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2024

BANCO DE ESPAÑA
Eurosistema

Documentos de Trabajo
N.º 2437

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Documentos de Trabajo. N.º 2437

October 2024

NumeroDOI

ISSN: 1579-8666 (on line)

Abstract

This paper analyses the effect of the expected credit loss model under IFRS 9 on relationship lending in Spain. We document that relationship exclusivity between a bank and a firm has a positive effect on the growth of credit. However, this positive effect is significantly reduced after implementation of IFRS 9. We estimate that in 2018 the negative impact of IFRS 9 on relationship lending led to a reduction in credit to Spanish non-financial firms of 2.8% of their total outstanding credit, suggesting a sizeable effect on the availability of credit. For borrowers with Stage 1 loans, we show that the new regulation has a negative impact on relationship lending at firms with a higher probability of default and whose credit quality has deteriorated. Our findings are consistent with a change in the incentives that underpin relationship lending.

Keywords: relationship lending, IFRS 9, credit, probability of default.

JEL classification: D82, G21, G28.

Resumen

En este documento se examina el efecto sobre el crédito relacional en España de la implementación, en enero de 2018, del modelo de pérdida crediticia esperada según las Normas Internacionales de Información Financiera (NIIF-9). Los resultados obtenidos muestran que la relación de exclusividad entre un banco y una empresa, definida como aquella existente cuando la mayor parte del crédito de una empresa es concedido por un determinado banco, tiene un efecto positivo en el crecimiento del crédito. Sin embargo, este efecto positivo se reduce significativamente tras la implementación de NIIF-9. Se estima que el impacto negativo asociado a esta norma contable sobre el crédito relacional ha conducido a una reducción del saldo vivo de los préstamos concedidos a las empresas no financieras españolas del 2,8 %. Un análisis adicional, que restringe la muestra a empresas cuya totalidad del crédito se podría clasificar en la etapa 1 de acuerdo con la norma contable, ilustra que el impacto negativo de la nueva regulación sobre los préstamos relacionales se observa para las empresas con una mayor probabilidad de impago de su deuda bancaria y cuya calidad crediticia se ha deteriorado de manera significativa. Estos resultados son coherentes con un cambio en los incentivos que sustentan el crédito basado en las relaciones banco-cliente.

Palabras clave: crédito relacional, NIIF-9, crédito, probabilidad de impago.

Códigos JEL: D82, G21, G28.

1. Introduction

The questions this study addresses are whether and how bank regulation affects the role of relationship banking in facilitating credit access for firms. Although there has been ample research on the impact of banking regulations on the supply of credit (e.g., Jiménez et al., 2017; Gropp et al., 2019), and on the determinants of relationship lending (e.g., Sette and Gobbi, 2015; Bolton et al., 2016; Banerjee et al., 2021), there is limited knowledge on whether regulatory changes affect relationship banking and the channels through which this effect can occur. These are relevant public policy questions given the significant role of relationship lending in facilitating borrowers' access to capital through loan contracting over time (e.g., Degryse et al., 2015).

To address our research questions, we exploit an accounting standard change in 2018, the implementation of IFRS 9 by Spanish banks. This is a powerful setting to assess the impact of bank regulation on relationship lending for two reasons. First, the new accounting standard is highly material for the banking industry (e.g., GPPC, 2017).[1] IFRS 9 mandates a forward-looking approach to estimate loan loss provisioning, the most important accrual for banks, based on expected credit losses (ECL). This is a major departure from the previous methodology that relied on incurred credit losses (ICL) and is likely to result in a significant increase in recognized credit losses, which can have a significant effect on bank regulatory capital. Second, unlike other banking regulations introduced gradually and spanning several years (e.g., Basel III), the shift to IFRS 9 was entirely effective with the fiscal year change in January 2018. By comparing the role of relationship lending using a short window before and after the implementation of IFRS 9, it is less likely that our results are affected by other aggregate factors.

A strong relationship between a bank and a borrower is characterized by both the access to soft information about the borrower and a higher level of exposure between the two entities (e.g., Kysucky and Norden, 2016; López-Espinosa et al., 2017). Prior literature reveals that these two characteristics of relationship lending generally increase the availability of credit to borrowers (e.g., Boot, 2000; Kysucky and Norden, 2016). First, the use of soft information by banks may be key to mitigate information frictions between the lender and the borrower (e.g., Petersen and Rajan, 1994). Second, the "exclusivity dimension" of relationship banking implies that a bank that has an exclusive relationship with a borrower (i.e., a large share of the borrower's total credit) has a greater incentive to facilitate new lending to avoid the recognition

[1] The Global Public Policy Committee states: "The introduction of the requirement to estimate expected credit losses ("ECL") under IFRS 9 Financial Instruments is perhaps the single most significant change in the history of financial reporting of banks" (GPPC, 2017).

of credit losses, because the decision to reduce lending could increase the probability of the borrower defaulting (e.g., Boot, 2000).[2]

We predict and find that IFRS 9 has a negative impact on relationship lending by affecting the "exclusivity dimension" of relationship banking, thereby reducing the availability of credit to borrowers. Prior to IFRS 9, under the ICL model, banks could finance riskier borrowers under an exclusive relationship without any direct impact on loan loss provisions. Loan loss provisions, which decrease regulatory capital, were only recognized if there was objective evidence of impairment or a triggering event. In this case, banks were willing to facilitate new credit to riskier relationship borrowers to prevent default and the recognition of credit losses (Boot, 2000). Under IFRS 9, loan loss provisions are forward-looking and recognized at loan origination. Thus, banks may anticipate having to recognize loan loss provisions when extending new credit and during the life of the loan for borrowers with riskier profiles, even if there is no evidence of impairment. After implementation of IFRS 9, an exclusive relationship with a risky borrower likely reduces the bank's incentive to increase that share. For this reason, we predict that IFRS 9 decreased the positive effect of holding an exclusive relationship on the availability of credit.

To examine the impact of IFRS 9 on relationship lending, we analyse the lending decisions of Spanish banks over the period June 2016 to June 2019, a window that spans three semesters before and after the introduction of the ECL model in January 2018. Specifically, we analyse growth in credit provided to borrowers in banking relationships. Our focus on Spanish banks provides a powerful setting to study the impact of IFRS 9 on relationship lending because of the relatively large fraction of Small and Mediums-sized Enterprise (SME) borrowers in Spain.[3] SME lending is characterized by high information frictions between borrowers and lenders and difficulty for borrowers to access external finance. Unlike in other European countries, where only listed banks are required to adopt IFRS 9, Spanish regulation mandates all—listed and non-listed—banks to implement IFRS 9, regardless of whether they have issued securities in a regulated market (Circular 4/2017).[4] Also, the Spanish economy was experiencing significant financial stability when the new accounting standard was first introduced. This alleviates the potential confounding effect of a crisis or a general macroeconomic downturn on relationship lending (Sette and Gobbi, 2015; Bolton et

[2] Relationship lenders can have incentives to continue to provide credit to poorly performing borrowers even in the absence of bank regulation. For example, in a theoretical model, Hu and Varas (2021) shows that relationship lenders will continue to provide credit to so-called "zombie" firms—firms whose operating cash flows are consistently less than their interest payments—if the firms will soon payoff their loans by substituting market financing for private financing with relationship lenders.

[3] Small and Medium-sized Enterprises are defined by the European Commission as companies with fewer than 250 employees and an annual turnover of no more than €50 million, or an annual balance sheet total of no more than €43 million.

[4] Circular 4/2017 issued by the Banco de España, required the adoption of the expected credit loss model from IFRS 9 in 2018 for all credit institutions in Spain, including both listed and non-listed banks. The adoption of IFRS 9 became mandatory for all listed banks in the EU in that same year.

al., 2016; Banerjee et al., 2021). Finally, our focus on Spain allows us to access the rich loan-level data from the Credit Register of the Banco de España.

To assess the effect of IFRS 9 on relationship lending, we employ an OLS regression to compare the growth of credit for a borrower from a bank with a previous strong relationship relative to a bank with a weaker relationship, before and after the implementation of IFRS 9. We perform our analyses using two different proxies for relationship lending that reflect the exclusivity of a relationship between a bank and a firm commonly employed in prior research (e.g., Elsas, 2005; Kysucky and Norden, 2016; López-Espinosa et al., 2017). We consider the perspective of the borrower, i.e., whether a firm has a high proportion of its credit in a given bank, and the perspective of the lender, i.e., whether a bank has exposure to a given firm. Additionally, as a robustness check, we use the number of new relationships between a lender and a borrower over the past five years as a proxy for relationship lending. We include firm-time fixed effects to account for credit demand trends (Khwaja and Mian, 2008), and bank-time fixed effects as controls for concurrent bank-specific time varying factors.

IFRS 9 requires banks to recognize expected credit losses for financial instruments based on a three-stage classification system. New originated loans and loans without a significant increase in credit risk since origination are classified in Stage 1. For these loans, banks recognize expected credit losses considering the probability that the borrower defaults in the following 12 months. Loans that have experienced a significant increase in credit risk since initial recognition but have not yet incurred a credit loss event are classified in Stage 2. In this case, expected credit losses are based on the probability of default (PD) over the entire life of the instrument. Finally, non-performing loans, with a PD close to 100%, are classified in Stage 3. Provisioning under the ICL methodology was restricted and akin to the estimation of the accrual for loans classified in Stage 3 under IFRS 9. We expect the effects of IFRS 9 on relationship lending to be strongest for loans with higher credit risk in Stages 1 and 2, and weakest for borrowers whose loans are in Stage 3 because the new regulation does not change the loan loss allowance associated with loans that have objective evidence of impairment.

A key challenge to estimate the effect of IFRS 9 on relationship lending is that the three-stage asset classification under IFRS 9 did not exist before the introduction of the new regulation and data were not available immediately following its introduction for Spanish banks.[5] We address this limitation by proposing an approximation of Stage 1 at the borrower level based on observable borrower characteristics before and after the introduction of IFRS 9. A borrower is classified in Stage 1 if it

[5] Furthermore, IFRS 9 requires a determination of the expected credit losses and the stage classification at the loan level. As described below, we approximate the stages at the borrower level because unavailability of loan-level credit rating information for our sample borrowers, which predominantly consists of micro, small, and medium-sized enterprises.

satisfies two criteria. First, we require that all its loan exposures are performing. Second, we require that the borrower has not experienced a significant increase in its credit risk, potentially triggering a transition of the outstanding credit from Stage 1 to Stage 2.[6] We estimate and use the change in the PD of a firm in the years 2014 and 2015 to measure the variation of credit risk of a borrower in the pre-IFRS 9 period. Similarly, we use the change in a firm's PD during 2016 and 2017 to measure the increase of credit risk in the post-IFRS 9 period. We conduct our main analysis focusing on firms in Stage 1 because this is the stage that we can approximate with higher accuracy (see Section 2). In supplementary analysis, we evaluate whether the effects on relationship lending are more pronounced for firms whose credit risk has deteriorated sufficiently to transition to Stage 2 and whether there is any effect for firms with all outstanding credit classified as non-performing, i.e., those in Stage 3.

Our baseline analysis indicates that, on average, IFRS 9 reduced the role of relationship lending in facilitating firms' access to credit. Nonetheless, there is still a positive net effect of relationship lending on loan growth after IFRS 9, which indicates that it remains an important mechanism for access to credit. Considering relationship lending from the borrowers' (banks') perspective, we show that the credit growth of relationship borrowers was 13.2 (8.5) pp higher before IFRS 9, relative to non-relationship lending borrowers. This difference decreased by 2.1 (2.5) pp in the aftermath.[7] Thus, relationship banking plays a smaller role in facilitating new lending under the new accounting standard. In addition, we show that this effect implies a reduction in the availability of credit at the firm level. Firms that relied more on relationship banking were unable to substitute the lending from banks with a previous strong relationship to banks with a weaker relationship. An approximate calculation suggests a sizeable effect on the availability of credit. In particular, the negative effect of IFRS 9 on relationship lending implies a reduction in credit of €13.4 billion in 2018, which represent 2.8% of the total outstanding credit of Spanish non-financial corporations as of December 2017.

