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"If you want to succeed you should strike out new paths,

rather than travel the worn paths of accepted success"

John D. Rockefeller

Executive Summary

This dissertation comprises three distinct chapters. The first chapter examines whether accounting quality improves for firms voluntarily adopting IFRS by using a single country setting of Swiss firms. The Swiss setting enables isolating the effect of the change from accounting standards from changes in reporting enforcement. I find that voluntary adopters exhibit significant improvement in accounting quality metrics in the post-adoption period. Classifying the adopters in non-serious or serious adopters based on their *actual* reporting changes around the adoption, I find that the non-serious adopters do not face accounting quality improvements in the post-adoption period. Overall, the evidence points towards the explanation that accounting quality is mainly shaped by reporting incentives.

The second chapter examines the new Expected Credit Loss (ECL) model's impact on the predictability of loan loss provisions (LLP) and potential market discipline consequences. I examine whether the arguably less objective LLP under IFRS 9 obscure market participants' ability to monitor the banks' risk-taking incentives. The empirical findings suggest a decrease in the association between loan loss provisions and the incurred loss model determinants in the post-IFRS 9 period, i.e., LLP are based less on objective determinants after IFRS adoption. Furthermore, I find a decrease in the sensitivity of leverage to changes in risk in the post-adoption period of IFRS 9, indicating an attenuated market discipline over banks' risk-taking. In contrast, I find no changes in the determinants of LLP and market discipline for the benchmark sample of U.S. banks, which were not subject to similar accounting changes during the sample period.

The third chapter examines whether banks change the accounting designation of derivatives after ASU 2017-12. I investigate the impact of the new standard on earnings volatility within

different groups of derivative users. Using detailed quarterly data on financial derivatives for bank holdings, I find that the level of earnings volatility and the ASU 2017-12 influence the banks' decisions to use hedge accounting. In assessing the impact within groups of derivative users, I find evidence that banks that designate derivatives for hedge accounting purposes exhibit a lower level of earnings volatility around the adoption of ASU 2017-12 as opposed to banks that elect not to apply hedge accounting. I also find that banks that elect to use hedge accounting for the first time after adopting the standard update exhibit decreased earnings volatility. Overall, the findings confirm the FASB's initial intention of introducing the accounting standard's update.

Keywords: IFRS, Reporting Incentives, Accounting Quality, Institutional environment, Voluntary adoption, IFRS 9, Loan Loss Provisions, Incurred Loss, Expected Credit Loss, Market Discipline, Hedge Accounting, Derivatives, Hedging, Earnings Volatility.

Resume

Cette dissertation comprend trois chapitres distincts. Le premier chapitre examine si la qualité de la comptabilité s'améliore pour les entreprises suisses qui adoptent volontairement les IFRS. Le contexte suisse permet d'isoler l'effet du changement de norme comptable des changements dans l'application de la législation. Je constate que les entreprises qui adoptent volontairement les IFRS présentent une amélioration significative des métriques de qualité comptable dans la période qui suit l'adoption. En classant les adoptants en adoptants sérieux ou non sérieux sur la base des changements réels de leurs rapports financiers autour de l'adoption, je trouve que les adoptants non sérieux ne subissent pas une amélioration de la qualité de leur comptabilité dans la période post-adoption. Dans l'ensemble, les preuves vont dans le sens de l'explication selon laquelle la qualité comptable est principalement façonnée par les incitations à la communication d'informations.

Le deuxième chapitre examine l'impact du nouveau modèle ECL (Expected Credit Loss) sur la prévisibilité des provisions pour pertes sur prêts (LLP) et les conséquences potentielles sur la discipline de marché. J'examine si les LLP moins objectives sous IFRS 9 obscurcissent la capacité des participants du marché à surveiller les incitations des banques à prendre des risques. Les résultats empiriques suggèrent une diminution de l'association entre les provisions pour pertes sur prêts et les déterminants du modèle de pertes encourues dans la période post-IFRS 9, c'est-à-dire que les LLP sont moins basées sur des déterminants objectifs après l'adoption des IFRS. En outre, je trouve une diminution de la sensibilité de l'effet de levier aux changements de risque dans la période post-adoption de l'IFRS 9, indiquant une discipline de marché atténuée sur la prise de risque des banques. En revanche, je ne trouve aucun changement dans les déterminants du LLP et de la discipline de marché pour l'échantillon de

référence des banques américaines, qui n'ont pas été soumises à des changements comptables similaires pendant la période d'échantillonnage.

Le troisième chapitre examine si les banques modifient la comptabilisation des produits dérivés après l'ASU 2017-12. J'étudie l'impact de la nouvelle norme sur la volatilité des bénéfices au sein de différents groupes d'utilisateurs de produits dérivés. En utilisant des données trimestrielles détaillées sur les dérivés financiers pour les avoirs bancaires, je constate que le niveau de volatilité des bénéfices ainsi que l'ASU 2017-12 influencent les décisions des banques d'utiliser la comptabilité de couverture. En évaluant l'impact au sein des groupes d'utilisateurs de produits dérivés, je trouve des preuves que les banques qui désignent les produits dérivés à des fins de comptabilité de couverture présentent un niveau plus faible de volatilité des bénéfices autour de l'adoption de l'ASU 2017-12, par rapport aux banques qui choisissent de ne pas appliquer la comptabilité de couverture. Je constate également que les banques qui choisissent pour la première fois d'utiliser la comptabilité de couverture après l'adoption de la norme comptable mise à jour affichent une volatilité des bénéfices réduite. Dans l'ensemble, les résultats confirment l'intention initiale du FASB d'introduire la mise à jour de la norme comptable.

Mots-clés: IFRS, incitations à la communication, qualité de la comptabilité, environnement institutionnel, adoption volontaire, IFRS 9, provisions pour pertes sur prêts, pertes encourues, pertes de crédit attendues, discipline de marché, comptabilité de couverture, produits dérivés, couverture, volatilité des bénéfices.

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Chapter 1: Does Accounting Quality Really Improve with Voluntary IFRS Adoption? Evidence from Switzerland

Introduction

The Modigliani and Miller (1958) irrelevance theory suggests that accounting choices are irrelevant in the absence of market imperfections because shareholders possess the tools and information necessary to efficiently create their own risk-return profiles. However, the added complexity in accounting standards may make it difficult for investors to assess firms' financial performance by enhancing information asymmetry. The increase in volume and the increasingly technical nature of accounting standards over the past decades have increased the complexity of financial reporting and present many challenges to the prepares as well as other users of financial statements. The need for financial information that is reliable, transparent, and relevant to financial users has been under debate for many decades and has been the focus of many studies. The accounting standards and reporting needs of users have been discussed at length. Thus, the standard-setting processes have undergone significant changes over the years so that financial reporting better reflects economic reality.

This dissertation focuses on the impacts of changes in accounting regulation using empirical research methodologies. The conversion from local accounting standards to International Financial Reporting Standards is a heavily discussed topic in the corporate world and academia. Expected benefits of adoption include reporting consistency, enhanced competition and comparability, and improved financial reporting consistency. IFRS adoption research is focused mainly on the economic consequences of voluntary and mandatory adoption, the reporting quality improvements around the adoption, and the drivers of this adoption. Daske et al. 2008 examined 3,100 firms in 26 countries mandated to adopt IFRS and investigate the economic effects of IFRS for both early and mandated adoption.

On the other hand, Barth et al. (2008) focus on the accounting quality improvements of IFRS adoption. JeanJean and Stolowy (2008) examine the effect of IFRS conversion on

earnings quality and find mixed results. Additionally, it is not yet clear why some firms appear to benefit more than others in terms of accounting quality improvements from the IFRS adoption.

In the first chapter, I examine whether accounting quality improves for firms voluntarily adopting IFRS using a single-setting country of Swiss firms. The motivation of this paper comes from mixed evidence on the capital-market perceptions of the quality of financial statement information (Bruggemann et al., 2013; Byard et al., 2011; Horton et al., 2013; Landsman et al., 2012). I exploit the unique features offered by the voluntary adoption of IFRS in Switzerland. The Swiss setting allows isolating the effect of the change from accounting standards from the effect of changes in reporting enforcement.

Furthermore, I exploit the fact that many firms early adopted IFRS in early 1990 (hereafter, "benchmark firms"), although IFRS was not mandatory in Switzerland. I examine whether firms adopting IFRS have better accounting quality metrics in the post-adoption period. I find that voluntary adopters exhibit significant improvement in accounting quality metrics in the post-adoption period. Additionally, I examine whether firms that "seriously" adopt IFRS exhibit higher accounting quality improvements. Classifying the adopters as non-serious or serious adopters based on their reporting changes around the adoption, I find that the non-serious adopters do not face accounting quality improvements in the post-adoption period. Overall, the evidence points towards the explanation that accounting quality is mainly shaped by reporting incentives.

In the second chapter, I examine the impact of the Expected Credit Loss (ECL) model on the predictability of loan loss provisions (LLP) and potential consequences on market discipline. In 2014, the IASB issued the new standard *IFRS 9 Financial Instruments* (hereafter, IFRS 9), which contains a new approach to classify and measure financial instruments, a

forward-looking impairment model, and hedge accounting. The new standard requires reporting entities to incorporate information from past events, current conditions, as well as reasonable and supportable forecasts in their measurement of expected credit losses (ECL). The IASB developed the ECL model based on expected loss rather than incurred loss to better reflect the general pattern of deteriorations or improvements in the credit quality of financial instruments. I investigate whether the association between recognized loan loss provisions and objective determinants of the incurred loss model (i.e., changes in non-performing loans and the level of non-performing loans) decreases after IFRS 9 adoption. Next, I examine whether the arguably less objective LLP under IFRS 9 obscure market participants' ability to monitor the banks' risk-taking incentives. The empirical findings suggest a decrease in the association between loan loss provisions and incurred loss model determinants in the post-IFRS 9 period, i.e., LLP are based less on objective determinants after IFRS adoption.

Furthermore, I find a decrease in the sensitivity of leverage to changes in risk in the post-adoption period of IFRS 9, indicating an attenuated market discipline over banks' risk-taking. The results are mainly driven by banks in countries that allow more smoothing through loan loss provisions as opposed to banks in more forward-looking countries. In contrast, I find no changes in the determinants of LLP and market discipline for the benchmark sample of U.S. banks, which were not subject to the same accounting change during the sample period.

The increased complexity of accounting standards and the difficulties faced by financial statement preparers have led standard-setting bodies to consider reducing the burden of applying certain accounting standards. In August 2017, the Financial Accounting Standards Board (FASB) issued an Accounting Standards Update (ASU) to improve accounting for hedging activities and enhance derivative usage transparency. ASU 2017-12 provides targeted improvements to the hedge accounting model intended to facilitate financial reporting that

reflects an entity's risk management activities more closely and to simplify the application of hedge accounting. The third chapter examines whether banks change the accounting designation of derivatives after ASU 2017-12. Moreover, I investigate the impact of the new standard on earnings volatility within different groups of derivative users. I split the sample banks into hedgers and non-hedgers based on the use of derivatives for hedging purposes. Using detailed quarterly data on financial derivatives for bank holdings, my results show that the level of earnings volatility and the ASU 2017-12 influence the banks' decisions to use hedge accounting. In assessing the impact within groups of derivative users, I find evidence that banks that designate derivatives for hedge accounting purposes exhibit a lower level of earnings volatility around the adoption of ASU 2017-12 compared to banks that elect not to apply hedge accounting. Furthermore, the differences in earnings volatility become more pronounced in the post-adoption period, whereas I fail to detect any differences in cash flow volatility among the two groups. I also find that banks that elect to use hedge accounting for the first time after adopting the standard update exhibit a decrease in earnings volatility.

The first chapter contributes to the literature by providing evidence on the discussion of whether the improvements in accounting quality for voluntary adopters may arrive from the changes on reporting enforcement and not the accounting standards per se. By showing that the firms that voluntarily adopt and commit to IFRS exhibit accounting quality improvements in a setting where there are no changes in reporting enforcement, this empirical evidence points towards the explanation that accounting quality is mainly shaped by reporting incentives. The second chapter provides a first-hand analysis of the changes in loan loss provisions around the new expected credit loss model. While there has been researching and models (e.g., Gebhardt, 2016; Novotny-Farkas, 2016; Seitz et al., 2018) that predict how the model will impact the loan loss provisioning for banks, this paper is the first to provide empirical evidence of the effects

of the expected credit loss on the determinants of loan loss provisions. Finally, the third chapter provides new evidence on the impact of simplified hedge accounting standards and the determinants of banks' decisions to apply hedge accounting and its impact on earnings volatility. The third chapter confirms that the accounting treatment of derivatives on the old standard causes an "artificial" increase in earnings volatility. Overall, these three chapters shed light on how the accounting standard changes affect firms' decisions and their impact on the overall accounting quality of firms.

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Chapter 1: Does Accounting Quality Really Improve with Voluntary IFRS Adoption? Evidence from Switzerland.

1.1. Introduction

I examine whether accounting quality improves for firms voluntarily adopting IFRS using a single-setting country of Swiss firms. The motivation of this paper comes from mixed evidence on the capital-market perceptions of the quality of financial statement information (Bruggemann et al., 2013; Byard et al., 2011; Horton et al., 2013; Landsman et al., 2012). Moreover, it has not yet been entirely able to distinguish the effect of IFRS adoption on accounting quality and enforcement. Prior research finds an improvement in accounting quality around the voluntary IFRS adoption (Barth et al., 2008; Gassen and Sellhorn, 2006). However, Christensen et al. (2015) argue that such improvements may arise from the reporting enforcement and vary with firm-specific reporting incentives (e.g., connections with banks and insider ownership). Similarly, Daske et al. (2013) find that the liquidity improvements around IFRS adoption depend on the firm's reporting incentives.

This paper aims to exploit the unique features offered by the voluntary adoption of IFRS in Switzerland. First, Switzerland is one of the few countries where the adoption of IFRS was not mandatory in 2005. Until the mid-1990s, due to the absence of restrictive national standards, many large Swiss firms voluntarily adopted the International Accounting Standards (IAS), reaching a percentage of 40% of the companies listed on the SIX Exchange. Thus, offering a wide range of IAS/IFRS adoption across the sample period. Second, Switzerland's regulatory environment did not experience significant changes around the sample period, especially around 2005 (Daske et al., 2013). Therefore, this setting isolates the effect of a change in

accounting standards from potentially confounding effects of the legal environment and other institutional features.

Because of the early adoption of IFRS, there is no available data before the switch for some firms. Additionally, many firms started reporting under IFRS directly after their IPOs. Therefore, I use these firms as the control group for the difference-in-differences regression (DID) in addition to the Swiss GAAP stayers control group. Early adopter firms have similar incentives in their decision to adopt IFRS and similar characteristics with the treatment sample. Therefore, using these firms as a benchmark sample offers the advantage of mitigating the selection bias issue. Additionally, I include firm fixed effects to control for differences in firm characteristics.

To shed light on the discussion whether the accounting quality improvements can be attributed to the change in the accounting standards, I investigate the accounting quality improvements around the voluntary IFRS adoption using several accounting quality metrics following the methodology from Barth et al. (2008) and the modified model of discretionary accruals of Jones (1991). Using both early adopters and Swiss GAAP stayers as a control group allows to better measure accounting quality changes around voluntary IFRS adoption. Additionally, the extensive sample period from 1990-2016 provides the advantage of increasing the sample observations and number of adoptions. Following Ball (2006) definition, I interpret financial reporting 'quality' as satisfying the demand for financial reporting. That is, high-quality financial statements provide useful information to a variety of users, including investors. Consistent with prior international accounting studies, I interpret accounting choices that result in greater smoothing of earnings, greater management of earnings to meet a target, and overstatement of profits (or delayed recognition of losses) as discrediting the true and

faithful representation of the underlying economics and reducing accounting quality (Leuz et al., 2003; Barth et al., 2008; Christensen et al., 2015; Chen et al., 2010; Ahmed et al., 2013).

First, I examine the accounting quality metrics constructed following prior literature (Lang et al., 2006; Barth et al., 2008; Paananen and Lin, 2009). I investigate four measures of earnings management metrics: (1) the variability of changes in earnings; (2) the variability of changes in earnings relative to the variability of changes in cash flows, (3) the negative correlation between accruals and cash flows, and (4) earnings management toward small positive net income. I find that the adopting firms exhibit a significant increase in the variability of the changes in net income, the variability of the changes in net income over the variability of changes in cash flows, and the correlation between accruals and cash flows. The earnings management toward small positive net income coefficient is negative and significant at the 1% level. Overall, all the accounting quality metrics suggest an increase in accounting quality for IFRS adopter firms in the years reporting under IFRS.

Second, taking account of the widespread use of discretionary accruals in tests of earnings management (Defond and Jiambalvo, 1994; Dechow et al., 1995; Kothari, 2001), I use a discretionary accrual measure based on the modified model of Jones (1991). I run a difference in differences regression around the change in the accounting standards and use as a control group the firms that have adopted IFRS but do not have a switch year[1] and the Swiss GAAP stayer firms. I include firm/industry and year fixed effects to control for time-invariant firm's characteristics as well as time trends. I find that firms exhibit significantly lower discretionary accruals after the IFRS adoption given by the significant negative coefficient β_1 from the

[1] These firms adopted IFRS earlier than 1990, or there is no accounting data available before the adoption of IFRS.

regression results. The results hold when including the firm/industry fixed effects and using only the early IFRS adopters as the control group.

Third, to examine whether adopting firms change their financial reporting, I compare annual reports before and after the adoption. I find that the adopter firms substantially increase the quantity of disclosure. The number of pages in annual reports increased, on average, by 27 pages, and around 85% of adopters increased their segment disclosure. In addition, there is an increase in the audit fees, suggesting that the IFRS standards are more extensive than Swiss GAAP.

Next, in contrast with Daske et al. (2013) and Christensen et al. (2015), which classify the IFRS adopter firms based on their changes on reporting incentives and the timing of the adoption of IFRS, I classify the firms based on the *actual* reporting changes around the IFRS adoption. I examine the reporting changes around the adoption (annual report pre-post adoption) and classify the IFRS adopter sample in two categories, namely, "non-serious" and "serious" adopters. Reporting changes include the change in the number of pages in the annual report, the number of pages in the notes of the financial statements, changes in segment reporting, and audit fees. A firm with above (below) median reporting changes is classified as a serious (non-serious) adopter. I test whether the non-serious adopters have an improvement in accounting quality in the post-adoption period. Consistent with Daske et al. (2013), I find no improvement in accounting quality for these firms as they do not exhibit lower discretionary accruals in the post-adoption period of IFRS.

Overall, the results show that firms that voluntarily adopt IFRS exhibit an increase in accounting quality in the post-adoption period even when controlling for the potentially confounding effect of changes in reporting enforcement, legal environment, and other institutional features. This paper contributes to the literature by providing evidence on the

discussion of whether the improvements in accounting quality for voluntary adopters may arrive from the changes on reporting enforcement and not the accounting standards per se. By showing that the firms voluntarily adopting IFRS exhibit accounting quality improvements in a setting where there are no changes in reporting enforcement, this empirical evidence points towards the explanation that the IFRS standards indeed impact accounting quality for a voluntary adopter. Additionally, using early adopters as control, this paper contributes to the literature using a better benchmark sample, which has more similar characteristics with the treatment sample. In contrast, prior research uses the local GAAP firms as control when estimating these changes in accounting quality.

The remainder of the paper is organized as follows. Section 1.2 outlines the background and the hypothesis development. Section 1.3 explains the research design, section 1.4 describes the sample selection process and the descriptive statistics, and section 1.5 presents the empirical results. Section 1.6 provides additional analysis, and section 1.7 concludes.

1.2. Background and Hypothesis Development

1.2.1. Accounting in Switzerland

The accounting regulation of Switzerland is part of the Code of Obligations (CO), which applies to all Swiss companies regardless of their listing status. CO contains several articles on the accounting rules and the financial statements' preparations since its effective date on 1 January 1912. Until the mid-1980s, Switzerland had no accounting standard-setting body. Thus, the Foundation for Accounting Standards Committee (FER) was created in 1984. Since then, FER has issued more than 20 "recommendations" (The Swiss GAAP FER). In general terms, the Swiss GAAP FER consists of simplified regulations of International Accounting Standards (IAS) and IFRS. Thus, because FER is a private organization, it could not enforce

its recommendations considering that they mirror the real value of the principle, which would consequently follow the declaration of hidden reserves. Until the mid-1990s, due to the absence of restrictive national standards, many large Swiss companies voluntarily adopted IAS, reaching a percentage of 40% of the companies listed on the SIX Exchange (Dumontier and Raffournier, 1998). In 1997, market authorities required all listed companies to use either Swiss GAAP FER or IAS/IFRS.

In 2005, after the IFRS adoption was mandatory in the European Union (EU), Switzerland followed another policy. The regulatory environment in Switzerland did not have significant changes around the sample period, especially around 2005 (Daske et al., 2013). All listed companies in the SIX Exchange are divided into two segments: (i) Main Segment and (ii) Domestic Segment. The main segment refers to firms that want to have access to foreign markets and satisfy the needs of foreign institutional investors, while the domestic segment refers to firms that are only interested in attracting domestic investors or do not yet fulfil the requirements of getting listed under the main segment. To be listed on the main segment, a firm must have a minimum capital of CHF 25 million and a free float[2] of at least 25%.

On the other hand, SIX required only CHF 2.5 million of capital and 20% free float shares for a firm to be listed on the domestic segment. All companies listed in the main segment of the SIX whose financial year starts on or after 1 January 2005 had to apply one of the two internationally recognized accounting standards – IFRS or US GAAP. Swiss GAAP was no longer be permissible. Thus, allowing only the firms listed on the domestic standards to use Swiss GAAP (these firms were also allowed to use IFRS). On the contrary to the EU decision, the adoption of IFRS was not mandatory. The SIX announced that due to the fact that the switch

[2] The number of freely tradable shares in circulation.

to IFRS could involve substantial cost, firms that wish to continue using Swiss GAAP were allowed to move to the domestic segment (SIX, 2015).

Until 2015, a firm listed on the Main Standard that had incentives to report according to Swiss GAAP FER rather than IFRS had to change to the Domestic Standard. Such a change would probably come with a price (i.e., the perception among the investor community of having downsized from a global to a local player). In 2012, Swatch Group decided to switch from IFRS to Swiss GAAP, followed by several large global companies. The explanation rests on the complexity of IFRS and their unattractive cost-benefit ratio (Fiechter et al., 2017).

Rather than delegating the Swatch Group to the domestic standard, the SIX decided to amend its regulation (Raffournier, 2017). A new concept governing the regulatory standards for equity securities was introduced on 1 August 2015. The listing requirements for the new standards entitled "International Reporting Standard" (previously "Main Standard") and "Swiss Reporting Standard" (previously "Domestic Standard") have been largely aligned. They both now have the same listing requirements. However, the critical difference lies in the accounting standards permitted: for the International Reporting Standard, issuers must apply IFRS or US GAAP; for the Swiss Reporting Standard, they must apply Swiss GAAP FER. On the other hand, banks are obligated to work under the Swiss Banking Act (SIX, 2015). The new concept accounts for the fact that, in the past few years, issuers have switched their accounting standard from IFRS to Swiss GAAP FER and were, thus, transferred to the Domestic Standard.

1.2.2. Literature Review and Hypothesis Development

The broad literature on the accounting quality of the IFRS adoption is mainly divided into two categories. On the one hand, early research focuses on the effect of voluntary adoption of IFRS on accounting quality and market outcomes (Ball, 2006; Covrig et al., 2007; Barth et al.,

2008; Barth et al. 2012; Christensen, 2012; Daske et al., 2013; Kim and Shi, 2012). The other group focuses on the effects of the mandatory IFRS adoption around 2005 (Ahmed et al., 2013; Armstrong et al., 2011; Byard et al., 2011; Christensen et al., 2013; Christensen et al., 2015; Daske et al., 2008).

