post-implementation sample is conditional on both bank size and country-level credit risk. Specifically, the positive association between market reactions and changes in loan loss reserves is significant for large banks and those operating in low credit risk environments. In contrast, this effect is not observed for small banks or for banks based in countries with elevated credit risk. These findings suggest that investor interpretation of changes in loan loss reserves is influenced by institutional and macroeconomic factors.

The findings of this study contribute to the literature in two primary ways. First, building on the predicted market implications of the ECL framework under IFRS 9 (Beatty & Liao, 2021; Wheeler, 2021), this study examines how market reactions to changes in loan loss reserves differ under the two regulatory frameworks IAS 39 and IFRS 9. In doing so, it offers insight into how the design of accounting standards can shape investor perceptions and market behavior, thereby underscoring the broader role of financial reporting in influencing market dynamics. Second, this study revisits the extensively researched relationship between loan loss provisions and market reactions within the context of the IFRS 9 reporting regime. By focusing on the post-implementation period (2019–2023), it assesses whether previously documented associations under previous accounting frameworks continue to hold under the ECL framework. Given the substantive shift in the underlying accounting framework, it is meaningful to evaluate whether the nature of the market's interpretation of such provisions has changed. Additionally, the research provides an opportunity to reexamine the behavioral mechanisms underpinning investor responses to changes in loan loss reserves, such as signaling effects, earnings management, and risk assessment.

The remainder of the paper is structured as follows. Section 2 provides the institutional background, detailing the transition from IAS 39 to IFRS 9, and reviews relevant literature on the effects of the regulatory change as well as on the relationship between loan loss accounting and market returns. Section 3 describes the data selection process and outlines the empirical methodology employed in the analysis. Section 4 presents the results of the main regression models alongside the additional analyses. Section 5 offers a discussion of the findings, and Section 6 presents the key insights and limitations of this study.

2. Literature review

The literature review will first outline the regulatory transition from IAS 39 to IFRS 9, with a focus on its impact on loan loss recognition. It will then examine the implications of IFRS 9 for the banking sector, as highlighted in prior research. Next, the review will summarize the relationship between loan loss accounting and stock market behavior established in prior research. Finally, the hypotheses will be presented.

2.1 Transition from IAS 39 to IFRS 9

Historically, the banks that are subject to the accounting standards set by the International Accounting Standards Board (IASB) have recognised provisions for loan losses in accordance with the accounting standard IAS 39. Under this regulation, the applied incurred credit loss (ICL) model required banks to recognise credit losses on an outstanding loan only when there was objective evidence of a loss event (Frykström & Li, 2018). Consequently, the application of the model generally resulted in deferral of loan loss provisions until evidence of borrower default (Pucci & Skærbæk, 2020).

Over the years, the model has received criticism for reinforcing lagged recognition of loan losses that failed to represent the prevailing market conditions and expectations. The view was that the credit losses reported under the ICL model were "too little, too late" which could have generated procyclicality, the tendency of financial accounting to amplify the business cycle (Barth & Landsman, 2010; Bischof et al., 2020; Frykström & Li, 2018; Gaston & Song, 2014). This became especially apparent following the Great Financial crisis in 2008 and consequently the prevailing accounting method was deemed insufficient by the G20 leaders (G20, 2009) and the Basel Committee on Banking Supervision (BCBS), who questioned the timeliness of recognized loan losses and highlighted the need to replace the existing ICL model (BCBS, 2011).

In response to the critique, the IAS 39 was replaced by IFRS 9, which came into effect on 1 January 2018 and replaced the ICL model with the expected credit loss (ECL) model. Contrary to the backward-looking ICL approach, the ECL model adopts a forward-looking approach which takes a broader range of available credit information into account when estimating potential loan losses (Frykström & Li, 2018). In practice, IFRS 9 specifies the expected credit loss as the difference between the contractual payments and the expected payments, discounted by the effective interest rate (IASB, 2022). Thus, it requires banks to account for their exposure to future impairment of outstanding loans as opposed to the previous framework which only allowed for confirmed impairments to be recognised, leading to an earlier recognition of expected credit losses compared to the previous ICL model (IASB, 2013).

The model for estimating the loan loss reserves recognised in the financial statements relies on the estimation of three variables: Exposure At Default (EAD), Probability of Default (PD) and Loss Given Default (LGD). EAD reflects the total currency amount of any outstanding

loan less any collateral connected to the loan, PD is the estimated risk of borrower default and LGD is the estimated proportion of the exposure the bank anticipates to suffer in the case of borrower default (IFRS Foundation, 2016). Based on these estimates the computation of loan loss reserves is as follows:

$$LLR = EAD \times PD \times LGD$$

where LLR is the loan loss reserves, EAD is the exposure at default, PD is the probability of default and LGD is the loss given default

Loan loss reserves represents a balance sheet provision that reduces the carrying value of financial assets by the total amount of expected credit losses, while changes in loan loss reserves are recognized in the income statement and are referred to as loan loss provisions. The determination of appropriate estimates for PD and LGD shall, as outlined by IFRS 9, reflect "*an unbiased and probability-weighted amount that is determined by evaluating a range of possible outcomes*" (IASB, 2022). In addition to the incorporation of various scenarios, the framework requires the inclusion of a credit quality assessment in the determination of appropriate loan loss reserves. The credit quality assessment is defined as a three-stage approach where a bank's financial assets are categorised as performing (stage 1), underperforming (stage 2) or impaired (stage 3) (Frykström & Li, 2018). Financial assets classified in stage 1 indicate that there is no deterioration in the credit quality of the assets from the time of initial recognition and in this case the provision for loan losses should account for the expected losses for the following 12 months. Financial assets in stage 2 imply a significant increase in credit risk since the initial recognition of the asset whereas financial assets in stage 3 are already credit-impaired. Provisions for loan losses of financial assets in both stage 2 and stage 3 should be determined using the lifetime expected credit loss of the asset. The standard does not outline a specific definition of a significant increase in credit risk, but rather mandates banks to apply various approaches when assessing the potential change in credit risk of a financial asset. (IASB, 2014)

Table 1. Classification of financial assets under IFRS 9

Increase in credit risk since initial recognition →		
Stage 1 *Performing* Assets with unchanged credit risk	**Stage 2** *Underperforming* Assets with significant increase in credit risk	**Stage 3** *Impaired* Assets considered credit-impaired
Impairment recognition		
12-month expected credit losses	Lifetime expected credit losses	Lifetime expected credit losses
Interest revenue		
Effective interest on gross carrying amount	Effective interest on gross carrying amount	Effective interest on amortised cost

As the regulatory change from IAS 39 to IFRS 9 introduced a more comprehensive recognition of credit risk exposure, the BCBS released a standard for an interim regulatory treatment of accounting provisions and standards for transitional arrangements, with the

objective to avoid a capital shock, as the new approach was expected to increase provision and thus have an adverse effect on banks' regulatory capital. The transitional agreement allowed banks, for up to five years, to determine their regulatory capital using the previous ICL model. Thus, it did not affect the loan loss recognition but served as a measure to allow banks to rebuild their capital resources in the case that their regulatory capital would be significantly negatively impacted by the introduction of the ECL model. (BCBS, 2017)

2.2 Effects on the banking sector

The implementation of IFRS 9 and adoption of the ECL model signified a substantial shift in the accounting treatment of loan losses, and was expected to have significant implications, not only for individual banks but also for overall financial stability. Before its implementation, the ECL model was expected to result in earlier and higher levels of loan loss provisions (Frykström & Li, 2018), which was anticipated to encourage banks to adopt more prudent and less cyclical lending strategies, thereby enhancing management of credit risk (European Systemic Risk Board, 2017). Thus, the principles of the ECL model could contribute to reducing bank risk. Further, the objective of the new standard was to reduce the information asymmetry inherent in the older method for loan loss recognition, by incorporating more detailed disclosures on loan quality and creditworthiness into the new model (Giner & Mora, 2019). However, with the new accounting framework, increased managerial judgment is required through the assessment of credit quality and forecasting of macroeconomic scenarios (Frykström & Li, 2018). Provisioning that requires managerial judgment has been found to be closely associated with earnings management (Ozili, 2017; Skala, 2015), the practice of using financial accounting to manipulate earnings, suggesting that the risk of strategic accounting for loan losses is likely to increase with the adoption of the ECL model. The incorporation of future macroeconomic conditions may however exert favorable effects on financial stability by allowing for earlier recognition of credit losses, particularly in the context of anticipated economic downturns, thereby mitigating the procyclical effects of financial reporting (ESRB, 2017).

While IFRS 9 may enhance the transparency and informativeness of banks' financial statements, its application poses inherent risks if not applied with proper discipline by management. Thus, the market's reaction to loan losses under the ECL model is subject to how soundly the model is perceived to be applied by the banks. The field of research has approached the question of the efficacy of the implementation of the new accounting framework extensively, by studying the actual outcomes of the regulatory shift.

In line with the intended outcome of the new accounting standard as set out by the IASB (IASB, 2014), post-implementation research finds that shifting from the ICL to the ECL model has resulted in an increased timeliness of loan loss recognition (Jin & Wu, 2023; Kim et al., 2021; Oberson, 2021; Onali et al., 2024) as the new standard requires banks to incorporate current changes in the credit quality as well as changes in the macroeconomic environment. Lòpez-Espinosa et al. (2021) demonstrate that for more than 90% of globally

systemically important banks, the day-one impact of the new standard increased loan loss provisions by an average of 20%, highlighting the magnitude of the effect.

Connected to the timeliness of loan loss recognition under the new accounting regulation, research on the implementation of IFRS 9 has attempted to derive its effects on procyclicality which the previous model under IAS 39 was criticised for enhancing (Barth & Landsman, 2010). On the one hand, several studies find support for the new ECL model resulting in less procyclicality than the ICL model, as a consequence of earlier recognition of loan losses (Buesa et al., 2019; Fatouh & Giansante, 2023; Hansen et al., 2024; Kund & Rugilo, 2023; López-Espinosa & Penalva, 2023). These observations suggest that the procyclicality of impairments has decreased, which in turn would benefit financial stability. On the other hand, Pastiranová and Witzany (2022) find contradicting evidence that a decrease in procyclicality as a result of IFRS 9 is not supported in the data. Thus, although a substantial body of research on the procyclicality effects of IFRS 9 and the ECL model indicates a reduction in the procyclicality effects of financial statements, a full consensus and a definitive conclusion of its effects on financial stability is yet to be determined.

With the more comprehensive credit assessments outlined in the ECL model, that all else equal increase the loan loss provisions recognised (López-Espinosa et al., 2021), banks have revised their lending policies, improving the quality of loans in an effort to prevent accumulation of credit losses (Ricapito, 2024). Thus, the forward-looking provisioning under IFRS 9 has driven banks to significantly decrease their systematic risk exposure, with the decrease in bank risk being most evident in countries with strong accounting regulatory enforcement and banking supervision (Dong & Oberson, 2022; Kyiu & Tawiah, 2023). The reduction in bank risk resulting from the implementation of IFRS 9 may serve as a strategic response to mitigate the financial statement impact of the enhanced credit risk reporting requirements. Consequently, the market's interpretation and reaction to changes in loan loss reserves become critical, as despite the observed increase in the amount of loan loss reserves, evidence suggests that the actual risk exposure of banks has decreased. The observed increase in reserves does not appear to be driven by higher risk exposure, raising the question of how investors will incorporate the additional information embedded in the loan loss reserves into their valuation models and risk assessments.

The replacement of the ICL with the ECL model requires banks to account for a broader range of risk factors in the accounting of loan losses (Frykström & Li, 2018) and thus the ECL model should provide more information about banks' credit risk exposure. The application of the ECL model appears to be in line with the intended objective and provide more informative provisions. Oberson (2021) finds a decrease in the credit default swap (CDS) pricing volatility of banks after the implementation of IFRS 9, indicating an increased alignment in credit investors' assessments of banks' credit risk. Further, the implementation of the ECL model has resulted in loan loss provisions being more predictive of future bank risk (López-Espinosa et al., 2021) as it has improved the expectation of future bank risk (Salazar et al., 2023). Loan loss provisions for loans classified in stage 2, i.e., loans with significant deterioration in credit quality, is found to be the most significant driver to the

increased predictability of loan loss provisions on future overall bank credit risk (Salazar et al., 2023). These findings support the notion that the implementation of the new accounting framework decreases information asymmetry and provides investors with a more comprehensive outlook of banks' credit risk exposure.

Central to the topic of financial statement transparency and information asymmetry is however the risk of the ECL model being used as an earnings management tool, which would decrease the transparency of financial statements (Bushman & Williams, 2012). As a result of the new ECL model being subject to estimation, and by extension to judgement, the risk for the accounting of loan losses being used as a tool for earnings management is enhanced (Ozili, 2017; Skala, 2015). The degree to which earnings management is used in the application of the ECL model therefore becomes critical for how investors will interpret and incorporate recognised credit losses in their investment decisions.

The issue of whether the ECL model demonstrates a greater tendency for earnings management compared to the previous ICL model has been studied extensively since its implementation, yielding conflicting results. On the one hand, Norouzpour et al. (2023) observe an increase in both earnings and capital management under the ECL framework, with country regulatory quality acting as a mitigating factor to the extent of banks' earnings management. Similarly, Oberson (2021) argues that the increased association between loan loss provisions and return on assets (ROA) after the implementation of IFRS 9 points to banks managing their accounting discretion more aggressively through recognition of loan losses in order to smooth earnings. On the contrary, López-Espinosa et al. (2021) found no evidence of increased managerial discretion in the recognition of loan losses neither to manage earnings nor to meet regulatory capital requirements. Several studies highlight the same conclusion, that the adoption of IFRS 9 has led to a decrease in earnings management due to the new standard calling for more transparency in accounting practices (Casciello et al., 2024; Proença et al., 2024; Resende et al., 2024), suggesting that the ECL model brings improvements in financial disclosure reliability and capital soundness (Casciello et al., 2024). As established, the research field has yet to reach a consensus on the extent to which the ECL model is subject to earnings management in banks.

Hence, as indicated by contradicting evidence in previous research, determining where the application of the ECL model can be placed in the trade-off between increased financial disclosures and transparency, and the exposure for opportunistic behaviors is a complex question. Nevertheless, the potential for increased earnings management may influence how investors integrate the supplementary information offered by the ECL model into their investment and valuation decisions. This provides the question of how the additional information provided by ECL disclosures is embraced and interpreted by investors.

2.3 Market reaction implications from regulatory shift

Financial reporting standards function as a regulatory framework that mandates managers to disclose operating outcomes fairly and transparently, thereby mitigating information

asymmetry for external investors (Bushman & Smith, 2001). Previous research into the market effects of increased financial reporting transparency have found that it reduces the risk of large negative shocks to stock returns (Du et al., 2016) and similarly, that higher quality of banking accounting regulation is positively associated with higher stock valuations and lower volatility in returns as it reduces information asymmetry problems (Song, 2017). Consequently, the adoption of IFRS 9, which improves the transparency of individual banks' credit risk reporting if applied soundly, equips investors with more effective information to respond appropriately to bank-specific developments.

The notion that the ECL model provides additional information of the credit risk exposure poses the question of how analysts and investors treated the lack of forward-looking information before the implementation of IFRS 9. Beatty and Liao (2021) demonstrate that the loan loss provisions under the ICL model fail to capture all available future loss information and provide evidence that analyst provision forecasts have predictive power for future non-performing loans. Further, they provide evidence that both actual and forecasted loan loss provisions are associated with negative excess market returns. Wheeler (2021) corroborated this relationship by estimating expected credit loss allowances, as if the ECL model applied. The study found a negative relationship between stock prices and the estimated expected credit losses between 2006 and 2016, suggesting that investors did obtain and incorporate information about unrecognized expected credit losses into their investment decisions under IAS 39 reporting. The relationship is further found to be stronger for larger banks, consistent with them having greater transparency and more readily accessible information compared to smaller banks. Additionally, Wheeler (2021) found the relationship to be stronger for banks with larger analyst following, indicating that analysts were to some degree able to bridge the information gap for investors. Thus, the pre-implementation research suggests that stock market behaviors have factored in unrecognized expected loan losses, raising the question of how investor behavior towards recognised loan losses changed with the adoption of IFRS 9, which provides a more comprehensive description of the credit risk exposure compared to IAS 39.