When a loan is secured by collateral, transitioning from the ICL model to the ECL model may not have a significant effect on loan loss provisions because collateral reduces the loss given default and expected credit losses. Hence, banks lending to relationship borrowers whose credit is guaranteed by collateral do not expect to raise high loan loss provisions at loan origination or throughout the loan's life and this applies both before and after IFRS 9 implementation. Given that the new impairment model has minimal impact on loan loss provisions for borrowers with

[6] IFRS 9 does not provide a sharp rule regarding what should be considered a significant increase in credit risk, triggering a transition from Stage 1 to Stage 2. For this reason, we employ the existing guidance of regulators and consider a threefold increase in the credit risk of a borrower to be a sufficient condition for a significant increase in credit risk (see Section 2.2). To the extent that our approach leads to classification error, it will be harder for us to detect the effect on relationship lending of a firm transitioning from Stage 1 to Stage 2.

[7] As shown below, the inferences we draw are robust to alternative definitions of the credit growth, relationship lending, sample selection criteria and the possibility of an anticipation effect by banks to IFRS 9.

guaranteed credit exposures, we find that the introduction of IFRS 9 does not alter the effect of relationship banking on credit growth.

Next, we investigate heterogenous effects of IFRS 9 on relationship lending based on borrower characteristics. First, we predict that the effect of IFRS 9 on relationship lending is greater for borrowers with a riskier profile. The cost in terms of regulatory capital is larger for loans to riskier borrowers because of the higher level of provisions at loan origination. In addition, a higher *ex-ante* risk may increase the likelihood of loan migration from Stage 1 to Stage 2 in the future, which considers lifetime default probabilities, resulting in a significant rise in loan loss provisions.[8] To this end, we exploit the cross-sectional variation in the risk of borrowers whose loans are classified in Stage 1. In particular, we repeat our baseline regression partitioning the sample into low and high risk borrowers. Our findings show prior to IFRS 9, holding a relationship had a similar effect on the growth of credit for low and high risk borrowers. However, following implementation of the new standard, we find that the ECL model has a negative impact on relationship banking for high risk borrowers but not for low risk ones. These findings suggest that the introduction of IFRS 9 created a new asymmetry regarding the role of relationship lending, whereby riskier borrowers benefit less from relationship lending facilitating access to credit.

Second, we consider the role of the deterioration of the credit quality of a borrower. New credit to borrowers that have already experienced a significant increase in credit risk are more likely to migrate from Stage 1 to Stage 2 when lifetime PDs are considered, and provisions may significantly rise (ESRB, 2017). To this end, we partition the sample of borrowers in Stage 1 into low risk firms whose credit risk has remained low and high risk firms with a deterioration of credit quality, which we approximate as the variation of the PD in the previous years. We show that the negative impact of IFRS-9 is present for high risk borrowers in Stage 1 whose credit quality has deteriorated but not for low risk firms in Stage 1 with stable credit quality.

Third, we further investigate how IFRS 9 affects relationship lending for Stage 2 borrowers by focusing on risky firms that have experienced a three-fold increase in credit risk—the measure that is used by Spanish bank regulators as a significant decrease in credit quality. These borrowers are not included in the sample of our main analysis relating to firms that we approximate as being Stage 1 borrowers and are likely to have outstanding credit in Stage 2 (see Section 2.2). We find that the negative effect of IFRS 9 on relationship lending is significantly larger for these firms, indicating that banks have greater incentives to reduce their exposure to relationship borrowers if there is a high probability of the loan downgrading to Stage 2 in future periods.

[8] Throughout the paper we use the term "*ex-ante* risk" of a borrower to refer to the credit risk level of a firm before obtaining new credit.

Finally, we conduct a falsification test to mitigate the likelihood that an omitted variable may affect the role of relationship lending for riskier borrowers after 2018, thereby confounding our inferences regarding the effect of IFRS 9. If this were the case, we would expect the omitted variable to affect the role of relationship lending for Stage 3 borrowers, which are highly risky firms, i.e., firms with all their credit exposures being impaired. In contrast, IFRS 9 should not affect the role of relationship lending for this profile of borrowers because the ICL model already contemplated raising life-time provisions at loan origination when there was objective evidence of impairment. Therefore, we analyse the effect of the ECL model on relationship lending focusing on Stage 3 borrowers. Findings reveal that IFRS 9 does not alter the role of relationship lending for this group of firms. In particular, we document a large effect of relationship lending on the growth of credit both before and after IFRS 9. This result increases our confidence that our tests correctly identify the effect of IFRS 9 on relationship lending.

Our analysis relates to the literature focusing on the value and consequences of relationship lending (e.g., Petersen and Rajan, 1994; Berger and Udell, 1995; Degryse et al., 2015; Banerjee et al., 2021). To the best of our knowledge, our study is the first to consider the effect of banking regulation on relationship lending.[9] We focus on the implications of the new impairment model under IFRS 9 introduced in the year 2018. Our findings suggest that holding an exclusive relationship facilitates firms' access to external finance, both before and after the regulatory change. However, the increase in the cost of lending after IFRS 9 reduces the incentives of banks to grant new credit to relationship borrowers that are *ex-ante* riskier and whose credit quality has deteriorated.

Our paper also contributes to the literature that studies the effect of loan loss provisioning methodologies on bank's lending behaviour and risk taking (e.g., Beatty and Liao, 2011; Bushman and Williams, 2012; 2015; Abad and Suarez, 2018; Morais et al., 2020). Focusing on the introduction of IFRS 9, Bischof et al. (2022) finds that German banks strategically adjust their internal ratings and lending decisions to minimize loan loss provisions. The study shows that the impact of IFRS 9 on the supply of credit depends on the risk profile of borrowers.[10] We contribute to this literature in three ways. First, we focus on the interaction between the new impairment model and relationship lending. This focus is particularly relevant because relationship lending plays a key role in facilitating access to credit for significant market segments, such as private firms and SME borrowers. SMEs represented 99.7% of non-financial Spanish companies as of January

[9] There is a large literature that studies the impact of bank regulation on lending (see, e.g., Jiménez et al. (2017) and Gropp et al. (2019) for recent empirical contributions). However, the effect of prudential or accounting regulation on relationship lending has not yet been explored.

[10] Overall, prior research suggests that the implementation of IFRS 9 affects banks' lending and reporting decisions (e.g., Ertan, 2021; López-Espinosa et al., 2021).

1, 2023, and are attributed with 40.7% of the total gross fixed capital formation (see Banco de España, 2024). SMEs are also characterized by high information frictions and bank credit is the main source of external financing for this type of firms. This is why relationship lending is crucial for their access to credit and for their investment activity. Second, we develop a methodology for approximating the three stages under IFRS 9 at the borrower level that can be used in future research. Our analysis includes micro, small, and medium-sized firms because our classification of stages is not limited to firms with a loan volume above a certain threshold. In contrast, Bischof et al. (2022) focuses on large firms because the study's sample is restricted to loans with a volume of more than two million euros in at least one quarter of the sample period. This allows us to study the role of relationship lending for micro, small, and medium-sized firms, where it is expected to be more relevant. Finally, we examine the impact of collateral under IFRS 9, where the estimation of loan loss provisions depends on the expected loss given default, which can be significantly reduced by the presence of collateral.

The remainder of the paper is organized as follows. Section 2 describes the institutional background for our analysis and our approach for approximating our classification at the borrower level the three stages under IFRS 9. Section 3 describes our dataset and the variables employed in the analysis. Section 4 presents our research design. Section 5 discusses the main results, focusing on borrowers classified in Stage 1 under IFRS 9. Section 6 explores the effect of the transition to Stage 2. Section 7 presents findings from the falsification test. Section 8 presents finding from additional robustness tests of our baseline regression and Section 9 concludes.

2. Institutional Background and Research Design

2.1 The new impairment model under IFRS 9

In contrast to the incurred loss (ICL) model that was prevalent before 2018, the new provisioning methodology under IFRS 9, the expected credit loss (ECL) model, requires banks to recognize loan loss provisions at loan origination or purchase, reflecting expected credit losses. The ECL model, which is forward-looking in nature, was introduced in response to the "too little, too late" concern associated with ICL model, particularly during financial downturns such as the 2008 financial crisis (e.g., Gaston and Song, 2014; Acharya and Ryan, 2016; de Haan and van Oordt, 2018). The ICL model mandates banks to recognize provisions under verifiable evidence of impairment. As a result, loan losses are primarily considered when the probability of default (PD) is close to 100% (Novotny-Farkas, 2016). The ECL model eliminates the "loss event" constraint of the old methodology by considering loan losses when PDs are less than 100%.

A key input for the estimation of expected credit losses is the probability that a borrower defaults in the future. Under IFRS 9, banks must estimate the PD considering different

macroeconomic scenarios. Furthermore, the new accounting standard mandates banks to classify financial assets in three stages, according to the credit quality deterioration since initial recognition. Such classification determines the time horizon for the estimation of the PD. New loans and loans without a significant increase in credit risk (SICR) are allocated in Stage 1, where only PDs in the next 12 months are considered. If a loan suffers a SICR, a migration to Stage 2 occurs and the allowance must be updated to incorporate life-time PDs. Finally, loans that are non-performing are classified in Stage 3. Hence, Stage 3 loans result in essentially the same loan loss allowance as those recognized under the ICL model.

Figure 1 illustrates the loan loss allowance (y-axis) associated with a financial instrument under both the ICL methodology and the ECL model of IFRS 9 as the credit quality of the instrument deteriorates (x-axis). The diagram depicts sharp differences between the two accounting regimes. First, the pronounced convexity of provisions under the ICL model (red line) reflects the concern of prudential regulators. No matter the *ex-ante* credit risk of a borrower or the deterioration of credit quality, provisions are not recognized until there was objective evidence of impairment as of the balance-sheet date.

In contrast, the ECL model under IFRS 9 yields a smoother pattern of loan loss provisions as credit quality deteriorates (blue line). At origination, before the loan has suffered any change in its credit risk, banks must already estimate the PD in the next 12 months of the borrower and expected credit losses in the next 12 months, and recognize a provision for loan losses. This is reflected in the intersection of the allowance scheme with the y-axis in the origin (point A in the Figure 1). As the credit quality of the loan deteriorates, banks must update the level of the accrual. Notably, a sharp increase occurs when a loan migrates from Stage 1 to Stage 2 as a result of consideration of lifetime PDs in this second bucket, i.e., after a SICR occurs, as depicted in Figure 1. The literature has referred to the transition between the first and the second buckets as a "cliff" caused by the sharp increase in provisions (ESRB, 2017). Finally, a loan that becomes non-performing is allocated in Stage 3 and deemed credit impaired, with PD=100%, thereby coinciding with the ICL methodology.

2.2 Identifying stages at the borrower level

Ideally, to estimate the impact of the ECL model under IFRS 9 on relationship banking we would control for the classification of loans in the different stages and aggregate this information at the borrower level. Each stage considers different horizons for the estimation of PDs. This may affect substantially the estimated expected credit losses. Controlling for the stage classification in our empirical framework would require two conditions. First, it would be necessary to identify correctly each loan's as-if stage before the implementation of IFRS 9. Second, it would be

necessary to observe the actual stage allocation of each loan after the introduction of the rule. The distinction of the buckets would allow for the correct classification of the outstanding credit of a borrower. In this case, we would be able to identify the distinct role of the stages in contributing to the effect of the new rule.

The lack of stage classification prior to IFRS 9 and the fact that, immediately afterwards, banks do not disclose the classification at the loan or borrower level poses a challenge to our identification strategy. We address this challenge by proposing an approximation of the stages at the borrower level using observable information before and after the introduction of the new rule. Our main analysis focuses on firms whose loans are classified in Stage 1, in light of the fact that identifying when a loan is in Stage 2 cannot be made with precision. Moreover, the ample room for discretion and professional judgement in the application of IFRS 9 makes such precise imputation even more difficult.[11] However, it is still possible to estimate the likelihood that the newly issued credit initially classified in the first stage may migrate to the second bucket by considering the determinants of this transition.

2.2.1 Identifying Stage 1

Stage 1. Baseline sample.