While mandatory IFRS adoption is a country-level regulatory event that aims to enhance public disclosure quality, the adoption of IFRS voluntarily can be viewed as an individual firm's strategic commitment to better reporting (Leuz and Verrecchia, 2000; Covrig et al., 2007). Kim and Shi (2012) find that voluntary IFRS adoption facilitates incorporating firm-specific information into stock prices. Recent studies claim that an individual firm's decision to voluntarily adopt IFRS leads to positive economic consequences and provide evidence that public disclosures under IFRS are generally of higher quality than those under local accounting standards in most accounting regimes. These studies find that voluntary IFRS adoption is associated with less accounting flexibility (Ashbaugh and Pincus, 2001), lower cost of capital (Daske et al., 2013), higher market liquidity (Leuz and Verrecchia, 2000), and better accounting quality (Barth et al., 2008). Firms that adopt IFRS voluntarily exhibit higher accounting quality and transparency after the adoption (Barth et al., 2008).

Further research by Daske et al. (2013) and Christensen et al. (2013) investigate whether the improvements in liquidity and accounting quality may arise from changes in the financial reporting incentives rather than the accounting standards per se. Daske et al. (2013) document that the liquidity improvements are more prominent for firms with a genuine commitment compared to firms that only change the "label" of their accounting standards. Similarly, Christensen et al. (2013) show that the market benefits are attributable to reporting enforcement changes rather than to the change in accounting standards.

The Swiss setting eliminates the effect of the changes in reporting enforcement, and Swiss firms did not have to adopt IFRS in 2005. Regarding the accounting quality improvements, Christensen et al. (2015) find that accounting quality improvement varies with firm-specific reporting incentives using a single-country of German firms. In light of these findings, I test the hypothesis that firms adopting IFRS have better accounting quality measures in the post-adoption period by using a single-country of Swiss firms. I test this hypothesis by following Barth et al. (2008) methodology for the accounting quality metrics. In addition, I perform a difference in differences (DID) regression around the IFRS adoption by using firms that never adopt IFRS and early IFRS adopters.

Considering that the market effects and accounting quality varies with firms' characteristics, I look at the reporting changes around the adoption (annual report pre-post adoption). I classify the IFRS adopter sample in two categories: "non-serious" and "serious" adopters. A firm with below (above) median reporting changes is classified as a non-serious (serious) adopter. Additionally, Fiechter et al. (2017) investigate the determinants of a switch back for a firm from IFRS to Swiss GAAP and find that firms with more dispersed ownership experience decreased liquidity after the switch back. I test the hypothesis that non-serious adopter firms do not face improvements in accounting quality and transparency after the IFRS adoption. This hypothesis is built on the assumption that the IFRS adoption from these firms was not sustained by a true commitment to transparency.

1.3. Research Design

1.3.1 General Design and Accounting Quality Measures

Following prior research, this paper attempts to associate the concept of accounting quality[3] with accounting-based attributes, such as accrual quality, persistence, and smoothness of earnings. To do so, I adopt earnings management metrics on the quality of accounting information prepared under Swiss GAAP and IFRS before and after the adoption. Particularly, I investigate the changes in accounting quality measures around the IFRS adoption. Following the modified model of Jones (1991), constructed by Dechow et al. (1995), I estimate a discretionary accrual measure and perform a DID regression around the IFRS adoption with several control variables, including firm and year fixed effects. Using the early IFRS adopters as a control group mitigates the effect of selection bias issue, and firm fixed effects allow to control for non-varying firm characteristics.

I follow the methodology from Barth et al. (2008) to construct the accounting quality measures around the IFRS adoption. I compute four measures of earnings management metrics: (1) the variability of changes in earnings; (2) the variability of changes in earnings relative to the variability of changes in cash flows, (3) the negative correlation between accruals and cash flows, and (4) earnings management toward small positive net income. In addition, I follow the modified model of Jones (1991) by using the discretionary accruals as a proxy for earnings management. I expect that non-serious adopters have higher discretionary accruals compared to serious adopters. I compare these measures pre- and post-IFRS to check whether firms stop or reduce earnings management.

[3] Ball et al. (2003) defines accounting quality as the ability of users to see through the financial statements to comprehend the underlying accounting events and transactions in the firm.

The first three metrics are constructed from the variances of the residuals from the regressions in equation (1.1). First, the variability of changes in earnings is the variance of the residuals when using ΔNI as the dependent variable. The second metric, the variability of changes in earnings relative to the variability of changes in cash flows, is constructed as the ratio of the variability of changes in earnings and the variance of the residuals constructed from eq. (1.1) when using ΔCF as the dependent variable. The third metric, the correlation between accruals and cash flows, is the Spearman correlation between the residuals of the following regression when using *ACC* and *CF* as the dependent variable. When calculating the third metric, the net cash flow from operations is not used as an independent variable because of collinearity problems.

$$\begin{aligned} \textit{Dependent Variable} = {} & \beta_0 + \beta_1 SIZE_{it} + \beta_2 GROWTH_{it} + \beta_3 EISSUE_{it} + \beta_4 LEV_{it} \\ & + \beta_5 DISSUE_{it} + \beta_6 TURN_{it} + \beta_7 CF_{it} + \beta_8 AUD_{it} + \beta_9 CLOSE_{it} \\ & + \sum \beta_i IDUM_i + \varepsilon_{it} \end{aligned} \tag{1.1}$$

The ΔNI variable is the change in earnings before extraordinary items scaled by the end-of-year total assets. The ΔCF variable is the change in net cash flow from operations scaled by end-of-year total assets. The accruals measure *ACC* is the difference between earning and net cash flow from operations scaled by end-of-year total assets. *SIZE* is the natural logarithm of the market value of equity. *GROWTH* is the annual growth in revenues. *EISSUE* and *DISSUE* is the percentage change in common stock and total liabilities, respectively. *LEV* is the leverage ratio measured as the total liabilities over total assets. *TURN* variable is measured as the ratio of revenues over total assets. *CF* is the net cash flow from operations scaled by end-of-year total assets. *AUD* is a dummy variable that takes the value of one when the auditor of the

company is one of the big four and zero otherwise. *CLOSE* is the percentage of closely held shares.

I follow Barth et al. (2008)'s approach, to measure the last earnings management metric. The following regression measures whether a firm is managing its earnings towards small positive net income relative to the pre-adoption period:

$$POST(0,1)_{it} = \beta_0 + \beta_1 SPOS_{it} + \beta_2 SIZE_{it} + \beta_3 GROWTH_{it} + \beta_4 EISSUE_{it} + \beta_5 LEV_{it} + \beta_6 DISSUE_{it} + \beta_7 TURN_{it} + \beta_8 CF_{it} + \beta_9 AUD_{it} + \beta_{10} CLOSE_{it} + \sum \beta_i IDUM_i + \varepsilon_{it} \quad (1.2)$$

Where *POST (0, 1)* is an indicator variable that equals one for observations in the post-adoption period and zero otherwise. *SPOS* is a dummy variable equal to one if the net income over total assets is between 0 and 0.01. The control variables include size, growth, profitability, debt and equity issuance, the percentage of closely held shares, audit company, and the industry dummies. A negative coefficient (β_1) suggests that firms manage earnings less towards a small positive target in the post-adoption period.

1.3.2. Transparency Across Swiss Firms around IFRS Adoption

Following Dechow et al. (2010), *accounting quality* can be defined as the extent to which accrual accounting facilitates the measurement of the underlying economic performance. Following the approach from Dechow et al. (1995), I construct a discretionary accrual measure (*DA*) using the modified model of Jones (1991). I run the following regression to examine whether an IFRS adopter firm exhibits lower discretionary accruals in the post-adoption period.

Lower discretionary accruals are associated with higher transparency and, therefore, with higher accounting quality.

$$DA_{it} = \beta_0 + \beta_1 POST\_ADOPTION_{it} + \sum \beta_j Controls_j + \sum \beta_i Fixed\ Effects_i + \varepsilon_{it} \quad (1.3)$$

POST_ADOPTION is a dummy variable equal to zero if the firm is an IFRS adopter and the year is in the post-adoption period. *Controls* include variables that influence accruals, such as size, profitability, leverage, growth, and ownership concentration. Additionally, since the adoption of IFRS is spread across multiple years, it allows year fixed effects to control for any time trends. Furthermore, the adoption may have a different impact based on the industry and different time-invariant firm characteristics. Thus, I include firm or industry fixed effects to isolate the IFRS adoption effects on the discretionary accruals measure.

To construct the *DA* variable, I calculate the total accruals (*ACC_Jones*) measure following the model from Jones (1991). The composition of *ACC_Jones* is presented in the following regression:[4]

$$ACC\_Jones_{it} = (\Delta CA_{it} - \Delta CL_{it} - \Delta CASH_{it} + \Delta STD_{it} - DEP_{it}) / A_{it-1} \quad (1.4)$$

ΔCA and *ΔCL* is the change between year t and t-1 in the current assets and current liabilities, respectively; *ΔCASH* is the changes in cash and cash equivalents between year t and t-1; *ΔSTD* is defined as the change in the short-term debt between year t and t-1; *DEP* is the depreciation

[4] Following Dechow et al. (2010), if one of the variables used to measure total accruals for a firm is missing, I assume the change to be equal to zero to save observations.

expense in year t, and *A* is the reported total assets in year t-1. Following Dechow et al. 1995, I calculate the *DA* as the absolute value of the difference from the ACC_Jones_{it} estimated from eq. (1.4) and the prediction from the following regression at the firm level using at least ten observations in the estimation period:

$$ACC\_Jones_t = \alpha_0(1/A_{t-1}) + \beta_1(\Delta REV_t - \Delta REC_t) + \beta_2 PPE_t + \varepsilon_t \quad (1.5)$$

ACC_Jones is the total accruals in year t estimated from eq. (1.4). A_{t-1} is the total assets in year t-1. ΔREV is the change in revenues between year t and t-1. ΔREC is the change in net receivables between year t and t-1. *PPE* is the gross property plant and equipment in year t. and ε_t is the estimation of discretionary accruals in year t.

1.4. Sample Selection and Descriptive Statistics

1.4.1 Sample Selection Process

The sample consists of 266 Swiss firms listed on the SIX Exchange that apply either IFRS or Swiss GAAP. The sample contains 210 firms that have adopted IFRS (41 of these firms have switched back to Swiss GAAP during the 2008-2015 period) and 56 firms that report under Swiss GAAP. The benchmark sample includes 88 firms applying IFRS which have no switch year or adopted IFRS prior to 1990. The IFRS adopter firms are further divided into non-serious and serious adopters based on the reporting changes manually collected from their annual reports around the IFRS adoption. This dataset includes 3890 firm-year observations for the period 1990-2016.

[Insert Table 1.1 and Figure 1.1 about here]

Under the Code of Obligations, Swiss firms listed at the SIX Exchange had the right to exploit the option of using the hidden reserves to show smoother earnings until Swiss GAAP became mandatory in 1997. Figure 1.1 shows a comparison of the earnings scaled by total assets for firms using Swiss GAAP and IFRS prior to and after 1997. I denote Swiss GAAP prior and after 1997 since it is not possible to distinguish whether the firms using local standards were reporting under CO or Swiss GAAP. The histograms suggest that firms manage their earnings towards a positive net income regardless of their reporting standards. However, this appears more present when firms report under Swiss GAAP.

1.4.2. Descriptive Statistics

Panel A in Table 1.2 presents a comparison of the descriptive statistics between the IFRS and the Swiss GAAP firms. Among the variables, I observe statistically significant differences between voluntary adopters and firms reporting under Swiss GAAP in operating cash flow *(CF)*, small positive income *(SPOS)*, stock returns *(R)*, and total accruals *(ACC)*. Moreover, consistent with Christensen et al. (2015) and Barth et al. (2008), the descriptive statistics show that firms that have adopted IFRS are larger and, on average, have higher growth, use higher leverage, issue more equity and debt securities. These firms have less closely-held shares and are more likely to be audited by a Big Four auditor.

[Insert Table 1.2 about here]

A comparison of the descriptive statistics for the IFRS adopters and early adopters on the same variables is presented on panel B of Table 1.2. The results suggest that the treatment sample firms exhibit smaller differences compared to the benchmark sample of early adopters. The IFRS adopters have a higher frequency of small positive net income, are slightly smaller in size, and use more leverage. Additionally, there are some differences in the audit firm and

the percentage of closely held shares. Since firms that apply IFRS have similar incentives that lead to the adoption of the IFRS compared to the benchmark sample, I expect that using the early adopters as a benchmark when comparing the accounting quality measurements to be more accurate.

1.5. Empirical Results

1.5.1. Accountings Quality Metrics

Table 1.3 presents the comparison of accounting quality metrics around the IFRS adoption for the voluntary adopters of IFRS and the accounting quality metrics for the Swiss GAAP stayers. In line with the findings from Christensen et al. (2015), the variability of changes in earnings *(ΔNI)* increases significantly in the post-adoption period, and it is consistent with decreased earnings management. However, the variability of changes in earnings over the variability of changes in cash flows also increases, indicating that the increase in earnings variability is not driven by the underlying cash flows. The third metric, which is the correlation between accruals and the net cash flows from operations, is less negative in the post-adoption period suggesting less earning management after the IFRS adoption.

[Insert Table 1.3 about here]

The post-adoption period changes are significant at the 1% level except for the correlation between the accrual measure of Jones (1991) and the net cash flows from operations. Compared to the Swiss GAAP stayers, the voluntary adopters of IFRS are not significantly different. Consistent with the results from Figure 1, the small positive net income (β_1) coefficient generated from eq. (1.2) is also negative and significant at 1% level suggesting less earnings management toward a small positive net income target in the post-adoption period. The regression results are consistent with the findings from Barth et al. (2008) and Christensen et

al. (2015), given that in the post-IFRS adoption period, firms seem to manage less their earnings towards a small positive income target.

1.5.2. Transparency Across Swiss Firms around IFRS Adoption

Panel A in Table 1.4 presents the results of the regression of the discretionary accruals from the eq. (1.3), which compares the differences between the IFRS adopters with the Swiss GAAP stayers and early IFRS adopters as a control sample. The discretionary accruals (*DA*) measure is estimated as the absolute value of the difference between the *ACC_Jones* and the predicted value estimated from eq. (1.5). Compared to the control sample, IFRS adopters exhibit a decrease in discretionary accruals in the post-adoption period on all three columns given by the significant negative coefficient on the variable *POST_ADOPTION* (β_1 = -0.0086, *t*-stat = -2.18). Additionally, consistent with Ball et al. (2000), the control variables have a negative effect on discretionary accruals except for leverage and growth, which are not significant at the 10% level. When adding the firm fixed effects, the model explains 65% of the variation in discretionary accruals due to firm characteristics not captured by the variables in columns (1) and (2).

[Insert Table 1.4 about here]

Consistent with the results from Table 1.3, the results suggest that the firms are more transparent in the post-adoption period. Panel B in Table 1.4 presents the regression results when using only the early IFRS adopter firms which have no switch year when applying IFRS as a control sample. The results are not affected by the control sample. Similarly, the coefficient measuring the effect of ownership concentration on discretionary accruals becomes positive and significant when controlling for firm and year fixed effects.

1.5.3. Reporting Changes

Fiechter et al. (2017) investigate the determinants and the consequences of a voluntary turn away from IFRS to Swiss GAAP. They analyze the reporting changes for the switchers and find a significant decrease in the pages in the annual report, notes to financial statements, segment reporting, equity, and audit fees. Table 1.5 shows the impact of the IFRS adoption on accounting disclosure, equity, and net income for the adoption firms. These reporting changes are measured by investigating the annual reports before and after the IFRS adoption. After IFRS adoption, the average number of pages of the annual report increased by 27 pages (43%), of which 14 pages are attributable to the notes of the financial statements. These firms increase by about five pages the outline of the accounting principles, consistent with more extensive accounting standards under IFRS than under Swiss GAAP. The mean changes are statistically significant at the 1% level. When looking at the changes in the number of positions presented in the balance sheet and cash flow statement, there is an increase by approximately three (*t*-stat = 2.83) and five positions (*t*-stat = 5.33), respectively. However, there are no changes in the number of positions in the income statements.

[Insert Table 1.5 about here]

With respect to segment reporting, these firms would disclose only the revenues per segment and general geographic segments prior to the IFRS adoption. After the adoption, 40 out of 47 adopter firms provide more details on segment reporting, including segment results, segment assets and liabilities, and capital expenditures. Additionally, the number of disclosed segments increased from 2 to 3 segments (*t*-stat = 3.51). There is no significant change in the book value of equity or net income. However, audit fees significantly increased by 20% (*t*-stat = 2.85) from CHF 828,000 to CHF 992,000. Given that audit fees are positively associated with audit

length and complexity, these findings suggest that annual reports under IFRS are more extensive than under Swiss GAAP.

Generally, the reporting changes around the IFRS adoption suggest that voluntary adopters, on average, increase the disclosure quantity (e.g., notes to the annual report) in the annual report and quality (e.g., segment reporting).

1.6. "Non-serious" Adoption of IFRS

Daske et al. (2013) and Christensen et al. (2015) find that reporting incentives can drive the changes in accounting quality rather than changes in the accounting standards per se. Consequently, I follow Daske et al. (2013) approach and classify the IFRS adopter firms in two categories: "serious" and "non-serious" adopters based on the reporting changes manually collected from their annual reports around the IFRS adoption. The sample of 46 adopting firms is split into 23 serious adopter firms and 23 non-serious adopters. A firm that has above (below) median reporting changes is classified as a serious (non-serious) adopter based on Table 1.5. I analyze the accounting quality metrics and perform the discretionary accruals regression around the IFRS adoption for the non-serious adopters using the Swiss GAAP stayer and early adopters of IFRS with missing switch year.

[Insert Table 1.6 about here]

Panel A of Table 1.6 presents the accounting quality metrics for the non-serious adopters around the IFRS adoption. The significant coefficient β_1 of -0.0421 (t-stat = -6.43) and -0.0339 (t-stat = -5.08) from columns 1 and 2, respectively, suggests that there is an improvement in the accounting quality for the non-serious adopters when controlling for year and industry fixed effects. However, when including firm and year fixed effects the coefficient becomes insignificant (β_1 = -0.0074, t-stat = -1.25). Consistent with the results from Daske et al. (2013),

this suggests that when controlling for firm-specific characteristics, there is no improvement in accounting quality for the non-serious adopters in the post-adoption period. Additionally, ownership concentration has a positive but not significant impact on accounting quality improvements given by the coefficient of 0.0114 (*t*-stat = 1.33) on the variable *CLOSELY*.

Panel B of Table 1.6 presents the analysis for the serious adopters to rule out the concern that the small sample size introduces bias in favor of accepting the null hypothesis and inaccurately claiming that there is no difference in the discretionary accruals around the IFRS adoption for the non-serious adopters. The negative and significant coefficient on the *POST_ADOPTION* variable (β_1 = -0.0205, *t*-stat = -2.31) suggests that for the serious adopters, there is indeed an improvement in accounting quality measurements supporting the results from Panel A for non-serious adopters. Additionally, the coefficient for the serious adopters is more negative when compared to the results from Table 1.4, which take into account all the IFRS adopter firms.

1.7. Conclusion

This paper investigates the accounting quality improvements around IFRS adoption for voluntary adopter firms. Following Christensen et al. (2015), the purpose of the paper is to examine whether IFRS per se leads to accounting quality improvements. I exploit the Swiss setting, where firms could voluntarily adopt IFRS instead of local GAAP starting in early 1990. I exploit the Swiss setting where the IFRS adoption is voluntary and there were no changes in the regulatory environment. This allows the effect around the adoption to be isolated from the effect of changes in enforcement.

I find a decrease in earnings management and an increase in timely loss recognition after voluntary IFRS adoption. In the post-adoption period, the voluntary adopters exhibit a decrease

in discretionary accruals, which suggests an improvement in transparency, and therefore, higher accounting quality. In contrast, I find no accounting quality improvements for firms classified as non-serious adopters following the Daske et al. (2013) classification approach.

As such, this paper contributes to the literature by providing evidence on the discussion that the improvements in accounting quality for voluntary adopters may arrive from the changes on reporting enforcement and not the accounting standards per se. By showing that the firms that voluntarily adopt and commit to IFRS exhibit accounting quality improvements in a setting where there are no changes in reporting enforcement, this empirical evidence points towards the explanation that accounting quality is mainly shaped by reporting incentives.

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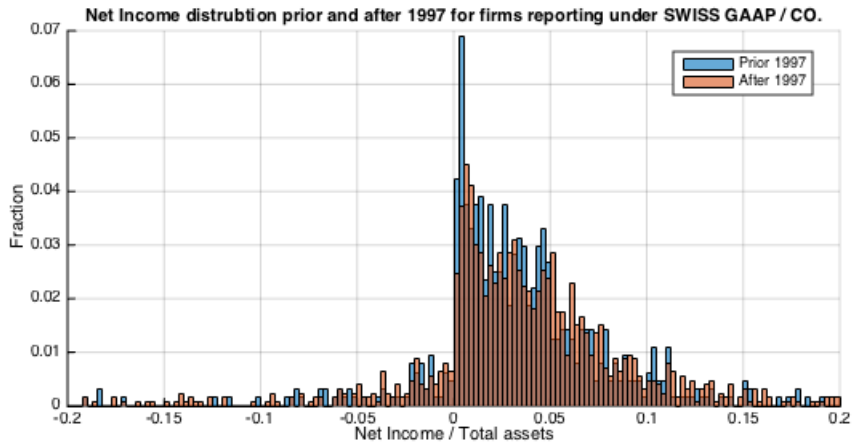
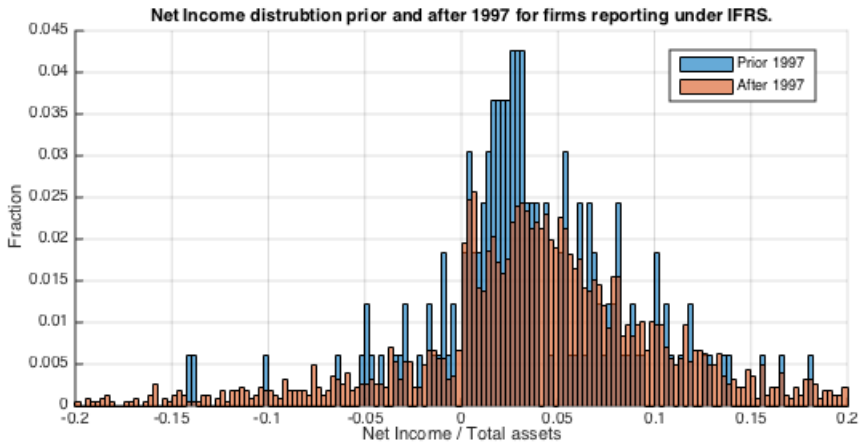
Tables and Figures

FIGURE 1.1. *Net income distribution the firms listed at SIX Exchange.*





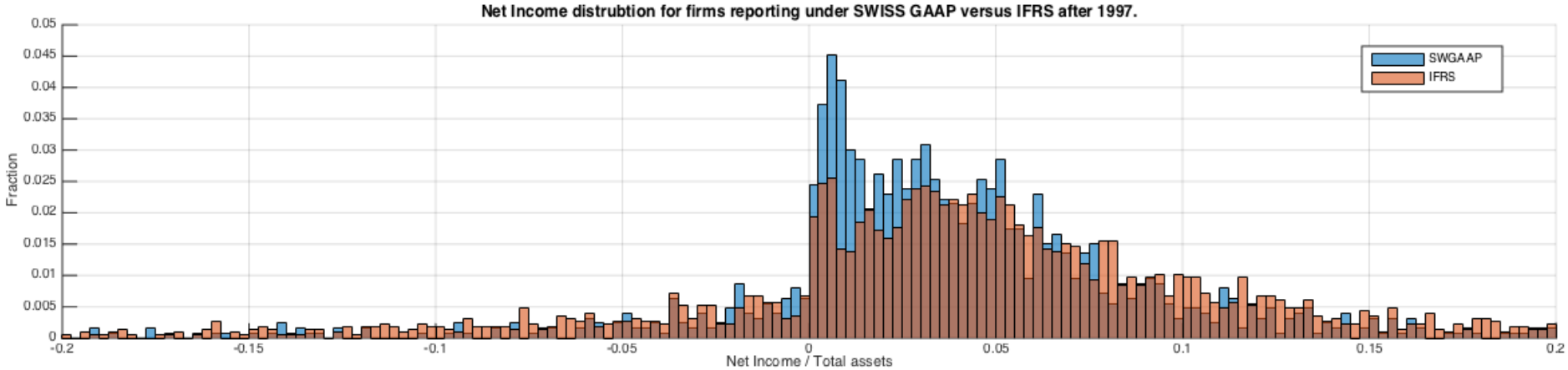


TABLE 1.1

Sample selection process

Panel A. Sample selection process

	Number of Firms
Existing Swiss Firms in Datastream January 2017	272
No accounting Standard information	17
Firms with accounting standard information	255
Dead Swiss Firms in Datastream January 2017	148
No accounting information	97
Firms with accounting standard information	306
U.S. GAAP / applied U.S. GAAP in the past	21
Bank law	19
Firms with accounting standard information	**266**
IFRS Stayers Sample	169
Swiss GAAP sample	56
Switch Sample (SWGAAP => IFRS => SWGAAP)	41

Panel B. IFRS adoption year and Swiss GAAP switch back during 1990-2016.