The relationship between loan loss provisions and market returns has been studied extensively in previous research. Contrary to the finding of Beatty and Liao (2021), which found loan loss provisions to be negatively priced by the market during the period when IAS 39 and the ICL model were in effect, previous research has generally documented a positive association between discretionary loan loss provisions and both stock returns (Beaver et al., 1997; Wahlen, 1994) and market values of commercial banks (Beaver et al., 1989; Beaver & Engel, 1996). Various attempts have been made to explain this relationship. Notably, Beaver et al. (1989) argue that increases in loan loss reserves can serve as a signal of robust earnings, suggesting that firms are sufficiently resilient to absorb the negative impact of these reserves on reported earnings. Similarly, Beaver et al. (1997) suggest that despite the apparent adverse impact of loan loss provisions on financial performance, the observed positive relationship between loan loss provisions and stock returns can be attributed to discretionary loan loss provisions being positively associated with future earnings. This interpretation aligns with Wahlen (1994), which finds that loan loss provisions tend to increase when prospects for

future cash flows improve. Thus, these studies support the view that managers may use discretion in the accounting for loan losses to signal positive expectations about a bank's financial strength.

While the research into this relationship largely has found a positive association between loan loss provisions and stock returns, contrasting evidence has been presented. Namely, Ahmed et al. (1999) and Docking et al. (1997) found loan loss provisions to be associated with negative abnormal returns and net stock returns respectively. Thus, challenging Beaver et al. (1997) who claimed that a substantial body of research supports that increases in loan loss provisions are good news.

Recent research by Hegde and Kozlowski (2021) however adds to the previous literature by evidencing that the relationship between discretionary loan loss provisions and bank abnormal returns are economic cycle dependent. During economic expansion the relationship is positive and during economic recession, where default concerns are increasing, discretionary loan loss provisions are associated with negative abnormal returns. They further present that higher recognized provisions during economic expansions are associated with significantly higher earnings and loan growth in the following year, similar to the arguments presented in previous research (Beaver et al., 1989; Beaver et al., 1997).

Thus, while previous findings remain ambiguous regarding how markets respond to changes in loan loss reserves, several studies support the idea that when accounting for loan losses allows for managerial discretion, signaling effects related to both current and future financial performance drive the positive market pricing of these changes. In this context, the introduction of the new ECL model, which allows even greater discretion in determining loan loss provisions than prior accounting frameworks, underscores the relevance of reinvestigating this relationship.

This study intends to build on the field of previous research that has studied initial market reactions to the replacement of the ICL model with the ECL model. Onali et al. (2024) provide pre-implementation evidence of the market reactions towards announcements surrounding the development of IFRS 9. The evidence presented shows an overall positive market reaction to ECL model announcements suggesting that investors perceived the new framework to enhance market discipline and financial reporting quality. Post-implementation research on the market’s response to the adoption of the ECL model finds support for a decrease in the future stock crash risks in banks as a result of the shift from the ICL to the ECL model (Jin & Wu, 2023), indicating that the more dynamic approach generates more timely and predictable loan loss recognition (López-Espinosa et al., 2021) and in turn reduces the accumulated announcements of bad news.

López-Espinosa et al. (2021) provides evidence of the initial market reaction to the transitional effects of the implementation of the ECL model by studying the stock price reaction of the day-one impact of the change in loan loss reserves in globally systemically important banks. They find that an increase in loan loss reserves is associated with a negative

stock price reaction for banks with higher increases in credit risk conditions. This relationship does however not remain for banks with lower increases in credit risk conditions. The price reaction observed of the day-one impact of the ECL model raises the question of whether it reflects a market adjustment to newly available information that had not previously been incorporated into pricing, or whether it signals a response towards recognised loan losses that will persist over time. This study aims to address this question by extending the post-implementation horizon.

2.4 Hypothesis development

The transition from IAS 39 to IFRS 9 represents a more comprehensive approach to recognizing credit risk exposure. Consequently, it is anticipated that market reactions to changes in loan loss reserves will differ under the two regulatory frameworks. Under the ICL framework, only confirmed impairments were recognized (Pucci & Skærbæk, 2020), which is equivalent to the recognition of stage 3 loans under the ECL model. As a result, changes in loan loss reserves under the ICL model were expected to signal not only deterioration in impaired assets but also potential deterioration in other assets that had not yet defaulted, equivalent to the recognition of stage 2 assets under the ECL model. The reasoning aligns with Beatty and Liao (2021), who found that actual loan loss provisions were associated with stronger negative excess returns when expected provisions were not controlled for. Wheeler (2021) presents further findings in line with this, providing evidence that investors did obtain and incorporate information about unrecognized expected credit losses into their investment decisions under IAS 39 reporting. This suggests that part of the observed market response to recognized loan losses is attributed to expectations of the credit quality of other assets. Therefore, it is expected that the market reaction to changes in loan loss reserves under the ECL framework, which accounts for the credit condition of all assets, will differ from that under the ICL model. Based on this reasoning, the following hypothesis is proposed:

H1: The market reaction to changes in loan loss reserves under the ECL model differs from that under the ICL model

As established in previous sections, the effects of IFRS 9 and specifically the implementation of the ECL model in the banking sector have been studied extensively. While research supports the view that IFRS 9 enhances the predictability and informativeness of banks' financial statements, conflicting evidence exists regarding whether the increased managerial judgment required by the new model has led to increased earnings management. Hence, there are conflicting forces at play in understanding how investors incorporate banks' loan loss information into their investment decisions.

The one post-implementation study investigating the transitional effect of IFRS 9 on stock price reactions finds a negative relationship between changes in loan loss reserves and abnormal returns for banks with higher increases in credit risk conditions (López-Espinosa et al., 2021). The findings are consistent with enhanced disclosure under IFRS 9 providing investors with more information about bank risk. The established relationship of the one

post-implementation study is consistent with the portion of previous research finding a negative association between loan loss provisions and market returns (Ahmed et al., 1999; Beatty & Liao, 2021; Docking et al., 1997). In this context, where changes in loan loss reserves signal shifts in bank risk, it would suggest that the negative relationship between credit risk and market returns will persist in the post-implementation period. Specifically, the negative implications of increased loan loss reserves, which signal higher levels of bank risk, will outweigh the positive market effects arising from improved disclosure and transparency (Song, 2017).

In contrast, earlier research presents an alternative perspective, identifying a positive association between changes in loan loss reserves and stock returns (Beaver & Engel, 1996; Beaver et al., 1997; Wahlen, 1994). Consequently, these findings suggest that when the accounting for loan losses allows for managerial discretion, signaling effects of strong current and future financial performance drive a positive market reaction to changes in loan loss reserves (Beaver et al., 1989; Beaver et al., 1997). In this context, and with the ECL model allowing for greater managerial judgment, it would suggest that changes in loan loss reserves provide information of banks' financial resilience. From this perspective, a positive relationship between changes in loan loss reserves and market returns in the post-implementation period is expected.

Given the contradictory evidence in the literature on market reactions to changes in loan loss reserves, it remains unclear whether the introduction of the ECL model will lead to a negative or positive market reaction to changes in loan loss reserves. Instead existing literature suggests that the market's response is contingent upon whether changes in loan loss reserves are primarily interpreted as signals of bank risk or as indicators of bank financial resilience. Consequently, we formulate the following dual hypothesis:

H2a: There is a negative relationship between changes in loan loss reserves and stock returns post the implementation of IFRS 9

H2b: There is a positive relationship between changes in loan loss reserves and stock returns post the implementation of IFRS 9

The introduction of the ECL model under IFRS 9 has enhanced the informativeness of banks' credit risk (López-Espinosa et al., 2021; Oberson, 2021). Recent research highlights that disclosures of loan loss provisions of assets in stage 2 is the most significant determinant in anticipating future bank risk (Salazar et al., 2023). Thus, if H2a can be accepted, which would imply that increases in loan loss reserves reflect shifts in perceived bank risk that subsequently drive negative market reactions, it is expected that the loan stages of loan loss reserves may influence the markets' reaction. Accordingly, we pose the following hypothesis:

H3: Changes in stage 2 loan loss reserves is the most significant driver in the stock price reaction

3. Data and Methodology

This study investigates the relationship between changes in loan loss reserves and market returns. To address the research question and empirically test the proposed hypotheses, a quantitative approach with panel regressions is applied. The following sections provide a detailed overview of the data utilized and methodology adopted in the analysis. Firstly, the data collection and sample selection process will be described in order to illustrate how the final sample of European public banks was derived. Secondly, the methodology is outlined, including a discussion on the dependent variable, main variable of interest and control variables. Finally, the model specifications are presented.

3.1 Data collection and cleaning

3.1.1 Scope

The scope of this study is delimited to publicly listed commercial banks in Europe. The delimitation of public banks is central to the topic studied, as observable stock price data is required in order to examine market reactions. Further, listed banks are defined as banks which are listed at the sample period end, in order to exclude potential effects from banks delisting. The focus on commercial banks is based on their core business model, which is closely linked to lending activities and the management of credit risk. Consequently, financial assets related to lending activities are expected to represent a significant component of their balance sheets and changes in reserves related to these are likely to attract investor attention. While the choice of scope may hinder the generalizability of the results to banks where other types of business models are at the core, we argue that including a broader range of banks could distort the findings, as varying operational factors could drive investor reactions, and thus also market returns.

The delimitation of European banks is based on several considerations. Firstly, the homogenous institutional environments between European countries, compared to other geographical regions enhances comparability between banks. Related to this is also the regulatory environment, and more specifically Regulation (EC) No 1606/2002 which states that in all EU member states, listed companies traded on an EU regulated market are required to prepare consolidated financial statements in accordance with the International Financial Accounting Standards (IFRS) (European Parliament and Council, 2002). The shared regulatory environment within EU thus further motivates the choice of studied region as it contributes with delimiting the sample to banks which apply the accounting principles of interest, IFRS.

The sample period is determined by the most recent available annual reports at the point of data collection, with the most recent published annual report being for the year 2023. This allows for a five year post-implementation period, covering years 2019 to 2023. The analysis excludes the IFRS 9 implementation year, 2018, in order to prevent the transitional effects to distort the results. Including 2018 would further compromise the explanatory variable of

interest as change in loan loss reserves is calculated as the year-over-year difference, and the year-end figures for 2017 and 2018 are non-comparable as they are reported under two different accounting standards. In order to study the difference between market reactions under the two regulatory frameworks, IAS 39 and IFRS 9, a pre-implementation period of five years is included, consistent with the length of the post-implementation period. Thus, the full sample period is 2013 to 2023, excluding 2018.

3.1.2 Sample selection

The sample of data on all publicly listed commercial banks in Europe is compiled through collection of data from the database Orbis by Bureau Van Dijk offering comprehensive worldwide company data (Moodys, n.d.). This is complemented with data on loan loss reserves for individual loan stages and macroeconomic indicators from S&P Capital IQ Pro, a platform providing tools and data on worldwide companies, industries and markets (S&P Global, n.d.). Lastly, data on the index returns has been obtained from Stoxx Ltd., a provider of global indices (Stoxx, n.d.).

Following the collection of the dataset of firm-year observations, the sample selection process is initiated by removing banks which do not adopt IFRS. In accordance with Regulation (EC) No 1606/2002, the use of IFRS is required for consolidated financial statements of publicly traded companies in all EU countries. For non-EU countries in the sample, IFRS Accounting Standards are required for all domestic public companies (IFRS Foundation, n.d.) with the exception of Switzerland. For the Swiss banks, the applied accounting principles have been assessed on a case-by-case basis and banks not reporting under IFRS have thereafter been removed from the sample.

Moreover, subsidiaries are excluded from the sample for two reasons. Firstly, including them would pose a risk of double counting, which could occur if both the consolidating entity and the stand-alone subsidiary would be part of the sample. Secondly, excluding subsidiaries also aligns with the scope of the sample as Regulation (EC) No 1606/2002 requires publicly listed entities to prepare their consolidated, and not individual, financial statements in accordance with IFRS. Moreover, banks with a financial year end different from December are removed, in order to ensure that the correct financial reporting effect is captured by the collected market return data. Furthermore, banks not providing interim reporting are excluded from the sample, since without interim financial disclosures during the year, the observed market reactions cannot be attributed to the release of accounting information. Lastly, observations with missing data for any of the variables in the regressions are removed. Following the sample selection process, the final dataset consists of 107 banks across 32 countries, resulting in a total of 830 bank-year observations for the full sample. The final sample is winsorized at the 1st and 99th percentiles to mitigate the influence of extreme outliers and enhance the robustness of the results. Table 2 provides an overview of the sample removal process and Table 3 illustrates the distribution of the sample across countries.

Table 2. Sample selection process

Selection criteria	Number of banks
Listed banks	190
(-) Banks not applying IFRS	-9
(-) Subsidiaries	-18
(-) Non financial year end 12/31	-1
(-) Non interim reporting	-11
(-) Missing observations	-44
Final sample	**107**

Table 3. Sample distribution by country

Country	Number of banks	Country	Number of banks
Austria	2	Lithuania	1
Bosnia and Herzegovina	1	Malta	2
Bulgaria	3	Netherlands	2
Croatia	2	North Macedonia	2
Cyprus	1	Norway	5
Czech Republic	1	Poland	7
Denmark	16	Portugal	1
Estonia	1	Republic of Moldova	1
Finland	3	Romania	1
France	3	Russian Federation	4
Germany	2	Slovenia	1
Greece	4	Spain	5
Hungary	1	Sweden	5
Iceland	2	Turkiye	8
Ireland	3	Ukraine	2
Italy	14	United Kingdom	1
Total sample		**107**	

3.2 Methodology

3.2.1 Dependent variable

The aim of this paper is to study the market reaction to changes in loan loss reserves and if they differ under two different regulatory frameworks, IAS 39 and IFRS 9. The dependent variable in all models, serving as proxy for the market reaction, is defined as the return on individual bank stocks, similar to previous literature studying the same relationship (Beaver et al., 1997). Two different measures of return are employed, the 12-month raw stock return and the 12-month market-adjusted return. The first measure *Stock Return* is defined as the annual return from holding a bank's equity, while the latter *Market-Adjusted Return* (*MAR*) is the annual stock return adjusted for the return of the market portfolio. Consistent with previous research, the DJ STOXX Index Global 1800 is used as a proxy for the market portfolio. Specifically, the DJ STOXX Index Global 1800 ex Europe is employed, which excludes the returns from European firms in the index. This approach ensures that the

dependent variable is not measured in a way that could dilute or eliminate the very effect under examination (Armstrong et al., 2010; Joos & Leung, 2013; Onali et al., 2024). The use of two different return measures as proxies for market reactions serves as a robustness test, verifying that the results are not contingent on any single measure for market return, in order to enhance the reliability of the findings. In line with previous research studying annual market returns, the dependent variables are measured as the return from April 1st of year t to March 31st of year t+1 (Hamberg & Beisland, 2014; Hegde & Kozlowski, 2021), capturing the market reaction to the release of interim and annual reports for the corresponding fiscal year.

3.2.2 Independent variable

As the purpose of this study is to examine the market reaction towards banks' changes in loan loss reserves, the independent variable of interest is defined as the year-over-year percentage change in loan loss reserves (*ΔLLR)*. In line with López-Espinosa et al. (2021), the change in loan loss reserves is used as a proxy for loan loss provisions in a given year. The decision to employ a balance sheet-based proxy, specifically the change in loan loss reserves, rather than the corresponding income statement item is made to more accurately capture the relevant variations. Under the ECL framework, the income statement line item for provisions comprise not only credit losses related to loans but also impairments associated with other financial assets, such as trade receivables and lease receivables (IASB, 2014). As a result, relying on this item risks conflating loan-specific reserve adjustments with those pertaining to non-loan exposures, thereby potentially distorting the empirical analyses focused on lending activities. In contrast, the change in loan loss reserves more precisely captures reserve movements attributable to the loan portfolio, minimizing the influence of credit risk components unrelated to loans. Thus, this study adopts the change in loan loss reserves as a more precise proxy for provisions directly associated with loan losses, in line with López-Espinosa et al. (2021).

$$\triangle LLR = \frac{LLR_t - LLR_{t-1}}{LLR_{t-1}}$$

Further, in contrast to prior studies analysing market reactions to loan loss accounting by disaggregating provisions into discretionary and non-discretionary components, this study employs changes in total loan loss reserves as a single, aggregate measure. This decision is driven by the practical challenges and model-dependence involved in accurately identifying the discretionary portion, as highlighted by Hegde and Kozlowski (2021). By employing an aggregate measure, the approach avoids dependence on potentially subjective estimation models and ensures that the analysis captures the full informational content of reserve changes as perceived by the market.

To test the first and second hypothesis, the variable of interest is the aggregate change in loan loss reserves (*ΔLLR*). However, to test the third hypothesis, the aggregate measure is replaced with the changes in loan loss reserves for the individual loan stages. Specifically, the

variables *ΔLLR Stage 1*, *ΔLLR Stage 2* and *ΔLLR Stage 3,* defined as the year-over-year percentage change in loan loss reserves for each loan stage classification, are introduced. These enable the analysis of how the market reacts to changes in individual loan stages and whether that reaction differs across stages.

