How do changes in financial reporting standards affect relationship lending?*

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Abstract

This paper studies the effect of the ECL model under IFRS 9 on relationship lending. To this end, we combine detailed firm-level and bank-firm-level information in Spain. We focus on firms that are proxied to be in the first stage under IFRS 9 and inspect the differential effect of relationship lending on credit growth before and after the introduction of the regulation. Our results document that relationship lending has a positive and significant effect on the growth of credit. Despite still present, such positive effect is significantly reduced after IFRS 9. The negative impact of the new regulation on relationship lending is stronger for firms with a high PD and whose credit quality has deteriorated. This may be explained by both larger expected credit losses at origination and a higher probability of transitioning to Stage 2.

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

JEL Classification Codes: D82, G21, G28.

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1. Introduction

In an environment characterized by asymmetric information, relationships bring valuable information for banks and firms, allowing a more fluent loan contracting over time. Overall, it is well stablished in the literature that the value of the information brought by the repeated interaction of lenders and borrowers may depend on characteristics of the relationship, cross-sectional characteristics of banks and firms and the aggregate state of the economy (Degryse et al., 2015). In particular, relationship banking may be key to overcome credit constraints when information frictions are most severe (Degryse et al., 2009). This is the case when the economy enters a recession or when firms are opaquer and riskier, facing higher difficulties in accessing external finance (Banerjee et al., 2021; Bolton et al., 2016; López-Espinosa et al., 2017). Very little, however, is known about how bank regulation may interact with relationship lending and its insulation effect on the flow of credit to firms. Arguably, both prudential and accounting regulation may shape the role of relationship lending as a prominent tool to overcome the consequences of credit restrictions.

In this paper we provide first evidence on the impact of the new impairment model under IFRS 9 accounting standard, the expected credit loss (ECL) model, on relationship lending. The introduction of the ECL model in the year 2018 represents an unprecedented shift in the way banks must provision for loan losses. Under the incurred credit loss (ICL) model, prevalent before 2018, banks materialized the accrual expense when there was objective evidence that impairment had occurred. This characteristic was criticised to yield insufficient and untimely provisions, exacerbating the business cycle (Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019). As a response to this concern, provisions under the ECL model are forward-looking and raised at loan origination. Furthermore, IFRS 9 standard mandates banks to classify financial instruments in three stages according to their deterioration in credit quality since initial recognition. Expected credit losses for new loans and loans that have not experienced a significant increase in credit risk (Stage 1) are based on 12-months PDs while the estimation of provisions for loans with a significant credit risk deterioration (Stage 2) or credit impaired loans (Stage 3) rely on life-time PDs. In contrast, provisioning under the ICL methodology was restricted and akin to the estimation of the accrual for loans classified in Stage 3 under IFRS 9.

Whether the new provisioning approach strengthens or weakens the role of relationship lending in providing liquidity to firms is an open empirical question. On the one hand, the new methodology requires provisioning at origination. Relative to the ICL model, banks will face a higher cost of lending when granting credit to non-impaired firms as loan loss provisions reduce regulatory capital.¹ Notably, estimated expected losses at origination will increase with the PD of a firm, suggesting that the effect of

¹As an expense, provisions enter in the income statement of a bank, reducing the net interest income. Because loan loss provisions do not count as Tier 1 capital, they decrease the numerator of the Tier 1 capital ratio by (1-tax rate) x LLP.

the regulatory shift may be higher for riskier than for safe borrowers. This pattern may be reinforced if ex-ante riskiness translates into a more likely downgrade in the credit rating of a client, increasing the probability of a transition from Stage 1 to Stage 2, where life-time PDs are considered. Overall, the different risk-taking assumed by lenders will have immediate implications on provisions, earnings, and capital, increasing the cost of risk associated with the financial transaction. While the ICL model could motivate banks to preserve a fluent loan contracting with their riskier borrowers to maintain their business activity and to avoid impairment, the new regulation may shape the incentives of banks to reduce their lending to such expositions to avoid a current raise of provisions. Relative to the ICL model, banks under the ECL model may decrease their loan supply to those riskier borrowers with a strong relationship.

On the other hand, the ECL model requires complex modelling and broadens the need of data. Banks must rely on numerous assumptions and judgement to estimate future losses (ESRB, 2017). Because relationships facilitate the acquisition of information about borrowers, it may enable banks to estimate loan loss provisions with more precision and to rely on professional judgement and soft information when estimating the likelihood that a borrower may default in the future. These aspects may translate into lower loan loss provisions (Alessi et al., 2014; Aristei & Gallo, 2019) and may incentivize banks to preserve the value of their relationships over time by granting new credit to their borrowers. Thus, this second channel would suggest a positive effect of the new methodology on relationship banking.

Our analysis focuses on the lending decisions of Spanish banks over the period June 2016 to June 2019, namely a window of three semesters before and after the introduction of the ECL model in January 2018. Our focus on Spain provides an interesting scenario to study the impact of IFRS 9 on relationship lending. First, the high presence of SMEs in the Spanish economy, characterized by higher information frictions and greater difficulties in accessing external finance, makes soft information raised by relationships especially relevant for the Spanish banking sector. Second, the Spanish economy was experiencing stable growth and significant financial stability when the new regulation was first introduced, alleviating the potential confounding of the introduction of IFRS 9 with the effect of a change in the business cycle. Finally, our focus on Spain allows us to rely on the rich loan-level data from the Credit Register of the Banco de España which enables us to use firm, bank and bank-firm relationship characteristics in our analysis.