Year	#IFRS	#SWGAAP	Year	#IFRS	#SWGAAP
until 1990	7	0	2004	10	0
1991	1	0	2005	39	0
1992	12	0	2006	10	0
1993	9	0	2007	5	0
1994	5	0	2008	2	1
1995	9	0	2009	3	7
1996	20	0	2010	0	10
1997	8	0	2011	0	4
1998	10	0	2012	0	4
1999	10	0	2013	0	9
2000	25	0	2014	0	5
2001	7	0	2015	0	1
2002	12	0	2016	0	0
2003	6	0	Total	210	41

Notes: Panel A presents the sample selection process. Panel B reports the distribution of IFRS adoption years in the sample. The number of firm-year observations is reported separately in each table later. Accounting standard information collected from Thomson Reuters Database and hand-checked with the annual reports.

TABLE 1.2

Descriptive Statistics

Panel A: Descriptive Statistics comparison of IFRS adopters and Swiss GAAP stayers.

	IFRS adopters				Swiss GAAP Stayers			
Variables	**N**	**Mean**	**Median**	**SD**	**N**	**Mean**	**Median**	**SD**
⊿NI	3166	-0.002	0.001	0.096	660	-0.002	0.001	0.071
⊿CF	2791	0.000	0.002	0.082	549	0.002	-0.001	0.074
ACC_Barth	2876	-0.046	-0.038	0.080	563	-0.046	-0.041	0.069
ACC_Jones	3125	-0.037	-0.040	0.108	653	-0.049 ***	-0.047	0.092
DA	2845	0.127	0.101	0.103	566	0.167 ***	0.120	0.145
CF	2876	0.069	0.081	0.113	563	0.077 **	0.077	0.069
R	2754	0.314	0.142	0.853	635	0.263	0.120	0.673
EARN	2843	0.060	0.065	0.195	646	0.104 ***	0.087	0.238
SPOS	3166	0.185	0.000	0.388	660	0.270 ***	0.000	0.444
SIZE	2951	6.058	5.930	1.949	666	4.556 ***	4.435	1.369
LEV	3266	0.535	0.552	0.199	687	0.505 ***	0.495	0.199
GROWTH	3144	0.080	0.039	0.325	655	0.051 **	0.023	0.239
ROA	3166	0.028	0.042	0.115	660	0.030	0.033	0.064
EISSUE	3030	0.011	0.000	0.246	626	-0.004 *	0.000	0.165
DISSUE	3166	0.105	0.010	0.488	660	0.047 ***	-0.007	0.388
AUD	2663	0.894	1.000	0.307	481	0.792 ***	1.000	0.406
CLOSELY	3224	0.357	0.342	0.281	685	0.428 ***	0.486	0.326
TURN	3243	1.043	0.989	0.663	681	1.002	0.837	0.705
PPE	3142	0.305	0.265	0.217	653	0.515 ***	0.490	0.269
DEP	3220	0.046	0.040	0.043	679	0.049 **	0.045	0.035

(Continued)

TABLE 1.2 - Continued

Descriptive Statisctics

Panel B: Descriptive Statistics comparison around IFRS adoption.

	PRE-IFRS				POST-IFRS				
	N	**Mean**	**Median**	**SD**	**N**	**Mean**		**Median**	**SD**
⊿NI	481	-0.004	0.000	0.079	585	0.000		0.001	0.090
⊿CF	421	0.000	-0.001	0.072	493	0.003		0.001	0.074
ACC_Barth	431	-0.038	-0.035	0.070	501	-0.045		-0.034	0.083
ACC_Jones	459	-0.032	-0.036	0.109	570	-0.042		-0.041	0.099
DA	398	0.143	0.126	0.105	532	0.106	***	0.092	0.077
CF	431	0.064	0.069	0.103	501	0.079	**	0.083	0.090
R	450	0.264	0.077	0.939	541	0.290		0.146	0.789
EARN	460	0.052	0.067	0.234	558	0.068		0.075	0.168
SPOS	481	0.173	0.000	0.378	585	0.190		0.000	0.392
SIZE	479	6.032	6.142	2.035	571	5.396	***	5.355	1.770
LEV	493	0.540	0.561	0.220	597	0.554		0.579	0.214
GROWTH	478	0.077	0.041	0.332	586	0.068		0.039	0.325
ROA	481	0.031	0.038	0.096	585	0.035		0.044	0.106
EISSUE	457	0.005	0.000	0.242	573	0.006		0.000	0.228
DISSUE	481	0.129	0.026	0.508	585	0.076	*	0.006	0.425
AUD	396	0.902	1.000	0.298	472	0.792	***	1.000	0.372
CLOSELY	486	0.398	0.405	0.276	593	0.370	*	0.358	0.259
TURN	489	0.925	0.842	0.632	595	1.129	***	1.099	0.583
PPE	463	0.292	0.232	0.233	581	0.298		0.269	0.203
DEP	468	0.038	0.033	0.025	581	0.049	***	0.042	0.047

Notes: This table presents summary statistics for firms listed at SIX Exchange reporting under IFRS and Swiss GAAP. Panel A presents the comparison between IFRS adopter firms and firms reporting under Swiss GAAP. Panel B presents the comparison pre and post the IFRS adoption for the IFRS sample. $\triangle NI$ is calculated as the change in net income scaled by end-of-year total assets. $\triangle CF$ is the change in operating cash flow scaled by end-of-year total assets. *ACC_Barth* is the difference between net income and cash flow from operations scaled by end year total assets. *ACC_Jones* is estimated from eq. (1.4) following the Jones 1991 model. *DA* is a discretionary accruals metric estimated as the residuals from the regression results of eq. (1.5) following the modified Jones model from Dechow et al. 1995. *CF* is the operating cash flow scaled by end-of-year total assets. *R* is the 15-month return including dividends 3 months after the fiscal year end. *EARN* is the annual earnings per share before extraordinary items deflated by beginning of period price. *SPOS* is a dummy equal 1 if net income before extraordinary items over end-of-year total assets is between 0 and 0.01. *SIZE* is the natural logarithm of the end-of-year market value of equity. *LEV* is the end-of-year book value of liabilities divided by the end-of-year book value of equity. *GROWTH* is the percentage change in sales. *ROA* is the return on assets. *EISSUE* is a dummy variable equal to one if the firm issued equity. *DISSUE* is the percentage change in total liabilities. *AUD* is a dummy variable equal to one if the firm's auditor is one of the Big Five auditors and zero otherwise. *CLOSELY* is the percentage of closely held shares. *TURN* is the ratio between sales and end-of-year total assets. *PPE* is the net property plant and equipment scaled by end-of-year total assets. *DEP* is the depreciation and amortization expense during the year scaled by end-of-year total assets.

TABLE 1.3

Comparison of Earnings management metrics Pre-Post IFRS adoption

Metric	Prediction	PRE N= 870	POST N= 1727	Difference	Significance	Swiss GAAP N= 420
Variability of ⊿NI	Post > Pre	0.0044	0.0090	103%	***	0.0049
Variability of ⊿NI over ⊿CF	Post > Pre	1.3928	2.1529	55%	***	1.8115
Correlation of ACC_Barth and CF	Post > Pre	-0.6156	-0.2005	67%	***	-0.5573
Correlation of ACC_Jones and CF	Post > Pre	-0.2230	-0.0792	64%	**	-0.3804
Small positive income	-	-0.0836***				

Notes: This table presents a comparison of the earnings management metrics from Barth et al. 2008 around the IFRS adoption and for the Swiss GAAP stayers using firm year observations from 1990-2016. The *variability of ⊿NI* is defined as the variance of the residuals generated from the regression of the *⊿NI* on the control variables from eq. (1.1) controlling for industry and year fixed effects. The variability of *⊿NI* over *⊿CF* is defined as the ratio of the variance from the residuals generated from the regression of the *⊿NI* on the control variables from eq. (1.1) and the variance of the residuals generated from the regression of eq. (1.1) using *⊿CF* as the dependent variable. The *correlation of ACC_Barth and CF* is defined as the correlation between the residuals of the regression from eq. (1.1) using *ACC_Barth* and *CF* as the dependent variable. The *correlation of ACC_Jones and CF* is similar to the *correlation of ACC_Barth and CF* but instead of *ACC_Barth* I use the *ACC_Jones* variable generated from eq. (1.3). The small positive income represents the coefficient β_1 from the regression results of eq. (1.2). The definition of *⊿NI, ⊿CF, ACC_Barth, ACC_JONES, CF* and *SPOS* is described in the notes of table 1.2. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

TABLE 1.4

Regression of Discretionary accruals around IFRS adoption.

Panel A: Using Swiss GAAP and IFRS early adopters as a control group.

Variable	Expected sign	Model 1	Model 2	Model 3
POST_ADOPTION	(-)	-0.2611***	-0.0251***	-0.0086**
		(-6.50)	(-5.93)	(-2.18)
SIZE	(-)	-0.0084***	-0.0090***	0.0008
		(-8.06)	(-7.58)	(0.37)
ROA	(-)	-0.0889***	-0.0819***	-0.0727***
		(-3.71)	(-3.37)	(-2.95)
LEV	(-)	-0.0005	0.0766	-0.0201
		(-0.05)	(0.65)	(-1.57)
GROWTH	(-)	-0.0035	-0.0040	-0.0059
		(-0.61)	(-0.67)	(-1.16)
CLOSELY	(+)	-0.0192***	-0.0178**	0.0123*
		(-2.61)	(-2.24)	(1.91)
Intercept	?	0.1849***	0.2017***	0.1930***
		(12.33)	(11.88)	(7.46)
Firm fixed effects		No	No	Yes
Industry fixed effects		No	Yes	No
Year fixed effects		Yes	Yes	Yes
Adj. R-squared		0.058	0.069	0.715
F-Statistics		6.68	8.38	484.84
Observations		3,271	3,271	3,271

(Continued)

TABLE 1.4 - Continued

Regression of Discretionary accruals around IFRS adoption.

Panel B: Using early IFRS adopters as a control group.

Variable	Expected sign	Model 1	Model 2	Model 3
POST_ADOPTION	(-)	-0.0215***	0.0196***	-0.0089**
		(-5.10)	(-4.42)	(-2.16)
SIZE	(-)	-0.0065***	-0.0050***	0.0012
		(-6.02)	(-4.29)	(0.52)
ROA	(-)	-0.0981***	-0.0982***	-0.0670***
		(-4.05)	(-3.95)	(-2.63)
LEV	(-)	-0.0197*	-0.0062	-0.0161
		(-1.67)	(-0.51)	(-1.15)
GROWTH	(-)	-0.0038	-0.0046	-0.0087
		(-0.64)	(-0.75)	(-1.64)
CLOSELY	(+)	-0.0195**	-0.0016	0.0155**
		(-2.60)	(-0.20)	(2.12)
Intercept	?	0.1832***	0.1683***	0.1248***
		(12.26)	(10.59)	(6.34)
Firm fixed effects		No	No	Yes
Industry fixed effects		No	Yes	No
Year fixed effects		Yes	Yes	Yes
Adj. R-squared		0.051	0.067	0.659
F-Statistics		4.60	7.12	62.44
Observations		2,716	2,716	2,716

Notes: This table presents OLS estimation results from regressing Discretionary accruals *(DA),* proxied by the residuals of the modified Jones model (Dechow et al. 1995), on a IFRS versus Swiss GAAP firms and pre- versus post adoption of IFRS, while controlling for size, return on assets, leverage and growth. *POST_ADOPTION* is a dummy variable equal to one if the firm is applying IFRS/IAS on year *t* and zero otherwise. *SIZE* stands for the natural logarithm of the market value of the firm. *ROA* is return on assets calculated as the ratio of net income before extraordinary items and preferred dividend over the total assets. *LEV* stands for the leverage ratio calculated as the ratio of total liabilities over total assets. *GROWTH* is the annual percentage change in revenues. CLOSELY is the percentage of closely held shares. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

TABLE 1.5

Reporting changes around IFRS adoption

	N	Swiss GAAP					IFRS					Mean differences		
Annual reporting: Switchers		**Mean**	Std. dev.	p25	Median	p75	**Mean**	Std. dev.	p25	Median	p75	(*t*-statistic)		*%*
# of pages in the annual report	46	**63**	20	47	63	76	**90**	33	67	88	108	27.2 (8.30)	***	+43%
# of pages in the notes	46	**19**	9	13	17	25	**33**	12	25	34	39	14.5 (8.17)	***	+77%
# of pages on principles of accounting	46	**3**	1	3	3	4	**8**	4	6	7	10	4.8 (9.44)	***	+147%
# of words in the annual report (in 1000)	46	**17**	7	12	17	20	**25**	11	17	23	30	7.7 (9.19)	***	+45%
# of positions in the balance sheet	46	**30**	7	28	30	33	**33**	5	30	33	36	2.7 (2.83)	***	+9%
# of positions in the income statement	46	**20**	5	17	19	23	**20**	4	18	19	23	-0.0 (0.03)		-0%
# of positions in the cash flow statement	46	**28**	6	25	28	35	**33**	6	29	33	41	5.0 (5.33)	***	+18%

(Continued)

TABLE 1.5 - Continued
Reporting changes around IFRS adoption

	N	Swiss GAAP					IFRS					Mean differences		
		Mean	Std. dev.	p25	Median	p75	**Mean**	Std. dev.	p25	Median	p75	(*t*-statistic)		*%*
Equity and net income (in CHF million)														
Shareholders' equity	46	**619**	1282	66	211	373	**650**	1330	63	210	538	30.26 (1.24)		4.9%
Goodwill							**4**	20	0	0	0			
Pension accounting							**3**	52	-3	0	0			
Tax and other effects							**23**	128	-5	0	6			
Net income	46	**76**	189	5	26	71	**83**	217	4	26	58	6.86 (1.03)		9.0%
Goodwill							**4**	21	0	0	0			
Pension accounting							**0**	0	0	0	2			
Tax and other effects							**3**	40	-2	0	2			
Audit (in CHF thousand)														
Audit fees	46	**828**	1107	157	370	958	**991**	1249	237	437	1200	163.93 (2.85)	***	19.8%
Additional fees	46	**381**	477	91	189	453	**438**	682	65	204	413	56.48 (0.37)		14.8%

Notes: This table presents descriptive statistics on the extent of disclosed financial information in the annual report, the reconciliation of shareholder's equity and net income from Swiss GAAP to IFRS, and the changes in the audit fees before and after switching from Swiss GAAP to IFRS. For the number of pages, words, positions, and audit fees, I compare the last annual report prepared according to SWGAAP (e.g., 2001 to the first annual report prepared according to IFRS (e.g., 2002). For shareholders' equity and net income, I compare restated IFRS amounts to reported figures in the last annual report under Swiss GAAP (e.g., 2002). In addition, the table shows the reconciliation of shareholders' equity and net income from Swiss GAAP to IFRS (i.e., adjustments for different goodwill accounting, pension accounting, tax effects, and other effects. ***, **, and * indicate that the means are significantly different at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test with paired data.

Table 1.6

Regression of Discretionary accruals around IFRS adoption for non-serious and serious adopters

Dependent Variable: Discretionary Accruals				
Variable	Expected sign	Model 1	Model 2	Model 3
POST_ADOPTION	?	-0.0421***	-0.0339***	-0.0074
		(-6.43)	(-5.08)	(-1.25)
SIZE	(-)	-0.0088***	-0.0074***	0.0060**
		(-6.43)	(-4.89)	(1.99)
ROA	(-)	-0.0796**	-0.0919***	-0.0862***
		(-2.48)	(-2.92)	(-2.51)
LEV	(-)	0.0192	0.0287*	0.0093
		(1.24)	(1.91)	(0.54)
GROWTH	(-)	-0.0024	0.0033	0.0010
		(-0.29)	(0.42)	(0.15)
CLOSELY	(+)	-0.0047	-0.0054	0.0114
		(-0.43)	(-0.53)	(1.33)
Intercept	?	0.1740***	0.2096***	0.1663***
		(7.23)	(11.42)	(5.92)
Firm fixed effects		No	No	Yes
Industry fixed effects		No	Yes	No
Year fixed effects		Yes	Yes	Yes
Adj. R-squared		0.054	0.177	0.747
F-Statistics		3.99	253.04	394.90
Observations		1760	1760	1760

Notes: This table reports coefficient estimates and, in parentheses, *t*-statistics from regression results of eq. (1.3). The dependent variable *DA* is the discretionary accrual measure from the modified model of Jones (1991). For all other variable definitions see notes from table 1.4. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels (two-tailed)

TABLE 1.6 - Continued

Regression of Discretionary accruals around IFRS adoption for non-serious and serious adopters

Panel B: Serious adopters

Variable	Expected sign	Model 1	Model 2	Model 3
POST_ADOPTION	(-)	-0.0234***	-0.0172*	-0.0205**
		(-2.79)	(-1.77)	(-2.31)
SIZE	(-)	-0.0108***	-0.0105***	0.0045
		(-7.45)	(-6.47)	(1.30)
ROA	(-)	-0.0577*	-0.0511	-0.0851**
		(-1.78)	(-1.57)	(-2.29)
LEV	(-)	0.0096	0.0093	-0.0090
		(0.59)	(0.53)	(-0.45)
GROWTH	(-)	-0.0016	-0.0023	-0.0001
		(-0.20)	(-0.30)	(-0.01)
CLOSELY	(+)	-0.0082	-0.0158	0.0168*
		(-0.74)	(-1.42)	(1.85)
Intercept	?	0.1953***	0.2108***	0.1720***
		(7.49)	(7.67)	(5.71)
Firm fixed effects		No	No	Yes
Industry fixed effects		No	Yes	No
Year fixed effects		Yes	Yes	Yes
Adj. R-squared		0.055	0.096	0.751
F-Statistics		3.66	6.41	311.98
Observations		1634	1634	1634

Notes: This table reports coefficient estimates and, in parentheses, *t*-statistics from regression results of equation (1.3). The dependent variable *DA* is the discretionary accrual measure from the modified model of Jones (1991). For all other variable definitions see notes from table 1.4. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% levels (two-tailed)

Chapter 2: Loan Loss Provisioning and Market Discipline: Evidence from the IFRS 9 Adoption

2.1. Introduction

Financial instruments represent the most significant part of a bank's balance sheet regarding the percentage of total assets. After the financial crisis in 2008, regulators and standard-setting bodies issued new sets of rules for financial institutions. In 2014, the IASB issued the new standard *IFRS 9 Financial Instruments* (hereafter, IFRS 9), which contains a new approach to classify and measure financial instruments, a forward-looking impairment model, and hedge accounting. The new standard requires reporting entities to incorporate information from past events, current conditions, as well as incorporating reasonable and justifiable forecasts in their measurement of expected credit losses (ECL).

The extended disclosure requirements related to the IFRS 9 ECL model are likely to contribute to the transparency of the process of loan loss accounting, thus promoting financial stability (IASB, 2014; Novotny-Farkas, 2016). However, the subjectivity allowed from the new expected credit loss model may be more susceptible to earnings management and reduce the disciplinary pressure over risk-taking of banks (Bushman and Williams, 2012; Novotny-Farkas, 2016; Camfferman, 2015). Additionally, Gebhardt (2016) shows that the increased discretion by IFRS 9 may also affect earnings comparability as management expectations will differ across banks and market participants' expectations.

This research paper aims to examine the impact of the ECL model on the predictability of loan loss provisions (LLP) and potential consequences on market discipline. Under the incurred loss impairment model, prior research uses the level of non-performing loans (hereafter, NPL) and changes in NPL as determinants of the LLP recognized by the bank and the credit quality

of a bank's portfolio of loans (Ahmed et al., 1999; Beatty and Liao, 2011; Kilic et al., 2013). I investigate whether the association between recognized loan loss provisions and objective determinants of the incurred loss model (i.e., changes in non-performing loans and the level of non-performing loans) decreases after the IFRS 9 introduction. Furthermore, evidence indicates that bank managers, on average, tend to smooth reported income through loan loss provisions (Wahlen, 1994; Kanagaretnam et al., 2003; Liu and Ryan, 2006). As the introduction of IFRS 9 allows for more discretion (Novotny-Farkas, 2016), I predict that LLPs under IFRS 9 obscure market participants' ability to monitor the banks' risk-taking incentives.

I collect quarterly data for IFRS banks from Thomson Reuters Database, resulting in a total of 1,261 bank-quarter observations for 172 unique banks from 2016-2019. I manually hand collect the relevant non-performing loans data from the quarterly reports for the treatment and benchmark sample. I control for time trends in loan loss provisioning and market discipline and use a benchmark sample comprising of 3,775 bank-quarter observations for 319 banks reporting under U.S. GAAP. While I acknowledge the limitations due to the differences in the characteristics between the two samples, I do not expect a change in loan loss provision and corresponding effects on market discipline for the benchmark sample, as U.S. banks are not subject to the same accounting changes during the sample period.

First, I examine the association of the LLP with its determinants from the incurred loss model. More specifically, I investigate the relation of LLP with changes in NPL and the level of NPL (i.e., the determinants of the incurred loss model) in the pre-adoption period of IFRS 9. I then examine whether this relation is changing after the introduction of the new impairment model of IFRS 9, with respect to the pre-period. Prior research documents that bank managers may use loan loss provisions for earnings management, i.e., banks can overstate (understate) loan loss provisions when earnings are expected to be high (low). Related, banks may use the

loan loss provisioning for regulatory capital management because general loan loss provisions are included in the Tier 2 capital. For these reasons, I control for these incentives and other bank characteristics, which might impact the risk of banks' loan portfolios. Second, I examine the concerns raised by prior research that the discretion allowed from the new expected credit loss model might reduce the disciplinary pressure over risk-taking of banks (Bushman and Williams, 2012; Novotny-Farkas, 2016). I investigate if there is any change in the discipline over risk-taking around the IFRS 9 adoption period. Following a similar methodology to Bushman and Williams (2012), I test whether the association between the changes in leverage and changes in asset volatility is different in the post-period adoption of IFRS 9. Finally, I exploit cross-country variation to determine whether the effect is driven by countries that allow more smoothing through loan loss provisioning, as compared with countries that promote forward-looking loan loss provisioning.