We classify a borrower in Stage 1 if it satisfies two criteria. First, all its loan exposures are performing. Second, it must not be a high yield firm that has experienced an annual three-fold increase in credit risk, considering the change in credit risk in 2015 for the pre-IFRS 9 period and in 2017 for the post-IFRS 9 period. This latter restriction is designed to eliminate borrowers whose outstanding credit may have already migrated from Stage 1 to Stage 2, and is consistent with the criterion used by regulators as an indicator of a significant increase in credit risk (see, e.g., the AQR Manual and the EBA Stress Test Methodological guidance).[12]

Our approach for identifying Stage 1 borrowers requires the estimation of the credit risk of a firm such that we can classify it as an investment grade or high yield company. To do this, we

[11] Supervisors provide general guidance to banks regarding what should be deemed a significant credit quality deterioration (e.g., a threefold increase in the lifetime PD from initial recognition). However, the standard stages that the SICR triggers should not be rule-based but rather rely on professional judgment and on all relevant quantitative and qualitative information. A more precise identification of Stage 2 would be possible if we could observe the internal credit rating that banks assign to their borrowers, as suggested by Bischof et al. (2022). From each bank's Basel III Pillar 3 disclosures, the study derives the individual mapping from PDs into internal ratings. However, we cannot apply this approach because the Spanish credit registry only contains information about the internal risk assessments of banks (i.e., borrowers PD) from 2019 onwards, and they are only available for lenders using an internal rating-based (IRB) approach.

[12] The AQR (Asset Quality Review) Manual is a guide used by banking regulators to assess a bank's asset quality and identify risks in its balance sheet. It provides a standardized methodology for evaluating credit, market, and operational risks. The EBA Stress Test Methodological Guidance is a common framework for stress testing EU banks. It outlines the methodology, scenarios, and templates that banks must use to assess their resilience to different stress scenarios.

estimate annually the PD of each firm following the methodology of Blanco et al. (2023) (see section 3.2). We use the PD of a firm in the years 2014 and 2015 to estimate the level and change of risk of a borrower in the pre-IFRS 9 period. Similarly, we use the PD of a borrower in the years 2016 and 2017 to measure the variation and level of risk of a firm in the post-IFRS 9 period. We use the PD intervals of the European Central Bank's CQS methodology to define high yield firms (PD>0.4%) and investment grade firms (PD≤0.4%).[13]

Partition of Stage 1 at the borrower level: Ex-ante risk and credit quality deterioration

The effect of IFRS 9 on relationship lending may be heterogenous for different borrowers within Stage 1. We predict that the negative effect of IFRS 9 on relationship lending is greater for firms with a riskier profile. Before IFRS 9, a bank with an exclusive relationship with a risky borrower (i.e., holding a large share of the borrower's total credit) had strong incentives to facilitate new lending to avoid recognizing credit losses, because reducing lending to this borrower could increase default risk (Boot, 2000). Under IFRS 9, loan loss provisions are based on expected credit losses and are recognized at loan origination. This may reduce the bank's incentive to increase lending to a risky borrower in an exclusive relationship. In contrast, relationship lending to less risky firms may not be affected by IFRS 9 because expected credit losses for these borrowers may be low.

To examine the heterogeneous effects of IFRS 9 on relationship lending for both relatively low and high risk borrowers, we partition our Stage 1 sample as follows. First, we partition the sample into high yield and investment grade firms (i.e., borrowers with PD above or below 0.4%, respectively). We expect the effect of IFRS 9 on relationship lending to be stronger for high yield firms. Second, we further refine this partition by categorizing Stage 1 firms into high yield firms whose credit quality has deteriorated (i.e., the PD has increased in the previous years), and investment grade firms with a stable credit quality (i.e., the PD has remained equal or below 0.4%).[14] This refinement allows us to identify more precisely two groups of firms that may be differentially affected by IFRS 9.[15] We expect the impact of IFRS 9 on relationship lending to be stronger for high-yield firms whose credit quality has deteriorated.

[13] The Credit Quality Steps (CQS) methodology is used by the European Central Bank to assess the creditworthiness of companies in the Eurosystem credit operations.

[14] Specifically, the first group is comprised of firms with a PD above 0.4% in 2015 (for the pre-IFRS 9 period) and in 2017 (for the post-IFRS 9 period) and this PD has increased with respect to the previous year (i.e., 2014 and 2016, respectively). The second group is comprised of firms with a PD below or equal to 0.4% in 2014 and 2015 (for the pre-IFRS 9 period) and in 2016 and 2017 (for the post-IFRS 9 period).

[15] The outstanding credit of borrowers that have experienced an increase in credit risk is more likely to migrate from Stage 1 to Stage 2 where lifetime PDs are considered, leading to a significant rise in provisions (ESRB, 2017). We expect the effect of IFRS 9 on relationship lending to be stronger for this group of firms. Conversely, we expect the effect to be non-significant for safe firms with stable credit quality.

2.2.2 The transition to Stage 2

The effect of IFRS 9 on relationship lending may be more pronounced for borrowers that have experienced a significant increase in credit risk (i.e., borrowers with outstanding credit classified in Stage 2). The probability that new credit that initially is in Stage 1 downgrades to Stage 2 may be higher for this profile of firms. Under IFRS 9, new lending to these borrowers may imply provisioning for large expected credit losses not only at origination, but also if the new loan downgrades to Stage 2 in the future, where lifetime PDs are considered.

To examine the role of Stage 2, we define a new sample of firms. We define Stage 2 borrowers as high-yield firms that have experienced a threefold annual increase in credit risk. Specifically, we consider firms with a PD above 0.4 percent in 2015 (for the pre-IFRS 9 period) and 2017 (for the post-IFRS 9 period), and for which the PD has experienced a threefold increase compared to the previous year (i.e., in 2014 and 2016, respectively). These borrowers were excluded from the sample of our main analysis (our approximation of Stage 1 borrowers).

2.2.3 Identifying Stage 3

Finally, we consider borrowers whose outstanding credit may be allocated in Stage 3. The accounting treatment of impaired firms in the ICL and ECL methodology requires banks to consider a PD of 100% to estimate expected losses. We consider borrowers to be classified in Stage 3 if all its credit exposures have a non-performing status. The definition of Stage 3 allows us to conduct a falsification test, because the new impairment model does not introduce major differences for this profile of firms. Thus, we predict no effect of IFRS 9 on relationship lending and hence access to credit for borrowers in Stage 3.

3. Data and Variables

3.1 Data

To study the impact of IFRS 9 on relationship lending, we combine three different data sources: the Spanish Credit Register (CIR), firm balance-sheet and profit and loss accounts from the Banco de España's Central Balance Sheet Data Office, and supervisory bank balance-sheet information.

The CIR contains monthly information on all outstanding loans to non-financial firms granted by all credit institutions operating in Spain. Our dataset provides a comprehensive representation of the population of loans to firms. From the CIR we obtain detailed information about each loan, including the amount (both drawn and undrawn), which will be key to construct our main dependent variable, and its performing situation. Focusing on the period from June 2016 to June 2019, we aggregate the outstanding amount of credit of each firm in each bank at the end of each semester to obtain the total bank-firm credit exposure, which also allows us to construct our

different proxies of relationship banking. Additionally, the database provides information about the borrower and bank identity, which permits us to match each loan with characteristics of the bank and the firm. We take into account all mergers and acquisitions of banks that took place between 2016 and 2019. Specifically, if a bank was acquired during a given semester, we consider that this bank was the same entity as the acquiring bank in the previous semester by creating a synthetic bank. By doing so, we ensure that the variation of credit is not affected by the disappearance of banks or the creation of new banks arising from mergers and acquisitions.

We complement the information from the Spanish Credit Register with annual firm-level data from the Banco de España's Central Balance Sheet Data Office (CBSDO) to estimate the credit risk of a firm (i.e., the probability of default, PD). This database provides information on the financial accounts of more than 750,000 non-financial corporations on an annual basis by combining administrative data at the annual level from accounts filed with the mercantile registries in Spain with information compiled from surveys of non-financial firms conducted by the Central Balance Sheet Office of Banco de España[16]. We match this firm-level information with loan-level data using the unique firm fiscal identifier. Lastly, we obtain bank financial statement information collected by the Banco de España in its role of banking supervisor. We define annual firm and bank characteristics as of December 2015 when referring to the pre-IFRS 9. For the post-IFRS 9 period, we use firm and bank information as of December 2017.

Our analyses are restricted to firm-bank pairs with an existing relationship at the beginning of each semester for which we can calculate the growth of credit and for borrowers with enough information to estimate their PD.[17] This approach for defining an existing relationship, which closely follows Sette and Gobbi (2015), eliminates the bias that would result from defining the growth of credit for firms with zero initial outstanding credit. Namely, a mechanically positive association would arise between firms with zero initial outstanding credit (and, thus, a very low relationship strength with the considered bank) and the growth of credit. Finally, to focus on borrowers in Stage 1 in our baseline analysis, we restrict our sample to firms with all credit exposures classified as performing, excluding those high yield firms that have experienced a threefold increase in their PDs (see subsection 2.2.1). The sample that we use in our main analysis, reflecting borrowers with loans in Stage 1, consists of 2,269,993 firm-semester observations from

[16] We restrict our sample to firms with adequate accounting quality based on the Banco de España's internal classification criteria. In particular, we apply two filters provided by the CBSDO and exclude firms with (i) balance sheets with non-reliable monetary units; and (ii) firms with inadequate information in their financial statements (with blatant accounting errors, such as large mismatches in balance sheet amounts, negative values in items that should be positive by definition, missing headings, or figures of disproportionate magnitude).

[17] We follow the methodology of Blanco et al. (2023) to estimate the PD of a borrower. To measure the level and change in risk of a borrower before (after) the IFRS 9 period, we estimate the probability of default (PD) of a firm for the years 2014 and 2015 (2016 and 2017). See Section 3.2 for more details.

the second semester of 2016 to the first semester of 2019 that are distributed in a range between 618,489 and 711,962 observations per semester.

3.2 Variables

The dependent variable in our analyses is the semi-annual credit growth, measured at the bank-firm level. Namely, we consider the change in credit balance of firm *f* in bank *b* in a given semester with respect to the previous semester divided by the average credit balance in the two semesters.[18]

To measure relationship lending, we focus on the exclusivity of a relationship between a bank and a firm. This variable has been shown to be a key determinant of relationship banking and plays a crucial role in facilitating access to credit. A bank with an exclusive relationship with a borrower (i.e., a large share of the borrower's total credit) has a greater incentive to facilitate new lending to avoid the recognition of credit losses, because the decision to reduce lending could increase the probability of the borrower defaulting (e.g., Boot, 2000). Supporting the significance of exclusivity, López-Espinosa et al. (2017) compares the importance of relationship exclusivity with other relationship variables and find that exclusivity has the greatest economic impact in facilitating access to credit in Spain. Similarly, Kysucky and Norden (2016) shows that a higher exclusivity is associated with lower loan rates. Furthermore, Elsas (2005), which identifies relationship lending based on the self-assessment of banks, finds that a high exposure between a lender and a borrower is the most important factor that determines whether they form a relationship.[19]

To this end, we employ several proxies of relationship lending that reflect the exclusivity of a relationship between a bank and a firm. First, we construct two measures considering the perspective of the borrower. *Main bank* is an indicator variable that equals 1 if the bank was the main lender of a given firm at the beginning of the semester (i.e., the largest fraction of a firm's debt comes from this bank), and 0 otherwise. We also use an alternative measure which is a refinement of the previous variable. *Main bank credit > 50%* is an indicator variable that equals 1 if the amount of credit outstanding with the main lender was more than 50% of the firm's total amount outstanding, and 0 otherwise. Second, we propose two additional measures considering the perspective of the lender: (i) *High exposure 90th percentile* is an indicator variable that equals 1 if a bank's exposure to a given firm (i.e., the amount of outstanding credit granted by the bank to the firm) is above the 90th percentile of the distribution of bank's exposures to

[18] Our definition of the growth of credit follows Arce et al. (2021).

[19] The exclusivity of a relationship can reflect both the intensity of the relationship in a given period and the creation of information over time. However, other variables, such as the frequency of interactions between a bank and a firm, may more accurately reflect the development of soft information (Kysucky and Norden, 2016). As described more fully below, inferences based on our main findings are unchanged when we use an alternative proxy for relationship lending, defined as the number of new interactions between a lender and borrower over the past five years.

individual firms. (ii) *High exposure 95th percentile* is defined similar to (i) but using the 95th percentile as the threshold.