3.2.3 Control variables

To isolate the effect of the change in loan loss reserves on market returns, a number of controls are included to capture firm-level characteristics and macroeconomic factors that could influence both the dependent and independent variables. The controls have been chosen in line with López-Espinosa et al. (2021), which studied the relationship between market returns and loan loss provisions in the transition to IFRS 9. The application of these controls is however not limited to this study as they have been extensively employed in previous research studying the association between reported accounting figures and stock market performance of banks. The control variables included are past loan loss reserves, past return, size, loans, net interest income, tier-1 ratio, book-to-market equity ratio and GDP growth.

Firstly, consistent with previous research (Beatty & Liao, 2021; López-Espinosa et al., 2021) the control variable past loan loss reserves (*Past LLR*) is included. The variable is included to capture varying levels of loan reserves of banks, and is defined as the lagged ratio of total loan loss reserves to total assets. While the independent variable (*ΔLLR)* captures the relative change in level of loan loss reserves, the absolute level of loan loss reserves considered in relation to the balance sheet size may be a determining factor in how investors perceive an annual change in loan loss reserves. Thus, *Past LLR* is included as a control variable to capture this effect.

The second control variable included in line with López-Espinosa et al. (2021) is *Past Return*, defined as the previous year market return. The variable is included to control for investor sentiment and perception affected by the banks' historical performance. As investor perceptions to accounting changes may be affected by how banks have performed historically, including the variable is thus an attempt to exclude effects from market trends on investor perceptions.

Firm size has by previous literature been shown to have an association with market stock return and has thus been heavily adopted as a control variable in research on the topic (Beatty & Liao, 2021; Hegde & Kozlowski, 2021; Jin & Wu, 2023; López-Espinosa et al., 2021; Onali et al., 2024). The inclusion of *Size* as a control variable is motivated by the fact that banks of varying sizes may differ in several key aspects such as access to capital markets, degree of business diversification and regulatory scrutiny. Moreover, large banks may also be associated with higher stock liquidity and attract higher investor and analyst following, which can all affect stock returns. *Size* is defined as the natural logarithm of market value of equity at the end of the fiscal year. Since larger banks tend to be more stable and diversified in their operations, it is predicted that the variable *Size* is positively associated with market return.

Additionally, the control variable *Loans* is included and is defined as the ratio of loans outstanding to total assets. Consistent with previous research (Beatty & Liao, 2021; López-Espinosa et al., 2021), the variable is included to account for differences in lending intensity. The weight a bank has on lending, relative to other types of activities, is associated with factors such as exposure to economic conditions related to lending, which may in turn affect market returns. Further, the weight on lending activities is expected to influence the size of loan loss reserves which may affect the way investors perceive the effect in this account. Thus, the inclusion of the control is motivated by both its relation to the dependent and the independent variable.

Moreover, the variable *Net Interest Income* is included as a control variable to account for bank's differences in profitability, and is defined as net interest income relative to total assets. Net interest income is the difference between a bank's interest income and interest expense and is a key measure of operating performance for financial institutions (IFRS Foundation, 2019). In line with previous research (López-Espinosa et al., 2021) *Net Interest Income* is thus included to control for the financial performance effect on market returns, as strong financial performance is generally associated with higher returns. Accordingly, it is expected that *Net Interest Income* will have a positive association with the dependent variable market return.

Furthermore, a control for regulatory capital Tier 1 is included (*Tier 1*), defined as Tier 1 capital relative to risk-weighted assets (RWA). The control has in previous literature been applied to account for differences between banks as it serves as an indicator of financial strength (Beatty & Liao, 2021; Hegde & Kozlowski, 2021; López-Espinosa et al., 2021). A higher Tier 1 capital ratio signals stronger solvency and a greater ability to absorb potential losses. As a result, investors may perceive banks with higher capital buffers as more resilient in the face of credit risk, and consequently a positive coefficient is expected for *Tier 1*. Including the control thus accounts for differences in how the market responds to changes in loan loss reserves depending on the underlying capitalization strength of the bank.

In line with prior literature on the topic, the book-to-market equity ratio (*B/M Ratio*) is included as a control (Jin & Wu, 2023; López-Espinosa et al., 2021), and is defined as the book value of equity relative to market value of equity. Firms with different B/M ratios may experience varying investor reactions to accounting signals, and including the variable thus helps control for heterogeneity in investor behavior.

Finally, in line with previous research, the control variable ΔGDP is included (López-Espinosa et al., 2021; Onali et al., 2024). The variable is defined as the annual growth in real GDP and accounts for macroeconomic differences across countries. Given that the banking sector is sensitive to broader macroeconomic conditions, growth in GDP is associated with the bank's financial performance, and thus by extension also with the market returns within the sector. The inclusion of ΔGDP thus helps reduce the potential influence of macroeconomic variations on the results.

3.2.4 Model specification

To address the research question and test the hypotheses, three ordinary least squares (OLS) multivariate linear regressions models are specified. Using this method allows for the estimation of the relationship between the dependent variable, market returns, and the independent variable of interest, changes in loan loss reserves, while controlling for other variables that may influence this relationship. All models include a vector of controls ($X'_{it}\gamma$), entailing the control variables past loan loss reserves, past return, size, loans, net interest income, tier-1 ratio, book-to-market equity ratio and GDP growth. The models are specified with robust standard errors to account for heteroskedasticity. All models include year and firm fixed effects in order to capture unobserved heterogeneity. Firm fixed effects are included to absorb time-invariant differences between firms, while year fixed effects are included to account for time-specific shocks or macroeconomic developments which are constant across the firms in the sample. Including country fixed effects as an alternative to firm fixed effects was also considered. However, given that the sample consists of European banks operating under the same regulatory environment and relatively similar supervisory environments, the cross-country variation is likely to be less pronounced than firm-level heterogeneity. Including both firm and country fixed effects is avoided as the two may capture overlapping variation, potentially resulting in model over-specification.

To test the first hypothesis, which intends to investigate whether there is a difference in market reactions to changes in loan loss reserves under the two regulatory frameworks, model (1) is specified. The model is applied on the full sample, including both the pre- and post-implementation sample period (2013-2017 and 2019-2023). The model specification is applied for two distinct return measures, *Stock Return* and *Market-Adjusted Return (MAR)*, as defined in 3.2.1. The independent variable of interest is *ΔLLR*, the percentage change in loan loss reserves. Furthermore, a binary variable which takes on the value 1 for the post-implementation years (2019-2023) and 0 for the pre-implementation years (2013-2017) is included. The coefficient of interest is β_3 which describes the estimate for the interaction term ΔLLR_{it}*IFRS*. A significant and non-zero β_3 is consistent with H1 and would capture a difference in the market reaction to changes in loan loss reserves under the two different accounting frameworks.

$$Return_t = \beta_0 + \beta_1 \Delta LLR_{it} + \beta_2 IFRS_t + \beta_3 \Delta LLR_{it} * IFRS_t + X'_{it}\gamma + FirmFE_i + YearFE_t + \varepsilon_{it} \quad (1)$$

where $X'_{it}\gamma$ are the controls past loan loss reserves, past return, size, loans, net interest income, tier-1 ratio, book-to-market equity ratio and GDP growth

To test the second hypothesis, which intends to investigate the post-implementation association between changes in loan loss reserves and market reactions, regression model (2) is specified and applied to the post-implementation sample period (2019-2023). Similar to model (1), the model specification is applied with two different return measures, *Stock Return* and *Market-Adjusted Return (MAR)* as dependent variables. The independent variable used is the percentage change in loan loss reserves, *ΔLLR*. A negative value of β_1 would indicate that the market reacts negatively to an increase in loan loss reserves in line with H2a, while a positive value would support H2b, indicating that an increase in loan loss reserves is positively priced by the market.

$$Return_t = \beta_0 + \beta_1 \Delta LLR_{it} + X'_{it}\,\gamma + FirmFE_i + YearFE_t + \varepsilon_{it} \quad (2)$$

where $X'_{it}\,\gamma$ are the controls past loan loss reserves, past return, size, loans, net interest income, tier-1 ratio, book-to-market equity ratio and GDP growth

To test the third hypothesis, which aims to address the market reaction to changes in loan loss reserves related to the individual loan stages, model (3) is specified. Similar to Salazar et al. (2023), the model includes one variable for each loan stage to capture the market's reaction to changes in the individual loan stages. Due to the financial asset stages being introduced with IFRS 9, the model is only applied to the post-implementation sample. Similar to previous models, the model specification is applied for two return measures, *Stock Return* and *Market-Adjusted Return (MAR)* as dependent variables. The independent variables estimated are the changes in loan loss reserves pertaining to the individual loan stages, *ΔLLR Stage 1*, *ΔLLR Stage 2* and *ΔLLR Stage 3*. A β_2 with a greater absolute value than β_1 and β_3 would be consistent with H3, indicating changes in stage 2 loan loss reserves to be the most significant driver of market reactions.

$$\begin{aligned} Return_t = \beta_0 + \beta_1 \Delta LLR\ Stage\ 1_{it} + \beta_2 \Delta LLR\ Stage\ 2_{it} + \beta_3\, \Delta LLR\ Stage\ 3_{it} \\ + X'_{it}\,\gamma + FirmFE_i + YearFE_t + \varepsilon_{it} \end{aligned} \quad (3)$$

where $X'_{it}\,\gamma$ are the controls past loan loss reserves, past return, size, loans, net interest income, tier-1 ratio, book-to-market equity ratio and GDP growth

4. Results

The following section provides the descriptive statistics and correlation matrices for the three different samples used in the models. Further, it presents hypothesis testing of the three model specifications, results from the additional analysis and a discussion of the robustness of the findings.

4.1 Descriptive statistics

Table 4. Descriptive statistics

Variable	N	Mean	SD	Median	Min	Max
Panel A: pre- and post-IFRS 9 implementation (2013-2023)						
Stock Return	830	0.100	0.400	0.073	-0.857	1.408
Market-Adjusted Return (MAR)	830	-0.006	0.359	-0.023	-0.942	1.220
ΔLLR	830	0.024	0.270	-0.007	-0.531	1.306
Past LLR	830	0.035	0.037	0.023	0.001	0.195
Past Return	830	0.047	0.394	0.012	-0.857	1.378
Size	830	7.340	2.213	7.678	2.150	11.162
Loans	830	0.602	0.147	0.615	0.229	0.923
Net Interest Income	830	0.023	0.013	0.021	0.006	0.077
Tier 1 Ratio	830	0.160	0.043	0.153	0.076	0.314
B/M Ratio	830	1.701	1.278	1.387	0.201	7.639
ΔGDP	830	0.022	0.038	0.021	-0.092	0.126
Panel B: post-IFRS 9 implementation (2019-2023)						
Stock Return	469	0.145	0.418	0.117	-0.745	1.540
Market-Adjusted Return (MAR)	469	0.015	0.362	0.009	-0.988	1.243
ΔLLR	469	0.000	0.279	-0.023	-0.679	1.376
Past LLR	469	0.027	0.029	0.018	0.001	0.215
Past Return	469	0.048	0.402	-0.009	-0.745	1.454
Size	469	7.295	2.150	7.568	1.979	11.098
Loans	469	0.582	0.142	0.586	0.239	0.917
Net Interest Income	469	0.023	0.015	0.020	0.006	0.089
Tier 1 Ratio	469	0.173	0.045	0.165	0.069	0.361
B/M Ratio	469	1.836	1.360	1.494	0.184	8.089
ΔGDP	469	0.022	0.047	0.023	-0.109	0.133
Panel C: post-IFRS 9 implementation (2019-2023)						
Stock Return	395	0.149	0.440	0.117	-0.810	1.579
Market-Adjusted Return (MAR)	395	0.018	0.380	0.020	-1.002	1.311
ΔLLR Stage 1	395	0.157	0.516	0.042	-0.569	3.296
ΔLLR Stage 2	395	0.216	0.670	0.044	-0.651	3.923
ΔLLR Stage 3	395	-0.068	0.265	-0.078	-0.767	0.952
Past LLR	395	0.027	0.029	0.019	0.001	0.172
Past Return	395	0.041	0.423	-0.028	-0.801	1.688
Size	395	7.500	2.067	7.686	2.496	11.182
Loans	395	0.583	0.139	0.593	0.231	0.901
Net Interest Income	395	0.023	0.014	0.020	0.006	0.083
Tier 1 Ratio	395	0.169	0.041	0.161	0.067	0.314
B/M Ratio	395	1.895	1.383	1.536	0.168	8.801
ΔGDP	395	0.022	0.047	0.022	-0.109	0.133

Table 4 presents summary statistics for all variables included in the regression analysis, with separate statistics provided for each sample corresponding to the three models. Panel A reports summary statistics for the full sample period on which model (1) is applied, while Panel B and C both illustrate the post-implementation period. Panel B relates to model (2), which investigates the post-implementation association between aggregate changes in loan loss reserves and market reactions, whereas Panel C corresponds to model (3) which evaluates the relationship between individual loan stages and market reactions.

Panel A shows that the mean of the dependent variable *Stock Return* is 10%, with a standard deviation of 40%. Interestingly, the corresponding mean value for the second proxy of market reaction *MAR,* is -0.6%, indicating that when adjusting for market movements, the annual average return in the full sample period is negative. Both variables exhibit substantial variability in returns as *Stock Return* ranges from a minimum of -85.7% to a maximum of 140.8%, and *MAR* ranges from a minimum of -94.2% to a maximum of 122%. This indicates that the sample experiences large variations in returns across firms and time. A comparison of the summary statistics for the dependent variables between the full sample period and post-implementation period provides several insights, as Panel B and C show higher average returns for both dependent variables compared to Panel A. In Panel B, the mean annual *Stock Return* is 14.5% and in Panel C, the corresponding value is 14.9%. Similarly, *MAR* experiences an increase to positive averages of 1.5% in Panel B and 1.8% in Panel C, in contrast to the negative mean observed in Panel A. These results suggest an improvement in market returns in the post-implementation period, both in terms of raw returns and market-adjusted returns.

For the full sample period presented in Panel A, the independent variable change in loan loss reserves (ΔLLR) has a mean value of 2.4%, indicating that on average there is an annual increase in loan loss reserves. The annual change in loan loss reserves varies across the sample, ranging from a decrease of 53.1% to an increase of 130.6%. The standard deviation of 27% further underscores the variability, indicating that the banks in the sample experience large differences in relative changes. Panel B shows a slightly lower mean change in loan loss reserve of 0%, a minimum value of -67.9% and a maximum value of 137.6%, reflecting large variations also in the post-implementation sample.

Panel C presents the summary statistics for the post-implementation sample in which the aggregate change in loan loss reserves in Panel A and Panel B is replaced by the changes in loan loss reserves for the individual loan stages. Descriptive statistics demonstrate that the mean value for $\Delta LLR\ Stage\ 1$ and $\Delta LLR\ Stage\ 2$ are positive, at 15.7% and 21.6%, while $\Delta LLR\ Stage\ 3$ has a negative mean value of -6.8%. This suggests that in the post-implementation period, on average, banks are increasing their loan loss reserves in stage 1 and stage 2, while decreasing reserves in stage 3. The standard deviations of $\Delta LLR\ Stage\ 1$ and $\Delta LLR\ Stage\ 2$ are relatively high, at 51.6% and 67%, indicating a considerable variation. In contrast, the standard deviation of $\Delta LLR\ Stage\ 3$ is lower, at 26.5%. Moreover, the maximum values for $\Delta LLR\ Stage\ 1$ and $\Delta LLR\ Stage\ 2$ are notably high, 329.6% and 392.3%, which may be driven by small baseline values for which modest absolute deviations can

result in large relative changes. This is addressed by including *Past LLR* as a control variable in the regression, which accounts for the underlying level of loan loss reserves.

In Panel A, *Past LLR* has a mean value of 3.5% and a standard deviation of 3.7% indicating that, on average, banks maintain reserves equivalent to 3.5% of their total balance sheet size. Similarly, in Panel B *Past LLR* shows slightly lower values, with an average value of 2.7% and a standard deviation of 2.9%. The variable *Past Return* has a similar mean value for the full sample period in Panel A as for the post-implementation period in Panel B, 4.7% and 4.8% respectively. In Panel A, *Size* has an average value of 7.340, and exhibits notable variations with a standard deviation of 2.213. The variation is expected as the sample includes banks of all sizes. Similar values are observed for the post-implementation period in Panel B, where the mean for *Size* is 7.295 and the standard deviation is 2.150.