Consistent with prior research, NPL, changes in NPL, loan loss allowance (LLA), and the earning management incentives are positively related to the loan loss provisions in the pre-period of IFRS 9 adoption. Additionally, the results are also consistent with capital management through loan loss provisions theory. More importantly, I find that the association between LLP and changes in NPL is lower in the post-period of IFRS 9 adoption compared to the pre-period. Furthermore, the association of LLP and the level of NPL also decrease after the introduction of the new ECL impairment model. In contrast, I find no significant differences in these associations for the U.S. GAAP sample banks.

Furthermore, I find a decrease in the sensitivity of changes in leverage to changes in asset risk for the treated sample, but not for the U.S. benchmark sample, in the post-IFRS 9 adoption period. Exploiting country variation, I find that the reduction in market discipline is mainly driven by banks in countries that allow more smoothing through loan loss provisions. Thus,

the forward-looking LLP approach works only if the institutional environment is designed to do so.

Overall, the findings indicate a decrease in the association between loan loss provisions and the determinants of the incurred loss model in the post-IFRS 9 period, i.e., LLP are based less on objective determinants after IFRS adoption. I acknowledge that the current model does not capture the new drivers that banks are using to determine LLP amounts. Additionally, the results show a decrease in the sensitivity of leverage to changes in risk in the post-adoption period of IFRS 9, signifying an attenuated market discipline over risk-taking of banks for the banks reporting under IFRS.

This paper contributes to the literature in several directions. First, it provides a first-hand analysis of the changes in loan loss provisions around the new ECL model. While there has been research and models (e.g., Gebhardt, 2016; Novotny-Farkas, 2016; Seitz et al., 2018) that predict how the model will impact the loan loss provisioning for banks, this paper is the first to provide empirical evidence of the effects of ECL on the determinants of loan loss provisions. Kim et al. (2020) study the impact of the shift from the incurred to the ECL model on the LLP timeliness and find a more pronounced positive effect for riskier banks and banks with a low level of LLP prior to the adoption of ECL. On the real effects side, Ertan (2020) finds that the ECL model reduces access to funding for small- and medium-sized enterprises (SMEs). Thus, raising another unintended consequence of IFRS 9, my findings align with the expectations that IFRS 9 may bring unintended consequences for market discipline. Second, the findings of this study are particularly important for standard setters in view of future IFRS 9 amendments and for regulators to gain insights into industry-wide results.

The remainder of the paper is constructed as follows. Section 2.2 discusses the background for the Expected Credit Loss impairment model, and section 2.3 describes the literature review

and builds the hypotheses. Section 2.4 provides the sample selection and descriptive statistics, and section 2.5 outlines the research design. Section 2.6 contains the empirical results, and section 2.7 concludes.

2.2. Background

The scope of the impairment requirements under IFRS 9 is now much broader. Under IAS 39, LLPs are only recorded for impaired exposures, whereas ECL requires the LLP to be recorded for all credit exposures not measured at fair value through profit and loss. Under ECL, it is no longer necessary for a credit event to occur before recognizing credit losses. The new model results in timelier recognition of expected losses by requiring a 12-month ECL allowance for all credit exposures and lifetime ECL if the credit risk deteriorates (BIS, 2015; Novotny-Farkas, 2016). These imply that banks will provide users of financial statements with more timely and forward-looking information.

The ECL model is more information-sensitive than the IAS 39 impairment model as it requires entities to consider reasonable and supportable future forecasts of economic conditions (IASB, 2014). For example, an entity has to consider how changes in macroeconomic factors will affect the ECL. The ECL is expected to increase the LLA, particularly for banks and similar financial institutions (Ernst & Young, 2014; Deloitte, 2013 & 2016). However, entities with shorter-term and higher quality financial instruments are expected to be less affected. Lastly, the volatility of the ECL amounts charged to the income statement is expected to increase, especially for financial institutions, i.e., the LLP will change as new information for future economic conditions is available.

After the financial crisis, the delayed recognition of credit losses associated with loans and other financial instruments was identified as a weakness in existing accounting standards.

According to Beatty and Liao (2014), this is mainly because current impairment requirements are based on an incurred loss model. That is, credit losses are not recognized unless a credit event occurs. Moreover, losses are unlikely to occur evenly over the loan terms, resulting in a mismatch between the timing of the recognition of the loans and any impairment losses.

The IASB developed the ECL model based on expected loss rather than incurred loss to better reflect the general pattern of deteriorations or improvements in the credit quality of financial instruments. The model applies to debt instrument assets measured at amortized cost (AC) or fair value through other comprehensive income (FVOCI), lease receivables, contract assets, loan commitments, and financial guarantee contracts that are not measured at fair value through profit and loss. The entity must recognize a 12-month ECL for the financial asset at the first reporting date and updated the ECL provisions every year. The amounts recognized as loan loss provisions will depend on the extent of credit deterioration after initial recognition.

The ECL approach is comprised of two measurement bases (IASB, 2014): (i) **12-month ECL (stage 1)**, applying to all items as long as there is no significant deterioration in credit quality and, (ii) **Lifetime ECL (Stage 2 and 3)**, applying to cases when a significant increase on credit risk occurs on an individual or collective basis. During the first stage, the 12-month ECL is recognized for all financial assets subject to the ECL model, regardless of the credit quality. The financial asset is classified to the second stage if there is a significant deterioration in the credit quality or the third stage when the contractual cash flows on the financial asset are not fully recoverable in the event of default. In both stages, the LLA is recognized based on the lifetime expected losses. The transfer of financial assets from one stage to another is symmetrical. That is, any financial asset can move back to the first stage (lowest risk stage) if there is a significant improvement in credit quality.

2.3. Literature Review and Hypothesis Development

Loan loss provisions represent the estimated expected credit losses on outstanding loans and are typically a bank's largest and most discretionary accruals. Prior evidence documents that these accruals impact lending and the risk profile of banks and, thereby, the overall stability of the financial system (Beatty and Liao, 2011; Bushman and Williams, 2012; Bhat et al., 2018). Furthermore, the delayed recognition of loan losses under the IAS 39 incurred loss approach has been criticized as a major weakness of the current financial accounting standards.

The incurred loss model specifies that loan losses are recognized only when a loss is probable based on past events and existing conditions at the financial statement date. Consequently, it does not take into account the losses expected in the future.[5] Policymakers argue that the incurred loss approach reinforces the procyclical effects of bank regulation relative to forward-looking provisioning. Procyclicality is defined as the exaggeration of cyclical tendencies in aggregate economic activity that intensifies business cycle fluctuations. When loan loss reserves cannot absorb credit losses during recessions, banks have to recognize greater loan loss recognition, which in turn reduces capital adequacy and potentially causing banks to cut lending and so prolong the downturn (Bushman and Williams, 2015).[6]

Prior research documents that banks have incentives to use the allowed discretion given by the accounting standards for earnings and capital management (Beatty and Liao, 1995, 2002; Collins, 1995; Liu and Ryan, 2006; Bushman and Williams 2012). Evidence indicates that bank managers, on average, exhibit a tendency to smooth reported income through loan loss provisions (Wahlen, 1994; Kanagaretnam et al., 2003; Liu and Ryan, 2006). For this reason,

[5] Prior research decomposes loan loss provisions into two main components, discretionary and non-discretionary. The non-discretionary part includes the expected losses on the bank's portfolio, and the non-discretionary part is used by the bank managers mainly for earnings management and capital management.

[6] The capital crunch theory as referred from Beatty and Liao (2011).

LLP is generally split into two main components, the non-discretionary and discretionary components. The non-discretionary part of LLP contains information about future excepted losses for the loan portfolio of the bank, while under the current incurred loss model it is determined by the changes in non-performing loans (Liu and Ryan 2006).

Gebhardt and Novotny-Farkas (2011) investigate the implications of mandatory IFRS adoption on the accounting quality of banks in Europe. They document that the restriction to recognize only incurred losses significantly reduces income smoothing. Consistent with the findings of Beatty and Liao (2011), they also find that the incurred loss model results in less timely loss recognition. The procyclicality of bank lending is argued as one of the main drawbacks of the incurred loss model (IASB, 2014; Dugan, 2009). Beatty and Liao (2011) study the impact of the incurred loss model on the procyclicality of bank lending and find that timelier loss recognition reduces the sensitivity of lending to regulatory capital constraints during recession periods. These results suggest that the incurred loss model amplifies the cyclical tendencies in an economy.

According to Beatty and Liao (2011) and Domikowsky et al. (2014), the "incurred" loss framework contributes to the procyclicality of banks' lending and regulatory capital requirements by delaying the expected loss recognition. Bhat et al. (2018) show evidence that banks that provide better credit risk disclosures in their financial reports exhibit lower lending procyclicality. Further, they conclude that the timelines of banks' recognition of loan losses reflect their internal credit risk modeling quality.

Novotny-Farkas (2016) argues that IFRS 9 can mitigate the amplifying effect of the incurred loss approach on procyclicality and reduce capital inadequacy concerns during a crisis. While forward-looking provisioning reflecting timely recognition of expected future loan losses is associated with enhanced risk-taking discipline, the new ECL embeds significant risks of

unintended consequences. Bushman and Williams (2012) raise the concern that gains from reducing procyclicality may be overshadowed by losses in transparency that dampen market discipline. Besides, the ECL model requires significant work to process/aggregate data and inevitably introduces subjectivity in the process. For example, banks need to measure the lifetime probability of default for individual loans classified to Stage 2 and Stage 3.

Under the incurred loss model, NPL and changes in NPL are the major determinants of LLP. That is, credit losses are not recognized unless a credit event occurs. Moreover, losses are unlikely to occur evenly over the loan terms, resulting in a mismatch between the timing of the recognition of the loans and any impairment losses. Therefore, in a backward-modeling approach, changes in NPL are good indicators of the LLP and the risks identified by banks for their loan portfolios.

Prior research finds a positive relationship between the loan loss provisions and changes in non-performing loans (Ahmed et al., 1999; Beatty and Liao, 2011; Kilic et al., 2013). However, the introduction of the new forward-looking impairment model requires entities to consider reasonable and supportable future forecasts of economic conditions to better reflect the general pattern of deteriorations or improvements in the credit quality of financial instruments. The association between loan loss provisions and non-performing loans should be significantly lower after the adoption of IFRS 9 due to the forward-looking factors, which are expected to be the new drivers of loan loss provisions. Hence, if the new impairment model introduces new determinants for LLP compared to the incurred loss model, I should observe a weaker relation between changes in NPL and LLP after the adoption of IFRS 9.

H_1: The association between loan loss provisions and changes in non-performing loans will be weaker in the post-period adoption of IFRS 9 than in the pre-period for firms reporting under IFRS.

Banks reporting under the U.S. GAAP reporting standards were not affected by this regime change under IFRS. While there are fundamental differences between these two samples, there should not be any differences in the post-IFRS 9 period between LLP and changes in NPL. Thus, I investigate the association between loan loss provisions and changes in non-performing loans around the IFRS 9 adoption period for banks reporting under the U.S. GAAP standards. Banks reporting under the U.S. GAAP standards were not part of any regulatory change during the same period when IFRS 9 became applicable. Therefore, in spite of the fundamental differences between the two samples, there should not be any difference in the association between LLP and determinants of the incurred loss model for the U.S. GAAP banks.[7]

Prior research documents that the LLP accounting choice impacts the volatility and cyclicality of bank earnings by showing a positive correlation between discretionary loan loss provisioning and stock returns (Liu et al., 1997; Kanagaretnam et al., 2004; Bushman and Williams, 2012).

Bushman and Williams (2012) investigate the implications of bank accounting discretion on risk-taking and raise the concern that the accounting discretion given to the banks is a double-edged sword. On the plus side, the expected credit loss model allows more discretion to facilitate the incorporation of more information regarding future expected losses into loan

[7] In fact, the FASB issued an accounting standard update (ASU) similar to IFRS 9 with the aim to improve financial reporting by requiring timelier recording of credit losses on loans and other financial instruments. However, the accounting standards update adoption is mandated to start from January 1st, 2020.

loss provisions and mitigate procyclicality. However, the allowed accounting discretion increases the potential of managers for opportunistic accounting behavior that can reduce bank transparency.

Berger (1991) defines *market discipline* as a tool in a situation in which market participants (investors, shareholders, and creditors) face increasing costs when banks increase their risk and take action to discipline banks' behavior based on these costs. Market discipline is considered one of the three tools together with regulatory supervision and capital requirements by Basel III to improve bank stability. Empirical literature divides market discipline into (i) monitoring and (ii) influence (Flannery, 2001; Hett and Schmidt, 2017). Monitoring refers to market pricing reflecting the perception of the investors for a specific bank. Consequently, this information influences bank managers to alter their risk behavior. In this paper, I examine the monitoring component of market discipline by focusing on the riskiness of banks is reflected in the market prices.

Exploiting cross-country variation in 27 countries under the IFRS accounting standards, Bushman and Williams (2012) estimate two aspects of provision practices that reflect a forward-looking orientation. The authors first designate income smoothing, a country-specific measure, defined as the regression coefficient of loan loss provision on contemporaneous earnings. The second measure is the predictability of future non-performing loans from current loan loss provisions. Both these measures are considered as a form of forward-looking orientation. The authors examine discipline over bank risk-taking by investigating the impact of the two measures of forward-looking provisioning on the relationship between changes in asset volatility and changes in bank leverage. The idea behind the analysis is that the outside discipline of risk-taking will force banks to decrease leverage (increase capital) as a response to increases in risk.

The findings suggest that accounting discretion used for income smoothing decreases the sensitivity of changes in leverage to changes in asset volatility, therefore, dampening the disciplinary pressure. On the other hand, when accounting discretion is used to anticipate future loan deterioration, the market discipline is stronger on bank risk-taking. These results raise the concern that gains of the new expected credit loss model from reducing procyclicality may be overshadowed by losses in bank transparency that dampen market discipline.

In contrast to Bushman and Williams (2012), the sample allows to directly measure the impact of the expected credit loss model on the bank risk-taking by examining the sensitivity of changes in leverage to changes in asset volatility around the IFRS 9 adoption. Furthermore, using the U.S. GAAP as a control sample allows controlling for any time trends.

I posit the following hypothesis to test whether the IFRS 9 adoption impacts the discipline of banks' risk-taking by investigating the sensitivity of changes in leverage to changes in asset volatility.

H_2: The association between changes in leverage and changes in asset volatility is more negative in the post-period adoption of IFRS 9 than in the pre-period for firms reporting under IFRS.

To control for trends in this sensitivity, I run the same analysis for the U.S. GAAP sample firms, and I do not expect to see any impact as there should not be any regulatory change that would impact the market discipline under the same period. Therefore, I expect that banks reporting under U.S. GAAP reporting standards, the association between changes in leverage and changes in asset volatility does not change in the post-period adoption of IFRS 9 compared to the pre-period.

2.4. Sample Selection and Descriptive Statistics

I collect quarterly data from all publicly traded bank holding companies reporting under International Financial Reporting Standards (IFRS) from 2016Q1-2019Q3, for which all of the necessary variables to estimate equation (2.1) are available on the Thomson Reuters Database. This yields 5,104 bank-quarter observations for 464 unique banks. I remove all the observations with missing data, particularly for the non-performing loans, after double-checking and manually collecting the non-performing loans from the quarterly reports of these banks for the sample period 2016Q1-2019Q3. The final sample consists of 1'261 bank-quarter observations (142 unique banks).

For the benchmark sample, I collect quarterly data from all publicly traded bank holdings reporting under the U.S. GAAP reporting standards from 2016Q1-2019Q3, for which all the necessary variables are available in the Thomson Reuters Database. After removing all the observations with missing data, the final sample consists of 3,775 bank-quarter observations (319 unique banks).

Deloitte (2016) conducted a survey and finds that the transition to the IASB impairment model is likely to increase the loan loss allowances by 25%. Thus, banks are likely to be significantly affected by the new standard and are concerned about the impact of IFRS 9 in their financial statements and accounts.

[Insert Table 2.1 about here]

Table 2.1 reports the descriptive statistics of the variables used in the regression for the entire sample of IFRS banks and U.S. GAAP banks. On average, U.S. banks recognize significantly lower loan loss provisions and have higher loan loss allowances for their loan portfolios compared to IFRS banks. While the ratio of loans to total assets is slightly higher for U.S. banks, these banks have less NPL and lower occurring changes in NPL over the entire

sample period. On the other hand, IFRS banks reported higher earnings before LLP and have a similar ratio of equity to total assets compared to U.S. banks. Although the two samples have different firm characteristics, the U.S. banks serve as a "placebo" to test whether the changes in the association of LLP and with the incurred loss determinants are not simply time trends and are emerging from the effect of IFRS 9.

2.5. Research Design

In this study, I investigate whether the new impairment model does indeed impact the loan loss provisions. More specifically, I examine the association of loan loss provisions recognized by banks around the adoption of IFRS 9 with the classic loan quality determinants such as non-performing loans and changes in loans based on the incurred loss impairment model.

2.5.1. Determinants of Loan Loss Provision

IFRS 9 introduced the concept of expected losses, whereas the old approach (IAS 39) is based on "incurred" losses. The new approach applies to all financial assets that are not valued at fair value (IASB, 2014), and it eliminates the threshold to recognize credit losses only if a credit event occurs. Now, ECL and changes in ECL are recognized and updated at each reporting period to reflect the credit quality of the financial assets since initial recognition. The goal of IASB is to develop an impairment model that would reflect the general pattern of deterioration in the credit quality of financial instruments and in which the amount of the expected credit losses recognized as a loss allowance or provision depends on the level of deterioration in the credit quality of financial instruments since initial recognition. IASB (2014) claims that the ECL impairment model will make loan loss recognition timelier to better reflect the current and expected future economic conditions.

I follow a similar empirical specification based on Ahmed et al. (1999), and Bushman and Williams (2012) on the determinants of loan loss provisions. In an incurred loss provisioning system, loan loss provisions are directly related to non-performing loans. This is because when loans become non-performing, it triggers the recognition of loan loss provisions. I use the lagged NPL ratio to total loans at the beginning of the quarter *t-1* ($NPL_{i,t-1}$) and the first difference of $\Delta NPL_{i,t}$ ($NPL_{i,t} - NPL_{i,t-1}$) as explanatory variables.[8] These variables are good indicators of the loan loss provisions and the risks identified by banks for their loan portfolios. Therefore, I expect these variables to display a positive relationship with loan loss provisions. In principle, the purpose of loan loss provisions is to adjust banks' loan loss allowances to reflect expected future losses on their loan portfolios.[9] Thus, the level of loan loss loans must be positively associated with loan loss provisions. I use the ratio of loan loss allowances ($LLA_{i,t-1}$) to total loans in the previous quarter as a determinant of loan loss provisions. Additionally, I include the ratio of net loans to total loans to total assets ($Loans_{i,t}$) and the first difference of $\Delta Loans_{i,t}$ ($Loans_{i,t} - Loans_{i,t-1}$) as a measure of the risk of default for the overall credit portfolio. The coefficients associated with these variables should be positive.

Prior literature decomposes the loan loss provisions into discretionary and non-discretionary parts. The discretionary components include the use of loan loss provisions to fulfill managerial objectives in two main directions. First, managers may use loan loss provisions for earnings management, i.e., banks can overstate (understate) loan loss provisions when earnings are expected to be high (low). I include the ratio of earnings before loan loss provisions to total assets ($EBLLP_{i,t}$) to control for income smoothing objectives of banks through loan loss

[8] Based on the incurred loss impairment model, non-performing loans and changes in non-performing loans are defined as the non-discretionary determinants of loan loss provisions.
[9] See the American Institute of Certified Public Accountants (AICPA) Guide Audits of Banks (1983).

provisioning. A positive coefficient between $EBLLP_{i,t}$ and loan loss provisions will be consistent with the income smoothing hypothesis.

Second, banks may use the loan loss provisioning for regulatory capital management because general loan loss provisions are included in the Tier 2 capital.[10] Due to the missing data on Tier 1 and Tier 2 capital, I use the ratio of total equity to total assets ($Capital_{i,t}$) to capture this behavior.[11] However, because of the new changes in the capital requirements for banks, this relationship is expected to be weaker than in prior studies. Moreover, I expect a negative relationship between capital and loan loss provisions due to the effect of the risk profile of banks.[12]

I investigate the association between loan loss provisions and loan quality drivers around the adoption to determine whether it is more or less correlated after IFRS 9 adoption. I examine this association by using the following empirical specification for the IFRS sample and the benchmark sample separately due to the complications in interpreting triple interaction coefficients.

$$\begin{aligned} LLP_{i,t} = {} & \beta_0 + \beta_1 \Delta NPL_{i,t} + \beta_2 Post \times \Delta NPL_{i,t} + \beta_3 NPL_{i,t-1} + \beta_4 Post \times NPL_{i,t-1} \\ & + \beta_5 LLA_{i,t-1} + \beta_6 EBLLP_{i,t} + \beta_7 Capital_{i,t} + \beta_8 Size_{i,t} + \beta_9 \Delta Loans_{i,t} + \beta_{10} Loans_{i,t} \\ & + Bank\ FE + Year\text{-}Quarter\ FE + \varepsilon_{i,t} \end{aligned} \quad (2.1)$$

[10] The Basel III accord allows general loan loss reserves to count toward Tier 2 capital up to a maximum of 0.6% of risk-weighted assets.

[11] In addition, I control for size as a general control, which is measured as a natural logarithm of the total assets, but I make no predictions regarding the sign of its coefficient.

[12] Bikker & Metzemakers (2005) documents that riskier banks hold less regulatory capital and record more losses and loan loss provisions.

The dependent variable $LLP_{i,t}$ is the loan loss provision per quarter as a percentage of total assets. *Post* is an indicator variable equal to one in the post-adoption period IFRS 9 and zero otherwise. $\Delta NPL_{i,t}$ is the first difference between $NPL_{i,t}$ and $NPL_{i,t-1}$, and measures the change in non-performing loans with respect to the previous quarter as a percentage of total loans. $NPL_{i,t-1}$ is the ratio of non-performing loans at *t-1* on the total loans at *t-2*. LLA_{t-1} is the ratio of loan loss allowance and total loans in the previous quarter in the previous quarter. $\Delta Loans_{i,t}$ is the change in loans during the quarter as a percentage of the beginning loans. $Loans_{i,t}$ is the total loans as a percentage of total assets at the beginning of the quarter. $EBLLP_{i,t}$ is earnings before loan loss provisions for period *t* scaled by total loans at the beginning of the quarter. $CAPITAL_{i,t}$ is the equity capital to total assets at the end of the quarter. $Size_{i,t}$ is the natural log of the total assets in the quarter.

The coefficient (β_2) measures the association between a change in non-performing and loan loss provisions in the pre-period of IFRS 9 adoption. The coefficient of interest is (β_2) (*and* (β_4)), which measures the incremental association of the changes in non-performing (the level of non-performing loans) and the loan loss provisions in the post-adoption period of IFRS 9 relative to the same association when the banks were using the incurred loss model. That is, (β_2) represents the difference in the association between changes in non-performing loans and loan loss provisions between the post- and pre-IFRS 9 periods. I estimate the models separately for both samples as the variable of interest is the change and not the level of the association between changes in non-performing loans and loan loss provisions around the IFRS 9 adoption. A classic difference-in-differences design would require a triple interaction with the change in non-performing loans, the IFRS 9 dummy, and the U.S. GAAP dummy. I opt to compare the interaction terms in split samples because they are easier to interpret and qualitatively the same as the triple interactions.

I expect that the association between changes in *NPL* and *LLP* to decrease or become insignificant as IFRS 9 introduces a forward-looking model, and banks do not have to wait for loans to become non-performing to trigger an increase in the *LLP*. Instead, *LLP* should be more associated with more timely and forward-looking information for loan quality rather than past or current factors. The forward-looking information that impacts loan loss provisioning could include expectations for economic conditions such as GDP growth, interest rates, unemployment rates, number of business failures, housing permits, and other specific characteristics related to the loan portfolio (Gambera, 2000).