We estimate the probability of default (PD) for all the firms in our sample for each year to assess if the introduction of the new provisioning model has a different effect on relationship lending for safe (investment grade) and risky (high yield) firms. The PD is based on the methodology developed in Blanco et al. (2023) for the Banco de España internal credit assessment. This measure follows –and extends– the approach of Altman (1968) to Spanish firms. Blanco et al. (2023) considers a firm to be in default if it has nonperforming loans for at least three months in a given year. We model the probability of default using a logit regression that includes five accounting ratios (own funds to total assets, financial expenditures to sales, ROA, liquid assets to total assets, sales to total assets or gross value added to total assets) and the growth rate of aggregate credit to nonfinancial corporations. We estimate this model for six groups of firms based on their size (i.e., micro-firms vs. small, medium and large firms) and on their sector (i.e., manufacturing, construction and other sectors).[20] We use a firm's PD in 2015 (2017) as a control for a firm's credit risk in the pre-IFRS 9 (post-IFRS 9) period.

Table 1 provides the descriptive statistics for the main variables that we consider in our analysis, distinguishing between the period before and after IFRS 9. We first discuss our proxies of relationship lending. From the borrower perspective, approximately half of our bank-firm observations exhibit an exclusive relationship according to our first relationship lending variable, *Main Bank*. When considering the perspective of the lender (i.e., *High exposure 90th percentile* and *High exposure 95th percentile*), because we require lenders to have a very large exposure to a borrower (i.e., above the 90th and 95th percentile), the proportion of bank-firm pairs that form a relationship significantly drops. Our dependent variable, the biannual credit growth at the bank-firm level, exhibits a negative average value of approximately 24% during our period of analysis. The decrease is similar both before and after IFRS 9, which is indicative of a steady trend throughout this period, when the Spanish non-financial sector was still experiencing a deleveraging process.

Next, we consider the variables that are measured at the firm level. Focusing on the indicator variable that defines a high yield firm (i.e., PD>0.4%), we observe that, on average, 74% of the borrowers before and after 2018 fall under this category. This statistic is likely attributable to the high presence of SMEs in the Spanish corporate sector. Among firms that are defined as high yield, we observe a sizable fraction—17 % of borrowers in this subsample before 2018 and 22%

[20] The category "Other sectors" comprises: Primary sector; Energy; Retail and wholesale trade; Hospitality, restoration and leisure; Transport and storage; Other market services; Motor vehicles.

after this date—experience an increase in their PD. In other words, a significant fraction of firms that are *ex-ante* risky experience a downgrade in their credit quality.

< Insert Table 1 here >

4. Methodology: Identifying the effect of IFRS 9 on relationship lending

The main objective of this study is to examine the effect of IFRS-9 impairment model on relationship lending. As noted earlier, our identification faces several challenges. First, we need to restrict our sample to borrowers affected by the new provisioning methodology. In particular, the impact of the introduction of the ECL model is expected to be concentrated in borrowers with loans classified in Stage 1 and in Stage 2 and it should potentially be higher for Stage 2 loans. In contrast, the loan loss allowance associated with new credit to firms classified in Stage 3 should be similar under the ICL the ECL models. Hence, including these borrowers in our estimation likely would introduce a form of measurement error and bias in favor of finding no effect of IFRS 9 on relationship lending. Although the three-level asset classification did not exist prior to 2018 and is unobservable at the borrower level after the introduction of the new rule, as described in Section 2.2, we address these data limitations by classifying firms into different stages using observable information in our period of analysis (see Section 2.2). Our baseline regression considers borrowers that we classify in Stage 1, and we use firms defined as in Stage 3 to conduct a falsification test.

The second challenge we face is to disentangle the effect of IFRS 9 on relationship lending from credit supply trends during our period of analysis. Endogeneity bias could result if these factors were relevant determinants of the growth of credit and associated with the relationship strength between banks and firms. For example, a "low-for-long" interest rate environment, characterized by low interest rates over an extended period, has been shown to affect the provision of credit and risk taking (Arce et al., 2018). During our sample period, such an environment was present in the Eurozone, in part the result of European Central Bank (ECB) monetary policy. Also, the participation of banks in the non-regular open market operations of the ECB could affect the supply of credit for firms in our sample. We address the potential effects of these unobserved time-varying factors by introducing bank-time fixed effects, and by conducting cross-sectional tests to show that our effect becomes more relevant whenever we predict that IFRS 9 should have a higher impact.

We also control for the demand of credit by introducing firm-time fixed effects. Thus, we conduct our analysis on the sample of firms with multiple relationships and further show that our inferences are robust to the consideration of single-relation firms, employing industry-location-time fixed effects (Degryse et al., 2019). Finally, if banks changed their lending behavior prior to

the implementation of IFRS 9, our estimation would be biased in favor of finding no effect of IFRS 9 on relationship lending. We mitigate this possibility by conducting an anticipation test that shows no noticeable credit effects prior to implementation of IFRS 9.

We identify the effect of the ECL model on relationship banking by comparing the supply of credit of banks to their relationship borrowers, before and after the introduction of IFRS-9. In particular, we estimate the following regression equation at the bank-firm-semester level, focusing on borrowers with loans that we classify as being in Stage 1:

$$\Delta Credit_{fbt} = \beta_1 RL_{fbt-1} + \beta_2 RL_{fbt-1} \times Post_t + \alpha_{ft} + \gamma_{bt} + \epsilon_{fbt} \quad (1)$$

The dependent variable is the growth of credit between firm *f* and bank *b* in semester *t*. *RL* denotes our proxy of relationship banking, measured at the bank-firm-semester. We employ different definitions of this variable considering both the perspective of the lender and the borrower (see Section 3.2). Our main variable of interest is the interaction of *RL* and *Post,* a time indicator variable that equals zero for semesters before January 1, 2018 and one after this date. Thus, β_2 reflects the incremental effect of *RL* on *ΔCredit* associated with the ECL model. If the new provisioning methodology dilutes the role of relationship lending, we would expect to observe a negative coefficient on the interaction term, β_2. Our regression includes firm-time fixed effects, α_{ft} and bank-time fixed effects, γ_{bt}. This regression model is similar to that of Sette and Gobbi (2015), which studies whether relationship lending mitigates the transmission of the Lehman default shock to the supply of credit in Italy.

5. Stage 1 and relationship lending

5.1 Baseline analysis

Table 2 presents the findings from the estimation of equation (1), pooling all firms that we classify as being in Stage 1. The Columns 1 and 2 (Columns 3 and 4) findings are based on estimations in which *RL* is measured from the perspective of the borrower (lender), *Main bank* and *Main bank credit > 50%* (*High exposure 90th percentile* and *High exposure 95th percentile*). The findings in Table 2 reveal a significantly negative effect of the new impairment model on the role of relationship lending across all four *RL* estimations.[21] The Column 1 findings indicate that a firm holding an exclusive relationship enjoys 10.3 percentage points (pp) higher semiannual credit growth before the implementation of IFRS 9, i.e, the *RL* coefficient = 0.103, but this effect falls by 1.8 pp

[21] Untabulated findings from estimations that include firms for which we do not have enough information to estimate their PD before and after the introduction of IFRS and estimations in which we use log difference of credit as our dependent variable yield the same inferences as those based on the Table 2 findings. See Section 8 for additional tests assessing the robustness of inferences based on the baseline results.

following implementation. The Column 2 findings reveal the firms with more than 50% of the total amount outstanding have an even larger relative fall in credit growth, 2.1 pp, after 2018. The Columns 3 and 4 findings reveal a similar pattern, with the fall in credit growth being larger for borrowers in higher exposure percentiles. We observe a 1.9 pp and 2.5 pp decreases when a credit exposure is above the 90th and 95th percentiles of the distribution at the beginning of the semester.

The findings in Table 2 showing a positive effect of relationship lending both before and after 2018 (i.e., all of the *RL* and sum of *RL* and *RL* × *Post* coefficients are significantly positive), corroborate extant findings in the literature that relationship lending is a key that enables firms to access external finance (e.g., Sette and Gobbi, 2015; Bolton et al., 2016; Banerjee et al., 2021). However, the new impairment model appears to reduce the effect of relationship banking on credit growth. This finding suggests that IFRS 9 may reduce the incentives of lenders under an exclusive relationship to further increase their exposure to their relationship borrowers by granting new credit.

< Insert Table 2 here >

5.2 Implications on the availability of credit

Equation (1) identifies the effect of IFRS 9 on a borrower's credit growth from a bank with a strong relationship compared to a bank with a weaker relationship. However, this specification does not address whether total lending to a borrower who relies more on relationship lending may have decreased as a result of IFRS 9. It is possible that these borrowers substituted the lending from banks with a strong relationship to banks with a weaker relationship.

To assess the impact of IFRS 9 on relationship lending at the firm level, we estimate a variation of equation (1), where the regression analysis is performed at the firm level instead of at the bank-firm level, and include firm-bank pairs with an existing relationship at the beginning of each semester. [22] We define credit growth as the change in a firm's total credit balance with all banks in one semester relative to the previous semester, normalized by the average credit balance in the two semesters. The explanatory variable of interest is *Share_MainBank*, which we define as the fraction of the credit balance of a firm in its main bank at the beginning of each semester. To measure the differential effect of relationship lending when IFRS 9 is implemented, we interact *Share_MainBank* with a time indicator, *Post*, that equals one after January 2018. To control for the effects of time-varying credit demand, we follow Cingano et al. (2016) and include the estimated firm-time-fixed effect (α_{ft}) from the bank-firm level regression (equation (1)), additional firm control variables, and industry-location-size-time fixed effects.

[22] For this analysis, we also focus on firms that we classify as being in Stage 1.

Table 3 presents the findings. In Column 1, we measure *Share_MainBank* as the amount of a firm's credit with its main bank relative to its total credit. In Column 2, we measure *Share_MainBank* as the share of credit with the main bank only if it accounts for more than 50% of a firm's total credit. In both cases, the findings reveal that the interaction coefficients, –0.0243 and –0.0179, are significantly negative, which indicates that implementation of IFRS 9 reduces the positive effect of relationship lending on loan growth. These results are consistent with the evidence presented in Table 2 at the firm-bank level. Furthermore, they suggest that firms that relied more on relationship lending experienced greater difficulties in accessing credit after the implementation of IFRS 9, and did not offset fully the loss of credit from relationship lenders by borrowing from non-relationship lenders.

< Insert Table 3 here >

To assess the economic relevance of the negative impact of IFRS 9 on relationship lending, we perform an approximate calculation. First, we calculate the reduction of credit for a borrower from its main bank after IFRS 9. To do so, we multiply the average outstanding credit of firms with their main bank at the end of the year 2017 by the annualized impact of IFRS 9 on relationship lending (i.e., the coefficient of *Share_MainBank* × *Post* in Column 1 of Table 3). Next, to approximate the aggregate reduction in credit we multiply this figure by the total number of non-financial corporations in Spain with positive outstanding credit at the end of the year 2017. Finally, we divide the aggregate reduction in credit by the total outstanding credit of Spanish non-financial corporations at the end of the year 2017. Our calculation suggests a sizeable effect on the availability of credit: the impact of IFRS 9 on relationship lending entailed an aggregate credit reduction of €13.4 billion in the year 2018, which represents 2.8% of the total outstanding credit of Spanish non-financial corporations at the end of 2017.

5.3 Heterogenous effects at the bank level: The role of capital

An exclusive relationship implies a higher exposure between a bank and a firm compared to a less exclusive relationship. Our findings are consistent with IFRS 9 reducing the incentives of a bank to facilitate new credit to a borrower holding an exclusive relationship. The main intuition behind this result is that, after IFRS 9, banks may be less willing to further increase their exposure to borrowers for which they will have to recognize high loan loss provisions because provisions reduce regulatory capital (e.g., Abad and Suarez, 2018; Morais et al., 2020). Although we include controls in all our regressions for bank-time fixed effects, absorbing the direct effect of bank specific characteristics, it could be the case that the effect of IFRS 9 on relationship banking is more pronounced for banks that are less well-capitalized.