In Panel A, the control variable *Loans* has a mean value of 60.2%, indicating that on average loans outstanding correspond to 60.2% of total assets of banks. This reflects a relatively high level of lending intensity, consistent with the study's focus on commercial banks for which lending activities represent a core part of the business model. In Panel B, the corresponding mean value is similar at 58.2%. Related to loans is the variable *Net Interest Income* for which both Panel A and Panel B show an average value of 2.3%. *Tier 1 Ratio* in Panel A has an average value of 16%, while in Panel B the corresponding mean is slightly higher at 17.3%, suggesting that banks maintained higher relative capital in the post-implementation period compared to the full sample period. The *B/M Ratio* has an average value of 1.701, indicating that on average banks' market values are below their equity value. A similar average value at 1.836 is found for the post-implementation period as illustrated in Panel B. Lastly, ΔGDP has an average mean of 2.2% for the full sample period, indicating that, on average, countries represented in the sample experienced annual real economic growth of 2.2%. The same average is found in the post-implementation sample in Panel B.

Aside from the difference in the independent variable of interest between the two models covering the post-implementation sample period, model (2) and model (3), no notable differences can be observed for the summary statistics for the other variables in Panel B and Panel C. This is expected as both samples cover the same time period and differ only in the number of observations. The consistency in the descriptive statistics, despite the reduction in sample size, suggests that Panel C remains representative of the post-implementation sample.

4.2 Correlation matrices

In Table 5, 6 and 7, Pearson correlation matrices are presented for each regression model. Table 5 displays the correlation matrix for model (1) corresponding to the full sample period while Tables 6 and 7 reflect the post-implementation period and correspond to the samples used in model (2) and (3), respectively.

Table 5. Correlation matrix: pre- and post-IFRS 9 sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Stock Return	1.000										
(2) MAR	0.890***	1.000									
(3) ΔLLR	0.018	-0.030	1.000								
(4) Past LLR	-0.219***	-0.217***	-0.034	1.000							
(5) Past Return	0.045	0.150***	-0.118***	-0.171***	1.000						
(6) Size	0.032	0.044	-0.134***	-0.282***	0.031	1.000					
(7) Loans	-0.159***	-0.142***	0.193***	0.341***	-0.140***	-0.132***	1.000				
(8) NII	-0.013	-0.003	0.177***	0.295***	-0.012	-0.340***	0.352***	1.000			
(9) Tier 1 Ratio	0.135***	0.099***	-0.000	-0.156***	0.099***	-0.133***	-0.152***	0.012	1.000		
(10) B/M Ratio	-0.115***	-0.170***	-0.094	0.308***	-0.278***	-0.202***	0.029	-0.135***	-0.173***	1.000	
(11) ΔGDP	-0.211***	0.036	-0.180***	-0.063*	0.302***	-0.016	-0.063*	0.046	0.020	-0.102***	1.000

This table presents the correlation matrix for all continuous variables in the full pre- and post-IFRS 9 sample and shows the strength and direction of the linear relationships between the variables. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

Table 6. Correlation matrix: post-IFRS 9 sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Stock Return	1.000										
(2) MAR	0.831***	1.000									
(3) ΔLLR	0.067	-0.021	1.000								
(4) Past LLR	-0.136***	-0.137***	-0.151***	1.000							
(5) Past Return	-0.002	0.159***	-0.192***	-0.066	1.000						
(6) Size	0.056	0.076	-0.086*	-0.284***	0.014	1.000					
(7) Loans	-0.133***	-0.110**	0.218***	0.186***	-0.086*	-0.055	1.000				
(8) NII	0.013	-0.005	0.217***	0.318***	-0.009	-0.308***	0.358***	1.000			
(9) Tier 1 Ratio	0.124***	0.097**	0.131***	-0.195***	0.101**	-0.168***	-0.128***	0.087*	1.000		
(10) B/M Ratio	-0.010	-0.063	-0.137***	0.261***	-0.190***	-0.173***	-0.062	-0.162***	-0.215***	1.000	
(11) ΔGDP	-0.234***	-0.108**	-0.194***	-0.000	0.415***	-0.018	-0.062	0.022	-0.005	-0.089*	1.000

This table presents the correlation matrix for all continuous variables in the post-IFRS 9 sample and shows the strength and direction of the linear relationships between the variables. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

Table 7. Correlation matrix: post-IFRS 9 sample with disaggregated changes in loan losses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Stock Return	1.000												
(2) MAR	0.847***	1.000											
(3) ΔLLR Stage 1	0.162***	-0.013	1.000										
(4) ΔLLR Stage 2	0.069	-0.091*	0.334***	1.000									
(5) ΔLLR Stage 3	0.000	-0.028	0.056	0.107**	1.000								
(6) Past LLR	-0.159**	-0.167***	-0.035	0.063	-0.096*	1.000							
(7) Past Return	0.005	0.146***	-0.163***	-0.224***	-0.148***	-0.080	1.000						
(8) Size	0.041	0.061	-0.141***	-0.116**	-0.017	-0.289***	0.023	1.000					
(9) Loans	-0.127**	-0.110**	-0.027	0.038	0.240***	0.140***	-0.100**	-0.021	1.000				
(10) NII	0.014	0.026	-0.002	-0.002	0.183***	0.283***	0.002	-0.240***	0.298***	1.000			
(11) Tier 1 Ratio	0.165***	0.146***	0.105**	-0.053	-0.056	-0.218***	0.125**	-0.129**	-0.183***	-0.002	1.000		
(12) B/M Ratio	-0.032	-0.101**	-0.063	-0.012	-0.117**	0.251***	-0.199***	-0.211***	-0.083	-0.166***	-0.169***	1.000	
(13) ΔGDP	-0.234***	0.082	-0.215***	-0.226***	-0.205***	-0.008	0.384***	-0.024	-0.088*	0.029	-0.014	-0.106**	1.000

This table presents the correlation matrix for all continuous variables in the post-IFRS 9 sample with disaggregated changes in loan losses and shows the strength and direction of the linear relationships between the variables. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

Table 5 reveals no statistically significant association between the dependent variables, *Stock Return* and *MAR,* and the independent variable Δ*LLR*, suggesting that in the absence of control variables a clear linear relationship between the variables is not evident. In contrast, several control variables exhibit significant, though modest, correlations with the dependent variables, with the strongest being negative 0.219 at a 1% significant level between *Stock Return* and *Past LLR*. Furthermore, the correlations between the independent variable, Δ*LLR*, and most control variables are statistically significant, though generally low in magnitude. The strongest correlation observed is between Δ*LLR* and *Loans* at 0.193, significant at the 1% level. These findings suggest that while the control variables are related to the independent variable, there are no obvious concerns with regard to multicollinearity.

Table 6 displays the correlations between all variables in model (2) and presents similar patterns as those observed in Table 5. Firstly, no direct significant relationship is found between any of the dependent variables *Stock Return* and *MAR*, and the independent variable Δ*LLR*. Also, several control variables show significant and modest correlations with the dependent variables, the strongest being between *Stock Return* and Δ*GDP* at a value of -0.234. Moreover, while the correlation between Δ*LLR* and all control variables is significant, the strength of the correlation is relatively weak. Consistent with Table 5 the strongest correlation with Δ*LLR* is found for the control *Loans* with a value of 0.218 significant at the 1% level. Thus, of a magnitude not raising notable concerns with regard to multicollinearity.

In Table 7, a Pearson correlation matrix for the variables in model (3) is presented. As previously observed, correlation matrices for model (1) and (2) show that there is no significant relationship between any of the measures for return, *Stock Return* and *MAR*, and changes in aggregate loan loss reserves, Δ*LLR*. Interestingly, the correlation matrix for model (3) shows that there are however significant associations between the dependent variables and the changes in the independent reserve stages. Table 7 indicates that Δ*LLR Stage 1* is positively correlated with *Stock Return* at a 1% significance level, and that Δ*LLR Stage 2* is negatively associated with *MAR* at a 10% level. It is also observable that the changes in loan loss reserves in the individual stages do not exhibit high correlations with one another, the highest being 0.334, significant at a 1% level between Δ*LLR Stage 1* and Δ*LLR Stage 2*. This indicates that the changes in the individual loan stages do not move together to a significant extent.

The highest correlation identified between two control variables across the three correlation matrices is 0.415 significant at the 1% level, between *Past Return* and Δ*GDP* in the post-implementation sample presented in Table 6. Thus, overall, no issues of excessively high correlation between any of the control variables is identified, indicating no need for exclusion of any of the control variables from the models.

4.3 Regression results

4.3.1 Regression results for model (1)

Table 8 presents the regression results for model (1) investigating the difference between the market reactions to the reported changes in loan loss reserves of listed European commercial banks before and after the implementation of IFRS 9. The model includes a binary variable *IFRS* which equals 1 for the years 2019 to 2023, reflecting the post-implementation years and 0 for the years 2013-2017, indicating the pre-implementation years. The coefficient for ΔLLR thus depicts the relationship between changes in loan loss reserves and market reactions for the time period when IAS 39 was in effect. The coefficient on $\Delta LLR*IFRS$ captures the difference between the pre- and post-implementation period relationship and the total estimated effect of changes in loan loss reserves on market returns during the post-implementation period is thus given by the coefficients $\Delta LLR + \Delta LLR*IFRS$.

The first three columns depict the regression results where annual stock return is used as proxy for market reaction while columns 4 to 6 illustrate the results where the annual stock return has been adjusted with the return of the market portfolio, proxied by the DJ STOXX Global 1800 Index ex Europe. Columns 3 and 6 show the results of model (1) applied on the full sample, using the two different market reaction proxies. Further, columns 1, 2, 4 and 5 highlight additional analysis of the tested relationship in model (1) by partitioning the sample based on bank size. The subsample *Small* represents banks with market capitalization below or equal to the median values of the full sample, while the subsample *Large* represents banks with market capitalization above the median values. The subsample analysis is conducted to explore whether investors' perceptions vary based on bank characteristics that are typically associated with different levels of institutional stability (López-Penabad et al., 2021). All regressions include firm and year fixed effects and employ robust standard errors.

Table 8. Market reaction to changes in loan loss reserves: pre- and post-IFRS 9

	Dependent variable					
	Stock Return			Market-Adjusted Return (MAR)		
	Small	**Large**	**Pooled**	**Small**	**Large**	**Pooled**
ΔLLR	-0.1845**	-0.1179	-0.1384**	-0.1859**	-0.1109	-0.1402**
	(0.082)	(0.116)	(0.064)	(0.082)	(0.117)	(0.065)
IFRS	-0.1791**	-0.1309*	-0.1440***	-0.1437*	-0.0889	-0.1073**
	(0.079)	(0.077)	(0.054)	(0.078)	(0.077)	(0.054)
ΔLLR*IFRS	0.2433*	0.3538**	0.2506***	0.2540**	0.3403**	0.2529***
	(0.127)	(0.153)	(0.095)	(0.129)	(0.152)	(0.095)
Past LLR	-2.3118***	-1.7367	-1.8293**	-2.2622***	-1.8057	-1.8162**
	(0.885)	(1.218)	(0.720)	(0.873)	(1.245)	(0.717)
Past Return	-0.0619	-0.1287*	-0.0652	-0.0522	-0.1237*	-0.0561
	(0.060)	(0.066)	(0.045)	(0.059)	(0.066)	(0.045)
Size	-0.0368	-0.0955	-0.0515	-0.0350	-0.1175	-0.0557
	(0.050)	(0.125)	(0.050)	(0.050)	(0.121)	(0.049)
Loans	-0.4396	-0.7714**	-0.5676***	-0.4420	-0.7470**	-0.5616***
	(0.293)	(0.316)	(0.198)	(0.289)	(0.314)	(0.196)
Net Interest Income	6.2017	3.7561	6.1957*	6.8575	3.8989	6.5292**
	(5.214)	(4.492)	(3.263)	(4.854)	(4.495)	(3.126)
Tier 1 Ratio	1.9779***	0.5086	0.8467	1.9409***	0.5108	0.8102
	(0.699)	(0.957)	(0.572)	(0.691)	(0.962)	(0.571)
B/M Ratio	-0.0487*	-0.1261**	-0.0619**	-0.0438	-0.1389**	-0.0591**
	(0.029)	(0.061)	(0.027)	(0.027)	(0.061)	(0.026)
ΔGDP	-0.4261	-1.7621	-1.1431	-0.3918	-1.5965	-1.0340
	(0.989)	(1.238)	(0.777)	(0.974)	(1.214)	(0.762)
Constant	0.5101	1.9321	1.0771**	0.3276	1.9769*	0.9323*
	(0.385)	(1.216)	(0.519)	(0.381)	(1.183)	(0.508)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	415	415	830	415	415	830
R-squared	0.417	0.496	0.413	0.334	0.345	0.281
Adjusted R-squared	0.264	0.386	0.309	0.159	0.202	0.153

This table presents the regression results of model (1) which investigates the difference in market reaction to changes in loan loss reserves before and after the implementation of IFRS 9. The regression model is estimated using two different proxies for market reaction. Columns 1-3 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 4-6 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. Columns 3 and 6 present regression results for the full pre- and post-IFRS 9 sample and columns 1, 2, 4 and 5 present subsample results based on bank size, defined as below or above sample median values of market capitalization. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

The key variable of interest, Δ*LLR*IFRS*, exhibits a significant positive estimate for both proxies of market reaction, *Stock Return* and *Market-Adjusted Return (MAR)* for the full sample, at a 1% significance level. Thus, the results provide support for H1 confirming that the market reaction to changes in loan loss reserves differ between the pre- and post-implementation period. Further, the positive significant estimate for Δ*LLR*IFRS* indicate market reactions to changes in loan loss reserves are more positive under IFRS 9 reporting compared to under IAS 39 reporting. Additionally, the negative significant coefficient for the variable Δ*LLR* indicates that loan loss reserves were negatively priced in the pre-implementation period corroborating the findings of previous research (Beatty & Liao, 2021). On the contrary, results show that the market reaction to changes in loan loss reserves in the post-implementation period is positive for both proxies of market reaction, indicated by the positive estimate for Δ*LLR* + Δ*LLR*IFRS.*

The regression results for the full sample yield an adjusted R-squared of 30.9% for the model with *Stock Return* as the dependent variable. The level of explanatory power is comparable to, or exceeds, that reported in prior studies within the same field (Beatty & Liao, 2021; López-Espinosa et al., 2021), thereby supporting the validity of the regression results. However, for the models using *MAR* as the dependent variable, the adjusted R-squared is substantially lower, at 15.3%. As such, in isolation, these results should be interpreted with caution. Nonetheless, when considered alongside the formerly discussed model estimation, the consistency of the findings supports their overall robustness.

The subsample analysis based on bank size extends the results by establishing that the significant difference in market reactions towards changes in loan losses between the pre-and post-implementation period, indicated through $\Delta LLR*IFRS$, holds for both small and large banks, which both display a positive estimate at a 10% and 5% significance level respectively. These findings are consistent across both proxies for market reaction, *Stock Return* and *MAR*. Additionally, the results demonstrate that the negative significant relationship observed between changes in loan loss reserves and market reactions in the pre-implementation period only holds for small banks at a 5% significance level.

Additional subsample analysis for model (1), based on country-level credit risk conditions, is presented in Table 9. Columns 1 and 3 report the regression results for the subsample of banks with low credit risk, while columns 2 and 4 present the results for banks with high credit risk. A bank is defined as *Low* if it operates in a country with a five-year credit default swap (CDS) spread below or equal to the median spread across the countries in the sample, and as *High* if operating in a country with five-year CDS spreads above the median. Consistent with the previous subsample analysis, the objective is to examine whether investors' interpretation of changes in loan loss reserves depends on country-specific credit risk, given that countries with lower credit risk are typically associated with greater financial stability (Athari et al., 2023).

The results offer insights by revealing that the negative and statistically significant relationship observed between changes in loan loss reserves and market reactions in the sample during the pre-implementation period is primarily driven by banks in the subsample *Low*, for which the estimate is negative and significant at the 1% level. Similarly, the significant difference in this relationship between the pre- and post-implementation periods appears to be attributable to banks within the subsample *Low*, showing a positive estimate, significant at the 1% level. Thus, when the sample is split based on country-specific credit risk, it is revealed that the significant effects observed in the pooled sample are primarily driven by banks operating in countries with low credit risk.