2.5.2. Discipline over risk-taking changes around IFRS 9 adoption

I follow the approach of Bushman and Williams (2012) to estimate the implied values of assets using an option pricing approach, as I cannot directly observe the market value of assets and their volatility. I estimate the market value of assets (V) and the implied standard deviation of the rate of return on the value of bank assets (σ_v) as developed by Ronn and Verma (1986). First, I simultaneously solve the equations (2.2) and (2.3) to estimate the market value of assets (V) and the implied standard deviation of the rate of return on the value of banks assets (σ_v):

$$\sigma_v = \frac{\sigma_E E}{VN(x)} \tag{2.2}$$

Where:

$$x = \frac{\ln\left(\frac{V}{\rho D}\right) + {\sigma_v}^2 T/2}{\sigma_v\sqrt{T}}$$

E is the market value of equity calculated as the number of shares outstanding times the share price and σ_E is the standard deviation of the daily return on the market value of equity during the quarter.

The third equation is the option pricing of the market value of equity developed by Merton 1977:

$$E = VN(x) - \rho DN(x - \sigma_v\sqrt{T}) \tag{2.3}$$

Where D is the face value of debt[13]. Following previous research, I set the forbearance parameter ρ equal to 0.97 and time until the next audit (T) equal to one.

Similar to the approach from Bushman and Williams (2012), I investigate whether there is a change in the linear relationship between changes in leverage and changes in risk around the IFRS 9 adoption. Due to the disciplinary pressure on risk-taking banks must respond by decreasing leverage (or increase capital) if there is an increase in asset risk . I investigate this relationship using the following empirical specification for the IFRS sample and the benchmark sample separately.

$$\Delta D/V_{i,t} = \beta_0 + \beta_1 \Delta\sigma_{v\,i,t} + \beta_2 Post{\times}\Delta\sigma_{v\,i,t} + \beta_3 Size_{i,t} + \beta_4 ROE_{i,t} + Bank\ FE + Year\text{-}Quarter\ FE + \varepsilon_{i,t} \tag{2.4}$$

The dependent variable $\Delta D/V$ is the change in face value of debt over the market value of bank assets, $\Delta\sigma_v$ is the change in the volatility of bank assets. *Post* is an indicator variable equal

[13] Following prior research, I assume that the face value of debt is equal to the total liabilities (Ronn and Verma, 1986; Bushman and Williams, 2012)

to one if the firm applies IFRS 9 in the current quarter. $Size_{i,t}$ is the natural log of the total assets in the quarter. *ROE* is the return on equity, defined earnings before taxes scaled by total shareholders' equity.

Following prior research, I expect β_1 to be negative due to market disciplinary pressure on bank risk-taking. Accordingly, I expect banks to decrease leverage or increase capital as a response to an increase in risk. The sign on the coefficient (β_2) determines whether the introduction of the new expected credit loss model dampens or enhances the market discipline of bank risk-taking. A positive β_2 suggests that bank managers are potentially using the accounting discretion given by the new impairment model for income smoothing purposes, which is causing a reduction in transparency. I control for bank/country characteristics and include year-quarter fixed effects to control for time trends. I also cluster the standard errors by bank.[14]

2.5.3 Forward-looking versus Smoothing Countries

Following a similar methodology to Bushman and Williams (2012), I classify my sample countries (excluding the U.S.) into forward-looking and smoothing countries. I estimate the following regression for each country in the pre-period of IFRS 9:

$$LLP_{i,t} = \beta_0 + \beta_1 EBLLP_{i,t} + \beta_2 \Delta NPL_{i,t+1} + \beta_3 \Delta NPL_{i,t} + \beta_4 NPL_{i,t-1} + \beta_5 \Delta NPL_{i,t-2} + \beta_6 Capital_{i,t} + \varepsilon_{i,t} \quad (2.5)$$

[14] Results are robust to other clustering dimensions, e.g., country, bank and country, bank and year.

I classify a country as *Forward-looking* if the coefficient β_2 on $\Delta NPL_{i,t+1}$ is positive and statistically different from zero at the 10% significance level. Similarly, I classify a country as *Smoothing* if the coefficient β_2 on $\Delta NPL_{i,t+1}$ is statistically different from zero at the 10% significance level. If both coefficients are significantly different from zero, I classify the country as forward-looking.[15] I create another subsample for the countries, which do not fall in one of the two categories above and name it as *Others.* In the next step, I examine whether there is a change in the linear relationship between changes in leverage and changes in risk around the IFRS 9 adoption for banks across forward-looking countries and smoothing countries separately. Due to the market disciplinary pressure on risk-taking, if there is an increase in asset risk, banks must respond by decreasing leverage (or increase capital). In line with the results from Bushman and Williams (2012), I expect the impact to be higher for banks in smoothing countries.

2.6. Empirical Results

Panels A and B of Table 2.2 report descriptive statistics and correlations, respectively, for the variable in equation (2.1) for the affected sample around the IFRS 9 adoption. On average, loan loss provisions account for 0.19% of the total loans per quarter in the pre-period of IFRS 9 adoption. These provisions decrease by 16% in the post-period of IFRS 9, to 0.16% of the total loans reflecting improving economic conditions during the sample period also supported by the increase in the earnings before loan loss provision. In the same period, banks increase their loan loss allowance by 19.8% on average from 2.97% to 3.56%. Similarly, non-performing loans to total assets increase from 4.8% to 6.34% after the adoption of IFRS 9.

[15] Results are weakened but still hold when I include these countries in both samples.

While there are no changes in the ratio of total loans over total assets over the period, banks slightly increase their capital, possibly to protect from unexpected effects of the ECL model.

[Insert Table 2.2 about here]

Panel B reports the Pearson correlations of *LLP* with the explanatory variables in equation (2.1). The correlations are generally consistent with those reported in prior studies. For example, *LLP* is significantly positively correlated with *EBLLP* and capital, consistent with income smoothing and more solvent banks reserving more for loan losses. [16] *LLP* is also significantly positively correlated with *NPL* and *ΔNPL*, consistent with banks reserving more for loan losses when economic conditions are in a recession.

2.6.1. Loan Loss Provision determinants around IFRS 9

H1 hypothesis examines changes from the pre- to the post-IFRS 9 period in the association of loan loss provisions and changes in non-performing loans. Table 2.3 reports the results of the regression models in eq. (2.1) for the IFRS sample banks, which estimate the effects of IFRS 9 on loan loss provisions.

[Insert Table 2.3 about here]

The coefficients on the determinants of loan loss provisions are significantly different from zero and consistent with prior research in all the models (e.g., Beatty et al., 1995; Kanagaretnam et al., 2004; Kilic et al., 2013). More importantly, the coefficient on *ΔNPL*Post* is significantly negative (β_2 = -0.044, *t*-stat = -2.88) and consistent in all the models, indicating that, in the post-IFRS 9 period, banks rely less on the incurred loss model determinants than they did prior to IFRS 9. Moreover, the coefficient on *NPL*Post* is also significantly negative

[16] The main inferences also hold when I interact all the control variables (*LLA*, *Ebllp*, *Capital*, *Size, Loans, ΔLoans*) with the *Post* variable.

(β_4 = -0.014, *t*-stat = -4.62). Thus, the association between changes in non-performing loans and loan loss provisions is lower in the post-period of IFRS 9 adoption, suggesting that banks now rely less on objective determinants of loan loss provisions with the new impairment model.

Consistent with prior research, the earning management incentives are positively related to the loan loss provisions given by the significantly positive coefficient on *EBLLP* (β_6 = 0.224, *t*-stat = 3.18). Additionally, the negative relation between loan loss provisions and capital ratio (β_7 = -0.037, *t*-stat = -4.08) is consistent with the capital management through loan loss provisions theory.

Table 2.3 also reports the results from the regression models in eq. (2.1) for the U.S. GAAP sample banks around the same period. This benchmark sample acts as a "placebo" to test the robustness of the results from IFRS 9 on LLP. As there are no changes in the regulatory environment during the period where the ECL impairment model is introduced under IFRS, I expect not to find any differences in the association of LLP and the determinants based on the incurred loss model for the U.S. GAAP sample firms during this period.

In contrast to the results from the IFRS sample, I do not find any changes in the association of *LLP* and *ΔNPL* in the post-adoption given by the insignificant coefficient on the interaction term *ΔNPL*Post* (β_2 = 0.007, *t*-stat = 0.85). Notwithstanding, the association in the pre-adoption period between the two variables is significantly positive in all the models (β_1 = 0.008, *t*-stat = 1.69), in line with the IFRS sample results and prior research. Similarly, the insignificant coefficient β_4 = -0.002 (*t*-stat = -0.55) on *NPL*Post* indicates that in the post-period, there is no incremental difference in the relation between *LLP* and *NPL* compared to

the pre-period.[17] Overall, the coefficients on the control variables are consistent with prior research and the results on the pre-period of the IFRS sample.

2.6.2. Discipline over bank risk-taking around IFRS 9

Table 2.4 reports the descriptive statistics for the variables used in estimating equation (2.4) for the IFRS and U.S. GAAP samples. I find no significant differences between the samples, and the results are consistent with Bushman and Williams (2012) findings.

[Insert Table 2.4 about here]

Table 2.5 presents the coefficient estimates from equation (2.4) for both samples separately. I estimate the models separately for both samples. Similar to the analysis in table 2.3, the interest is in the change and not in the level of the association between changes in leverage and changes in risk around the IFRS 9 adoption. A classic difference-in-differences design would require a triple interaction with the result of the change in risk, the IFRS 9 dummy, and the U.S. GAAP dummy. I opt to compare the interaction terms in split samples because they are easier to interpret and qualitatively the same as the triple interactions. However, the inferences hold when I perform the untabulated triple interaction model on the entire sample.

[Insert Table 2.5 about here]

The results from model (1) show that the association between changes in leverage and changes in asset risk is significantly negative for both samples. The coefficient β_1 is more negative and significant for the U.S. GAAP sample (β_1 = -0.996, *t*-stat = -10.54) relative to the IFRS banks (β_1 = -0.526, *t*-stat = -5.82), potentially due to higher homogeneity across the U.S. banks and a higher number of observations. In model (2), the coefficient on the interaction term

[17] There are no improvements in the explanation power or the coefficient estimates after the second model for the U.S. GAAP sample firms.

$\Delta\sigma_v$ *x Post* is positive and significant (β_2 = 0.519, *t*-stat = 3.56), suggesting that the discipline over risk-taking is attenuated after the IFRS 9 adoption for the affected banks. In contrast, the coefficient on the interaction term is lower and not significant for the U.S. GAAP sample banks (β_2 = 0.218, *t*-stat = 1.59). Furthermore, the coefficient in the full interaction model $\Delta\sigma_v$ *x Post x Treat* (full sample including IFRS and U.S. GAAP firms) is negative and significant, suggesting that there the decrease in the sensitivity of the changes in leverage to changes in risk is significantly different for the IFRS sample relative to the U.S. GAAP sample. Overall, the results show that a decrease in the sensitivity of leverage to changes in risk in the post-adoption period of IFRS 9, signifying an attenuated market discipline over the risk-taking of banks.

2.6.3 Forward-looking versus Smoothing Countries

Bushman and Williams (2012) show that the market exercises a different level of discipline on banks' risk-taking depending on the institutional environment. Market discipline is enhanced in countries where banks use the loan loss provision in a more timely fashion and incorporate forward-looking information. On the contrary, countries in which banks use loan loss provisions for income smoothing purposes appear to dampen market discipline. Therefore, I do not expect substantial adverse effects of the new ECL approach on market discipline in forward-looking countries. In contrast, I predict negative effects for banks in those countries that actively use loan loss provisions for income smoothing purposes.

After classifying the treatment sample countries into forward-looking and smoothing countries, I estimate the regression results using eq. (2.4) for both samples and the rest of the banks. *Forward-looking* countries are countries where the coefficient β_2 on $\Delta NPL_{i,t+1}$ is positive and statistically different from zero at the 10% significance level. Similarly, *Smoothing*

countries are countries where the coefficient β_2 on $\Delta NPL_{i,t+1}$ is statistically different from zero at the 10% significance level. I create another subsample for the countries that do not fall in one of the two categories above and name it as *Others.*

[Insert Table 2.6 about here]

Table 2.6 presents the sensitivity of changes in leverage and changes in risk around the IFRS 9 adoption for banks in forward-looking countries and smoothing countries. Column (1) shows no changes in the sensitivity of changes in leverage to changes in risk for banks in forward-looking countries. Coefficient β_2 is negative and not significant for banks in forward-looking countries (β_2 = -0.29, *t*-stat = -1.01). On the other hand, the results show that for banks in smoothing countries, the market discipline is completely attenuated after the IFRS 9 adoption, given by the positive and significant coefficient in the interaction term $\Delta NPL*Post$ (β_2 = 0.944, *t*-stat = 4.76). I find similar results for the *Other* countries but less significant. The results suggest that the effect is greater in those countries where banks are using loan loss provisioning more for smoothing purposes. Indeed, banks in countries that use LLP to smooth income will take more advantage now that the standard allows for more discretion, and therefore, it is more difficult for the market to exercise discipline. The forward-looking LLP approach works only if the institutional environment is designed to do so.

2.7. Conclusion

IFRS 9 impact has been extensively debated in recent times, as it will significantly impact financial institutions. This paper contributes to the broad literature on banking research in several directions by providing a first-hand analysis of the changes in loan loss provisions around the new ECL model. While there has been research and modeling aiming to predict the impact of ECL on the loan loss provisioning for banks, this paper is among the first to provide

empirical evidence of the effects of ECL on loan loss provisions and its common determinants. Using a sample of IFRS banks throughout the adoption of IFRS 9, I find a lower association between the LLP and changes in NPL after the adoption. Moreover, I show that the change from the incurred to the expected credit loss model makes it more difficult for market participants to discipline banks' risk-taking.

These findings indicate that after the introduction of the new ECL impairment model, IFRS banks rely less on the "incurred loss" determinants of loan loss provisions and that there may be other factors that influence these provisions. Additionally, I find a decrease in the sensitivity of leverage to changes in risk in the post-adoption period of IFRS 9, signifying an attenuated market discipline over risk-taking of banks for the banks reporting under IFRS. I find that the reduction in market discipline is mainly driven by banks in countries that allow more smoothing through loan loss provisions, while I find no significant change for banks in countries that promote more forward-looking loan loss provisioning. I acknowledge that the current model does not capture the new drivers that banks are using to determine the level of loan loss provisioning. It remains to be investigated whether these banks turn to more forward-looking expectations for economic conditions such as GDP growth, interest rates, unemployment rates, number of business failures, and other specific characteristics related to the loan portfolio.

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TABLE 2.1

Descriptive Statistics for the IFRS and U.S. sample banks over 2016Q1-2019Q3

	IFRS Banks			U.S. GAAP Banks		
Variables	Mean	Median	StdDev	Mean	Median	StdDev
LLP	0.0015	0.0086	0.0021	0.0005	0.0004	0.0003
LLA	-0.0273	-0.0209	0.0231	-0.0102	-0.0100	0.0036
NPL	0.0397	0.0217	0.0445	0.0109	0.0079	0.0091
Δ*NPL*	0.0008	0.0003	0.0101	-0.0001	-0.0001	0.0028
Loan	0.6416	0.6491	0.1164	0.7032	0.7175	0.0938
Δ*Loan*	0.0145	0.0136	0.0304	0.0279	0.0182	0.0458
Size	24.08	24.02	1.84	22.25	21.92	1.48
Ebllp	0.0075	0.0064	0.0047	0.0057	0.0056	0.0019
Capital	0.1517	0.1500	0.0308	0.1272	0.1225	0.0245

Notes: This table reports the descriptive statistics for the variables used in equation (2.1) for the IFRS sample banks and the Benchmark sample. The IFRS bank sample consists of 1,261 bank-quarters over 2016Q1-2019Q3. The U.S. GAAP bank sample consists of 3,745 bank-quarters over the same period.

Variable Definitions

LLP	loan loss provisions scaled by lagged total net loans
Post	an indicator variable that equals 1 if the observation belongs post-IFRS 9 adoption period, and 0 otherwise
LLA	allowance for loan losses scaled by lagged total net loans
NPL	non-performing loans scaled by lagged total loans
Δ*NPL*	change in non-performing loans scaled by lagged total loans
Loan	net loans scaled by lagged total assets
Δ*Loan*	change in the net loans scaled by the lagged total assets
Size	the natural log of total assets at the beginning of the quarter
Ebllp	earnings before provisions and taxes scaled by lagged total loans
Capital	total equity scaled by total assets

TABLE 2.2

Descriptive Statistics and sample correlation

Panel A. Descriptive Statistics for the IFRS sample banks around the IFRS 9 at the bank-quarter level

	Pre-IFRS 9 (2016Q1-2017Q4)			Post-IFRS 9 (2018Q1-2019Q3)					
Variables	Mean	Median	StdDev	Mean		Median		StdDev	
LLP	0.0019	0.0010	0.0026	0.0016	***	0.0008	***	0.0023	
LLA	-0.0297	-0.0233	0.0281	-0.0356	***	-0.0272	***	0.0325	
NPL	0.0480	0.0218	0.0729	0.0634	***	0.0301	***	0.0877	
Δ*NPL*	0.0005	0.0002	0.0112	0.0012		0.0003	**	0.0131	
Loan	0.6145	0.6261	0.1294	0.6144		0.6213		0.1282	
Δ*Loan*	0.0153	0.0128	0.0334	0.0143		0.0138		0.0284	
Size	23.96	23.62	1.98	24.03		23.77		1.94	
Ebllp	0.0082	0.0066	0.0060	0.0080		0.0046		0.0054	
Capital	0.1507	0.1490	0.0341	0.1556		0.1557		0.0339	

Panel B. Pearson correlation matrix for the sample at the bank-quarter level, period 2015Q1-2019Q3

	LLP	*LLA*	*NPL*	Δ*NPL*	*Loan*	Δ*Loan*	*Size*	*Ebllp*	*Capital*
LLP	1								
LLA	0.469*	1							
NPL	0.343*	0.630*	1						
Δ*NPL*	0.019	0.008	0.074*	1					
Loan	-0.146*	-0.318*	-0.203*	0.008	1				
Δ*Loan*	0.042	-0.073*	-0.146*	0.036	0.003	1			
Size	-0.010	-0.183*	-0.207*	-0.048*	-0.240*	-0.007	1		
Ebllp	0.457*	0.423*	0.185*	0.064*	-0.417*	0.084*	-0.067*	1	
Capital	0.184*	0.062*	0.036	0.028	0.029	0.001	-0.206*	0.145*	1

Notes: This table presents summary statistics for the IFRS banks around the IFRS 9 adoption period. The Pre-IFRS 9 period summaries are constructed over the period 2016Q1-2017Q4, whereas the Post-IFRS 9 period summaries are constructed over the period 2018Q1-2019Q3. Panel A presents the descriptive statistics in the pre-post period. Panel B report the spearman correlations between the variables and whether the correlations are significant at the 5% level. See the noted from table 2.1 for variable definitions. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

TABLE 2.3

Regression of LLP around IFRS 9 adoption for the treatment and control sample

Dependent variable: *LLP*

		IFRS banks		U.S. GAAP banks	
Variable	Expected sign	(1)	(2)	(1)	(2)
Δ*NPL*	**(+)**	**0.009** **(1.51)**	**0.029***** **(3.90)**	**0.012***** **(2.65)**	**0.008*** **(1.69)**
Δ*NPL x Post*	**?**		**-0.044***** **(-2.88)**		**0.007** **(0.85)**
NPL	**(+)**	**0.012***** **(3.82)**	**0.023***** **(5.61)**	**0.011***** **(2.75)**	**0.011***** **(3.53)**
NPL x Post	**?**		**-0.014***** **(-4.62)**		**-0.002** **(-0.55)**
LLA	**(+)**	-0.028** (-2.25)	-0.025** (-2.02)	-0.054*** (-4.18)	-0.055*** (-4.26)
Ebllp	**(+)**	0.237*** (3.21)	0.224*** (3.18)	0.060*** (3.45)	0.060*** (3.46)
Capital	**(-)**	-0.032*** (-3.35)	-0.037*** (-4.08)	-0.003** (-2.18)	-0.003** (-2.22)
Size	**?**	-0.002* (-1.94)	-0.002** (-2.09)	-0.001 (-1.07)	-0.001 (-1.21)
Δ*Loan*	**(-)**	-0.002 (-0.95)	-0.002 (-0.96)	0.001*** (5.10)	0.001*** (5.09)
Loan	**(+)**	0.004* (1.94)	0.003* (1.69)	0.001** (2.41)	0.001** (2.40)
Year-quarter FE		Yes	Yes	Yes	Yes
Bank FE		Yes	Yes	Yes	Yes
Adj. R-squared		0.724	0.734	0.491	0.491
Observations		1,261	1,261	3,775	3,775

Notes: This table presents coefficient estimates from equation (2.1) for the IFRS and U.S. GAAP sample, and *t*-statistics in parenthesis based on heteroskedasticity-robust standard errors clustered by firm (Petersen, 2009). $LLP_{i,t}$ is the loan loss provision per quarter as a percentage of total assets. *Post* is an indicator variable equal to one if the firm has adopted IFRS 9. $\Delta NPL_{i,t}$ is the first difference between $NPL_{i,t}$ and $NPL_{i,t-1}$ and measures the change in non-performing loans with respect to the previous quarter as a percentage of total loans. $NPL_{i,t-1}$ is the ratio of non-performing loans at *t-1* on the total loans at *t-2*. LLA_{t-1} is the ratio of loan loss allowance and total loans in the previous quarter in the previous quarter. $EBLLP_{i,t}$ is earnings before loan loss provisions for period *t* scaled by total loans in the beginning of the quarter. $CAPITAL_{i,t}$ is the equity capital to total assets in the end of the quarter. $Size_{i,t}$ is the natural log of the total assets in the quarter (the coefficient on Size is multiplied by 100 for easier interpretation). $\Delta Loans_{i,t}$ is the change in loans during the quarter as a percentage of the beginning loans. $Loans_{i,t}$ is the total loans as a percentage of total assets at the beginning of the quarter. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

TABLE 2.4

Descriptive statistics for the risk-taking analysis variables

	IFRS			U.S. GAAP		
Variables	Mean	Median	StdDev	Mean	Median	StdDev
σ_v	0.1841	0.1289	0.1732	0.2330	0.2226	0.1073
$\Delta\sigma_v$	-0.0013	-0.0012	0.0804	-0.0017	-0.0075	0.0803
D/V	0.9125	0.9302	0.0832	0.8698	0.8734	0.0484
ROE	0.0278	0.0272	0.0149	0.0229	0.0227	0.0094
σ_E	2.0063	1.7155	1.0236	1.5669	1.5030	0.5241

Notes: This table reports the descriptive statistics for the variables used in equation (2.4) for the IFRS sample banks and the Benchmark sample. The IFRS bank sample consists of 1,896 bank-quarters over 2016Q1-2019Q3. The U.S. GAAP bank sample consists of 3,390 bank-quarters over the same period.