To test whether this is the case, we extend our baseline regression equation (1) by allowing for the effect of the new impairment model on relationship banking to differ for less well-capitalized

banks. In particular, we include an indicator variable, *Low Capital*, that equals one if the bank's capital ratio is below the median in December 2015 (2017) for the pre-IFRS 9 (post-IFRS 9) period, and its interactions with *RL* and *RL* × *Low Capital*. The findings, presented in Table 4, reveal that each of the *RL* × *Low Capital* coefficients is significantly positive, ranging from 0.0766 to 0.0851. These findings indicate that prior to IFRS 9, the positive association between relationship lending and the growth of credit is larger for less well-capitalized banks. The findings are also consistent with the higher incentives of a less well-capitalized bank to facilitate new credit to an exclusive borrower to avoid impairment and thus, the recognition of loan losses.[23]

The findings reveal that each of the *RL* × *Low Capital* × *Post* coefficients on triple interaction, is negative but significantly so only marginally for borrowers with *High exposure 95th percentile*. Hence, there is, at best, weak evidence of a differential effect of IFRS 9 on relationship lending for less well-capitalized banks. Our results suggest that the change in the incentives for banks to strengthen an exclusive relationship is present for both good and bad capitalized banks.

< Insert Table 4 here >

5.4 Heterogenous effects based on the role of loan guarantees

The expected loss given default of a loan is a key input to estimate loan loss provisions under IFRS 9. When a loan is secured by collateral, the shift from the ICL to the ECL model may have little implications for the loan loss provisions. The guarantees largely reduce the loss given default that the lender will face and, thus, expected credit losses. As a result, when considering new lending to a relationship borrower whose outstanding credit is guaranteed by collateral, banks may not have to foresee the need to recognize loan loss provisions at loan origination and throughout the life of the loan. In this case, banks may face similar incentives to facilitate new credit to an exclusive borrower before and after IFRS 9, and hence we should expect no change in the association between relationship banking and the growth of credit after IFRS 9.

To examine whether this is the case, we estimate equation (1) focusing on Stage 1 borrowers and including firm-bank pairs with guaranteed credit exposures at the beginning of each semester. The findings, presented in Table 5, reveal that each of the *RL* coefficients is significantly positive, ranging from 0.0110 to 0.0421. Thus, from the perspective of the borrower and the lender, holding an exclusive relationship has a positive effect on the growth of credit before implementation of IFRS 9. A comparison of the Table 2 and Table 5 *RL* coefficients

[23] Banks may have incentives to provide new credit to a borrower to avoid impairment and the recognition of loan loss provisions, which would imply a deterioration of capital buffers. For borrowers very close to default, the literature refers to this practice as evergreening or zombie lending (e.g., Peek and Rosengren, 2005; Caballero et al., 2008). Because we consider the effect of IFRS 9 on relationship lending for firms in Stage 1, which have all their outstanding credit classified as performing, our study's findings are unlikely to reflect the effects of zombie lending.

reveals that the magnitude of the effect is higher in Table 2, which includes firm-bank pairs both with and without guaranteed credit. These findings are consistent with a large literature documenting the role of collateral as a tool to reduce information asymmetries (e.g., Stiglitz and Weiss, 1981; Bester, 1985) and suggest that relationship lending is less relevant in the presence of collateral (e.g., Holmstrom and Tirole, 1997).

More important, the Table 5 findings reveal that none of the *RL* × P*ost* coefficients is significant, which indicates that implementation of IFRS 9 had no impact on the effect of relationship banking on the growth of credit for collateralized borrowers. As expected, the new impairment model may have little impactions on loan loss provisions when considering borrowers with guaranteed credit exposures. In this case, IFRS 9 does not alter the incentives of relationship lending. More broadly, these results provide evidence that the impact of IFRS 9 relates to the lower willingness of banks to increase their exposure to borrowers when they foresee having to account for high expected credit losses.

< Insert Table 5 here >

5.5 Heterogenous effects at the borrower level

5.5.1 *Ex-ante* risk

Our primary findings in Table 2 indicate that there is a negative effect of the new impairment model on relationship lending. We next consider potential channels that help to explain this finding. In particular, we consider the role of borrower credit quality. The higher the *ex-ante* probability of default of a borrower (i.e., higher PD), the higher the estimated expected credit losses and the provisions for loan losses. Following the implementation of IFRS 9, banks may have reduced incentives to increase their exposure to *ex-ante* risky borrowers (e.g., Ertan, 2021; Morais et al., 2020; Bischof et al., 2022). Furthermore, this change in incentives may be larger when banks hold an exclusive relationship (i.e., the bank has a large share of the borrower's total credit). This is because, under the ICL model, banks had strong incentives to facilitate new lending to risky borrowers in exclusive relationships to avoid recognizing credit losses, since reducing lending to these borrowers could increase default risk (Boot, 2000). IFRS 9 reduces these incentives by requiring provisions for expected credit losses to be recognized at loan origination. In contrast, the new impairment model may not affect relationship lending to safe borrowers because expected credit losses for these firms are low. For this reason, we predict that the negative effect of IFRS 9 on relationship lending is stronger for firms with a riskier profile.

To test this prediction, we estimate a version of equation (1), partitioning the sample into investment grade (IG) and high yield firms (HY) (see section 2.2.1). The findings are presented in

Table 6. The key finding is that the RL x Post coefficients are significantly negative only for the HY estimations in Columns 2, 4, 6, and 8. The negative impact of IFRS 9 for HY firms ranges from a 2 pp decrease for the *Main bank* estimation to a 2.9 pp decrease for the *High exposure 95th percentile* estimation. In contrast, the effect of relationship lending on the growth of credit for investment grade borrowers is unchanged after IFRS 9. Hence, consistent with our prediction, the effect of the new impairment model on relationship lending is present in the sample of borrowers with a high *ex-ante* probability of default.

< Insert Table 6 here >

Overall, the effect of the new impairment model on relationship lending introduces a new asymmetry in the way a firm may benefit from holding an exclusive relationship to access external finance. Before 2018, relationship lending benefited investment-grade and high-yield firms in a similar way. However, after IFRS 9 was implemented, the effect of relationship lending on the supply of credit changed for the two types of borrowers. Our findings suggest that the higher cost of lending after IFRS 9 and the impact on relationship banking is borne mainly by high yield firms. From a policy standpoint, this is an important finding because riskier borrowers may face greater difficulty in accessing external finance when relationship banking could no longer be as effective in insulating their flow of credit over time, especially during recessions and liquidity shocks (e.g., Bolton et al., 2016; Banerjee et al., 2021).

5.5.2 Credit quality deterioration

Next, we build on the comparison of investment grade and high yield firms in section 5.5.1 to identify two groups of firms that may be differentially affected by IFRS 9. Specifically, we consider the role of a deterioration in the credit quality of a borrower. We expect the impact of IFRS 9 on relationship lending to be stronger for riskier firms whose credit quality has deteriorated, as banks may anticipate higher loan loss provisions throughout the loan's life. This is because new loans to these borrowers are more likely to transition from Stage 1 to Stage 2, where lifetime PDs are considered, thereby resulting in a significant rise in provisions (ESRB, 2017).

To test our prediction, we estimate equation (1) for two subsamples: investment grade firms (IG) in Stage 1 with a stable credit quality (i.e., the PD has remained equal or below 0.4%) and high yield firms (HY) in Stage 1 whose credit quality has deteriorated (i.e., the PD has increased in the previous years). We define the change in credit quality of a firm in the pre-IFRS 9 period, i.e., before 2018, as the change in PD between 2014 and 2015. Similarly, we define the change in credit quality in the post-IFRS 9 period as the change in the PD between 2016 and 2017. Table 7, Panels A and B, presents the findings for each subsample.

The findings in Panel A reveal that none of the *RL* × *Post* coefficients is significant. Hence, as expected, the new impairment model does not affect relationship banking for *ex-ante* low risk firms in Stage 1 whose credit risk has remained low. These findings suggest that the increase in the cost of credit that results from provisioning at origination under IFRS 9 will be low for such firms, and that banks perceive that a future transition between Stage 1 and 2 is unlikely to occur when granting new credit to this profile of borrowers.

The findings in Panel B, reveal that three of the four *RL* × *Post* coefficients are significantly negative, with the significant coefficient ranging from –0.0214 to –0.0232. These findings indicate that the negative effect of the ECL on relationship lending is more pronounced for *ex-ante* high risk firms in Stage 1 that exhibit a deterioration in their credit quality and suggest that the outstanding credit for these borrowers is more likely migrate to Stage 2 in the future. In this case, banks may anticipate both larger provisions at loan origination and a higher probability that a transition between Stage 1 and Stage 2 occurs. Thus, after implementation of IFRS 9, banks are less willing to strengthen an exclusive relationship with borrowers that may more likely downgrade to Stage 2.

< Insert Table 7 here >

6. The transition towards Stage 2

Supervisors provide some guidance to banks regarding what should be deemed a significant increase in credit risk, triggering a transition from Stage 1 to Stage 2. In particular, as noted above, they suggest that a threefold increase in the lifetime PD from initial recognition should be used as a rule of thumb. Although this is not a definitive rule that banks must follow, it enables us to explore the "cliff effect" under IFRS 9, which refers to the significant increase in loan loss provisions when a loan transitions from Stage 1 (12-month expected credit losses) to Stage 2 (lifetime expected credit losses). Under IFRS 9, new lending to borrowers with a significant deterioration in credit quality may imply provisioning for large expected credit losses not only at origination, but also if the new loan downgrades to Stage 2 in the future. Therefore, we estimate equation (1) for the sample of high yield firms that have experienced a threefold increase in their PDs. These are firms that were excluded in our previous analyses. Thus, we now focus our attention on borrowers whose outstanding credit may have very likely already transitioned to the Stage 2.

The results from these estimations presented in Table 8 provide support for the hypothesis that the negative impact of IFRS 9 on relationship lending is significantly accentuated when lenders anticipate a likely transition from the first to the second stage, as predicted by the "cliff-effect" feature of IFRS 9. In particular, the *RL* × *Post* coefficient in the *Main bank credit > 50 %* estimation

indicates that there is a decrease the growth of credit by 5.7 pp. for relationship borrowers in the post-IFRS 9 period. This magnitude is twice as large as the negative impact of IFRS 9 on relationship lending for all Stage 1 firms with a high *ex-ante* credit risk shown in Table 6.

< Insert Table 8 here >

7. Falsification test: Stage 3

The three-stage asset classification under IFRS 9 allows for the possibility of conducting a falsification test. In particular, we would not expect to observe a significant effect of IFRS 9 on relationship banking when the *ex-ante* credit risk of a borrower is sufficiently high, as reflected by the borrower's non-performing status. Under both the ICL model and IFRS 9, when extending credit to these borrowers, banks must recognize loan loss provisions based on credit losses that assume a PD close to 100% (e.g., Novotny-Farkas, 2016; López-Espinosa et al., 2021). Therefore, the loan loss allowance recorded on loans with objective evidence of impairment (i.e., Stage 3 loans) is likely to be similar under the ICL and ECL models.

Table 9 presents findings from estimations of equation (1) using a sample of borrowers whose outstanding credit may be allocated in Stage 3. As described in section 2.2.3, we classify a borrower as being in Stage 3 if all their outstanding credit is non-performing. This sample comprises credit impaired firms with a PD very close to 100%. This is a conservative definition of Stage 3 because a borrower could be potentially close to impairment (and effectively treated as credit impaired) and still have some credit with an under-performing or even performing status. The findings reveal that prior to the introduction of IFRS 9, holding a relationship entailed a growth of credit between 15.4 pp and 24.6 pp higher than the one observed for non-relationship borrowers. These results corroborate the significant role of relationship lending in extending credit to very risky borrowers that would, otherwise, have no access to external finance. More importantly, the findings reveal that none of the $RL \times Post$ coefficients is significant, which indicates there is no significant differential impact of relationship lending on credit growth after the introduction of IFRS 9. This is consistent with the new regulation bringing no major changes regarding the provisioning methodology that is employed for credit impaired borrowers.