Table 9. Market reaction to changes in loan loss reserves by credit risk: pre- and post-IFRS 9

	Dependent variable			
	Stock Return		Market-Adjusted Return (MAR)	
	Low	High	Low	High
ΔLLR	-0.3649***	-0.1210	-0.3581***	-0.1193
	(0.122)	(0.089)	(0.122)	(0.088)
IFRS	-0.0887*	-0.1191	-0.0529	-0.0858
	(0.047)	(0.108)	(0.047)	(0.107)
ΔLLR*IFRS	0.6826***	0.0520	0.6866***	0.0496
	(0.151)	(0.121)	(0.154)	(0.121)
Past LLR	-0.8113	-2.2926***	-0.4194	-2.3132***
	(1.897)	(0.889)	(1.868)	(0.879)
Past Return	-0.1295**	-0.0360	-0.1338**	-0.0213
	(0.055)	(0.059)	(0.057)	(0.057)
Size	-0.0658	-0.0446	-0.0544	-0.0545
	(0.067)	(0.068)	(0.065)	(0.066)
Loans	0.0778	-0.5854*	0.0694	-0.5649*
	(0.272)	(0.309)	(0.273)	(0.305)
Net Interest Income	1.6251	5.9357	1.9910	6.3289
	(3.632)	(4.529)	(3.728)	(4.311)
Tier 1 Ratio	0.4021	1.0843	0.4670	0.9566
	(0.669)	(0.993)	(0.676)	(0.987)
B/M Ratio	-0.0796***	-0.0640*	-0.0757***	-0.0610
	(0.030)	(0.039)	(0.029)	(0.038)
ΔGDP	1.3245*	-4.5624***	1.3362**	-4.3762***
	(0.682)	(1.375)	(0.680)	(1.327)
Constant	0.8757	0.8356	0.5824	0.7547
	(0.720)	(0.645)	(0.691)	(0.629)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	413	389	413	389
R-squared	0.587	0.431	0.376	0.366
Adjusted R-squared	0.487	0.283	0.226	0.202

This table presents additional subsample regression results of model (1) which investigates the difference in market reaction to changes in loan loss reserves before and after the implementation of IFRS 9. The regression model is estimated using two different proxies for market reaction. Columns 1-2 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 3-4 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. For these regressions the full sample has been divided into two subsamples based on country-level credit risk, which is determined by whether a country's five-year credit default swap (CDS) spread is below or above the sample median. The regression results in columns 1 and 3 represent banks with low country-level credit risk, while columns 2 and 4 represent banks with high country-level credit risk. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

4.3.2 Regression results for model (2)

With the objective to investigate how market participants incorporate and react to the financial disclosures under the ECL model as outlined in the accounting standard IFRS 9, model (2) is employed. Table 10 presents the regression results for model (2), investigating the relationship between the market reactions and reported changes in loan loss reserves of listed European commercial banks during the IFRS 9 post-implementation period (2019-2023). The first three columns depict the regression results where annual stock return is used as proxy for market reaction and columns 4 to 6 illustrate the results where the annual stock return has been adjusted with the return of the market portfolio, proxied by the DJ STOXX Global 1800 Index ex Europe. Columns 3 and 6 show the results for the model including the full post-implementation sample for the two different market reaction proxies. Further, columns 1, 2, 4 and 5 highlight additional analysis of the tested relationship in model (2) by partitioning the sample based on bank size, as defined in the previous section.

Table 10. Market reaction to changes in loan loss reserves: post-IFRS 9

	Dependent variable					
	Stock Return			**Market-Adjusted Return (MAR)**		
	Small	**Large**	**Pooled**	**Small**	**Large**	**Pooled**
ΔLLR	-0.0066	0.2968***	0.1656**	0.0078	0.2898***	0.1727**
	(0.100)	(0.100)	(0.073)	(0.100)	(0.097)	(0.072)
Past LLR	-5.4010***	1.2856	-2.0424	-5.1295**	1.3403	-1.8691
	(2.059)	(1.233)	(1.440)	(2.056)	(1.214)	(1.448)
Past Return	-0.1509*	-0.3578***	-0.1739**	-0.1341	-0.3576***	-0.1565**
	(0.088)	(0.113)	(0.076)	(0.089)	(0.105)	(0.075)
Size	0.0250	0.4546**	0.0886	0.0280	0.4442**	0.0800
	(0.098)	(0.211)	(0.121)	(0.098)	(0.190)	(0.121)
Loans	0.0142	-2.7548***	-1.1215***	0.0414	-2.7542***	-1.0911**
	(0.491)	(0.641)	(0.422)	(0.509)	(0.634)	(0.435)
Net Interest Income	8.6113*	4.3122	10.4640***	9.0635*	4.7309	10.7717***
	(4.808)	(5.863)	(3.584)	(4.938)	(5.628)	(3.620)
Tier 1 Ratio	2.5817	0.8537	0.5221	2.5770	0.8034	0.4663
	(1.667)	(1.528)	(1.141)	(1.683)	(1.511)	(1.155)
B/M Ratio	0.0109	0.0226	-0.0103	0.0199	0.0167	-0.0052
	(0.048)	(0.091)	(0.048)	(0.046)	(0.083)	(0.046)
ΔGDP	-0.6915	-0.0539	-0.5829	-0.7803	0.0941	-0.5403
	(0.952)	(1.041)	(0.725)	(0.942)	(0.989)	(0.705)
Constant	-0.7984	-2.8243	-0.5275	-0.7336	-2.6030	-0.3737
	(0.735)	(2.135)	(1.191)	(0.729)	(1.909)	(1.189)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	235	234	469	235	234	469
R-squared	0.479	0.614	0.488	0.352	0.483	0.334
Adjusted R-squared	0.243	0.455	0.318	0.059	0.269	0.112

This table presents the regression results of model (2) which investigates the market reaction to changes in loan loss reserves in the IFRS 9 post-implementation period. The regression model is estimated using two different proxies for market reaction. Columns 1-3 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 4-6 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. Columns 3 and 6 present regression results for the full post-IFRS 9 sample and columns 1, 2, 4 and 5 present subsample results based on bank size, defined as below or above sample median values of market capitalization. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

The variable of interest, Δ*LLR,* shows a significant positive relationship with both of the proxies for market reaction, *Stock Return* and *MAR*, for the pooled sample at a 5% significance level. Thus, the results find support for H2b corroborating previous research that have found that changes in recognised loan losses are positively priced in the market. Similar to the regression results for model (1), the adjusted R-squared for model (2), with *Stock Return* as the dependent variable, is 31.8%. However, with *MAR* as the dependent variable, the adjusted R-squared drops significantly to 11.2%. Thus, the explanatory power of the regression using *Stock Return* being comparable to that of prior studies, along with the consistent results using *MAR*, supports the robustness of the findings.

The subsample analysis based on bank size extends the results by establishing that large banks exhibit a significant positive relationship between Δ*LLR* and market return, at a 1% significance level for both proxies of market reaction. Meanwhile the results for small banks yield small and inconsistent coefficients with low statistical significance, indicating that the significant relationship observed in the pooled sample is driven by large banks.

As shown in Table 11, additional subsample analysis of model (2) based on country-level credit risk conditions reveals that the significant relationship observed in the pooled post-implementation sample is driven by banks operating in low credit risk countries. This is evidenced by a positive and statistically significant coefficient on Δ*LLR* at the 1% level for the subsample *Low*, while the corresponding estimate for the subsample *High* is not statistically significant.

Extending the interpretation of the market sentiment towards loan loss accounting, the control variable *Past LLR* provides additional nuances to the results, specifically for small banks and banks operating in countries with high credit risk. While the coefficient is statistically insignificant for the pooled post-implementation sample, the subsample analysis reveals that there is a negative significant relationship for small banks between *Past LLR* and both proxies for market reactions, at the 1% significance level. The corresponding association for large banks is positive but statistically insignificant. Similarly, there is a negative significant association for banks with high country-specific credit risk, at a 5% level. For banks operating in low credit risk countries, the estimated coefficient is positive and insignificant. Thus, it is indicated that market sentiment towards recognized loan losses is dependent on the size of the bank and the credit quality in the country in which it operates.

Table 11. Market reaction to changes in loan loss reserves by credit risk: post-IFRS 9

	Dependent variable			
	Stock Return		Market-Adjusted Return (MAR)	
	Low	High	Low	High
ΔLLR	0.3232***	-0.0293	0.3393***	-0.0162
	(0.102)	(0.088)	(0.097)	(0.088)
Past LLR	0.0105	-3.6161**	1.0086	-3.5709**
	(3.356)	(1.593)	(3.034)	(1.617)
Past Return	-0.2592***	-0.1506	-0.2614***	-0.1244
	(0.090)	(0.096)	(0.093)	(0.093)
Size	-0.2874*	0.1104*	-0.2493	0.0880
	(0.174)	(0.162)	(0.167)	(0.159)
Loans	-1.0823**	-0.7246	-1.1082**	-0.6852
	(0.550)	(0.655)	(0.563)	(0.675)
Net Interest Income	16.1988***	11.2919**	16.2597***	11.5726**
	(5.925)	(4.705)	(6.013)	(4.666)
Tier 1 Ratio	-2.1176	0.6544	-1.9311	0.4562
	(1.567)	(1.523)	(1.569)	(1.545)
B/M Ratio	-0.1586**	-0.0270	-0.1453**	-0.0216
	(0.071)	(0.070)	(0.066)	(0.068)
ΔGDP	1.5588**	-4.4287***	1.4655**	-4.2852***
	(0.700)	(1.233)	(0.674)	(1.187)
Constant	3.4433*	-1.1950	3.1616*	-0.9075
	(1.835)	(1.393)	(1.729)	(1.371)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	233	218	233	218
R-squared	0.692	0.523	0.493	0.450
Adjusted R-squared	0.548	0.282	0.255	0.172

This table presents additional subsample regression results of model (2) which investigates the market reaction to changes in loan loss reserves in the IFRS 9 post-implementation period. The regression model is estimated using two different proxies for market reaction. Columns 1-2 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 3-4 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. For these regressions the post-implementation sample has been divided into two subsamples based on country-level credit risk, which is determined by whether a country's five-year credit default swap (CDS) spread is below or above the sample median. The regression results for columns 1 and 3 represent banks with low country-level credit risk, while columns 2 and 4 represent banks with high country-level credit risk. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

4.3.3 Regression results for model (3)

To extend the understanding from model (2) which addresses the relationship between market reactions to reported changes in loan loss reserves, model (3) is articulated to explore if the market reactions observed can be attributed to specific loan stages of loan loss reserves. Table 12 presents the regression results for model (3), analysing the association between disaggregated changes in loan loss reserves by loan stage classification and the two proxies for market reaction in the IFRS 9 post-implementation period. Columns 1 to 3 depict the regression results where *Stock Return* is used as proxy for market reaction, while columns 4 to 6 illustrate the results with *Market-Adjusted Return (MAR)* as the proxy. Columns 3 and 6 show the results for the model using the full sample for the two different market reaction proxies. Further, columns 1, 2, 4 and 5 highlight additional analysis of the tested relationship in model (3) by partitioning the sample based on bank size, as defined in Section 4.3.1.

Table 12. Market reaction to disaggregated changes in loan loss reserves: post IFRS-9

	Dependent variable					
	Stock Return			**Market-Adjusted Return (MAR)**		
	Small	**Large**	**Pooled**	**Small**	**Large**	**Pooled**
ΔLLR Stage 1	0.0022	-0.1620**	-0.0055	0.0014	-0.1586**	-0.0055
	(0.033)	(0.079)	(0.032)	(0.033)	(0.078)	(0.032)
ΔLLR Stage 2	-0.0445	-0.0169	-0.0391	-0.0421	-0.0145	-0.0370
	(0.035)	(0.065)	(0.033)	(0.036)	(0.064)	(0.034)
ΔLLR Stage 3	0.0184	0.4296***	0.2111**	0.0337	0.4133***	0.2158**
	(0.119)	(0.139)	(0.087)	(0.122)	(0.133)	(0.087)
Past LLR	-5.5346**	1.6010	-1.8461	-5.2096**	1.6789	-1.6514
	(2.287)	(1.204)	(1.476)	(2.272)	(1.185)	(1.456)
Past Return	-0.1181	-0.4629***	-0.1811**	-0.1040	-0.4566***	-0.1646**
	(0.100)	(0.117)	(0.085)	(0.102)	(0.107)	(0.083)
Size	-0.0036	0.6355***	0.0716	-0.0021	0.6238***	0.0647
	(0.105)	(0.225)	(0.132)	(0.104)	(0.202)	(0.131)
Loans	0.1693	-2.2836***	-1.1194**	0.1830	-2.2998***	-1.0943**
	(0.645)	(0.722)	(0.528)	(0.660)	(0.718)	(0.536)
Net Interest Income	11.8627**	6.9968	11.9253***	12.4908**	6.9705	12.2219***
	(5.744)	(7.995)	(4.440)	(5.787)	(7.906)	(4.491)
Tier 1 Ratio	2.1771	4.6354	0.0476	2.0950	4.7263	-0.0606
	(2.190)	(2.897)	(1.570)	(2.211)	(2.903)	(1.584)
B/M Ratio	-0.0229	0.0948	-0.0372	-0.0144	0.0876	-0.0320
	(0.046)	(0.099)	(0.047)	(0.043)	(0.090)	(0.045)
ΔGDP	-0.9591	0.1695	-0.5971	-1.0197	0.3061	-0.5474
	(1.280)	(1.072)	(0.844)	(1.269)	(1.025)	(0.826)
Constant	-0.6670	-5.9526**	-0.3259	-0.5771	-5.7174***	-0.1743
	(0.808)	(2.344)	(1.268)	(0.791)	(2.101)	(1.252)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	198	197	395	198	197	395
R-squared	0.510	0.663	0.500	0.401	0.541	0.351
Adjusted R-squared	0.251	0.503	0.325	0.086	0.324	0.124

This table presents the regression results of model (3) which investigates the market reaction to changes in the disaggregated components of loan loss reserves in the IFRS 9 post-implementation period. The regression model is estimated using two different proxies for market reaction. Columns 1-3 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 4-6 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. Columns 3 and 6 present regression results for the full post-implementation sample and columns 1, 2, 4 and 5 present subsample results based on bank size, defined as below or above sample median values of market capitalization. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

The results of the pooled sample presented in columns (3) and (6) illustrate that only one of the three key variables of interest Δ*LLR Stage 1*, Δ*LLR Stage 2* and Δ*LLR Stage 3* shows a significant relationship to the dependent variable. Specifically, changes in loan loss reserves for loans classified in stage 3 exhibit a significant positive relationship with both proxies for market reaction, *Stock Return* and *MAR* at a 5% significance level. Thus, the results suggest that changes in stage 3 loan loss reserves are the primary driver of the market reactions observed in Table 10. These findings contradict the relationship proposed in H3, which predicts that changes in stage 2 loan loss reserves would be the primary driver of market reactions, leading to the rejection of H3.

Consistent with the regression results for previous models, the adjusted R-squared for model (3), with *Stock Return* as the dependent variable, is 32.5% and with *MAR* as the dependent variable, the adjusted R-squared drops significantly to 12.4%. Thus, the explanatory power for model (3) with *Stock Return* as the dependent variable, that is comparable to that of prior studies, together with the consistent results for *MAR*, supports the robustness of the findings.

Similarly to the findings from model (2), the results from the subsample analysis based on bank size for model (3) demonstrate that the significant relationship observed in the pooled sample is driven by banks in the subsample *Large*. There is a significant positive relationship between Δ*LLR Stage 3* and both proxies for market reactions for the subsample *Large* at a 1% significance level, while the relationship does not statistically hold for any of the loan classes for the subsample *Small*. In addition to the association found in the pooled sample, columns 2 and 5 also present a statistically significant association, at the 5% level, between changes in loan loss reserves for stage 1 loans and market reactions, consistent across both return measures. This suggests that the market responds negatively to increases in loan loss reserves for loans classified in stage 1 for large banks.

Further, subsample analysis for model (3) based on country-level credit risk conditions is presented in Table 13. This reveals that the significant relationship observed for stage 3 loans in the pooled post-implementation sample is largely explained by banks operating in low credit risk countries. This is evidenced by a positive and statistically significant coefficient of Δ*LLR Stage 3* at the 1% level for the subsample *Low*, while the corresponding estimate for the subsample *High* is not statistically significant. Also, in excess of what was observable for the pooled sample, columns 1 and 3 indicate a statistically significant negative relationship, at the 1% level, between changes in loan loss reserves for loans classified in stage 2 and market reactions among banks in low credit risk countries. The consistency of this effect across both return measures suggests that the market perceives increases in stage 2 loan loss reserves negatively within this subsample of banks.