Variable Definitions

σ_v	The quarterly implied standard deviation of the rate of return on the market value of assets.
$\Delta\sigma_v$	The change in the volatility of banks assets ($\sigma_{v,\,t}$ - $\sigma_{v,\,t-1}$).
D/V	The ratio of the face value of debt on the market value of assets.
ROE	Return on equity, defined as earnings before taxes scaled by total shareholder's equity.
σ_E	The standard deviation of the daily return on the market value of equity during the quarter

TABLE 2.5

Sensitivity of changes in leverage to changes in risk around the IFRS 9 adoption for the treatment and control sample

Dependent variable: $\Delta D/V$

		IFRS banks		U.S. GAAP banks	
Variable	Expected sign	(1)	(2)	(1)	(2)
$\Delta\sigma_v$	**(-)**	**-0.526*** **	**-0.681*** **	**-0.996*** **	**-1.083*** **
		(-5.82)	**(-6.80)**	**(-10.54)**	**(-10.59)**
$\Delta\sigma_v$ ***x Post***	**?**		**0.519*** **		**0.218**
			(3.56)		**(1.59)**
Size	**(+)**		1.606***		0.888***
			(3.54)		(4.12)
ROE	**(+)**		-0.307		-11.52***
			(-0.09)		(-2.99)
Year-quarter FE		Yes	Yes	Yes	Yes
Bank FE		Yes	Yes	Yes	Yes
Adj. R-squared		0.155	0.168	0.524	0.541
Observations		2,255	2,255	4,430	4,430

Notes: This table presents coefficient estimates from equation (2.4) for the IFRS and U.S. GAAP sample separately (*t*-statistics in parentheses) based on heteroskedasticity-robust standard errors clustered by firm (Petersen, 2009). The dependent variable $\Delta D/V$ is the change in the ratio of face value of debt over the market value of bank assets over the quarter. *Post* is an indicator variable equal to 1 for observations beginning on or after 2018Q1 and 0 otherwise. *See* table 2.4 for other variable definitions. The results are robust to other clustering dimensions, e.g., country, bank and country, bank and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

TABLE 2.6

Sensitivity of changes in leverage to changes in risk around the IFRS 9 adoption across forward-looking and smoothing countries.

Dependent variable: $\Delta D/V$				
Variable	Expected sign	Forward-looking Countries	Smoothing Countries	Others
$\Delta\sigma_v$	**(-)**	**-0.601***** **(-2.97)**	**-0.913***** **(-6.91)**	**-0.462**** **(-2.55)**
$\Delta\sigma_v$ ***x Post***	**?**	**-0.290** **(-1.01)**	**0.944***** **(4.76)**	**0.469*** **(1.99)**
Size	**(+)**	0.720 (0.72)	1.369 (1.86)	0.875 (1.65)
ROE	**(+)**	18.752** (2.47)	2.163 (0.52)	-5.605 (-1.62)
Year-quarter FE		Yes	Yes	Yes
Bank FE		Yes	Yes	Yes
Adj. R-Squared		0.233	0.230	0.186
Observations		518	970	483

Notes: This table presents coefficient estimates from equation (2.4) for banks in Forward-looking countries and Smoothing countries separately (*t*-statistics in parentheses) based on heteroskedasticity-robust standard errors clustered by firm (Petersen, 2009). The dependent variable $\Delta D/V$ is the change in the ratio of face value of debt over the market value of bank assets over the quarter. *Post* is an indicator variable equal to 1 for observations beginning on or after 2018Q1 and 0 otherwise. *See* table 2.4 for other variable definitions. The results are robust to other clustering dimensions, e.g., country, bank and country, bank and year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Chapter 3: To hedge or not to hedge? The impact of ASU 2017-12 on banks' hedging activities and earnings volatility

3.1. Introduction

Since the original issuance of the FAS 133 guidance in 1998, the FASB has been required to address numerous issues that have developed over time. Financial statement preparers have expressed concerns over the difficulties associated with applying hedge accounting rules and limitations for hedging both nonfinancial and financial risks. Moreover, users of financial statements have expressed concerns over the way hedging activities are reported in the financial statements (FASB, 2017). The current hedge accounting requirements do not faithfully portray the economic results of an institution's risk activities. In practice, the process of meeting the necessary criteria for a derivative to qualify for hedge accounting has proven to be difficult for many firms due to the high cost of application and documentation (Charnes et al., 2003, Panaretou et al., 2013). Thus, while many derivatives used by firms can be designated for hedge accounting purposes on principle, a firm may choose to forgo the use of hedge accounting and designate the derivatives as non-hedge derivatives.

In August 2017, the Financial Accounting Standards Board (FASB) issued an Accounting Standards Update (ASU) intended to improve accounting for hedging activities and enhance derivative usage transparency. ASU 2017-12 provides targeted improvements to the hedge accounting model intended to facilitate financial reporting that reflects an entity's risk management activities more closely and to simplify the application of hedge accounting.

I investigate how the change in accounting for derivative instruments affects banks' decisions as to whether they elect to designate the derivatives as hedges or not. As evidenced by prior research, the current hedge accounting standards have affected the cost and

effectiveness of using derivatives to smooth earnings (Barton, 2001; Pincus and Rajgopal, 2002; Choi et al., 2015). It is important to note that this paper is not testing whether ASU 2017-12 changed the way banks use derivatives. The purpose of this paper is to examine whether banks change the accounting designation of derivatives after ASU 2017-12. Moreover, I examine the new standard's impact on earnings volatility within different groups of derivative users.

First, I run a probit regression to examine the determinants that incentivize banks to designate derivatives for hedge accounting in the pre-adoption period of the ASU 2017-12. I use this analysis to investigate whether the relationship between these determinants and hedging changes in the post-adoption period of ASU 2017-12, and more importantly, whether ASU 2017-12 influences the banks' decisions to apply hedge accounting. Second, I examine the impact of the new standard on earnings volatility within groups of derivative users. I classify banks into hedgers and non-hedgers based on their derivative usage and their use of hedge accounting. I further classify the hedgers into existing hedgers and new hedgers.[18] I start by examining the differences among different users of derivatives (hedgers and non-hedgers) on earnings volatility in the pre-period of ASU 2017-12 using the banks that do not take advantage of hedge accounting (non-hedgers) as a control group. I perform a similar analysis regarding earnings volatility in the post-adoption period of ASU 2017-12 to determine whether the differences among the two groups become more pronounced. I then use a difference in differences analysis on earnings volatility changes among the two groups to determine whether these differences can be attributed to the designation of derivatives for hedge accounting purposes in the period around the adoption of the standard update. Because the accounting

[18] I classify banks that used hedge accounting prior to the adoption of ASU 2017-12 as existing hedgers and banks that elect to designate derivatives for the first time after the adoption of ASU 2017-12 as new hedgers.

standards update is expected to impact earnings volatility alone, I perform a similar analysis to investigate whether there are any differences in cash flow volatility among hedgers and non-hedgers during the same periods to control for the impact of any concurrent events. Finally, I investigate the impact of ASU 2017-12 on earnings volatility for banks that elect to use hedge accounting for the first time after the accounting standard update compared to non-hedgers.

I use bank-specific accounting, financial, and derivative data from FR Y-9C reports filed by Bank Holding Companies (BHC) with the Federal Reserve Bank and hand-collected data for hedging derivatives quarterly for the 2016-2020 period. In the pre-adoption period of ASU 2017-12, I find that high levels of earnings volatility influence the banks' decision to designate derivatives for hedge accounting purposes. This relationship becomes more significant in the post-adoption period of ASU 2017-12. Moreover, the adoption of ASU 2017-12 influences the decision to use hedge accounting, and 13% of the derivative users start designating for the first time derivatives for hedge accounting purposes in the post-adoption period. In contrast, only a handful of banks start using trading or non-trading derivatives for the first time after adopting the standard update. This finding is consistent with the argument that ASU 2017-12 simplifies the requirements for hedge accounting.

I show that banks that elect to designate derivatives for hedge accounting exhibit lower levels of earnings volatility compared to banks that elect not to do so, in line with the prediction that banks that take advantage of hedge accounting benefit from lower earnings volatility. Furthermore, the differences in earnings volatility become more pronounced in the post-adoption period of ASU 2017-12. Using a difference in differences regression, I show that the gap in earnings volatility between the two groups increases, suggesting that the ASU 2017-12 helps banks that elect to use hedge accounting to reduce earnings volatility. In contrast, I find no significant differences in cash flow volatility between the two groups in the pre-adoption

period. Moreover, I find no significant differences in the cash flow volatility between the two sample banks in the post compared to the pre-adoption period. Thus, suggesting that the differences in earnings volatility changes are not driven by any changes in the underlying cash flows.

Interestingly, when comparing the new users of hedge accounting to non-users of hedge accounting, I find that the new hedgers exhibit higher earnings volatility in the pre-period of ASU 2017-12. However, the results change when comparing the two samples in the post period of the accounting standards update, where the new hedgers exhibit lower earnings volatility, supporting the evidence that ASU 2017-12 helps reduce earnings volatility. I find that derivatives held for purposes other than trading are negatively associated with earnings volatility, consistent with the notion that banks use non-trading derivatives to hedge a part of their risk without applying hedge accounting. These results are significant after controlling for self-selection bias and additional variables that may impact earnings volatility, including bank and time fixed effects.

My study contributes to the literature on earnings management and derivative accounting in several ways. First, this paper provides new evidence on the impact of simplified hedge accounting standards and the determinants of banks' decisions to apply hedge accounting and its impact on earnings volatility. Therefore, confirming Choi et al. (2015) that accounting treatment of derivatives on the old standard causes an "artificial" increase in earnings volatility. Second, the results provide potentially useful information for standard setters in their broad assessment of hedge accounting effects on banks' earnings volatility.

The remainder of the paper is organized as follows. In section 3.2, I review the derivative accounting rules and develop the hypotheses. Section 3.3 describes the research design and the variables used in the empirical models. Section 3.4 presents the sample selection process,

including descriptive statistics, and the empirical results are in section 3.5. Section 3.6 concludes.

3.2. Background and Hypotheses Development

3.2.1. Fair Value and Hedge Accounting

Under ASC 815, if certain criteria are met, firms can elect to designate a derivative as designated for hedge accounting. For a derivative to qualify for hedge accounting, the firm must specify the hedged item, identify the hedging strategy and the derivative, and document by statistical or other means for the hedge to be highly effective in offsetting the hedged risk exposure item. The process of meeting the necessary criteria for a derivative to qualify for hedge accounting has proven to be difficult for many firms (Charnes et al., 2003, Panaretou et al., 2013). Thus, while many derivatives used by firms can be designated for hedge accounting purposes on principle, a firm may choose to forgo the use of hedge accounting and designate the derivatives as non-hedge derivatives. Changes under the new guidance include expanding the types of risk management strategies eligible for hedge accounting, easing the documentation and effectiveness assessment requirements, changing how ineffectiveness is measured, and changing the presentation and disclosure requirements for hedge accounting activities. The main provisions of the new standards include: (i) Expansion of risks eligible to be hedged; (ii) Simplified application of interest-rate risk in fair value hedges; (iii) Elimination of the separate measurement and recording of hedge ineffectiveness; (iv) Simplifications related to effectiveness assessments and related hedge documentation; and (v) Improvements to presentation and disclosure. Companies and investors have expressed overwhelmingly positive feedback on the amended hedge accounting model in the comment letters.

According to Abdel-Khalik and Chen (2015), some banks claim that the cost of documentation and continuous testing of hedge effectiveness is too high to justify using hedge accounting. Indeed, many banks disclose that they engage in hedging activities to reduce their risk exposure, and yet, they decide not to designate these derivatives for hedging purposes. Banks may enter into derivative contracts intended to economically hedge certain of their risks, even though hedge accounting does not apply. Although banks aim to reduce the variability of earnings, by not designating the derivatives for hedging purposes, certain banks are still exposed to some level of "artificial earnings volatility." Banks have to recognize in the net income all the changes in the fair value of derivatives, and therefore, they cannot recognize some of the changes in the other comprehensive income. Ultimately, expecting that after ASU 2017-12 banks can easily designate these derivatives for hedge accounting, the new standard affects earnings volatility.

If certain requirements are met to ensure it is a "highly effective" hedge, and a firm chooses to use hedge accounting for a derivative, then the derivative is recognized on the balance sheet at fair value, but the recognition of fair value changes is delayed until the offsetting earnings effect of the hedged risk is also recognized. By not classifying these derivatives for hedging purposes, banks have to recognize in the net income all the changes in the fair value of derivatives, and therefore, they cannot recognize some of these changes in the other comprehensive income. Ultimately, expecting that after ASU 2017-12 banks can designate more of these derivatives for hedge accounting, the new standard affects earnings volatility. As a result, one expects that the simplification in qualifying for hedge accounting and removing the ineffective portion from earnings may help banks report lower volatility in the reported earnings after ASU 2017-12 compared with the pre-period of the ASU 2017-12.

3.2.2. Literature Review and Hypothesis Development

Previous research has found that fair value accounting decreased the firms' use of derivatives for speculative purposes and has affected the firms' ability to hedge (Lins et al., 2011). Additionally, almost all theoretical and empirical research agree that greater application of fair value accounting leads to a higher level of earnings volatility (Barth et al., 1995; Barnes, 2001; Hodder et al., 2006; Fiechter, 2011; Sun, Liu & Cao, 2011). Compared with hedge accounting, fair value accounting of derivatives can potentially boost earnings volatility due to mismatches in the timing of the recognition of gains and losses on derivative instruments and their corresponding hedged items (Plantin et al., 2008; Zhang, 2009; Lins et al., 2011; Ahmed et al., 2006). However, there is no direct evidence of whether firms are willing to forgo their existing hedging strategies to avoid an increase in earnings volatility.

Prior literature documents two main motives for using financial derivatives: (i) reducing risk exposure by transferring risk from one party to another and (ii) managing liquidity, speculation, and profit-making (Hentschel and Kothari, 2001). The issuance of FAS 133 (currently ASC 815) in 1998 aimed at improving the financial reporting disclosure of the use of derivatives. In particular, the standards set up accounting and reporting based on classifying derivatives into two main categories: trading derivatives and hedging derivatives. ASC 815 provides a special set of hedge accounting treatments allowing the management to shelter earnings from the volatility introduced by changes in financial derivatives' fair values.

According to Abdel-Khalik and Chen (2015), some banks claim that the cost of documentation and continuous testing of hedge effectiveness is too high to justify using hedge accounting. Indeed, many banks disclose that they engage in hedging activities to reduce their risk exposure, and yet, they decide not to designate these derivatives for hedging purposes. DeMarzo and Duffie (1995) and Melumad et al. (1999) argue that the accounting used for

derivatives affects managers' hedging strategies, resulting in suboptimal hedging. On the other hand, Nan (2011) argues that FAS 133 may have the unintended consequence of promoting speculation due to the early recognition of unrealized gains and losses from non-designated derivatives. Although the banks aim to reduce the variability of earnings, by not designating the derivatives for hedging purposes, these banks are still exposed to "artificial earnings volatility." Because the offsetting gain or loss from the hedged risk would not occur until a future period, immediate recognition of derivative fair value gains and losses would increase earnings volatility in a way that misrepresented the underlying economics of the hedging activity.

Hughen (2010) documents that after the implementation of FAS 133, many firms misapplied hedge accounting. The author also examines how these firms respond to losing hedge accounting. She finds variation in whether firms choose to maintain stability in economic earnings but increase the volatility of accounting earnings by maintaining the derivative position or whether they choose to maintain stability in accounting earnings but increase the volatility of economic earnings by discontinuing the derivative position. Furthermore, that variation in this decision is driven by firms' historical ability to meet or beat earnings benchmarks.

In the previous years, few banks attempted to lessen the difficulty of hedging by using the "shortcut method," where FASB permitted the assumption of a perfectly effective hedge program if specific conditions were satisfied (Finnerty and Grant, 2002). Nevertheless, because of a minor missed detail or a sudden change in business conditions, the violation of any shortcut criterion led to the loss of hedge accounting privileges and, occasionally, an accounting restatement. The new accounting standard update offers an improvement to the shortcut method of assessing the effectiveness of a hedging program by allowing for a fallback to be

documented at the time of designation. This change will significantly reduce the risk of a restatement, and banks will be able to practice prudent hedging activities with less fear of an accounting miscalculation of hedge effectiveness. Moreover, it will allow a company to perform subsequent hedge effectiveness assessments qualitatively if certain conditions are met and provide more time to perform the initial quantitative hedge effectiveness assessment. According to Abdel-Khalik and Chen (2015), some banks claim that the cost of documentation and continuous testing of hedge effectiveness is too high to justify using hedge accounting.

The new ASU 2017-12 might incentivize firms to designate more derivatives for hedging purposes without concern for introducing unwanted volatility to reported earnings (Campbell et al., 2019). That is, to the extent that the hedging relationship is effective, the changes in fair value of derivatives designated for hedging purposes would be entirely offset by the changes in fair value of the hedged item (fair value hedge) or be reported in accumulated other comprehensive income until the future transaction occurs (cash flow hedge). ASU 2017-12 is effective for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. Early application is permitted in any interim period after issuance of the ASU for existing hedging relationships on the date of adoption. Early evidence shows that most banks have adopted the standards since the first quarter of 2018. The standard update aims to simplify hedge accounting guidance and make hedging more attractive for financial institutions. Therefore, the first hypothesis raises the question of whether banks designate more derivatives for hedging purposes due to the adoption of ASU 2017-12.

H_1: The adoption of ASU 2017-12 influences the banks' decision to designate derivatives for hedge accounting purposes.

Under the old standard, a hedge of interest-rate risk was allowed only for specific benchmark interest rates, i.e., LIBOR, U.S. Treasury, and the Overnight Index Swap (OIS) rates. The ASU amended this guidance to allow other interest rates to be hedged.[19] Moreover, hedging a portfolio of fixed-rate mortgages was impractical under the original standard because of the caveat that every loan in the pool of a loan portfolio had to be homogeneous concerning origination and maturity date, and other characteristics. Some banks would sometimes hedge larger commercial loans one at a time, but this prevalent source of interest rate risk was either hedged differently or ignored. The newly introduced "last-of-layer" designation eliminates this caveat and enables banks to hedge a larger portion of their loan portfolio. As a result of the ASU, banks will have a one-time chance to reclassify held-to-maturity securities as available-for-sale if they are eligible for the last-of-layer designation. I predict that upon the adoption of ASU 2017-12, banks will take advantage of the new strategy and reclassify securities from held-to-maturity to available for sale to apply more hedging techniques to hedge their prepayable loans on a portfolio basis. Some banks have taken advantage of this opportunity and reclassified some of the held-to-maturity securities to available-for-sale (e.g., J.P. Morgan)[20].

Barton (2001) documents that derivatives and discretionary accruals are used as partial substitutes to affect earnings volatility, reduce agency cost, reduce income taxes and increase managerial wealth. He provides evidence that derivative users have significantly lower volatile cash flows and total accruals as compared to non-derivative users. Barton (2001) also shows that non-derivative users aggressively manage accruals. Choi et al. 2015, document that the

[19] For cash flow hedges, ASU 2017-12 eliminated the concept of benchmark interest rates. Instead, an entity can hedge any contractually specified interest rate. For fair value hedges, the concept of benchmark interest rates was retained. However, the Securities Industry and Financial Markets Association (SIFMA) Municipal Swap Rate was added to the list of eligible U.S. benchmark interest rates mentioned above.

[20] See Appendix 3.A.

substitution between derivatives and discretionary accruals is attenuated and that earnings volatility increases after FAS 133 adoption.

Kilic et al. (2013) argue that under FAS 133, the mandatory accounting recognition of hedge ineffectiveness reduces banks' ability to smooth earnings and increases their reliance on loan loss provisions to reduce earnings volatility. The ASU 2017-12 will likely lower the income statement's volatility by eliminating the recognition of the hedge ineffectiveness. Mismatches between changes in the hedged item and hedging instrument's value may still occur, but they will no longer be separately reported in the income statement. Instead, for cash flow and net investment hedges, all changes in the value of the hedging instrument included in the assessment of hedge effectiveness will be deferred in other comprehensive income and recognized in earnings at the same time that the hedged item affects earnings. Under the old standard, the ineffectiveness portion was recognized in the income statement, and the effective portion was recognized in the Other Comprehensive Income.

Prior research documents at least two channels by which FAS 133 made derivatives less effective in reducing earnings volatility (Barton, 2001; Gastineu Smith and Todd, 2001; Choi et al., 2015). First, FAS 133 imposed strict rules which required firms to fulfill a documentation set that reduces the flexibility and discretion that firms had prior to FAS 133.[21] As a result, an economically sound hedging program may not qualify for hedge accounting purposes if it cannot fulfill FAS 133 requirements, forcing the derivative gains and losses to be recognized in the income statement and boost earnings volatility. Moreover, even if a derivative may fulfill the hedge accounting requirements, due to the complex requirements of the FAS 133, many

[21] Before starting the hedging program, the firm must document its risk management strategy, hedging relation at the inception, and the method of hedge effectiveness. FAS 133 imposed the 80%-125% rule, which is difficult to reach, especially when there is a low correlation between the hedging instrument and the hedged item.

firms elect to forgo the designation of derivatives as hedges and classify them as non-hedging derivatives (Abdel-Khalik and Chen, 2015). Thus, managers have less discretion in the timing and recognition of derivative gains and losses, which implies that derivatives have become less effective to smooth earnings and reduce earnings volatility.

Second, FAS 133 required firms to conduct additional assessments of "ineffectiveness" to determine what portion of the accumulated other comprehensive income balance has to be recognized in earnings in the current period or deferred for future periods. The recognition of this ineffective portion results in short-term volatility in cash flows and earnings. In other words, under FAS 133, a derivative used for hedging purposes may not fulfill the hedge accounting requirements, and even if the hedge is qualified, some portion may be characterized as "ineffective" and recognized in the income statement. Thus, I define the following hypotheses to test the impact of ASU 2017-12 on earnings volatility:

H_{2a}: Banks that use hedge accounting exhibit a decrease in earnings volatility compared to non-hedgers after the adoption of ASU 2017-12.

H_{2b}: New users of hedge accounting exhibit a decrease in earnings volatility compared to non-hedgers after the adoption of ASU 2017-12.

3.3. Research Design

3.3.1. Derivatives designated for hedging purposes around ASU 2017-12 adoption period

To examine whether banks designate more derivatives for hedging purposes after adopting ASU 2017-12, I compare the percentage of derivatives designated for hedging purposes before

and after the adoption of the new standards. I use these descriptive statistics to classify the sample banks into two categories: Hedgers and Non-hedgers.

To test the first hypothesis, I compare the characteristics of hedgers to the control sample of non-hedgers. If banks increase their use of hedging derivatives, I expect an increase in the decision to designate these derivatives for hedging purposes in the periods after the implementation. I model banks' decision to designate derivatives for hedging purposes using a probit regression on the incentives to reduce earnings volatility, cash flow volatility, and other control variables that proxy for incentives to use derivatives. The control variables serve as proxies for financial distress, managerial incentives, and information asymmetry. I define the dependent variable as HEDGE, a binary variable that takes the value of one when a bank designates derivatives for hedging purposes in its financial statements and zero otherwise. As a first step, I estimate the probit regression to examine the determinants of hedge accounting usage in the pre-period of ASU 2017-12. Next, I estimate the probit regression in the post-adoption period and examine whether the relationship between the determinants and the decision to hedge changes and whether the adoption of ASU 2017-12 plays a role in the banks' decision to use hedge accounting. I use a binary variable to proxy for the periods after the ASU 2017-12 implementation.

$$\begin{aligned} PR(HEDGE=1) = {} & \beta_0 + \beta_1 POST + \beta_2 EARNVOL + \beta_3 CFVOL + \beta_4 FV\_TR \\ & + \beta_5 FV\_NONTR + \beta_6 CFH\_OCI + \beta_7 SIZE + \beta_8 NI + \beta_9 LEV \\ & + \beta_{10} BIG4 + \beta_{11} LOANS + \varepsilon \end{aligned} \tag{3.1}$$

I include earnings volatility (cash flow volatility) defined as *EARNVOL* (*CFVOL*), calculated as the standard deviation of quarterly income before extraordinary items (cash flow

from operations) divided by beginning total assets over the prior four quarters.[22] I predict that banks with more ex-ante earnings volatility initiate hedging programs that designate derivatives for hedging purposes. Moreover, I expect a positive relationship between the probability to hedge and the POST variables, which takes a value of 1 if the bank has adopted ASU 2017-12 and 0 otherwise. I include control variables *FV_TR, FV_NONTR, CFH_OCI, SIZE, NI, LEV, BIG4,* and *LOANS.* I define *FV_TR* as the total fair value of trading derivatives in the prior quarter, and I expect a positive association between *FV_TR* and *HEDGE*. I define *FV_NONTR* as the total fair value of derivatives held for purposes other than trading in the prior quarter. The variable *SIZE* is calculated as the natural logarithm of total assets. I expect large banks to be more likely to designate derivates for hedging purposes. I define *BIG4* as a binary variable that takes the value of one when the bank is audited by a Big 4 audit company and zero otherwise. I expect a positive association between *BIG4* and *HEDGE* in line with the expectation that the audit company's expertise may influence the choice to designate derivatives for hedge accounting purposes. The other variables are defined in the tables.