< Insert Table 9 here >

8. Robustness tests and extensions of the baseline analysis

8.1 Single-relationship firms, anticipation effect, and alternative definition of relationship lending

In the previous analysis, we identified the effect of IFRS 9 on relationship lending controlling for the demand of credit with firm-time fixed effects. This approach focused on multi-bank firms,

excluding those that borrow from only one bank. Although multi-relationship firms account for approximately 80% of the total loan volume in the Spanish economy, assessing whether our findings apply also to single-relationship firms is important to assess the external validity of our results. Accordingly, we estimate equation (1) using both single- and multi-bank firms. Following Degryse et al. (2019), we control for credit demand using industry-location-size-time fixed effects. The findings in Columns 1 and 2 of Table 10 reveal that IFRS 9 has a negative average impact on relationship lending, which is consistent with the findings relating to multi-bank firms and suggests that our findings can be generalized to both single- and multi-bank firms.

Next, we test for an anticipation effect, reflecting the possibility that banks may have changed their lending behavior before adopting IFRS 9. IFRS 9 was issued by the International Accounting Standards Board on July 2014 and was first applied in the financial statements for the 2018 fiscal year. Because of the significance of this regulatory change, financial institutions made substantial efforts to develop new provisioning methodologies and understand the consequences of the ECL model on their business models before the adoption of the new regulation. This suggests that banks may have changed their lending behavior, particularly the role of relationship lending, before adopting IFRS 9. If such an anticipation effect is present, our estimates of the effect of IFRS 9 on relationship lending likely represent a lower bound of the true effect of IFRS 9. To test for the possibility of an anticipation effect, we repeated our baseline regression estimation of equation (1), excluding all observations from the last semester of 2017 when the anticipation effect is likely to have been most prevalent. The findings in Column 3 and 4 of Table 10 reveal no evidence of an anticipation effect. In particular, the $RL \times Post$ coefficients are similar to those in Table 2.

Finally, we assess whether our inferences are sensitive to use of an alternative definition of relationship lending that reflects the information a bank has about a firm. Our proxies for relationship lending focus on the exclusivity of a relationship from the perspective of the borrower and the lender. Thus, our proxy variables can reflect both the intensity of a relationship in a given period as well as the availability of information that facilitates loan contracting over time. Therefore, we consider an alternative definition of relationship lending that reflects primarily the information that a bank has about a firm, rather than focusing primarily on exposure.[24] Specifically, we develop a proxy for relationship lending as the number of new relationships between a lender and a borrower (i.e., the number of times that there is an increase in the outstanding amount of credit) over the past five years. We then estimate equation (1) using this alternative proxy of

[24] The exclusivity of a relationship from the bank's perspective also can indicate credit concentration. An alternative interpretation of our results could be that IFRS 9 affects diversification incentives rather than relationship lending. This is unlikely for two reasons. First, we observe a negative effect of IFRS 9 using a measure of relationship lending that is not based on the exposure between a bank and a firm (Table 10). Second, the firm's perspective on exclusivity (i.e., a bank holding a large share of the borrower's total credit) is generally unrelated to the bank's diversification incentives.

relationship lending. Consistent with our main findings in Table 2, the findings in Column 5 of Table 10 reveal that IFRS 9 has a negative effect on relationship lending.

< Insert Table 10 here >

8.2 The effect of IFRS 9 on relationship lending via lending rates

Our main analysis considers the effect of IFRS 9 on relationship lending focusing on the growth of credit. We document that IFRS 9 has a negative effect on relationship lending. It is plausible, however, that the effect of a higher cost of lending after IFRS 9 may translate into both a lower credit availability and higher lending rates for riskier borrowers under an exclusive relationship. We are not able to explore the impact of IFRS 9 on the cost of credit for our whole sample because lending rate data are only available since July 2018. Nonetheless, we conduct an exploratory empirical exercise considering a subsample of the main analysis.

Specifically, we examine the impact of IFRS 9 on the role of relationship lending via a change in lending rates by focusing on the credit granted before and after 2018 with a maturity greater than three years. This permits us to observe the interest rate of credit granted in the pre-adoption period (2016-2017) and in the post-adoption period (2018-2019).[25] Table 11 presents the results from estimating a version of equation (1) for the subsample using of loans with maturity greater than three years using the lending rate as the dependent variable. Consistent with the existing literature, we find that relationship lending facilitates access to credit as shown by the negative effect on interest rates (e.g., Petersen and Rajan, 1994; Elsas, 2005; Sette and Gobbi, 2015; Kysucky and Norden, 2016; López-Espinosa et al., 2017), i.e., all of the *RL* coefficients are significantly negative. However, we do not find that the effect of relationship lending on interest rates changes after the adoption of IFRS 9, i.e., none of the *RL* × *Post* coefficients is significant. These results suggest that, on average, the negative effect of IFRS 9 on relationship lending is manifested through the lower availability of credit rather than higher interest rates.

< Insert Table 11 here >

9. Conclusion

A large literature provides theoretical and empirical evidence that relationship lending benefits firms and banks. An exclusive relationship between a bank and a firm is a key source of reduction of information frictions that can facilitate loan contracting over time. Also, when a bank holds a large share of the borrower's credit, there is a greater incentive for the bank to support the borrower by providing new credit in order to avoid impairment. However, there is little evidence whether and how a banking regulation affects relationship lending. Providing such evidence is

[25] The main limitation of this strategy is that this subsample of loans may not be representative of the whole population, which limits the generalizability of the interest rate findings.

important to policy-makers and scholars alike given the central role of relationships in facilitating firms' access to external finance.

We fill this gap in the literature by focusing on the effect of the expected credit loss model under IFRS 9 on relationship lending. This is a major change in the way banks have to account for loan loss provisions, which are mandated to be forward-looking and raised at loan origination. Our results suggest that the new impairment model has reduced the role of relationship banking. In line with the existing literature, we show that holding an exclusive relationship is a relevant mechanism to enable firms to access external finance. Even though such a role remains after the introduction of IFRS 9, our study's findings suggest that the positive effect of relationship lending on the growth of credit is reduced. In addition, our results indicate that firms that relied more on relationship lending have experienced greater difficulties in accessing credit after the implementation of IFRS 9. The aggregate effect on credit availability is sizeable, with a reduction in credit to Spanish non-financial firms of 2.8% of their total outstanding credit. Finally, we document that the impact of IFRS 9 on relationship lending is present for the case of *ex-ante* riskier borrowers and whose credit quality has deteriorated. In contrast, the effect is significantly attenuated when considering new lending to a relationship borrower whose outstanding credit is guaranteed by collateral.

Our findings are consistent with a change in the incentives that underpin relationship lending. After IFRS 9, banks holding a more exclusive relationship with a firm are less willing to increase further their exposure if this results in larger expected credit losses at loan origination and a higher probability that the borrower downgrades to Stage 2 in future periods. Overall, our results suggest that regulatory changes may affect the role of relationship lending by affecting the "exclusivity dimension" of relationship banking. Specifically, banks may have less incentive to continue lending to exclusive relationship borrowers in order to avoid their default and the recognition of credit losses.

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FIGURE 1. EVOLUTION OF THE LOAN LOSS ALLOWANCE UNDER THE ICL AND ECL MODEL (IFRS 9)

This figure depicts the evolution of the loan loss allowance associated with a loan as its credit quality deteriorates. In the y-axis we represent the level of the allowance. In the x-axis we consider deterioration of credit quality since initial recognition (the increase in the PD of the loan). In red, we represent the scheme that results from the ICL model. We depict the evolution of the allowance according to the ECL model under IFRS 9 in blue. We further show the three-stage asset classification under IFRS 9 and the associated considered PD. Point A in the chart captures the initial allowance that is raised at origination under the ECL model. The particular level will depend on the PD and loss given default (LGD) of the borrower. We depict in the x-axis the significant increase in credit risk (SICR), the moment in where a loan classified in Stage 1 migrates to Stage 2.

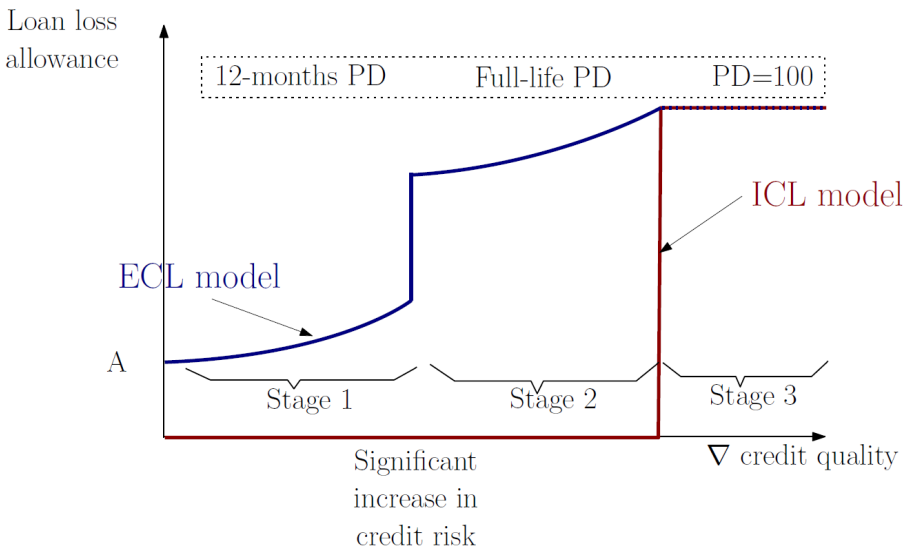

TABLE 1. DESCRIPTIVE STATISTICS ON RELATIONSHIP LENDING AND CREDIT RISK

Panels A and B of this table contain descriptive statistics (mean, standard deviation, median, 5th and 95th percentiles) on i) the relationship lending measures (main bank, main bank credit > 50 %, high exposure 90th percentile and high exposure 95th percentile), ii) the biannual credit growth at the bank-firm level, measured as the change in credit balance of firm f in bank b in a given semester with respect to the previous semester divided by the average credit balance in the two semesters, iii) *ex-ante* firms' credit risk (one-year estimated probability of default (PD) in December 2015 or 2017 depending on whether we use the pre- or post-even periods and the proportion of firms with PD>0.4%) and iv) *ex-ante* credit risk transition (firms with PD below or equal to 0.4% that had remained below this threshold in each period, firms with PD above 0.4% that had either increase less than three times or presented a threefold increase). We define the increase in PD based on the period 2014-2015 for the pre-event period and 2016-2017 for the post-event period. The sample only includes firm-bank pairs with an existing relationship at the beginning of each semester and it is restricted to firms with all their outstanding credit performing at the beginning of each semester. Additionally, for the case of the relationship lending measures, the biannual credit growth and *ex-ante* firms' credit risk, the sample only includes firms which had not experienced a threefold-increase in their credit risk. Panel A contains the descriptive statistics for the pre-IFRS9 period, while Panel B refers to the post-IFRS9 period.