Table 13. Market reaction to disaggregated changes in loan losses by credit risk: post IFRS-9

	Dependent variable			
	Stock Return		Market-Adjusted Return (MAR)	
	Low	High	Low	High
ΔLLR Stage 1	0.0093	-0.1132	0.0104	-0.1038
	(0.030)	(0.074)	(0.030)	(0.075)
ΔLLR Stage 2	-0.0737***	-0.0453	-0.0732***	-0.0379
	(0.027)	(0.055)	(0.027)	(0.055)
ΔLLR Stage 3	0.3713***	-0.1779	0.3820***	-0.1625
	(0.084)	(0.167)	(0.083)	(0.166)
Past LLR	-1.3416	-4.3517***	-0.2697	-4.1943**
	(3.798)	(1.673)	(3.362)	(1.660)
Past Return	-0.2418***	-0.1729*	-0.2446***	-0.1465
	(0.092)	(0.101)	(0.094)	(0.098)
Size	-0.2417	0.0672*	-0.2094	0.0518
	(0.186)	(0.162)	(0.180)	(0.159)
Loans	-1.6200***	0.0462	-1.6068***	0.0261
	(0.576)	(0.834)	(0.581)	(0.840)
Net Interest Income	19.4863***	13.5675**	19.7202***	13.6625**
	(6.467)	(5.748)	(6.572)	(5.792)
Tier 1 Ratio	-3.1986*	-0.3519	-3.0164*	-0.7086
	(1.698)	(2.419)	(1.679)	(2.449)
B/M Ratio	-0.1344*	-0.0291	-0.1237*	-0.0219
	(0.073)	(0.072)	(0.068)	(0.071)
ΔGDP	2.2243***	-5.7009***	2.1109***	-5.5139***
	(0.769)	(1.514)	(0.736)	(1.480)
Constant	3.3872*	-1.0947	3.1287*	-0.8000
	(1.990)	(1.412)	(1.892)	(1.400)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	208	178	208	178
R-squared	0.722	0.541	0.541	0.486
Adjusted R-squared	0.580	0.274	0.306	0.188

This table presents additional subsample regression results of model (3) which investigates the market reaction to changes in the disaggregated components of loan loss reserves in the IFRS 9 post-implementation period. The regression model is estimated using two different proxies for market reaction. Columns 1-2 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 3-4 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. For these regressions the post-implementation sample has been divided into two subsamples based on country-level credit risk, which is determined by whether a country's five-year credit default swap (CDS) spread is below or above the sample median. The regression results for columns 1 and 3 represent banks with low country-level credit risk, while columns 2 and 4 represent banks with high country-level credit risk. The standard errors are heteroskedasticity-robust and are reported in parentheses.***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

4.4 Additional analysis

To provide additional insight into the observed association between changes in loan loss reserves and market reactions in the post-implementation period, as outlined by the regression results for models (2) and (3), an additional analysis is conducted to examine the relationship between changes in loan loss reserves and earnings. This is motivated by prior research suggesting that loan loss provisioning may be used as a tool for earnings management (Norouzpour et al., 2023; Oberson, 2021), and that the market may interpret changes in loan loss reserves as informative signals about the strength of current and future financial performance (Beaver et al., 1989; Beaver et al., 1997).

4.4.1 Loan loss recognition and current earnings

Table 14 outlines the findings of the additional analysis where column 1 illustrates the relationship between the dependent variable (Δ*LLR*) and return on assets (ROA_t), defined as net income before changes in loan loss reserves over opening balance total assets. Column 2 to 4 presents the same relationship but where the variable Δ*LLR* is disaggregated into the three loan stage classifications, Δ*LLR Stage 1*, Δ*LLR Stage 2* and Δ*LLR Stage 3*. Similar methods have been used in earlier research to investigate potential signs of earnings management, including Oberson (2021) and Norouzpour et al. (2023). For all model specifications, control variables which are expected to have an association with changes in loan loss reserves (Δ*LLR)* and the independent variable ROA_t are included.

Table 14. Profitability as a determinant of changes in loan loss reserves: post-IFRS 9

	Dependent variable			
	ΔLLR	**ΔLLR Stage 1**	**ΔLLR Stage 2**	**ΔLLR Stage 3**
ROA_t	7.1893***	4.0182	13.3089**	7.8553***
	(1.738)	(2.939)	(5.628)	(1.1534)
Past LLR	-1.7490	-2.5757	4.1160	-1.0072
	(1.101)	(2.489)	(3.099)	(0.763)
Size	-0.0603*	0.0120	-0.0456	-0.0708**
	(0.033)	(0.067)	(0.073)	(0.031)
Loans	0.9603***	0.7409	0.9306	1.1194***
	(0.353)	(0.646)	(1.037)	(0.265)
Tier 1 Ratio	-0.5105	-0.9220	-3.7298	-0.9882
	(0.832)	(1.816)	(2.750)	(0.941)
ΔGDP	-0.0121	1.7546*	1.7970	-0.7208
	(0.478)	(0.944)	(1.285)	(0.484)
Constant	-0.1129	-0.6284	0.3712	0.0961
	(0.378)	(0.730)	(1.093)	(0.395)
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES
N	469	395	395	395
R-squared	0.573	0.334	0.363	0.556
Adjusted R-squared	0.436	0.116	0.155	0.411

This table presents the regression results of the additional analysis investigating the relationship between changes in loan loss reserves and return on assets before changes in loan loss reserves in the IFRS 9 post-implementation period. Column 1 reports the regression results with Δ*LLR*, defined as the annual fractional change in reported loan loss reserves, as the dependent variable. In columns 2-4 the dependent variable is defined as the fractional change in reported loan loss reserves disaggregated by the three asset stage classifications: stage 1, stage 2 and stage 3 respectively. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

The variable of interest ROA_t exhibits a significant positive relationship with changes in loan loss reserves (Δ*LLR*) for the full post-implementation sample, significant at the 1% level. This result holds consistently across all subgroups analyzed in previous models. These results suggest that increases in loan loss reserves are generally associated with higher earnings before changes in loan loss reserves, relative to total assets. In line with the arguments of Oberson (2021), the association indicates the use of accounting discretion in the recognition of loan losses, implying that provisions tend to increase in times when firms report stronger earnings.

Furthermore, when examining the same relationship in column 2 to 4 where changes in loan loss reserves are disaggregated by loan stage classifications, the results show that the positive association between Δ*LLR* and ROA_t is positive for all three stages, but only significant for the regressions with Δ*LLR Stage 2* and Δ*LLR Stage 3* as dependent variables. While the relationship between Δ*LLR Stage 2* and ROA_t is positive and significant, the explanatory power of the regression is low at 15.5%, indicating that much of the variation in Δ*LLR Stage 2* is explained by omitted variables, and the association should thus be interpreted with caution. On the contrary, the explanatory power of the regression results for Δ*LLR Stage 3* is substantially higher at 41.1%, and comparable to that of previous research (Norouzpour et al., 2023), suggesting that higher confidence can be placed on the estimated relationship between Δ*LLR Stage 3* and ROA_t. Thus, while the association with ROA_t is positive and significant for both changes in stage 2 and stage 3 loan loss reserves, there is stronger empirical evidence for the use of earnings management practices in the estimation of changes in stage 3 loan loss reserves. This aligns with the findings from model (3), where stage 3 changes were found to have the strongest positive association with market returns. Taken together, these results provide additional evidence supporting the interpretation that the positive association between changes in loan loss reserves and market reactions observed in the sample is driven by their role as a signal of strong underlying earnings. Thus, the results support that firms tend to increase reserves when earnings are strong, which is consistent with previous research suggesting that increases in loan loss reserves serve as a signal of robust earnings (Beaver et al., 1989).

4.4.2 Loan loss recognition and future earnings

In Table 15, the analysis is extended to examine the relationship between changes in loan loss reserves and return on assets in the subsequent year (ROA_{t+1}). The objective is to test whether changes in loan loss reserves are positively associated with future earnings, consistent with the signaling hypothesis proposed by Beaver et al. (1997). This specification investigates whether firms that increase reserves in the current period tend to exhibit stronger financial performance in the following year, supporting the interpretation that market reactions to changes in loan loss reserves are driven by expectations of future profitability. In column 1, the relationship between future earnings and the aggregate change in loan loss reserves is presented. Column 2 illustrates the relationship between changes in loan loss reserves, disaggregated by the three loan stage classifications, Δ*LLR Stage 1*, Δ*LLR Stage 2* and Δ*LLR Stage 3*, and ROA_{t+1}. This analysis allows for a deeper understanding of how provisioning across different credit risk categories relates to future earnings. The methodology applied in this analysis is consistent with prior research, including that of Beaver et al. (1997). For all model specifications, control variables which are expected to have an association with changes in loan loss reserves (Δ*LLR)* and the independent variable ROA_{t+1} are included.

Table 15. Changes in loan loss reserves and future profitability: post-IFRS 9

	Dependent variable	
	ROA_{t+1}	
ΔLLR	-0.0162***	
	(0.005)	
ΔLLR Stage 1		-0.0009
		(0.001)
ΔLLR Stage 2		0.0012
		(0.001)
ΔLLR Stage 3		-0.0066**
		(0.003)
Past LLR	-0.4088***	-0.3568***
	(0.080)	(0.082)
Size	-0.0019	-0.0010
	(0.004)	(0.004)
Loans	0.0025	-0.0219
	(0.030)	(0.020)
Net Interest Income	0.4360*	0.0287
	(0.242)	(0.145)
Tier 1 Ratio	-0.0808	-0.0638
	(0.056)	(0.064)
ΔGDP	-0.0107	-0.0046
	(0.024)	(0.024)
Constant	0.0247***	0.0400
	(0.039)	(0.041)
Firm fixed effects	YES	YES
Year fixed effects	YES	YES
N	457	387
R-squared	0.580	0.629
Adjusted R-squared	0.439	0.500

This table presents the regressions of the additional analysis investigating the relationship between changes in loan loss reserves and future earnings in the IFRS 9 post-implementation period. The dependent variable ROA_{t+1} is measured by the subsequent year net income before changes in loan loss reserves over opening balance total assets. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

The additional analysis examining the potential relationship between changes in loan loss reserves and future earnings, as illustrated in Table 15, reveals a negative relationship between Δ*LLR* and ROA_{t+1}, significant at the 1% level. These findings do not support the notion of changes in loan loss reserves being an indicator of strong future earnings as suggested by previous research (Beaver et al., 1997). On the contrary, the results indicate that higher provisioning is associated with lower earnings in the subsequent year. This effect is primarily driven by changes in stage 3 loan loss reserves as column 2 shows a significantly negative coefficient for Δ*LLR Stage 3* at the 1% level, while Δ*LLR Stage 1* and Δ*LLR Stage 2* exhibit no statistically significant relationship with future earnings.

4.5 Robustness of results

In the following sections, the steps taken to ensure the robustness of the results are presented. First, the results of the diagnostic tests for multicollinearity, heteroskedasticity and autocorrelation conducted on the data are presented. This is followed by a presentation of the results when applying the models on a balanced sample as well as a discussion on the economic significance of the key independent variable changes in loan loss reserves. Lastly, a discussion around the consistency of the results across the two proxies of market reaction is presented.

4.5.1 Multicollinearity

To enhance the robustness of results, it is essential to test for multicollinearity among the explanatory variables included in the models employed. Multicollinearity arises when independent variables in a model are excessively correlated to each other, potentially leading to unreliable coefficient estimates. To examine whether the models in this study exhibit potential multicollinearity, Variance Inflation Factor (VIF) tests have been conducted on the regression models, indicating that none of the models exhibit VIF values exceeding the commonly accepted threshold of 10. The highest observed VIF is 1.518 for *Net Interest Income* in model (2), which is lower than the critical value. Overall, all three VIF tests yield values below the threshold of 10, indicating that multicollinearity is not a concern in the models. The results from the conducted VIF tests on the three main regression models are presented in Appendix D.

4.5.2 Heteroskedasticity

To test for heteroskedasticity, Breusch-Pagan tests were conducted on all models. Heteroskedasticity arises when the variance of the error terms is not constant across the observations in the sample. If the assumption is violated and not adjusted for it can lead to inaccurate standards errors, affecting the validity of the hypothesis testing results. The results of the conducted Breusch-Pagan tests are presented in Appendix E, where columns 1 to 3 relate to the three models with *Stock Return* as the dependent variable while columns 4 to 6 present the results for the models with *Market-Adjusted Return (MAR)* as the proxy for market reaction. For all six tests the null hypothesis of homoscedasticity is rejected at the 1% significance level, indicating the presence of heteroskedasticity. To adjust for this, all regression models in the study employ robust standard errors.

4.5.3 Autocorrelation

As a further diagnostic test, Durbin-Watson tests were employed on the three models. This type of test is conducted in order to identify potential autocorrelation between the residuals in each model. The results from the tests are presented in Appendix F and show values close to 2 for all three regression models, for both proxies of market reaction. This suggests no concerning presence of autocorrelation.

4.5.4 Economic significance of changes in loan loss reserves

To assess what drives the change in the independent variable of interest, change in loan loss reserves, and ensure robustness in the return regressions, ΔLLR is regressed on the control variables in the main regressions. The results, presented in Appendix G, illustrate that changes in loan loss reserves are significantly associated with *Past LLR, Size* and *Loans*. These findings suggest that changes in loan loss reserves do not reflect random noise, but rather that they reflect economically significant factors. Furthermore, because *Past LLR, Size* and *Loans* are included in the main return regressions and are shown to be significantly associated to the key independent variable, this suggests that the remaining observable effect of changes in loan loss reserves on returns is less likely to be driven by omitted variables, thus supporting the robustness of the findings in our main models.

4.5.5 Balanced sample

To further assess the robustness of the results found with the use of the unbalanced sample of banks, the models are re-estimated using a balanced sample. Including only banks with complete observations for the full time period on which each respective model is applied yields a sample of 49 banks for model (1), 78 banks for model (2) and 67 banks for model (3). The regression results, presented in Appendix H, are consistent with the findings made for the unbalanced sample. In line with the previous findings, the results are significant across both proxies of market reaction and support H1 and H2b, but not H3. Thus, for all three models estimated using the balanced sample, the findings are consistent with those obtained for the unbalanced sample, supporting the robustness of the findings.

4.5.6 Proxies for market reaction

Across the three models employed in this study, two proxies for market reactions have been used as the dependent variable, *Stock Return* and *Market-Adjusted Return (MAR)*. While the models with *Stock Return* as the dependent variable exhibit relatively high R-squared, the results with *MAR* show somewhat lower explanatory power indicating that in isolation, the results should be interpreted with caution. Nonetheless, when considered alongside the previously discussed model estimation, the consistency of findings supports their overall robustness, indicating that the results are not driven by the choice of proxy for market reaction.

5. Discussion

This study set out to contribute to the literature on the implications of IFRS 9 by examining how the shift from the incurred credit loss (ICL) model to the expected credit loss (ECL) model affects market reactions to recognized loan losses. To explore this, the discussion is organized into two primary parts. First, the impact of the regulatory shift on the relationship between loan loss recognition and market responses is evaluated. Second, an understanding of how the market reacts to changes in loan loss reserves under the current accounting framework given the findings observed in the post-implementation period is provided.

5.1 The impact of the regulatory shift on the market reaction to loan loss recognition

Hypothesis 1 aims to build on the field of research that has addressed the effects of IFRS 9 and thus provide an understanding for how the regulatory shift affects the behavior of impacted stakeholders. Specifically, with the objective to explore how the implementation of IFRS 9 has altered investor behavior, an area still underexplored in existing literature. Drawing on Beatty and Liao (2021) and Wheeler (2021), who argue that the ICL model did not fully incorporate forward-looking information and that market participants responded to expected credit losses beyond those recognized in financial statements prior to the implementation of the ECL model, it was anticipated that the transition to the ECL framework would produce observable changes in market reactions. Consistent with this expectation, the empirical analysis of the full sample reveals a statistically significant difference in the association between market returns and changes in loan loss reserves between the pre- and post-implementation periods. These findings hold across both small and large banks, as well as for banks operating in low credit risk countries. The results suggest that under the ECL model, investors respond more positively to changes in loan loss reserves than under the ICL model. Although the results for banks in high credit risk countries are not statistically significant, the overall evidence supports the acceptance of Hypothesis 1.

The findings contribute to the existing body of research by providing empirical evidence that the design of accounting standards, specifically, the shift from the incurred to the expected credit loss model, can significantly influence investor interpretation of financial information. The results suggest that the shift to IFRS 9, which constitutes a more comprehensive disclosure of credit losses, has altered how investors interpret changes in loan loss reserves. This aligns with earlier claims about the role of financial reporting in shaping market dynamics (Du et al., 2016; Song, 2017) and supports the idea that accounting regulation not only affects firm-level disclosures, but also has broader implications for how financial information is priced by the market.