3.3.2. Difference-in-differences analysis of changes in earnings volatility

To test whether the adoption of ASU 2017-12 reduces earnings volatility, I start by examining the differences in earnings volatility between hedgers and non-hedgers separately for the pre-period and post-period of ASU 2017-12. Subsequently, I perform a difference-in-differences analysis of earnings volatility for banks that designate derivatives for hedging purposes and using the banks that were not involved in hedge accounting after the adoption as a control. Firms have incentives to reduce earnings volatility by managing the level of

[22] Following prior research, I also measure earnings volatility using a four, eight, and twelve quarters window, and find similar results (Fiechter, 2011; Abdel-Khalik and Chen, 2015).

derivatives and accruals (Barton, 2001; Choi et al., 2015). Thus, I perform similar regressions to determine the effects of ASU 2017-12 on cash flow volatility. I include a binary variable to classify banks into hedgers and non-hedgers and another binary variable to proxy for the period after implementing the standard update. The design uses control periods before and after the implementation to identify unexpected changes associated with the rule changes. Moreover, the control sample of non-hedgers provides an extra level of control to minimize the effects of any contemporaneous changes that may impact the sample banks. Therefore, I estimate the following model to examine the second hypothesis (H2a):

$$\begin{aligned} EARNVOL = {} & \beta_0 + \beta_1 POST + \beta_2 HEDGER + \beta_3 POST*HEDGER + \beta_4 FV\_TR \\ & + \beta_5 FV\_NONTR + \beta_6 CFH\_OCI + \beta_7 SIZE + \beta_8 LEV + \beta_9 NI + \beta_{10} LOANS \\ & + \beta_{11} Inv.\ Mills + Bank\ FE + Year\text{-}Quarter\ FE + \varepsilon \end{aligned} \tag{3.2}$$

$$\begin{aligned} CFVOL = {} & \beta_0 + \beta_1 POST + \beta_2 HEDGER + \beta_3 POST*HEDGER + \beta_4 FV\_TR \\ & + \beta_5 FV\_NONTR + \beta_6 CFH\_OCI + \beta_7 SIZE + \beta_8 LEV + \beta_9 NI + \beta_{10} LOANS \\ & + \beta_{11} Inv.\ Mills + Bank\ FE + Year\text{-}Quarter\ FE + \varepsilon \end{aligned} \tag{3.3}$$

The variables are defined as follows: *EARNVOL* is measured as the standard deviation of quarterly income before extraordinary items divided by beginning total assets over the prior four quarters. *POST* is a binary variable that takes the value 1 if the bank has adopted ASU 2017-12 and zero otherwise. *HEDGER* is a binary variable that takes the value 1 if the bank was already designating derivatives for hedge accounting and zero if the company does not designate derivatives for hedge accounting before and after the adoption of the standard; *FV_TR* is the total fair value of derivatives used for trading purposes scaled by total assets;

FV_NONTR is the total fair value of derivatives used for non-trading purposes (excluding the derivatives designated for hedging purposes); *SIZE* is the natural logarithm of total assets. I also include the *inverse Mills ratio* obtained from the probit regression in equation (3.1) to control for self-selection bias. Moreover, I include bank fixed effect and year-quarter fixed effect to control for bank-specific characteristics and time trends.

I perform a similar analysis for hypothesis H2b, where I compare a subsample that includes new users of hedge accounting to the non-users of hedge accounting. The new users of hedge accounting (new-hedgers) include banks that elect to use hedge accounting for the first time after adopting ASU 2017-12. The non-users of hedge accounting are defined as banks that are derivative users though do not elect to designate these derivatives for hedge accounting purposes.

The coefficient of interest β_3 (*POST*HEDGER*) captures the incremental change in volatility in the post-adoption of ASU 2017-12 for banks that designate derivatives for hedging purposes over banks that keep their activities constant (banks that do not designate derivatives for hedging purposes). I expect a negative coefficient β_3 in line with the prediction that banks that designate derivatives for hedging purposes exhibit lower earnings volatility due to the new Accounting Standard Update. I include the *FV_TR* and *FV_NTR* to control for the effect of other derivatives (trading and non-trading) on earnings volatility.

3.4. Sample Selection and Summary Statistics

3.4.1. Sample selection process

I collect data on the fair values and notional amounts of derivatives at the end of each quarter during my sample period (2016-2020) and other financial variables for bank holding companies (BHC) from FR Y-9C reports filed by BHCs with the Federal Reserve Bank on a quarterly

basis. I manually hand-collect the fair values designated for hedging purposes and the corresponding fair value gains and losses from the 10-Q and 10-K filings. Moreover, I hand-collect and verify the quarters in which the banks adopt (or early adopt) the ASU 2017-12 and collect the restatement filings needed for the restatement analysis. After deleting observations with missing financial data, I have a total sample of 218 banks and a total of 3,894 bank quarter observations. I collect the rest of the data from the Thomson Reuters database. A summary of the sample composition is presented in Table 3.1.

I split the sample into two subsamples based on the use of derivatives for hedging purposes around the adoption of ASU 2017-12. Namely, I classify banks into Hedgers and Non-hedgers. I define *Hedgers* banks involved in formal hedging relationships before or after the ASU 2017-12 adoption. This subsample includes banks that already have derivatives designated for hedging purposes in their financial statements and banks that start designating derivatives for hedge accounting purposes in the post period of ASU 2017-12. Conversely, *Non-hedgers* are banks that do not have any derivatives designated for hedging purposes before and after the ASU 2017-12 adoption.

3.4.2. Descriptive statistics

Panel A of Table 3.1 reports general descriptive statistics of the sample banks. Of the 218 banks, 89% (193) were found to be derivative users. Of the total, 84% (184) of the banks have non-trading derivatives that may be eligible to be designated for hedge accounting purposes. However, only 54% (118) of banks choose to designate a part of their derivatives for hedge accounting purposes prior to ASU 2017-12. About 12% (25) of the sample started designating derivatives for hedge accounting after adopting ASU 2017-12. Notably, 33% of the sample

banks adopted the standard update prior to its mandatory date of the first quarter of 2019. Only 37% (85) of banks disclose that they hold derivatives for trading purposes.

[Insert Table 3.1 about here]

Finally, table 3.1 reports that there are no significant changes in the derivative usage from banks around the adoption of ASU 2017-12. The number of derivative user banks increases only by 1%. However, after the adoption of the standard more banks start designating derivatives for hedge accounting purposes. This represents an increase of 21.2% compared to the preadoption period of the standard update. Panel B of Table 3.1 shows that 23% (50) of the sample banks updated the standard as soon as it became available during the first quarter of 2018. Overall, 67% of the sample banks adopted the standard at its mandatory date in the first quarter of 2019.

Table 3.2 provides additional descriptive statistics on the variables used in the empirical models.[23] The mean fair value amounts of hedging derivatives as a percentage of the total fair value of derivatives eligible for hedge accounting have increased from 38% to 47% in the post-adoption period of ASU 2017-12. Therefore, supporting the prediction that banks are taking advantage of the accounting standard update and are designating more derivatives for hedge accounting purposes. Additionally, more than 54% of derivatives users took advantage of the last layer designated and elected to reclassify a portion of their held-to-maturity securities into available-for-sale.

[Insert Table 3.2 about here]

The results show an increase in the average earnings volatility and cash flow volatility between the pre and the post-period of the standard update. (look at the median whether there

[23] All variables except the indicator variables and size are winsorized at the 1% and 99% levels to reduce the influence of outliers.

are any changes). The descriptive statistics show no changes in banks' profitability in the post periods, and the level of derivative usage has slightly increased.

Panel B of Table 3.2 reports the univariate comparison of differences between hedgers and non-hedgers. Banks that designate derivatives for hedge accounting purposes have slightly lower volatility of earnings and cash flows compared to banks that elect not to use hedge accounting. The hedgers take more advantage of the last-of-layer designation and elect to designate more than 2.9% of their total assets from held-to-maturity securities to available-for-sale compared to 1.8% for the non-hedger banks. Overall, both samples have similar profitability, and hedger banks are slightly larger and have a lower loan portfolio. Panel C of Table 3.2 reports correlations between the variables used in the empirical tests. Derivatives designated for hedging purposes are significantly correlated to size, suggesting that larger banks have more experience with hedge accounting and elect to designate a larger portion of their derivatives for hedging purposes.

3.5. Empirical Results

3.5.1. Hedge accounting determinants

Table 3.3 reports the probit regression results of hypothesis 1. In this model, I regress the decision to use derivatives for hedging purposes on earnings volatility, cash flow volatility, and control variables that proxy for other incentives to use hedge accounting.[24] Moreover, I use a dummy variable POST, which equals one in the post-adoption of ASU 2017-12 and zero otherwise. I estimate the probit regression on both the full sample and the derivative users to estimate equation (3.1).

[24] I make no claims on derivatives usage of banks. I rather focus on the classification of the derivatives that banks use into derivatives for hedge accounting purposes.

[Insert Table 3.3 about here]

Panel A of Table 3.3 separately reports the probit regression results in the pre- and post-adoption of ASU 2017-12. The significantly positive coefficient on EARNVOL (β_1 = 0.051, z-stat = 2.90) in the model (1) suggests a positive relationship between earnings volatility and the decision to designate derivatives for hedge accounting in the pre-period of ASU 2017-12. The coefficient is reinforced in the model (2) estimated in the post-adoption period of ASU 2017-12.

Panel B of Table 3.3 reports the probit regression results on the entire sample for the period around the adoption of the accounting standard update. I introduce the POST variable to test the influence of the ASU 2017-12 on the decision to designate derivatives for hedge accounting purposes. The models explain about 38% of the dependent variable variation and correctly classifies 70% of the observations. The results show that banks that elect to designate derivatives for hedge accounting purposes are characterized by a lower level of earnings volatility, in line with the prediction that banks that elect to use hedge accounting benefit lower earnings volatility. Similarly, the cash flow volatility is positively associated with the decision to designate derivatives for hedge accounting purposes. The coefficient on the period after the adoption of ASU 2017-12 is significant (β_1 = 0.226, z-stat = 4.54) and positively related to the decision to designate derivatives for hedge accounting purposes. Thus, ASU 2017-12 does influence the decision to use hedge accounting. In the post-adoption period of the standard update, there is a higher probability for a bank to designate derivatives for hedge accounting purposes, as opposed to the pre-period.

The loan portfolio is positively and significantly associated with the decision to use hedge accounting, suggesting that banks with large debt portfolios are incentivized to hedge their exposure to interest rate risk. Banks that hold a high level of derivatives held for trading and

non-trading purposes are also more incentivized to use hedge accounting. Moreover, size is significant and positively related to the use of hedge accounting, suggesting that scale economies of implementing a hedging program are more likely to encourage larger banks to designate derivatives for hedge accounting purposes. The coefficient on the BIG4 is not significant, suggesting that the audit company's expertise does not influence the choice to designate derivatives for hedge accounting purposes.

Only 54% of my sample banks pre-ASU 2017-12 and 66% post-ASU 2017-12 report designating derivatives for hedge accounting purposes. Thus, there is a need to control for potential self-selection bias. Following Barton (2001) and Choi et al. (2015), I compute the inverse Mills ratio and include it as an additional control variable in equations (3.2) and (3.3) to correct for potential selection bias.

3.5.2. Earnings Volatility

In this section, I examine the change in earnings volatility and cash flow volatility around the adoption of ASU 2017-12 for both hedgers and non-hedgers. The volatility of earnings is measured as the standard deviation of income before extraordinary items over the past four quarters, scaled by the average total assets over the same period.[25] Similarly, the volatility of cash flows is measured as the standard deviation of operating cash flows over the past four quarters, scaled by the average total assets over the same period.

[Insert Table 3.4 about here]

In Table 3.4, I regress the earnings volatility and cash flow volatility on a set of variables that proxy for the incentives to designate derivatives for hedging purposes and an indicator

[25] The results are similar when using 6, 8, and 12 quarters to estimate earnings volatility and cash flow volatility.

variable (*POST*) for the period after the implementation of ASU 2017-12. Additionally, I include a binary variable *HEDGER,* which takes the value one if the bank is classified as a hedger and zero otherwise. I interact the binary variable with the *POST* variable and compare the interaction terms' coefficients to determine whether there are any significant differences in the dependent variables with respect to the explanatory variables. For comparative purposes, I estimate several models, with and without the interactions and/or fixed effects.

I start by separately estimating the regression for the pre- and post-period of ASU 2017-12 adoption. In the pre-period of ASU 2017012, the negative coefficient of *HEDGER* (β_1 = -0.05, *t*-stat = -2.78) in the model (1) shows that the banks that designate derivatives for hedge accounting purposes exhibit lower volatility of earnings in the pre-period of the accounting standard update. Moreover, the gap in earnings volatility between the two groups becomes more prominent in the post period of ASU 2017-12, given by the more pronounced negative coefficient on *EARNVOL* in the model (2). The results provide supporting evidence that earnings volatility is lower for banks that elect to designate derivatives for hedge accounting purposes in the pre- and post-adoption period of ASU 2017-12. Moreover, in line with my prediction, I find no significant differences in the cash flow volatility between hedgers and non-hedgers in Table 3.5, around the accounting standards update. These results support the evidence that hedge accounting reflects only the choice of accounting methods, and therefore, does not affect the underlying cash flows.

In models (3) to (5), I estimate the regression on the entire sample period and include all the variables with and without the fixed effects. The coefficient on *HEDGER* is still significant in model (3), supporting the results that hedger banks experience lower earnings volatility in the pre-period of the adoption of the standards update. Additionally, the statistically positive significant coefficient on the *POST* variable (β_1 = 0.112, *t*-stat = 6.73) in models (3) and (4)

suggests that earnings volatility has increased for the non-hedger group in the post-period of the adoption of ASU 2017-12. These results are in line with expectations as the post period of ASU 2017-12 includes the first and second quarter of 2020 when high volatility levels characterized markets due to the impact of the COVID-19 pandemic.[26] As predicted, the estimated coefficient on *CFH* is negative and statistically significant at the 5% level (β_6 = -0.386, *t*-stat = -2.34), consistent with the prediction that the use of cash flow hedges helps in reducing earnings volatility. Similarly, the coefficient on *FV_NONTR* is negative and statistically significant at the 1% (β_5 = -0.297, *t*-stat = -5.42), consistent with the notion that banks use non-trading derivatives to hedge a part of their risk without applying hedge accounting. Conversely, the coefficient on *FV_TR* is positive and significant, consistent with the fact that derivatives held for trading increase earnings volatility. Finally, the coefficient of interest on the interaction term *POST*HEDGER* is negative and statistically significant in model (5) after controlling for bank and year-quarter fixed effects (β_3 = -0.025, *t*-stat = -2.92). In economic terms, the coefficient translates into a magnitude of 28% incremental lower earnings volatility for the hedgers in the post-adoption period. Thus, banks that designate derivatives for hedge accounting purposes exhibit a lower impact on volatility in the post period of ASU 2017-12 compared to non-hedger banks.

[Insert Table 3.5 about here]

In the set of regressions in Table 3.5, I find no conclusive evidence to support any differences from the impact of ASU 2017-12 on cash flow volatility. The results suggest no differences among the two groups in both the pre and post-period of ASU 2017-12. While the

[26] I find similar but slightly weaker results when I restrict the sample period until the fourth quarter of 2019 with respect to earnings volatility changes for the non-hedger sample. The interaction coefficient on the interaction term *POST*HEDGER* is still highly significant and negative.

coefficient *POST* is positive and significantly different from zero, the coefficient on the interaction term *POST*HEDGER* is not statistically significant (β_3 = -0.007, *t*-stat = -0.89). Thus, cash flow volatility increases in the post-adoption period of ASU 2017-12, in line with the impact on earnings volatility due to the COVID-19 pandemic. In economic terms, the insignificant coefficient on the interaction term translates into a magnitude of 4.11% incremental lower cash flow volatility for the hedgers in the post-adoption period. However, the regressions fail to detect any structural change in the coefficients after the implementation of the standard update for the two groups. These results address the risk that the differences in the earnings volatility impact may come from the differences of the changes from the underlying cash flows.

Regarding the control variables, banks with high levels of derivatives held for purposes other than trading, size, and profitability experience a higher level of earnings volatility. The coefficient on the Inverse Mills ratio shows no sample selection bias in my sample.

3.5.3. New users of hedge accounting

In this section, I examine the impact of ASU 2017-12 on earnings volatility for the subsample of new users of hedge accounting (new hedgers) compared to banks that elect not to designate derivatives for hedge accounting purposes. I perform a similar analysis to section 3.5.2 and exclude the existing hedgers from the sample.

[Insert Table 3.6 about here]

In contrast to the results on the full sample, the positive significant coefficient on β_1 (*t*-stat = 4.96) suggests that the earnings volatility in the pre-period of ASU 2017 is higher for the new hedgers compared to non-hedgers. This finding supports the results from the probit regression, suggesting that higher earnings volatility influences the decision of the banks to

start using hedge accounting. In line with the results from table 3.4, the new hedgers experience lower earnings volatility in the post period of the adoption of ASU 2017-12. The coefficient on the interaction term (β_3 = -0.044, *t*-stat = -2.56) suggests a more significant change in earnings volatility for the new hedgers compared to the existing hedgers versus the non-hedger banks. Thus, confirming the results that ASU 2017-12 decreases earnings volatility. Conversely, similar to the results from table 3.5, the insignificant coefficients in models (4) to (6) do not support any differences between the two groups in both the pre- and the post-adoption of ASU 2017-12.

3.6. Conclusion

Since the introduction of FAS 133, prior research has raised the concern and provided evidence that derivative hedging has become less effective as a tool for firms to reduce earnings volatility due to the strict hedge accounting requirements (Barton, 2001; Choi et al., 2015). The introduction of the accounting standard update on hedge accounting (ASU 2017-12) aims to simplify the application of hedge accounting and enhance the transparency of derivative usage by introducing new types of risk management strategies eligible for hedge accounting and easing the effectiveness assessment requirements.

In this paper, I investigate the banks' decision to designate derivatives for hedge accounting purposes around the adoption of ASU 2017-12 and its impact on earnings volatility. The new standard update provides targeted improvements to the current hedge accounting standards intended to facilitate financial reporting that more closely reflects an entity's risk management activities and to simplify the application of hedge accounting. Changes in the new guidance include expanding the types of risk management strategies eligible for hedge accounting, easing the documentation and effectiveness assessment requirements, changing how

ineffectiveness is measured, and changing the presentation and disclosure requirements for hedge accounting activities.

Using detailed quarterly data on financial derivatives for bank holdings for the period from 2016 to 2020, I find that banks that engage in derivative usage take advantage of the simplified ASU 2017-12 and classify more derivatives for hedge accounting purposes. Moreover, a significant number of banks elect to early adopt the standard update prior to its mandatory date. My results show that ASU 2017-12 influences the banks' decisions to use hedge accounting. In assessing the impact of ASU 2017-12 within groups of derivative users, I find evidence that banks that designate derivatives for hedge accounting purposes exhibit a lower level of earnings volatility around the adoption of ASU 2017-12 as opposed to banks that elect not to apply hedge accounting. The additional analysis of first-time users of hedge accounting after adopting ASU 2017-12 versus the non-users of hedge accounting reinforces the findings that hedge accounting helps reduce earnings volatility. I find that the new users of hedge accounting exhibit higher earnings volatility in the pre-period of ASU 2017-12 compared to non-hedgers. In contrast, during the post-adoption period, the new hedgers exhibit lower earnings volatility compared to non-hedgers. Additional analysis indicates that differences in the underlying cash flows do not drive the impact on earnings volatility.

Although I examine a large sample of banks that are more likely to use derivatives and be affected by the implementation of ASU 2017-12, my study contains several limitations. I cannot rule out that my results may also be influenced by omitted factors such as concurrent events to the extent that these events correlate with the treatment effect and concurrent changes in earnings volatility. Moreover, I cannot completely rule out the self-selection bias.

These potential limitations aside, this paper provides new evidence on the impact of simplified hedge accounting standards on banks' decisions to apply the standard and its impact

on earnings volatility. My findings contribute to the academic literature on derivative accounting and provide potentially useful information for standard setters in their broad assessment of hedge accounting effects on banks' earnings volatility.

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TABLE 3.1

Derivative usage and ASU 2017-12 adoption statistics

Panel A. Derivative usage around ASU 2017-12 Adoption

	Pre - ASU 2017-12		Post - ASU 2017-12		
	# banks	*%*	*# banks*	*%*	*% Change*
Derivative users	191	88%	193	89%	1.0%
Derivative non-users	27	12%	25	11%	-7.4%
Trading Derivatives users	81	37%	85	39%	4.9%
Non-trading Derivatives users	184	84%	186	85%	1.1%
Hedge accounting users	118	54%	143	66%	21.2%

Panel B. ASU 2017-12 adoption

Year - Quarter	*# banks*	*%*	*Cum.*		*# banks*	*%*	*Cum.*
2017q1	0	0%	0%	2018q2	4	2%	28%
2017q2	0	0%	0%	2018q3	3	1%	29%
2017q3	0	0%	0%	2018q4	8	4%	33%
2017q4	6	3%	3%	2019q1	147	67%	100%
2018q1	50	23%	26%	Total	218	100%	100%

Notes: Panel A reports derivative usage among the sample banks around the ASU 2017-12 adoption. Panel B reports the distribution of ASU 2017-12 adoption quarters in my sample. The data is collected from FR Y-9C report and hand-checked with the 10-Q and 10-K filing reports.

TABLE 3.2

Descriptive statistics and correlations

Panel A: Descriptive Statistics for the full sample around ASU 2017-12 adoption.