PANEL A: PRE-IFRS 9 PERIOD (JUNE 2016 - DECEMBER 2017)

Variable	*Units*	*Mean*	*Std. Dev.*	*Median*	*5th percentile*	*95th percentile*
Relationship lending						
Main bank	0/1	0.523	0.499	1	0	1
Main bank credit > 50 %	0/1	0.474	0.499	0	0	1
High exposure 90th percentile	0/1	0.099	0.298	0	0	1
High exposure 95th percentile	0/1	0.045	0.207	0	0	0
Credit						
Biannual credit growth (bank-firm level)	-	-24.631	74.886	-11.403	-200.000	86.546
Credit risk						
Firm's probability of default	%	1.353	4.827	0.925	0.077	2.653
High yield firms (PD>0.4%)	0/1	0.777	0.416	1	0	1
Credit risk transition						
Safe firms (PD=<0.4%)	0/1	0.134	0.341	0	0	1
Risky firms(PD>0.4%) and:						
Increase in credit risk	0/1	0.168	0.374	0	0	1
Threefold increase in credit risk	0/1	0.029	0.168	0	0	0

PANEL B. POST-IFRS 9 PERIOD (DECEMBER 2017 - JUNE 2019)

Variable	*Units*	*Mean*	*Std. Dev.*	*Median*	*5th percentile*	*95th percentile*
Relationship lending						
Main bank	0/1	0.517	0.500	1	0	1
Main bank credit > 50 %	0/1	0.469	0.499	0	0	1
High exposure 90th percentile	0/1	0.102	0.303	0	0	1
High exposure 95th percentile	0/1	0.047	0.211	0	0	0
Credit						
Biannual credit growth (bank-firm level)	-	-24.886	73.832	-12.290	-200.000	84.868
Credit risk						
Firm's probability of default	%	1.082	4.325	0.752	0.056	2.030
High yield firms (PD>0.4%)	0/1	0.713	0.452	1	0	1
Credit risk transition						
Safe firms (PD=<0.4%)	0/1	0.197	0.397	0	0	1
Risky firms(PD>0.4%) and:						
Increase in credit risk	0/1	0.221	0.415	0	0	1
Threefold increase in credit risk	0/1	0.033	0.178	0	0	0

TABLE 2. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS

This table reports the results obtained from the estimation of equation (1). The dependent variable is credit growth, which is measured as the change in credit balance of firm f in bank b in a given semester with respect to the previous semester divided by the average credit balance in the two semesters. Our first explanatory variable of interest is *RL* which is a dummy variable that takes the value of 1 if the bank and the firm had a lending relationship at the beginning of each semester. We employ four proxies of relationship lending. First, we use two measures considering the perspective of the borrower: (i) Main bank – in Column 1 – which is a dummy variable that takes the value of 1 if the bank was the main lender of a given firm at the beginning of the semester, and 0 otherwise, and (ii) Main bank credit > 50 % – in Column 2 – which is a refinement of the previous dummy variable such that it is equal to 1 if the amount of credit outstanding with the main lender was more than 50% of the total amount outstanding, and 0 otherwise. Second, we use other two measures considering the perspective of the lender: (i) High exposure 90th percentile– in Column 3– which is a dummy variable that takes the value of 1 if the firm was above the 90th percentile of the distribution of the amount of outstanding credit by firm and bank at the beginning of the semester and (ii) High exposure 95th percentile – in Column 4– for which we use the 95th percentile as the threshold. Our second explanatory variable of interest is the interaction of the measures of relationship lending and Post which is a dummy variable that takes the value of 1 for the period after the introduction of IFRS 9, i.e., from January 2018, and 0 before that date. All the regressions include firm-time and bank-time fixed effects. Our sample period spans from June 2016 to June 2019 and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. This is to guarantee that all the credit exposures of the banks in our sample to these firms can be classified in IFRS-9 stage 1. In addition, we restrict our sample to those firm-bank pairs with an existing relationship at the beginning of each semester. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL			
	From the borrower's perspective		*From the lender's perspective*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.1026***	0.1320***	0.0876***	0.0846***
	(0.0041)	(0.0036)	(0.0087)	(0.0093)
RL × *Post*	-0.0177***	-0.0206***	-0.0193***	-0.0247***
	(0.0037)	(0.0042)	(0.0058)	(0.0060)
RL + *RL* × *Post*	0.0850***	0.111***	0.0683***	0.0599***
	(0.00444)	(0.00395)	(0.00983)	(0.0101)
Observations	2,269,993	2,269,993	2,269,993	2,269,993
R-squared	0.3892	0.3899	0.3869	0.3865
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 3. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. EVIDENCE AT THE FIRM LEVEL

This table reports the results obtained from the estimation of a variation of equation (1) in which regression analysis is conducted at the firm level instead of at the bank-firm level. Hence the dependent variable credit growth is measured as the change in the total credit balance of firm f in all banks in a given semester with respect to the previous semester divided by the average credit balance in the two semesters. The explanatory variable of interest is *Share_MainBank* which is defined as the fraction of the credit balance of firm f in its main bank at the beginning of each semester and its interaction with a dummy variable that takes the value of 1 for the period after the introduction of IFRS 9, i.e., from January 2018, and 0 before that date. In Column 1, *Share_MainBank* is defined as the share of credit of firm f in its main bank with respect to the total credit balance of firm f in all banks whereas in Column 2 it is the share of credit in the main bank only when it represents more than 50% of the total credit balance of firm f. We include credit demand controls in the form of the estimated firm fixed effect from the bank-firm-level regressions in equation (1), additional firm control variables (the logarithm of total assets, return on assets, leverage ratio, cash ratio and sales turnover ratio) and industry-location-size-time fixed effects. Only those firm-bank pairs with an existing relationship at the beginning of each semester are included and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. The row below the coefficients (*Share_MainBank* + *Share_MainBank* × *Post*) contains the linear combination of the two estimated coefficients of interest. Standard errors are clustered at the firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL	
	From the borrower's perspective	
	Main bank	Main bank credit > 50 %
	(1)	(2)
Share_MainBank	0.1074***	0.0734***
	(0.003)	(0.002)
Share_MainBank × *Post*	-0.0243***	-0.0179***
	(0.004)	(0.002)
Share_MainBank + *Share_MainBank* × *Post*	0.0831***	0.0555***
	(0.0030)	(0.0016)
Observations	689,188	689,188
R-squared	0.625160	0.625122
Firm × Time FE	No	No
Bank × Time FE	No	No
ILS × Time FE	Yes	Yes
Credit Demand Control	Yes	Yes
Firm Controls	Yes	Yes

TABLE 4. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE ROLE OF BANKS' CAPITAL RATIO

This table reports the results obtained from the estimation of an extended version of equation (1), in which additional explanatory variables of interest have been added to those defined in Table 2, namely the interaction of the measures of relationship lending and *Low capital* and the interaction of the measures of relationship lending, *Post* and *Low capital*. *Low capital* is a dummy variable that takes the value of 1 if the bank capital ratio is below the bottom quartile, and 0 otherwise. The dependent variable and the set of fixed effects are the same as those defined in Table 2. As in Table 2, only those firm-bank pairs with an existing relationship at the beginning of each semester are included and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.0988***	0.1276***	0.0797***	0.0752***
	(0.0042)	(0.0040)	(0.0075)	(0.0074)
RL × *Post*	-0.0172***	-0.0195***	-0.0138	-0.0175*
	(0.0047)	(0.0053)	(0.0088)	(0.0092)
RL × *Low capital*	0.0781*	0.0851**	0.0766*	0.0846**
	(0.0469)	(0.0388)	(0.0445)	(0.0419)
RL × *Low capital* × *Post*	-0.0202	-0.0293	-0.0556	-0.0661*
	(0.0304)	(0.0297)	(0.0353)	(0.0358)
Observations	2,269,993	2,269,993	2,269,993	2,269,993
R-squared	0.3893	0.3899	0.3869	0.3866
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 5. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE CASE OF GUARANTEED CREDIT

This table reports the results obtained from the estimation of equation (1) as in Table 2, but with a different estimation sample given that it only includes guaranteed credit exposures. As in Table 2, we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. In addition, we restrict our sample to those firm-bank pairs with guaranteed credit exposures at the beginning of each semester. The dependent variable, the explanatory variables of interest and the set of fixed effects are similar to those defined in Table 2. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.0110***	0.0193***	0.0295***	0.0421***
	(0.0037)	(0.0040)	(0.0064)	(0.0074)
RL × *Post*	-0.0021	-0.0001	-0.0077	-0.0119
	(0.0042)	(0.0051)	(0.0085)	(0.0108)
RL + *RL* × *Post*	0.00887*	0.0192***	0.0218***	0.0302***
	(0.00492)	(0.00581)	(0.00807)	(0.00982)
Observations	1,186,564	1,186,564	1,186,564	1,186,564
R-squared	0.4067	0.4067	0.4067	0.4067
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 6. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE ROLE OF EX-ANTE CREDIT RISK

This table reports the results obtained from the estimation of equation (1) for different subsamples of the firms used in Table 2 depending on their *ex-ante* levels of credit risk. The dependent variable, the explanatory variables of interest and the set of fixed effects are the same as those defined in Table 2. We split the firms in Table 2 in two groups based on their *ex-ante* probability of default (PD). Thus, investment grade (IG) firms are those with a one-year PD below or equal to 0.4%, which corresponds with CQS 1 – 3 according to the ECB classification, whereas high yield (HY) firms have a one-year PD above 0.4% and correspond to CQS 4- 8. The PD for the pre- and post-IFRS 9 periods are calculated with firms' balance-sheet information for 2015 and 2017, respectively. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL							
	From the borrower's perspective				*From the lender's perspective*			
	Main bank		Main bank credit > 50 %		High exposure 90th percentile		High exposure 95th percentile	
	IG	HY	IG	HY	IG	HY	IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RL	0.1165***	0.1000***	0.1412***	0.1302***	0.1049***	0.0850***	0.0832***	0.0843***
	(0.0076)	(0.0039)	(0.0072)	(0.0038)	(0.0140)	(0.0085)	(0.0231)	(0.0087)
RL × *Post*	-0.0032	-0.0218***	-0.0045	-0.0254***	-0.0210*	-0.0195***	0.0009	-0.0278***
	(0.0062)	(0.0037)	(0.0061)	(0.0046)	(0.0112)	(0.0060)	(0.0196)	(0.0065)
RL + *RL* × *Post*	0.113***	0.0782***	0.137***	0.105***	0.0838***	0.0655***	0.0840***	0.0565***
	(0.00848)	(0.00367)	(0.00747)	(0.00339)	(0.0146)	(0.00941)	(0.0160)	(0.00987)
Observations	366,039	1,903,805	366,039	1,903,805	366,039	1,903,805	366,039	1,903,805
R-squared	0.4311	0.3791	0.4318	0.3797	0.4278	0.3769	0.4275	0.3766
Firm×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank×Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 7. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE ROLE OF THE CHANGE IN CREDIT RISK

This table reports the results obtained from the estimation of equation (1) based on different subsamples of the firms used in Table 2. The group of firms considered in Panel A (from those of Table 2) had a probability of default (PD) below or equal to 0.4% in 2014 (for the pre-event period) and in 2016 (for the post-event period) and this PD had remained equal or below 0.4% one year later (i.e., in 2015 and 2017, respectively). The group of firms considered in Panel B (from those of Table 2) had a probability of default (PD) above 0.4% in 2015 (for the pre-event period) and in 2017 (for the post-event period) and this PD had increased with respect to one year before (i.e., in 2014 and 2016, respectively). The dependent variable, the explanatory variables of interest and the set of fixed effects are the same as those defined in Table 2. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: Ex-ante safe firms (PD<0.4%) whose credit has remained low

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.1248***	0.1512***	0.1074***	0.0851***
	(0.0099)	(0.0095)	(0.0156)	(0.0279)
RL × *Post*	-0.0027	-0.0063	-0.0170	-0.0022
	(0.0075)	(0.0085)	(0.0155)	(0.0286)
RL + *RL* × *Post*	0.122***	0.145***	0.0904***	0.0829***
	(0.00865)	(0.00779)	(0.0171)	(0.0186)
Observations	227,085	227,085	227,085	227,085
R-squared	0.4397	0.4405	0.4358	0.4354
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

Panel B: Ex-ante risky firms (PD>0.4%) which have experienced an increase in their PDs

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.0942***	0.1218***	0.0747***	0.0774***
	(0.0047)	(0.0050)	(0.0107)	(0.0128)
RL × *Post*	-0.0214***	-0.0232***	-0.0114	-0.0222*
	(0.0044)	(0.0052)	(0.0085)	(0.0128)
RL + *RL* × *Post*	0.0727***	0.0986***	0.0633***	0.0552***
	(0.00473)	(0.00473)	(0.0115)	(0.0131)
Observations	499,669	499,669	499,669	499,669
R-squared	0.3919	0.3925	0.3902	0.3899
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 8. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE CASE OF EX-ANTE RISKY FIRMS THAT HAD EXPERIENCED A THREEFOLD INCREASE IN CREDIR RISK

This table reports the results obtained from the estimation of equation (1) based on a sample of firms which had aprobability of default (PD) above 0.4% in 2015 (for the pre-event period) and in 2017 (for the post-event period) and this PD had experienced a threefold increase with respect to one year before (i.e., in 2014 and 2016, respectively). The dependent variable, the explanatory variables of interest and the set of fixed effects are similar to those defined in Table 2. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(5)	(6)	(7)	(8)
RL	0.1138***	0.1371***	0.1432***	0.1089***
	(0.0147)	(0.0149)	(0.0319)	(0.0334)
RL × *Post*	-0.0449**	-0.0564***	-0.0751**	-0.0863*
	(0.0198)	(0.0206)	(0.0352)	(0.0453)
RL + *RL* × *Post*	0.0690***	0.0807***	0.0680***	0.0225
	(0.0111)	(0.0127)	(0.0258)	(0.0357)
Observations	43,333	43,333	43,333	43,333
R-squared	0.4595	0.4600	0.4574	0.4568
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 9. FALSIFICATION TEST: RELATIONSHIP LENDING AND STAGE 3 EXPOSURES