Further, the regression results from model (1) show that, under the ICL regime, increases in loan loss reserves were generally associated with negative market reactions, consistent with prior literature (Beatty & Liao, 2021). The negative coefficients for the pre-implementation period are consistent for all segments when running subsample analysis based on bank size

and country credit-risk conditions, though statistical significance was only found for small banks and banks in low credit risk environments.

5.2 Market reactions under the ECL framework

To deepen the understanding of investor responses to loan loss accounting under IFRS 9, model (2) is specified to examine the post-implementation period from 2019 to 2023. The objective is to assess how market participants respond to changes in loan loss reserves under the current ECL framework, and whether these reactions are consistent with findings from previous research conducted under earlier accounting regimes. This is of particular relevance given the substantial change in the provisioning model introduced by IFRS 9, which mandates a forward-looking approach compared to the ICL model under IAS 39.

Previous literature presents mixed and sometimes contradictory findings regarding the relationship between discretionary loan loss accounting and market reactions. A substantial portion of early research documents a positive association between loan loss provisions and market returns (e.g., Beaver et al., 1997; Wahlen, 1994), as well as with market valuations of commercial banks (Beaver et al., 1989; Beaver & Engel, 1996). These studies generally interpret increases in provisions as a signal of earnings strength and prudent financial management. However, other studies offer contrasting evidence, suggesting that loan loss provisions may instead be associated with negative market responses (Ahmed et al., 1999; Beatty & Liao, 2021; Docking et al., 1997). In light of these conflicting perspectives, a dual hypothesis was adopted to capture both potential market interpretations under the IFRS 9 regime.

The regression results from model (2) show a statistically significant positive association between changes in loan loss reserves and market returns during the post-implementation period. Thus, indicating that the negative market reaction to the transitional effects associated with the implementation of IFRS 9, as documented by López-Espinosa et al. (2021), do not persist in the post-implementation period. These results support Hypothesis 2b, indicating that, under IFRS 9, the market interprets increased provisioning as an indication of financial strength rather than a negative signal of elevated risk. This is consistent with earlier studies that highlight the signaling role of loan loss provisions (Beaver et al., 1989; Beaver et al., 1997). The observed positive association may also suggest that banks recognize provisions strategically in periods of strong earnings, aligning with prior research that links loan loss accounting to earnings management practices (Norouzpour et al., 2023; Oberson, 2021). To explore this further, an additional analysis was conducted to examine the relationship between changes in loan loss reserves and return on assets (ROA). Evidence of a systematic association would support the notion that banks increase provisions when earnings are high, using loan loss accounting to smooth income (Beaver et al., 1989; Oberson, 2021).

The regression results from this analysis reveal a significant positive relationship between return on assets (ROA_t) and changes in loan loss reserves, suggesting that banks may use loan loss recognition as a tool for earnings smoothing. Given that the empirical findings support

that banks tend to increase loan loss reserves when earnings are high and reduce them when earnings are low, the positive relationship between changes in loan loss reserves and market returns observed in the sample, may be explained by investors anticipating this strategic behavior. As a result, this would indicate that increases in loan loss reserves are interpreted as a signal of strong current earnings and thus as good news, consistent with the interpretations suggested by previous research (Beaver et al., 1989; Beaver et al., 1997). However, the additional analysis does not reveal a positive association between changes in loan loss reserves and future earnings (ROA_{t+1}) contrary to the findings of Beaver et al. (1997). As such, this study finds no evidence of a signaling effect in relation to future earnings, suggesting that while changes in loan loss reserves may reflect strong current performance, they do not appear to predict improved financial outcomes in subsequent periods.

To further explore the association between changes in loan loss reserves and market returns during the post-implementation period, a subsample analysis based on bank size and country-level credit risk is conducted. The results indicate that the positive market reaction observed in the pooled sample is primarily driven by large banks and those operating in low credit risk countries, thus indicating that investor framing of changes in loan loss reserves is dependent on institutional and macroeconomic factors. When considered alongside the additional analysis, which finds no significant differences between these subgroups in terms of earnings management practices, it suggests that the observed variation may instead be attributable to their institutional characteristics. In particular, large banks and those operating in low credit risk countries are commonly associated with greater institutional stability (Athari et al., 2023; López-Penabad et al., 2021). Consequently, the market may perceive increases in loan loss reserves within these contexts as a credible signal of strong earnings that can absorb the adverse effects of increased reserves, an interpretation that does not appear to extend to smaller banks in high credit risk environments. However, the underlying reasons for these subsample differences remain unclear, as they cannot be explained by variations in the relationship between changes in loan loss reserves and return on assets (ROA). Further research is therefore needed to fully understand the drivers of this divergence.

In contrast, the regression results from model (2) for small banks and those operating in high credit risk countries show no significant relationship between changes in loan loss reserves and market returns. However, in these cases, the ratio of loan loss reserves to total assets (*Past LLR*) emerges as a significant predictor of market returns, with a negative and statistically significant coefficient. These findings suggest that, for banks with these characteristics, investors place a greater emphasis on the absolute level of loan loss reserves rather than on changes over time. In such contexts, higher reserve levels may be interpreted as a signal of elevated credit risk or financial vulnerability, given that these bank characteristics are typically associated with lower institutional stability (Athari et al., 2023; López-Penabad et al., 2021). This interpretation is consistent with prior findings of this study evidencing that market reactions to loan loss accounting are dependent on specific bank and macroeconomic factors.

5.2.1 Market reactions to disaggregated changes in loan loss reserves

To further investigate the nature of market reactions to loan loss accounting under IFRS 9, model (3) disaggregates changes in loan loss reserves by loan stage classification. The results for the full post-implementation sample reveal a statistically significant positive association between changes in loan loss reserves for loans classified in stage 3 and market returns. In contrast, changes in reserves for stage 1 and stage 2 loans exhibit statistically insignificant negative associations with market returns. Consequently, the findings do not support Hypothesis 3, which proposed that changes in loan loss reserves for stage 2 loans would be the primary driver of market responses. Accordingly, this hypothesis is rejected.

This outcome is not entirely unexpected given the results from model (2) and the additional analyses, which indicate that market responses to changes in loan loss reserves during the post-implementation period are more strongly influenced by the signaling effect of earnings strength than by indications of rising credit risk. Since Hypothesis 3 was derived from earlier literature identifying stage 2 loan loss reserves as the most significant driver of bank credit risk (Salazar et al., 2023), the lack of support for this hypothesis may be explained by the market not interpreting changes in loan loss reserves as a direct proxy for changes in bank risk. Instead, the findings imply that investors may perceive increases in stage 3 loan loss reserves, reflecting credit-impaired loans, as a positive indication of bank financial performance.

To further evaluate this interpretation, additional analysis is conducted to examine the association between financial performance and changes in loan loss reserves across the three stages. The results of this analysis reveal that the observed positive and significant association between changes in loan loss reserves and current return on assets (ROA_t) remains for both stage 2 and stage 3 changes in loan loss reserves. However, due to the explanatory power of the regression results, a higher degree of confidence can be placed on the association between ROA_t and changes in stage 3 loan loss reserves. Consistent with previous arguments linking the association between changes in loan loss reserves and return on assets (ROA) to earnings management, these findings indicate the use of managerial discretion in the estimation of stage 2 and stage 3 loan loss reserves. As a result, the positive association between stage 3 loan loss reserves and return on assets (ROA) serves as an explanation for the positive market reaction observed to increases in both overall and stage 3 loan loss reserves, suggesting that the market view increases in stage 3 loan loss reserves as indicators of robust earnings capacity. In contrast, the market response to changes in stage 2 loan loss reserves appears to be influenced by factors beyond the signaling of strong current earnings.

6. Conclusion

This study examines the impact of the regulatory transition from IAS 39 to IFRS 9 on the relationship between market reactions and recognized changes in loan loss reserves among publicly listed European banks. The analysis is based on panel data comprising 107 banks across 32 European countries that report under International Financial Reporting Standards (IFRS) over the period 2013 to 2023. Three ordinary least squares (OLS) regression models including firm and year fixed effects are employed to answer the following research question:

How does the market respond to changes in loan loss reserves under IFRS 9, and does it differ from that under IAS 39?

The results indicate a significant difference in market reactions to changes in loan loss reserves under the two regulatory frameworks, IAS 39 and IFRS 9. Specifically, investors respond more positively to changes in loan loss reserves reported under IFRS 9 compared to those under IAS 39. These findings provide empirical support for Hypothesis 1, suggesting that the regulatory shift from the incurred credit loss (ICL) model to the expected credit loss (ECL) model has influenced how investors interpret recognized loan loss reserves. The evidence implies that investors have adapted their framing of such disclosures in response to the conceptual and informational changes introduced by IFRS 9.

Further analysis of the post-implementation period (2019–2023) reveals that under IFRS 9 investors generally respond positively to increases in loan loss reserves. This is evidenced by a significant positive association between market returns and changes in loan loss reserves, providing support for Hypothesis 2b. Additional analysis suggests that this positive relationship may be driven by earnings management, as indicated by a significant positive association between changes in loan loss reserves and return on assets (ROA). These findings imply that increases in loan loss reserves are perceived by investors as signals of strong earnings, which may explain the favorable market reaction. Furthermore, disaggregating changes in loan loss reserves by loan stage classification reveals that the observed association with market returns are primarily driven by adjustments to stage 3 loan loss reserves. This suggests that provisions related to credit-impaired loans are especially informative to investors and may play a central role in shaping market perceptions under IFRS 9.

Subsample analysis based on bank size and country-specific credit risk conditions during the post-implementation period indicates that the observed positive association between market returns and changes in loan loss reserves is primarily driven by large banks and banks operating in low credit risk countries, as evidenced by the regression results from both model (2) and model (3). These results may reflect underlying institutional and macroeconomic characteristics, as larger banks and countries with lower credit risk are commonly associated with greater financial stability. However, this study does not explore the underlying mechanisms behind these findings.

This study contributes to the existing literature on the implications of IFRS 9 by examining the sustained effects of the standard on market behavior. Specifically, it compares market reactions to changes in loan loss reserves under IFRS 9 and its predecessor IAS 39, thereby extending the understanding of investor responses beyond the transitional effects identified by López-Espinosa et al. (2021). The findings underscore the significance of accounting standard design in shaping how investors interpret and incorporate financial information into their valuation decisions. Furthermore, this study adds to the extensive body of research on the relationship between loan loss accounting and market returns by re-examining this association within the IFRS 9 context, which introduced a fundamental shift in the recognition and measurement of credit losses. In light of prior contradictory findings, the results presented here align with studies reporting a positive relationship between loan loss recognition and market returns, while offering contrasting evidence to research that identifies a negative association.

This study is subject to several key limitations. First, as IFRS 9 was implemented in 2018, the post-implementation sample period is limited to five years. This relatively short time frame coincides with major macroeconomic disruptions, including the COVID-19 pandemic and the war in Ukraine, which may affect the generalizability of the findings. Future research is therefore encouraged to revisit these relationships over a longer and potentially more stable period to validate the findings presented in this study. Furthermore, an extended time frame would allow for a reexamination of Hegde and Kozlowski's (2021) findings on the business-cycle dependence of market reactions to loan losses, specifically within the IFRS 9 context, an aspect not addressed in this study. Second, the scope of this study is limited to European commercial banks. This geographical and institutional focus, combined with the sample being skewed toward certain countries (notably Denmark and Italy), may limit the generalizability of the findings, as the market implications of IFRS 9 could vary across regions and among other types of financial institutions and non-financial firms. Further research examining the implications of IFRS 9 across different geographical regions and industry sectors are therefore proposed. Lastly, the study finds evidence of earnings management in loan loss accounting, as indicated by a significant positive association between changes in loan loss reserves and return on assets (ROA_t). This relationship helps explain the observed positive market reaction to reserve changes, but it does not account for the variation observed across banks of different sizes or across countries with differing levels of credit risk. Further research is therefore warranted to investigate the mechanisms driving these differences to better understand how bank-specific and country-specific factors interact with investor framing of accounting practices under IFRS 9.

References

Ahmed, A. S., Takeda, C., & Thomas, S. (1999). Bank loan loss provisions: A reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics 28*(1), 1-25.

Armstrong, C. S., Barth, M. E., Jagolinzer, A. D., & Riedl, E. J. (2010). Market Reaction to the Adoption of IFRS in Europe. *The Accounting Review, 85*(1), 31–61.

Athari, S. A., Irani, F., & AlAl Hadood, A. (2023). Country risk factors and banking sector stability: Do countries' income and risk-level matter? Evidence from global study. *Heliyon*, *9*(10), e20398.

Barth, M. E., & Landsman, W. R. (2010). How did Financial Reporting Contribute to the Financial Crisis? *European Accounting Review*, *19*(3), 399–423.

Basel Committee on Banking Supervision. (2011, 1 April). *Financial Instruments: Impairment* [Comment letter]. Bank for International Settlements. https://www.bis.org/bcbs/commentletters/iasb32.pdf

Basel Committee on Banking Supervision (2017). Regulatory treatment of accounting provisions – interim approach and transitional arrangements. Bank for International Settlements. https://www.bis.org/bcbs/publ/d401.pdf

Beatty, A., & Liao, S. (2021). What Do Analysts' Provision Forecasts Tell Us about Expected Credit Loss Recognition? *The Accounting Review*, *96*(1), 1–21.

Beaver, W., Eger, C., Ryan, S., & Wolfson, M. (1989). Financial Reporting, Supplemental Disclosures, and Bank Share Prices. *Journal of Accounting Research*, *27*(2), 157.

Beaver, W. H., & Engel, E. E. (1996). Discretionary behavior with respect to allowances for loan losses and the behavior of security prices. *Journal of Accounting and Economics*, *22*(1–3), 177–206.

Beaver, W. H., Ryan, S. G., & Wahlen, J. M. (1997). When Is "Bad News" Viewed as "Good News"? *Financial Analysts Journal, 53*(1), 45–54.

Bischof, J., Laux, C., and Leuz, C. (2020) *Accounting for Financial Stability: Lessons from the Financial Crisis and Future Challenges* (SAFE Working Paper, No. 283) Leibniz Institute for Financial Research SAFE.

Buesa, A., Población García, F. J., & Tarancón, J. (2019). *Measuring the procyclicality of impairment accounting regimes: A comparison between IFRS 9 and US GAAP* (ECB Working Paper Series No 2347). European Central Bank. https://data.europa.eu/doi/10.2866/117524

Bushman, R. M., & Smith, A. J. (2001). Financial accounting information and corporate governance. *Journal of Accounting and Economics, 32(1-3)*, 237–333.

Bushman, R. M., & Williams, C. D. (2012). Accounting discretion, loan loss provisioning, and discipline of Banks' risk-taking. *Journal of Accounting and Economics*, *54*(1), 1–18.

Casciello, R., Maffei, M., & Ziebart, D. A. (2024). Regulatory and contextual factors influencing earnings and capital management decisions: Evidence from the European banking sector. *Review of Quantitative Finance and Accounting*, *63*(1), 87–146.

Docking, D. S., Hirschey, M., & Jones, E. (1997). Information and contagion effects of bank loan-loss reserve announcements. *Journal of Financial Economics*, *43*(2), 219–239.

Dong, M., & Oberson, R. (2022). Moving toward the expected credit loss model under IFRS 9: Capital transitional arrangement and bank systematic risk. *Accounting and Business Research*, *52*(6), 641–679.

Du, C., Song, L., & Wu, J. (2016). Bank accounting disclosure, information content in stock prices, and stock crash risk: Global evidence. *Pacific Accounting Review*, *28*(3), 260–278.

European Parliament and Council (2002). *Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2022 on the application of international accounting standards*. Official Journal of the European Communities L 243, 1–4 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002R1606

European Systemic Risk Board. (2017). *Financial stability implications of IFRS 9.* European Systemic Risk Board. https://data.europa.eu/doi/10.2849/597293

Fatouh, M., & Giansante, S. (2023). The cyclicality of bank credit losses and capital ratios under expected loss model. *Annals of Operations Research*, *330*(1–2), 807–840.

Frykström, N., & Li, J. (2018). *IFRS 9 – the new accounting standard for credit loss recognition*. (Economic Commentaries No. 3). Sveriges Riksbank.

G20 (2009). *London summit - leaders statement.* http://www.g20.utoronto.ca/2009/2009communique0402.pdf

Gaston, E., & Song, I. W. (2014). Supervisory Roles in Loan Loss Provisioning in Countries Implementing IFRS. *IMF Working Papers, 2014*(170).

Giner, B., & Mora, A. (2019). Bank loan loss accounting and its contracting effects: The new expected loss models. *Accounting and Business Research*, *49*(6), 726–752.

Hamberg, M., & Beisland, L.-A. (2014). Changes in the value relevance of goodwill accounting following the adoption of IFRS 3. *Journal of International Accounting, Auditing and Taxation, 23*(2), 59–73.