	Total sample (N = 3,894)			Pre-ASU 2017-12 (N = 2,374)			Post-ASU 2017-12 (N = 1,520)		
Variable	*Mean*	*Std. Dev.*	*Median*	*Mean*	*Std. Dev.*	*Median*	*Mean*	*Std. Dev.*	*Median*
EARNVOL	0.0009	0.0010	0.0006	0.0008	0.0010	0.0005	0.0011	0.0011	0.0008
CFVOL	0.0017	0.0020	0.0011	0.0016	0.0021	0.0011	0.0018	0.0019	0.0012
FV_TR	0.0161	0.0861	0.0000	0.0125	0.0795	0.0000	0.0225	0.0962	0.0000
FV_NONTR	0.0018	0.0032	0.0005	0.0015	0.0029	0.0003	0.0023	0.0037	0.0008
FV_HEDGING	0.0006	0.0012	0.0000	0.0005	0.0011	0.0000	0.0007	0.0014	0.0000
FV_HEDGE_TO_NONTR	0.4145	0.6485	0.0822	0.3796	0.6215	0.0325	0.4689	0.6853	0.1918
DERIV_GAIN	0.0001	0.0003	0.0000	0.0000	0.0003	0.0000	0.0001	0.0003	0.0000
CFH_OCI	0.0001	0.0002	0.0000	0.0001	0.0002	0.0000	0.0001	0.0003	0.0000
HTM_RECLASS	0.0265	0.1454	0.0000	0.0071	0.0757	0.0000	0.0741	0.2362	0.0000
SIZE	16.2195	1.5637	15.8711	15.9828	1.4738	15.6911	16.5893	1.6275	16.2423
NI	0.0027	0.0014	0.0027	0.0026	0.0013	0.0026	0.0027	0.0015	0.0028
NII	0.0078	0.0024	0.0077	0.0078	0.0023	0.0078	0.0077	0.0024	0.0076
LOANS	0.6783	0.1547	0.7150	0.6781	0.1537	0.7117	0.6786	0.1564	0.7197
NPL	0.0054	0.0042	0.0045	0.0054	0.0042	0.0045	0.0056	0.0043	0.0048
LLA	0.0070	0.0041	0.0065	0.0068	0.0037	0.0064	0.0072	0.0045	0.0066
LLP	0.0013	0.0024	0.0006	0.0011	0.0021	0.0006	0.0017	0.0027	0.0008
CHARGEOFF	0.0012	0.0025	0.0005	0.0012	0.0023	0.0005	0.0012	0.0027	0.0005

(Continued)

TABLE 3.2 - Continued

Descriptive statistics and correlations

Panel B: Descriptive Statistics for hedgers and non-hedgers

	Hedgers (N = 2,497)			Non-Hedgers (N = 1,007)		
Variable	*Mean*	*Std. Dev.*	*Median*	*Mean*	*Std. Dev.*	*Median*
EARNVOL	0.0008	0.0007	0.0006	0.0010	0.0014	0.0008
CFVOL	0.0017	0.0017	0.0011	0.0018	0.0019	0.0011
FV_TR	0.0244	0.1058	0.0000	0.0012	0.0043	0.0000
FV_NONTR	0.0023	0.0035	0.0009	0.0011	0.0026	0.0002
FV_HEDGING	0.0009	0.0015	0.0002	0.0000	0.0000	0.0000
FV_HEDGE_TO_NONTR	0.5688	0.6987	0.4322	0.0000	0.0000	0.0000
DERIV_GAIN	0.0001	0.0003	0.0000	0.0000	0.0003	0.0000
CFH_OCI	0.0002	0.0003	0.0000	0.0000	0.0000	0.0000
HTM_RECLASS	0.0297	0.1540	0.0000	0.0179	0.1197	0.0000
SIZE	16.6108	1.6472	16.1885	15.7489	1.0733	15.7061
NI	0.0026	0.0013	0.0026	0.0027	0.0013	0.0028
NII	0.0075	0.0021	0.0076	0.0079	0.0012	0.0081
LOANS	0.6793	0.1487	0.7135	0.7023	0.1304	0.7310
NPL	0.0055	0.0041	0.0047	0.0054	0.0042	0.0043
LLA	0.0070	0.0041	0.0065	0.0065	0.0030	0.0063
LLP	0.0014	0.0024	0.0007	0.0010	0.0013	0.0006
CHARGEOFF	0.0013	0.0025	0.0006	0.0007	0.0009	0.0004

(Continued)

TABLE 3.2 - Continued

Descriptive statistics and correlations

Panel C: Pearson Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) EARNVOL	1														
(2) CFVOL	0.23*	1													
(3) FV_TR	0.06	0.09*	1												
(4) FV_NONTR	0.01	0.02	0.22*	1											
(5) FV_HEDGING	-0.02	0.02	0.30*	0.46*	1										
(6) HEDGE/NONTR	-0.04	-0.02	0.09*	-0.08*	0.36*	1									
(7) DERIV_GAIN	-0.03*	0.03	0.25*	0.11*	0.13*	0.09*	1								
(8) CFH_OCI	-0.08	0.04*	0.06*	0.23*	0.40*	0.22*	0.09*	1							
(9) HTM_RECLASS	0.06	-0.01	-0.01	-0.02	-0.02	-0.01	-0.05*	0.01	1						
(10) SIZE	0.03	0.02	0.50*	0.26*	0.35*	0.13*	0.21*	0.19*	0.03	1					
(11) NI	0.04*	0.11*	-0.06*	-0.01	-0.06*	-0.06*	-0.01	-0.10*	0.03	0.05*	1				
(12) NII	0.03*	-0.03	-0.30*	-0.16*	-0.19*	-0.09*	-0.16*	-0.17*	0.02	-0.18*	0.26*	1			
(13) LOANS	-0.15*	-0.19*	-0.44*	-0.07*	-0.17*	-0.07*	-0.17*	-0.04*	0.01	-0.41*	-0.06*	0.46*	1		
(14) NPL	0.24*	-0.07*	0.01	0.07*	0.03	-0.04	0.01	0.03	-0.02	0.16*	-0.14*	0.23*	0.08*	1	
(15) LLA	0.11*	0.005	-0.14*	-0.03	-0.02	-0.02	-0.05*	-0.02	0.01	0.03*	0.01	0.62*	0.33*	0.42*	1

Notes: Panel A presents summary statistics for the entire sample of banks during the pre-ASU 2017-12 and post-ASU 2017-12 period. Panel B presents summary statistics for hedgers and non-hedger banks. Panel C presents the Pearson correlations of the variables used in the regressions. All variables except dummy variables and size are winsorized at 1% and 99% to reduce the undue influence of extreme outliers.

TABLE 3.3

Determinants of incentives for designating derivatives for hedge accounting purposes

Panel A. Probit model before and after ASU 2017-12

Dependent variable:		(1) Indicator variable (1=hedger, 0=nonhedger)	(2)
Sample	Expected sign	Pre-ASU 2017-12	Post-ASU 2017-12
EARNVOL	+	0.051***	0.061***
		(2.90)	(3.22)
CFVOL	+/-	0.057*	0.054
		(1.69)	(1.26)
FV_TR	+	0.314***	0.201***
		(3.66)	(3.09)
FV_NONTR	+	0.983***	0.778***
		(6.45)	(5.49)
CFH_OCI	+/-	-0.006	-0.007
		(-0.76)	(-0.88)
SIZE	+	0.361***	0.353***
		(11.79)	(9.35)
NI	+/-	-0.612**	-0.427***
		(-4.33)	(-4.49)
LEV	+/-	2.058*	0.665
		(1.82)	(1.30)
BIG4	+/-	-0.012	-0.057
		(-0.49)	(0.-65)
LOANS	+/-	1.394***	1.346***
		(5.69)	(3.98)
Observations		2368	1342
LR Chi-sq		371.42	407.24
P-value		0.0000	0.0000
Pseudo R-squared		0.234	0.267

(Continued)

TABLE 3.3 - Continued

Determinants of incentives for designating derivatives for hedge accounting purposes

Panel B. Probit model based on the full sample period 2017Q1-2020Q2

Dependent variable:		(1) Indicator variable (1=hedger, 0=nonhedger)	(2)
Sample	Expected sign	Full Sample	Derivative users only
POST	+	0.226***	0.240***
		(4.54)	(4.67)
EARNVOL	+	0.059***	0.077***
		(4.66)	(5.26)
CFVOL	+/-	0.059*	0.055
		(1.76)	(1.46)
FV_TR	+	0.242***	0.206***
		(4.19)	(4.04)
FV_NONTR	+	0.972***	0.768***
		(8.55)	(7.22)
CFH_OCI	+/-	-0.007	-0.007
		(-0.76)	(-0.88)
SIZE	+	0.359***	0.283***
		(15.19)	(11.08)
NI	+/-	-0.578***	-0.413
		(-3.18)	(-1.59)
LEV	+/-	1.699*	2.164**
		(1.82)	(2.10)
BIG4	+/-	-0.032	0.036
		(-0.60)	(0.63)
LOANS	+/-	1.351***	0.986***
		(6.86)	(4.30)
Observations		3,710	3,343
LR Chi-sq		447.15	657.97
P-value		0.000	0.000
Pseudo R-squared		0.3421	0.3893
Correctly Predicted (%)		69.06%	71.49%

Notes: This table presents the probit coefficient estimates from equation (3.1) for the Full sample of banks and the derivative users explaining the choice of designating derivatives for hedge accounting purposes and *z*-statistics in parentheses below the coefficient estimate. The inverse Mills ratio computed from the probit model is used in equations (3.2) and (3.3) to correct potential self-selection bias. The sample used for this analysis is from the 2017Q1 to 2020Q2. The dependent indicator variable takes the value of 1 if the bank designates derivatives for hedge accounting purposes in the quarter and 0 otherwise. ***, **, * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively, using a two-tailed test.

TABLE 3.4

Effect of ASU 2017-12 on earnings volatility

		Pre-ASU 2017-12	Post ASU2017-12	Pre and Post ASU 2017-12		
		(1)	(2)	(3)	(4)	(5)
Dependent variable:	Expected sign	EARNVOL	EARNVOL	EARNVOL	EARNVOL	EARNVOL
POST				**0.112*** **	**0.091*** **	
				(6.73)	**(5.96)**	
HEDGER		**-0.050*** **	**-0.081*** **	**-0.066*** **		
		(-2.78)	**(-3.28)**	**(-2.89)**		
POST x HEDGER				**-0.034*** **	**-0.029*** **	**-0.025*** **
				(-4.64)	**(-3.36)**	**(-2.92)**
FV_TR		0.141***	0.168***	0.156**	0.093**	0.108**
		(4.70)	(5.10)	(2.57)	(2.42)	(2.53)
FV_NONTR		-0.119***	-0.198***	-0.131***	-0.179***	-0.173***
		(-3.53)	(-3.31)	(-2.76)	(-4.76)	(-4.81)
CFH_OCI		0.092*	-0.166***	-0.143**	-0.119**	-0.126**
		(1.76)	(-3.74)	(-2.28)	(-1.99)	(-2.37)
SIZE		-0.172**	-0.239***	-0.198***	-0.138***	-0.139***
		(-2.20)	(-5.18)	(-4.60)	(-4.47)	(-4.26)
LEV		0.076*	0.066***	0.069**	0.088	0.063
		(1.92)	(2.94)	(1.98)	(1.54)	(1.60)
NI		-0.065***	-0.046***	-0.117***	-0.162***	-0.176***
		(-2.72)	(-3.83)	(-6.11)	(-5.16)	(-5.14)
LOANS		0.049***	0.032***	0.034**	0.019**	0.016**
		(3.21)	(3.47)	(2.39)	(2.37)	(2.28)
Inverse Mills		0.025	0.085*	0.049	0.047	0.046
		(1.47)	(1.71)	(1.57)	(1.37)	(1.41)
Intercept		0.033***	0.041***	0.033***	0.039***	0.039***
		(3.91)	(2.98)	(3.91)	(3.63)	(4.08)
Year-quarter FE		Included	Included	Not Included	Not Included	Included
Bank FE		Not Included	Not Included	Not Included	Included	Included
Adj. R-squared		0.183	0.256	0.268	0.644	0.714
Observations		2,368	1,342	3,695	3,695	3,695

Notes: This table presents the results from estimating the DiD model (Eq. (3.2)) with earnings volatility as the dependent variable (*t*-statistics in parentheses). Control variables comprise cash flows from operations (CFO), fair value of derivatives designated for trading purposes (FV_TR), fair value derivatives designated for purposes other than trading (FV_NONTR), gains and losses from cash flow hedges recognized in other comprehensive invome (CFH_OCI), audit company (BIG4), reclassifications from held-to-maturity to available-for-sale securities (HTM_RECLASS), bank size (SIZE), leverage (LEV), profitability (NI), loan portfolio (LOANS), and the inverse mills ratio. ***,**,* indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively, using two-tailed test.

TABLE 3.5

Effect of ASU 2017-12 on cash flow volatility

		Pre-ASU 2017-12	Post ASU2017-12	Pre and Post ASU 2017-12		
		(1)	(2)	(3)	(4)	(5)
Dependent variable:	Expected sign	CFVOL	CFVOL	CFVOL	CFVOL	CFVOL
POST	+/-			**0.136*** **	**0.113*** **	
				(5.16)	**(4.16)**	
HEDGER	+/-	**-0.002***	**-0.004***	**-0.003***		
		(-1.87)	**(-1.91)**	**(-1.95)**		
POST x HEDGER	+/-			**-0.009**	**-0.006**	**-0.007**
				(-1.54)	**(-1.43)**	**(-0.89)**
FV_TR	+	0.053***	0.018*	0.035**	0.027**	0.026**
		(3.51)	(1.94)	(2.43)	(2.23)	(2.19)
FV_NONTR	-	-0.296***	-0.115***	-0.277***	-0.232***	-0.297***
		(-3.25)	(-2.87)	(-5.49)	(-5.23)	(-5.42)
CFH_OCI	-	-0.032	-0.225**	-0.189**	-0.192**	-0.386**
		(-1.51)	(-2.04)	(-2.35)	(-2.22)	(-2.34)
SIZE	-	-0.219***	-0.252**	-0.237***	-0.212***	-0.176***
		(-4.72)	(-2.57)	(-5.10)	(-4.87)	(-4.13)
LEV	+	0.024***	-0.016***	0.029**	0.023**	0.024
		(4.37)	(-2.82)	(2.31)	(2.14)	(0.34)
NI	-	-0.223***	-0.104**	-0.178***	-0.162***	-0.159***
		(-3.80)	(-2.21)	(-3.76)	(-3.19)	(-3.46)
LOANS	+	0.007***	0.003**	0.006***	0.004***	0.006***
		(3.42)	(2.49)	(3.93)	(3.73)	(3.38)
Inverse Mills	+/-	-0.142	-0.124*	-0.134	-0.129	-0.145
		(-1.42)	(-1.67)	(-1.44)	(-1.23)	(-1.09)
Intercept	+/-	0.065***	0.097***	0.046***	0.043***	0.0404***
		(5.48)	(3.78)	(3.92)	(4.23)	(3.98)
Year-quarter FE		Included	Included	Not Included	Not Included	Included
Bank FE		Not included	Not included	Not Included	Included	Included
Adj. R-squared		0.328	0.191	0.346	0.752	0.772
Observations		2,356	1,339	3,695	3,695	3,695

Notes: This table presents the results from estimating the DiD model (Eq. (3.3)) with cash flow volatility as the dependent variable (*t*-statistics in parentheses). Control variables comprise fair value of derivatives designated for trading purposes (FV_TR), fair value derivatives designated for purposes other than trading (FV_NONTR), gains and losses from cash flow hedges recognized in other comprehensive invome (CFH_OCI), reclassifications from held-to-maturity to available-for-sale securities (HTM_RECLASS), bank size (SIZE), leverage (LEV), profitability (NI), loan portfolio (LOANS), and the inverse mills ratio. ***,**,* indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively, using two-tailed test.

TABLE 3.6

Effect of ASU 2017-12 for new users of hedge accounting

		Pre and Post ASU 2017-12			Pre and Post ASU 2017-12		
		(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Expected sign	EARNVOL	EARNVOL	EARNVOL	CFVOL	CFVOL	CFVOL
POST	+/-	**0.109*** **	**0.101*** **		**0.132*** **	**0.119*** **	
		(3.41)	**(2.92)**		**(4.96)**	**(4.16)**	
NEW_HEDGER	+/-	**0.002***			**0.002***		
		(1.83)			**(1.65)**		
POST x NEW_HEDGER	+/-	**-0.054*** **	**-0.049*** **	**-0.044** **	**-0.007**	**-0.006**	**-0.006**
		(-3.71)	**(-3.11)**	**(-2.56)**	**(-1.59)**	**(-1.43)**	**(-0.89)**
FV_TR	+	0.085***	0.099***	0.093***	0.005**	0.006**	0.006**
		(5.75)	(3.42)	(3.32)	(2.46)	(2.33)	(2.12)
FV_NONTR	-	-0.043***	-0.079***	-0.083***	-0.227***	-0.216***	-0.211***
		(-7.10)	(-4.41)	(-4.92)	(-4.49)	(-4.13)	(-3.92)
CFH_OCI	-	-0.038*	-0.012	-0.010	-0.129	-0.119**	-0.116
		(-1.92)	(-1.39)	(-1.22)	(-1.34)	(-1.28)	(-1.14)
SIZE	-	-0.174***	-0.118***	-0.112***	-0.251***	-0.192***	-0.186***
		(-5.94)	(-3.47)	(-3.29)	(-5.16)	(-4.31)	(-4.11)
LEV	+	0.002	0.008	0.007	0.027***	0.022***	0.021***
		(1.16)	(0.94)	(1.32)	(4.31)	(4.12)	(3.94)
NI	-	-0.194***	-0.131***	-0.126***	-0.138***	-0.141***	-0.132***
		(-4.48)	(-2.94)	(-2.67)	(-3.79)	(-3.61)	(-3.24)
LOANS	+	0.006***	0.010***	0.011***	0.016*	0.014*	0.014*
		(4.83)	(3.32)	(2.88)	(1.93)	(1.78)	(1.69)
Inverse Mills	+/-	0.027	0.019	0.019	-0.164	-0.143	-0.128
		(1.61)	(1.39)	(1.40)	(-1.51)	(-1.33)	(-1.14)
Intercept	+/-	0.035***	0.032***	0.032***	0.075***	0.063***	0.051***
		(4.73)	(4.19)	(3.01)	(4.73)	(4.46)	(4.01)
Year-quarter FE		Not Included	Not Included	Included	Not Included	Not Included	Included
Bank FE		Not Included	Included	Included	Not Included	Included	Included
Adj. R-squared		0.405	0.682	0.724	0.407	0.782	0.790
Observations		1,702	1,702	1,702	1,702	1,702	1,702

Notes: This table presents the results from estimating the DiD models (Eq. (3.2) and (3.3)) with earnings volatility and cash flow volatility as the dependent variable (*t*-statistics in parentheses). The models are estimated on the new hedgers and non-hedgers. Thus, banks that were already using hedge accounting are excluded from the sample. Control variables comprise fair value of derivatives designated for trading purposes (FV_TR), fair value derivatives designated for purposes other than trading (FV_NONTR), gains and losses from cash flow hedges recognized in other comprehensive invome (CFH_OCI), reclassifications from held-to-maturity to available-for-sale securities (HTM_RECLASS), bank size (SIZE), leverage (LEV), profitability (NI), loan portfolio (LOANS), and the inverse mills ratio. ***,**,* indicate statistical significance at the 1 percent, 5 percent, and 10 percent level, respectively, using two-tailed test.

Appendix 3.A

Bank of Hawaii

In August 2017, the FASB issued ASU No. 2017-12, "Targeted Improvements to Accounting for Hedging Activities." This ASU's objectives are to (1) improve the transparency and understandability of information conveyed to financial statement users about an entity's risk management activities by better aligning the entity's financial reporting for hedging relationships with those risk management activities, and (2) reduce the complexity of and simplify the application of hedge accounting by preparers. ASU No. 2017-12 is effective for interim and annual reporting periods beginning after December 15, 2018; early adoption is permitted. *The Company currently does not designate any derivative financial instruments as formal hedging relationships, and therefore, does not utilize hedge accounting. However, the Company is currently evaluating this ASU to determine whether its provisions will enhance the Company's ability to employ risk management strategies, while improving the transparency and understanding of those strategies for financial statement users.*

NBT Bancorp Inc.

Effective January 1, 2018, the Company early adopted the provisions of FASB ASU 2017-12, *Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities*, which was issued in August 2017. ASU 2017-12 better aligns the accounting and reporting of hedging relationships with the economics of risk management activities. *The amendments of ASU 2017-12 were applied on a modified retrospective basis and adoption did not have an impact on the consolidated financial statements and related disclosures.*

2019

Derivative Instruments and Hedging Activities

The Company records all derivatives on the balance sheet at fair value. The accounting for changes in the fair value of derivatives depends on the intended use of the derivative, whether the Company has elected to designate a derivative in a hedging relationship and apply hedge accounting and whether the hedging relationship has satisfied the criteria necessary to apply hedge accounting. Derivatives designated and qualifying as a hedge of the exposure to changes in the fair value of an asset, liability or firm commitment attributable to a particular risk, such as interest rate risk, are considered fair value hedges. Derivatives designated and qualifying as a hedge of the exposure to variability in expected future cash flows, or other types of forecasted transactions, are considered cash flow hedges. Hedge accounting generally provides for the matching of the timing of gain or loss recognition on the hedging instrument with the recognition of the changes in the fair value of the hedged asset or liability that are attributable to the hedged risk in a fair value hedge or the earnings effect of the hedged forecasted transactions in a cash flow hedge. The Company may enter into derivative contracts that are intended to economically hedge certain of its risks, even though hedge accounting does not apply, or the Company elects not to apply hedge accounting.

2018 **Interest Rate Swaps**	2019 **Interest Rate Swaps**
The Company enters into interest rate swaps to facilitate customer transactions and meet their financing needs. **These swaps are considered derivatives but are not designated in hedging relationships.** These instruments have interest rate and credit risk associated with them. To mitigate the interest rate risk, the Company enters into offsetting interest rate swaps with counterparties. The counterparty swaps are also considered derivatives and are also not designated in hedging relationships. Interest rate swaps are recorded within other assets or other liabilities on the consolidated balance sheet at their estimated fair value. Changes to the fair value of assets and liabilities arising from these derivatives are included, net, in other operating income in the consolidated statement of income. At March 31, 2018 the notional amount of these customer derivative agreements and the offsetting derivative counterparty positions each totaled $551.8 million and the fair values included in other assets and other liabilities on the unaudited interim consolidated balance sheet applicable to these agreements amounted to $9.2 million. At December 31, 2017, the notional amount of these customer derivative agreements and the offsetting derivative counterparty positions each totaled $481.2 million and the fair values included in other assets and other liabilities on the unaudited interim consolidated balance sheet applicable to these agreements amounted to $0.2 million.	The Company records all derivatives on the balance sheet at fair value. **The accounting for changes in the fair value of derivatives depends on the intended use of the derivative, whether the Company has elected to designate a derivative in a hedging relationship and apply hedge accounting, and whether the hedging relationship has satisfied the criteria necessary to apply hedge accounting.** Derivatives designated and qualifying as a hedge of the exposure to changes in the fair value of an asset, liability or firm commitment attributable to a particular risk, such as interest rate risk, are considered fair value hedges. Derivatives designated and qualifying as a hedge of the exposure to variability in expected future cash flows, or other types of forecasted transactions, are considered cash flow hedges. Hedge accounting generally provides for the matching of the timing of gain or loss recognition on the hedging instrument with the recognition of the changes in the fair value of the hedged asset or liability that are attributable to the hedged risk in a fair value hedge or the earnings effect of the hedged forecasted transactions in a cash flow hedge. **The Company may enter into derivative contracts that are intended to economically hedge certain of its risks, even though hedge accounting does not apply, or the Company elects not to apply hedge accounting.**

J.P. Morgan

Hedge accounting

The adoption of this guidance better aligns hedge accounting with the economics of the Firm's risk management activities. As permitted by the guidance, *the Firm also elected to transfer certain investment securities from HTM to AFS. The adoption of this guidance resulted in a cumulative-effect adjustment to retained earnings and AOCI as a result of the investment securities transfer and the revised guidance for excluded components*. For additional information, see the table below, and Notes 4, 9 and 17.

Hedge accounting *Issued August 2017*	• Aligns the accounting with the economics of the risk management activities. • Expands the ability for certain hedges of interest rate risk to qualify for hedge accounting. • Allows recognition of ineffectiveness in cash flow hedges and net investment hedges in OCI. • Permits an election at adoption to transfer certain investment securities classified as held-to-maturity to available-for-sale. • Simplifies hedge documentation requirements.	• Adopted January 1, 2018. • For further information, see Note 1.

Wells Fargo

We early adopted ASU 2017-12 in fourth quarter 2017. Our financial statements for the year ended December 31, 2017, include a cumulative-effect adjustment to opening retained earnings and adjustments to our 2017 earnings to reflect application of the new guidance effective January 1, 2017. *The new guidance significantly reduces but does not eliminate interest-rate related hedge ineffectiveness and mitigates certain components of foreign currency related hedge ineffectiveness.* In particular, we continued to experience hedge ineffectiveness volatility related to certain hedges of foreign-currency denominated debt

liabilities. *The adjustment as of January 1, 2017, reduced retained earnings by $381 million and increased other comprehensive income by $168 million. The effect of adoption on previously reported year-to-date results through September 30, 2017, increased net income by* ***$169 million*** *($242 million pre-tax) and decreased other comprehensive income by $163 million.*