This table reports the results obtained from the estimation of equation (1) based on firms that are supposed to be in IFRS-9 stage 3 instead of stage 1 as in Table 2. We consider that a firm is in stage 3 when all its loans have a non-performing status. The dependent variable, the explanatory variables of interest and the set of fixed effects are the same as those defined in Table 2. The row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL			
	From the perspective of the borrower		*From the perspective of the lender*	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile
	(1)	(2)	(3)	(4)
RL	0.2339***	0.2462***	0.1543***	0.1841***
	(0.0231)	(0.0250)	(0.0561)	(0.0551)
RL × *Post*	-0.0362	-0.0164	-0.1069	-0.1568
	(0.0374)	(0.0413)	(0.1031)	(0.1055)
RL + *RL* × *Post*	0.198***	0.230***	0.0474	0.0273
	(0.0348)	(0.0383)	(0.0753)	(0.0951)
Observations	7,266	7,266	7,266	7,266
R-squared	0.5571	0.5580	0.5431	0.5429
Firm × Time FE	Yes	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes

TABLE 10. ROBUSTNESS TESTS. SINGLE-RELATIONSHIP FIRMS, ANTICIPATION EFFECT AND ALTERNATIVE DEFINITION OF REALATIONSHIP LENDING

This table presents three robustness tests to our baseline result (Table 2). Columns 1 and 2 report the results obtained from the estimation of equation (1) as in Table 2 but including both single- and multi-bank firms. The dependent variable and the explanatory variables of interest are those defined in Table 2 and bank-time fixed effects are also included, but we control for the demand of credit using industry-location-size-time fixed effects. In addition, we include firm control variables (the logarithm of total assets, return on assets, leverage ratio, cash ratio and sales turnover ratio). As in Table 2, only those firm-bank pairs with an existing relationship at the beginning of each semester are included and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. Columns 3 and 4 report the results obtained from the estimation of equation (1) as in Table 2 but excluding all observations that belong to the last semester of the year 2017, when the anticipation effect may have been most prevalent. The dependent variable, the explanatory variables of interest and the set of fixed effects are the same as those defined in Table 2. As in Table 2, only those firm-bank pairs with an existing relationship at the beginning of each semester are included and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. Column 5 reports the results obtained from the estimation of equation (1) as in Table 2 but considering an alternative definition of relationship lending which captures the information that a given bank has about a given firm rather than the exposure. In particular, relationship lending is proxied as the number of new relationships between a lender and a borrower (i.e., the number of times that there is an increase in the outstanding amount of credit) during the last five years. The dependent variable and the set of fixed effects are similar to those defined in Table 2. In all columns, the row below the coefficients (*RL* + *RL* × *Post*) contains the linear combination of the two estimated coefficients. Standard errors are clustered at the bank and firm level and are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Robustness Tests				
	Single-relationship firms		*Anticipation effect*		*Alternative definition of relationship lending*
	Main bank	Main bank credit > 50 %	Main bank	Main bank credit > 50 %	Number of new relationships during the last five years
	(1)	(2)	(3)	(4)	(5)
RL	0.0324***	0.0198***	0.1079***	0.1381***	0.0061***
	(0.0065)	(0.0050)	(0.0044)	(0.0042)	(0.0003)
RL × *Post*	-0.0099**	-0.0083**	-0.0229***	-0.0266***	-0.0005**
	(0.0046)	(0.0039)	(0.0039)	(0.0045)	(0.0002)
RL + *RL* × *Post*	0.0225***	0.0115***	0.0850***	0.111***	0.0056***
	(0.00447)	(0.00381)	(0.00444)	(0.00395)	(0.0002)
Observations	3,208,516	3,208,516	1,883,994	1,883,994	2,001,982
R-squared	0.0599	0.0597	0.3890	0.3897	0,3876
Firm × Time FE	No	No	Yes	Yes	Yes
Bank × Time FE	Yes	Yes	Yes	Yes	Yes
ILS × Time FE	Yes	Yes	No	No	No
Firm Controls	Yes	Yes	No	No	No

TABLE 11. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE EFFECT VIA LENDING RATES

This table reports the results obtained from the estimation of an alternative version of equation (1), in which the dependent variable is the lending interest rate at the loan level for a small subsample of the firms used in Table 2. As in Table 2, only those firm-bank pairs with an existing relationship at the beginning of each semester are included and we restrict our sample to firms with all their outstanding credit performing at the beginning of each semester and which had not experienced a threefold-increase in their credit risk. In addition, we only consider loans with an original maturity over 3 years. The explanatory variables of interest are those defined in Table 2. Firm-time fixed effects are included in Columns 1, 3, 5 and 7, whereas in Columns 2, 4, 6 and 8 we control for the demand of credit using industry-location-size-time fixed effects and include a set of control variables to account for firm specific characteristics (the logarithm of total assets, return on assets, leverage ratio, cash ratio and sales turnover ratio), loan amount, and maturity. In addition, all the regressions include bank-time and product-time fixed effects (with the later to control for loan type). Standard errors clustered at the bank-firm level are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Proxy for RL							
	From the borrower's perspective				*From the lender's perspective*			
	Main bank		Main bank credit > 50 %		High exposure 90th percentile		High exposure 95th percentile	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RL	-0.0547*	-0.0538*	-0.1782***	-0.0622*	-0.0087	-0.2531***	-0.1643***	-0.2641***
	(0.0278)	(0.0311)	(0.0480)	(0.0325)	(0.0426)	(0.0632)	(0.0428)	(0.0541)
RL × *Post*	-0.0412	-0.0535	0.0177	-0.0434	-0.0834	-0.0411	0.0698	0.0614
	(0.0493)	(0.0426)	(0.0646)	(0.0466)	(0.0529)	(0.0622)	(0.0530)	(0.0558)
Observations	30,099	91,950	30,099	91,950	30,099	91,950	30,099	91,950
R-squared	0.9292	0.7201	0.9293	0.7201	0.9291	0.7210	0.9292	0.7203
Firm × Time FE	Yes	No	Yes	No	Yes	No	Yes	No
Bank × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ILS × Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Product × Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Controls	No	Yes	No	Yes	No	Yes	No	Yes

Appendix - Detailed explanation of the ICL and ECL model

A1. The Incurred Credit Loss model

Prior to January 2018, banks following international accounting standards estimated loan loss provisions based on the Incurred Credit Loss model, as dictated by IAS 39. The ICL model required banks to materialize the accrual expense when there was objective evidence that impairment had occurred, constraining the incorporation of forward-looking information in the estimation of loan loss provisions. Hence, even if a bank could anticipate future events affecting the probability of default of a loan, early recognition was limited by the accounting rule. Impairment recognition had to be triggered by one or more 'loss events', such as a default or delinquency in interest or principal payments, indicating verifiable evidence of probable losses, as of the balance-sheet date. In practice, this entailed that loan losses were mainly considered when the probability of default (PD) was close to 100% (Novotny-Farkas, 2016).

While this methodology responded to the conservatism principle that is prevalent in many accounting practices, the 'backward-looking' nature of the ICL model was argued to have detrimental effects on financial stability, as witnessed during the financial crisis (Gaston and Song, 2014; Haan, de and van Oordt, 2018). The untimely and insufficient provisions that followed from the ICL model were blamed to exacerbate the severity of the crisis. Namely, delayed impairment recognition led to corrective provisions in the middle of the recession, increasing banks' capital inadequacy concerns and accentuating the ongoing credit crunch in the economy (Acharya and Ryan, 2016; Huizinga and Laeven, 2019; Bischof et al., 2021).

In the aftermath of the financial crisis, in response to this concern, the G-20 urged accounting setters to review the ICL methodology. Credit loss recognition was demanded to incorporate a more forward-looking approach. To this end, the International Accounting Standard Board replaced IAS 39 by IFRS 9, which was issued in July 2014 and effectively adopted for the first time in the year 2018. In a similar vein, the Federal Accounting Standard Board in the US introduced ASU 2016-13, adopted by listed banks in January 2020. In both versions, provisions were required to follow the Expected Credit Loss model, which is forward-looking in nature. The introduction of IFRS 9 in Spain in January 2018 through Circular 4/2017 represents the focus of our paper.

A2. The Expected Credit Loss model

The transition from the ICL model to a provisioning approach based on expected credit losses represents a very significant switch in the way banks must provision for loan losses. Under the Expected Credit Loss model, loan loss provisions are forward-looking and raised at origination or purchase of a loan. After initial recognition, entities must update the expected credit loss associated to the financial asset at each reporting date, considering all reasonable and supportable information, including forward-looking information. In general terms, the estimation of the expected credit loss of a loan is based on the following formula:

$$Expected\ Loss = PD \times LGD \times EAD$$

where PD is the expected probability of default of the loan, LGD denotes the expected loss given default and EAD refers to the exposure at default (the outstanding debt at the time of default). The estimates of PD and LGD are scenario based. Namely, these inputs are computed under different macroeconomic scenarios using forecasts of key determinants such as, for example, GDP growth, unemployment rate or housing prices and typically considering a 'baseline' scenario as well as optimistic and pessimistic deviations. The final PD and LGD that enters in the expected loss

formula results from weighting these scenario-based inputs with the probability that each scenario occurs. While this general description is common to both IFRS 9 and ASU 16-13 in the US, the two standards significantly differ in the considered time horizons for the estimation of the PDs. Notably, in the former approach the time horizon depends on the performing status of the loans whereas full-life PDs are applied for all financial instruments in the latter methodology, no matter their credit quality.

A3. Three-stage asset classification under IFRS 9

Under IFRS 9, the estimation of expected credit losses is based on a 3-stage asset classification. Loans are allocated into three different buckets according to their credit quality deterioration, considering different time horizons in each bucket to estimate the PD of the financial instruments. In particular, the expected credit loss of assets classified in stage 1 is based on 12-months PDs (i.e., the lender estimates the probability that the client will default in the next 12 months). Newly issued non-impaired loans and loans that have not experienced a significant increase in credit risk since origination are classified in this first bucket.

When a loan suffers a significant deterioration in credit quality, the asset is transferred into stage 2. In this second stage, banks must estimate the PD based on the remaining lifetime of the loan (full-life PDs). For this transition to be considered, IFRS 9 provides a rebuttable presumption that the credit risk of a financial asset has increased significantly since initial recognition when contractual payments are more than 30 days past due. The standard, however, requires banks to complement this criterion with both qualitative and quantitative information. Finally, if the credit risk of a financial asset rises to the point where it is regarded as credit impaired (PD=100%), the loan is classified in stage 3, in which lifetime expected credit losses are recognized.[26]

Hence, the crucial difference and impact of the new standard relative to the ICL model stems from the classification of exposures under stage 1 and stage 2, inexistent in the previous methodology. Notably, IAS 39 already considered raising provisions for loans with objective evidence of impairment at the reporting date (i.e., the loans that are classified in stage 3 under IFRS 9) and both methodologies were largely consistent in the treatment of purchased or originated credit-impaired assets. Under IFRS 9, provisions are raised at loans' origination, which are initially classified in stage 1. In sharp contrast to the ICL model, the credit risk assumed by a bank when granting a new loan will have immediate implications on provisions, earnings and regulatory capital, increasing the cost of risk that a bank incurs in his lending decision. Furthermore, provisions will have to be updated when the credit risk of the borrower changes significantly since initial recognition. This means that banks' lending decisions may be affected by both the initial raise in provisions at origination and the expectation of future corrections in the allowance. Such corrections may be especially relevant if a loan migrates from stage 1 to stage 2 as banks must start considering life-time PDs instead of 12-months PDs (ESRB, 2017).

[26] In addition, for loans classified in stage 3, the amortized cost net carrying amount is used to compute interest revenue (i.e., reduced for expected credit losses). In contrast, for loans classified in stage 1 and stage 2, interest revenue is still calculated on the gross carrying amount of the asset.

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