Hansen, S., Charifzadeh, M., & Herberger, T. A. (2024). The impact of IFRS 9 on the cyclicality of loan loss provisions. *Journal of Corporate Accounting & Finance*, *35*(2), 37–49.

Hegde, S. P., & Kozlowski, S. E. (2021). Discretionary loan loss provisioning and bank stock returns: The Role of economic booms and busts. *Journal of Banking & Finance*, *130*, 106186.

International Accounting Standards Board (2013). *Exposure Draft ED/2013/3. Financial Instruments: Expected Credit Losses.* IFRS Foundation.

International Accounting Standards Board (2014). *Project Summary: IFRS 9 Financial Instruments*. [Powerpoint presentation]. IFRS Foundation. https://www.ifrs.org/content/dam/ifrs/project/fi-impairment/ifrs-standard/published-documents/project-summary-july-2014.pdf

International Accounting Standards Board (2022). *The Annotated IFRS Standards. Part A: Issued Standards and the Conceptual Framework for Financial Reporting*. IFRS Foundation.

International Financial Reporting Standards Foundation (2016). *IFRS 9 Forward-looking information and multiple scenarios* [Powerpoint presentation]. https://www.ifrs.org/content/dam/ifrs/project/financial-instruments/webcast-july-2016/ifrs9-webcast-july-2016-slides.pdf

International Financial Reporting Standards Foundation. *Who uses IFRS Accounting Standards?* (n.d.). Retrieved 6 March 2025 from https://www.ifrs.org/use-around-the-world/use-of-ifrs-standards-by-jurisdiction/

International Financial Reporting Standards Foundation (2019). *Classification of income and expenses by financial entities* [IASB meeting, Staff paper] https://www.ifrs.org/content/dam/ifrs/meetings/2019/february/iasb/primary-financial-statements/ap21a-pfs.pdf

Jin, Q., & Wu, S. (2023). Shifting from the incurred to the expected credit loss model and stock price crash risk. *Journal of Accounting and Public Policy*, *42*(2), 107014.

Joos, P. P. M., & Leung, E. (2013). Investor Perceptions of Potential IFRS Adoption in the United States. *The Accounting Review, 88*(2), 577–609.

Kim, J., Ng, J., Wang, C., & Wu, F. (2021). The Effect of the Shift to an Expected Credit Loss Model on Loan Loss Recognition Timeliness. *Risk Management & Analysis in Financial Institutions eJournal.*

Kund, A.-G., & Rugilo, D. (2023). *Does IFRS 9 Increase Banks' Resilience?* (ECB Working Paper Series No 2792) European Central Bank. https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2792~ef62a4640d.en.pdf

Kyiu, A., & Tawiah, V. (2023). IFRS 9 implementation and bank risk. *Accounting Forum*, *49*(1), 234–258.

López-Penabad, M. C., Iglesias-Casal, A., & Neto, J. F. S. (2021). Competition and Financial Stability in the European Listed Banks. *SAGE Open, 11*(3).

López‐Espinosa, G., Ormazabal, G., & Sakasai, Y. (2021). Switching from Incurred to Expected Loan Loss Provisioning: Early Evidence. *Journal of Accounting Research*, *59*(3), 757–804.

López-Espinosa, G., & Penalva, F. (2023). Evidence from the adoption of IFRS 9 and the impact of COVID-19 on lending and regulatory capital on Spanish Banks. *Journal of Accounting and Public Policy*, *42*(4), 107097.

Moodys (n.d.). *Orbis*. Retrieved 6 May 2025 from https://www.moodys.com/web/en/us/capabilities/company-reference-data/orbis.html

Norouzpour, M., Nikulin, E., & Downing, J. (2023). IFRS 9, earnings management and capital management by European banks. *Journal of Financial Reporting and Accounting*, 2023-06.

Oberson, R. (2021). The Credit-Risk Relevance of Loan Impairments Under IFRS 9 for CDS Pricing: Early Evidence. *European Accounting Review*, *30*(5), 959–987.

Onali, E., Ginesti, G., Cardillo, G., & Torluccio, G. (2024). Market reaction to the expected loss model in banks. *Journal of Financial Stability*, *74*, 100884.

Ozili, P. K. (2017). Discretionary provisioning practices among Western European banks. *Journal of Financial Economic Policy*, *9*(1), 109–118.

Pastiranová, O., & Witzany, J. (2022). IFRS 9 and its behavior in the cycle: The evidence on EU countries. *Journal of International Financial Management & Accounting*, *33*(1), 5–17.

Proença, C., Augusto, M., & Murteira, J. (2024). IFRS 9 and earnings management in Eurozone banking: The moderating effect of gender diversity. *Accounting & Finance*, *64*(3), 3137–3155.

Pucci, R., & Skærbæk, P. (2020). The co-performation of financial economics in accounting standard-setting: A study of the translation of the expected credit loss model in IFRS 9. *Accounting, Organizations and Society*, *81*, 101076.

Resende, M., Carvalho, C., & Carmo, C. (2024). Impacts of the Expected Credit Loss Model on Pro-Cyclicality, Earnings Management, and Equity Management in the Portuguese Banking Sector. *Journal of Risk and Financial Management*, *17*(3), 112.

Ricapito, F. P. (2024). The impact of IFRS 9 on credit risk and profitability in the European banking sector. *Corporate Ownership and Control*, *21*(4), 41–48.

S&P Global (n.d.). *S&P Capital IQ Pro*. Retrieved 20 April 2025 from https://www.spglobal.com/market-intelligence/en/solutions/products/sp-capital-iq-pro

Salazar, Y., Merello, P., & Zorio-Grima, A. (2023). IFRS 9, banking risk and COVID-19: Evidence from Europe. *Finance Research Letters*, *56*, 104130.

Skała, D. (2015). Saving on a Rainy Day? Income Smoothing and Procyclicality of Loan‐Loss Provisions in Central European Banks. *International Finance*, *18*(1), 25–46.

Song, L. (2017). The effects of accounting regulations on stock valuation and volatility: Evidence from the banking industry. *Journal of International Financial Management & Accounting*, *28*(2), 205–229.

STOXX Ltd. (n.d.). *Stoxx and DAX indices*. Retrieved 20 April 2025, from https://stoxx.com/all-indices/

Wahlen, J. M. (1994). The Nature of Information in Commercial Bank Loan Loss Disclosures. *Accounting Review, 69*(3), 455–478.

Wheeler, P. B. (2021). Unrecognized Expected Credit Losses and Bank Share Prices. *Journal of Accounting Research*, *59*(3), 805–866.

Appendix

Appendix A. Variable definitions

Variable	Definition	Data source
Stock Return	Return from holding a share over a 12-month period (1 April - 31 March).	Orbis
MAR	Return from holding the share over a 12-month period (1 April - 31 March) adjusted by the return of the DJ STOXX Global 1800 Index ex Europe over the same time period.	Orbis
ΔLLR	The annual fractional change in reported loan loss reserves.	Orbis
ΔLLR Stage 1	The annual fractional change in reported loan loss reserves for assets classified in stage 2.	Capital IQ
ΔLLR Stage 2	The annual fractional change in reported loan loss reserves for assets classified in stage 2.	Capital IQ
ΔLLR Stage 3	The annual fractional change in reported loan loss reserves for assets classified in stage 3.	Capital IQ
Past LLR	Loan loss reserves in the prior year divided by total assets	Orbis
Past Return	Previous year return from holding a share over a 12-month period (1 April - 31 March).	Orbis
Size	Logarithm of total market capitalization (in EUR million).	Orbis
Loans	Total outstanding loans divided by total assets.	Orbis
Net Interest Income	Net interest income divided by total assets.	Orbis
Tier 1 Ratio	Common equity tier 1 capital divided by risk-weighted assets.	Orbis
B/M Ratio	Book value of equity divided by market value of equity.	Orbis
ΔGDP	The annual percentage change in real GDP.	Capital IQ
ROA_t	The net income before changes in loan loss reserves over opening balance total assets.	Orbis
ROA_{t+1}	The subsequent year net income before changes in loan loss reserves over opening balance total assets.	Orbis

Appendix B. Sample Distribution by Size and Credit Risk

model (1)		
High	23.2%	25.3%
Low	25.3%	26.2%
	Small	Large

model (2)		
High	23.1%	25.3%
Low	25.5%	26.1%
	Small	Large

model (3)		
High	23.8%	22.3%
Low	26.2%	27.7%
	Small	Large

Appendix C. Example of banks in the subsamples

	Small	Large
High	Attica Bank *Greece*	Intesa Sanpaolo *Italy*
Low	Spar Nord Bank *Denmark*	Skandinaviska Enskilda Banken *Sweden*

Appendix D. Robustness test: Variance Inflation Factors (VIF) tests

	model (1)	model (2)	model (3)
ΔLLR	1.147	1.255	
ΔLLR Stage 1			1.208
ΔLLR Stage 2			1.210
ΔLLR Stage 3			1.183
Past LLR	1.424	1.458	1.356
Past Return	1.216	1.289	1.278
Size	1.318	1.292	1.203
Loans	1.298	1.236	1.348
Net Interest Income	1.421	1.518	1.295
Tier 1 Ratio	1.112	1.120	1.195
B/M Ratio	1.361	1.281	1.313
GDP Growth	1.140	1.239	1.286

This table presents the results of the Variance Inflation Factor (VIF) tests conducted to test for multicollinearity. The test is conducted on the control variables included in each model specification where columns 1, 2 and 3 correspond to test results of model (1), (2) and (3) respectively.

Appendix E. Robustness test: Breusch-Pagan test for heteroskedasticity

Fitted values of :	Stock Return			Market-Adjusted Return (MAR)		
	model (1)	model (2)	model (3)	model (1)	model (2)	model (3)
Chi-Square	43.03	37.83	36.21	34.31	33.08	34.12
Prob	0.0000	0.0000	0.0002	0.0003	0.0001	0.0003

This table presents the results of the Breusch-Pagan tests conducted to test for heteroskedasticity. Columns 1-3 report the test results for the three models with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 4-6 report the test results for the three models with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe.

Appendix F. Robustness test: Durbin-Watson test for autocorrelation

	Stock Return			Market-Adjusted Return (MAR)		
	model (1)	model (2)	model (3)	model (1)	model (2)	model (3)
Test value	2.093	2.271	2.214	2.100	2.289	2.232

This table presents the results of the Durbin-Watson tests conducted to test for autocorrelation. Columns 1-3 report the test results for the three models with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 4-6 report the test results for the three models with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe.

Appendix G. Robustness test: Economic significance of ΔLLR

Dependent variable: ΔLLR	
Past LLR	-2.1958***
	(0.569)
Past Return	-0.0511
	(0.031)
Size	0.0541*
	(0.033)
Loans	0.8480***
	(0.186)
Net Interest Income	0.2178
	(1.935)
Tier 1 Ratio	0.0266
	(0.459)
B/M Ratio	0.0035
	(0.017)
GDP Growth	-0.7573
	(0.481)
Constant	-0.9738***
	(0.353)
Firm fixed effects	YES
Year fixed effects	YES
N	830
R-squared	0.365
Adjusted R-squared	0.255

This table presents the regression results of the economic significance testing of the main independent variable, Δ*LLR*, defined as the annual fractional change in reported loan loss reserves. The dependent variable used in this regression is Δ*LLR* and the explanatory variables are the control variables used in model (1), (2) and (3). The full sample is used, including both the pre- and post-IFRS 9 period. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

Appendix H. Robustness tests: Balanced sample

	Stock Return			Market-Adjusted Return (MAR)		
	model (1)	model (2)	model (3)	model (1)	model (2)	model (3)
ΔLLR	-0.2112**	0.1706**		-0.2142**	0.1794**	
	(0.092)	(0.081)		(0.092)	(0.081)	
IFRS	-0.1786***			-0.1399**		
	(0.060)			(0.059)		
ΔLLR*IFRS	0.2412*			0.2448*		
	(0.135)			(0.135)		
ΔLLR Stage 1			0.0053			0.0054
			(0.035)			(0.035)
ΔLLR Stage 2			-0.0441			-0.0421
			(0.036)			(0.037)
ΔLLR Stage 3			0.2352***			0.2455***
			(0.089)			(0.090)
Past LLR	-2.0623**	-1.4115	-1.3388	-2.0782**	-1.1453	-1.1567
	(0.903)	(1.416)	(1.494)	(0.900)	(1.383)	(1.474)
Past Return	0.0038	-0.1344*	-0.1383	0.0136	-0.1276	-0.1267
	(0.059)	(0.080)	(0.087)	(0.058)	(0.080)	(0.087)
Size	-0.0818	0.0293	0.0394	-0.0878	0.0344	0.0382
	(0.056)	(0.136)	(0.142)	(0.056)	(0.138)	(0.143)
Loans	-0.0273	-1.0791**	-1.1400**	-0.2610	-1.0995**	-1.1278**
	(0.238)	(0.508)	0.0549	(0.235)	(0.516)	(0.558)
Net Interest Income	5.5401	9.9917**	12.2263**	5.1652	10.1282**	12.5978***
	(4.911)	(4.148)	(4.801)	(4.878)	(4.190)	(4.865)
Tier 1 Ratio	0.0273	-0.6292	-1.3257	-0.0567	-0.6010	-1.4079
	(0.700	(1.363)	(1.551)	(0.695)	(1.403)	(1.569)
B/M Ratio	-0.0538**	-0.0579	-0.0512	-0.0515*	-0.0504	-0.0439
	(0.027)	(0.052)	(0.050)	(0.027)	(0.050)	(0.048)
GDP Growth	-0.3505	0.2707	0.4737	-0.4321	0.2904	0.4447
	(1.037)	(0.762)	(0.809)	(1.033)	(0.769)	(0.808)
Constant	1.0815***	0.2909	0.2550	0.9463**	0.3371	0.3675
	(0.371)	(1.325)	(1.302)	(0.371)	(1.344)	(1.308)
Firm fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
N	490	390	335	490	390	335
Number of banks	49	78	67	49	78	67
R-squared	0.452	0.529	0.533	0.319	0.336	0.361
Adjusted R-squared	0.365	0.388	0.383	0.211	0.137	0.156

This table presents the regression results of the three models, each estimated on a balanced sample of banks. Model (1) investigates the difference in market reactions to changes in loan loss reserves before and after the implementation of IFRS 9. Model (2) investigates the market reaction to changes in loan loss reserves in the IFRS 9 post-implementation period. Model (3) investigates the market reaction to changes in the disaggregated components of loan loss reserves in the IFRS 9 post-implementation period. Columns 1-3 report the regression results with *Stock Return* as the dependent variable, measured as the 12-month return. Columns 3-4 report the regression results with *MAR* as the dependent variable, measured as the 12-month return adjusted by the return of the DJ STOXX Global 1800 Index ex Europe. The standard errors are heteroskedasticity-robust and are reported in parentheses. ***, **, and * denote statistical significance at the 0.01, 0.05, and 0.1 level respectively.

Appendix I. Artificial Intelligence Disclosure

What AI tools have been used and how?

ChatGPT has been used as a tool for providing coding assistance and for spelling, structure and grammar checks on the written material. In terms of coding, it provided assistance throughout the coding process by suggesting specific lines of code and interpreting error messages, serving as a useful complement to the existing literature in the field. During the writing process, ChatGPT contributed by identifying typographical and grammatical issues to help ensure clarity and adherence to academic writing standards.

In what ways have these tools contributed to increasing the quality of the thesis?

We believe that the use of artificial intelligence in the coding process has contributed to reducing the risk of errors in the execution of statistical models, thereby enhancing the technical reliability of the results. Additionally, the use of ChatGPT during the writing process has improved the paper's readability and clarity.

What potential risks were found using AI and what measures were taken to reduce these risks?

The risks associated with using AI are similar to those posed by any information source: the possibility of inaccurate or incorrect information. Therefore, it is crucial to approach AI-generated information with the same level of critical evaluation applied to other sources. In the coding process, this meant ensuring a thorough understanding of the specific code suggested by ChatGPT, as well as verifying its correct implementation and the intended outcomes for each step of the process. We achieved this by reviewing random bank-specific observations and comparing them with manual calculations to validate the results. Additionally, to further mitigate the risk of errors in the statistical analysis, we incorporated statistical models with which we had a strong understanding. The methodological choices and results were also discussed and verified in meetings with our supervisor to ensure robustness and accuracy.

What are the insights gained from using AI tools in the thesis writing process?

Artificial intelligence is a valuable tool in the process of writing academic research, however, it is essential to remain vigilant when using it. This includes maintaining a strong understanding of the research field and consistently verifying the accuracy of the information and suggestions provided.