To identify the effect of the new provisioning scheme on the credit supply of banks to their relationship borrowers, we estimate an OLS regression at the bank-firm level in which the dependent variable is the growth of credit in each semester and the main independent variable is the interaction between our proxy of the relationship strength between a bank and a firm and a dummy variable capturing the period before and after the introduction of IFRS 9. We perform our baseline regression employing different proxies of relationship lending. In particular, we consider the perspective of the borrower (a firm having a high exposure to a given bank) and the perspective of the lender (a bank being highly exposed to a firm). Because we are interested in giving a supply-side interpretation of our findings, we control for the demand of credit by including firm-time fixed effects (Khwaja & Mian, 2008). Furthermore, we saturate our regression with bank-time fixed effects to account for concurrent bank-specific time varying factors affecting the lending behaviour of banks around the introduction of the new provisioning scheme. Overall, our specification allows us to disentangle the change in the supply of credit of banks to their relationship borrowers, relative to their non-relationship borrowers, before and after the introduction of IFRS 9.

An ideal setting to conduct this empirical analysis would require the exact classification of financial instruments in the three stages considered by IFRS 9, before and after the implementation of the rule. This identification, however, is not feasible due to two main reasons. First, prior to IFRS 9, banks did not classify financial instruments in the three buckets that were later considered and, hence, they are not observable. Second, after the introduction of the new standard, banks did not disclose information about the stage classification at the loan or borrower level. Our identification strategy addresses this limitation by approximating Stage 1 at the borrower level, before and after the introduction of IFRS 9. We focus on the credit granted to firms with all their loan exposures classified as performing and that have not experienced an event which could likely trigger a transition from Stage 1 to Stage 2. In particular, following the general guidance of regulators on what should be deemed a significant increase in credit risk (e.g. the AQR Manual and the EBA Stress Test Methodological guidance), we exclude from our sample high yield firms that have experienced a threefold increase in their PDs.² Crucially, our identification of the first bucket is well defined and observable before and after IFRS 9. In addition to this, we inspect the role of Stage 2 under IFRS 9 approximating the likelihood that the new credit, initially classified in Stage 1, may migrate to Stage 2. Finally, we consider the identification of Stage 3 by focusing on firms with all their outstanding credit classified as non-performing. We employ this sample to conduct a falsification test. Overall, we propose a novel solution to approximate the three-stage asset classification under IFRS 9 at the borrower level which may be exploited in future studies.

The empirical analyses deliver the following results. No matter the considered definition of relationship lending, we find that banks reduce their credit supply to relationship borrowers in Stage 1 after the introduction of IFRS 9. Defining relationship lending from the borrower's (bank's) perspective, we observe that relationship borrowers were receiving on average 12.8 (8.6) pp more lending before IFRS 9 while this effect decreases by 1.4 (2.3) pp in the aftermath. Consistent with previous findings in the literature suggesting that relationship lending may be an important mechanism to enable firms accessing external finance, we find a positive and significant effect of holding a relationship on the supply of credit both before and after the introduction of IFRS 9.³ However, the role of relationship banking seems to be in part

 $^{^2}$ 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 above-mentioned guidance of regulators. We acknowledge that the inspection of the role of Stage 2 in our analysis may be subject to classification error. This aspect prevents us from cleanly disentangling the effect of Stage 2 but does not induce a bias regarding the impact of IFRS 9 on relationship lending.

³ In the appendix we show that the effect of relationship lending on the growth of credit is significantly larger for microenterprises, relative to the rest of firms. This finding aligns with an ample literature showing that relationship banking may be of special importance for smaller and opaquer firms (e.g. Beck et al., 2018; López-Espinosa et al., 2017). Furthermore, it confirms that we are correctly proxying for relationship lending.

diluted after the new accounting regime. This finding suggests that the impact of the higher cost of risk associated with the new provisioning scheme outweighs the information advantage that relationships bring, potentially important to estimate expected credit losses with precision.

To further sharpen our identification, we consider borrowers in Stage 1 that may be more affected by the new regulation, according to the channel that highlights the effect of provisions on regulatory capital. First, the impact of the new regulation on provisions and the supply of credit is expected to be stronger for firms with a high PD due to both larger expected credit losses at origination. We inspect the relevance of this channel in driving our first result. To this end, we estimate the probability of default for all the firms in our sample and split them into safe (investment grade) and risky borrowers (high yield).⁴ We repeat our baseline regression for the two groups of firms. We observe that the effect of relationship lending on credit growth was positive and of similar magnitude between investment grade and high yield firms before IFRS 9. This finding corroborates the importance of relationship banking as a tool to enhance a fluent loan contracting, no matter the ex-ante credit risk of a borrower. Interestingly, the new impairment model induces a novel asymmetry, as the negative impact of IFRS 9, ex-ante risky firms appear to benefit less from the information advantage that relationships bring.

Together with this, the impact of IFRS-9 should be higher if a firm is more likely to experience a significant increase in credit risk, implying a transition from Stage 1 to Stage 2. At this point, lifetime PDs are considered and provisions may sharply rise (i.e. "cliff-effect") (ESRB, 2017). To inspect the role of Stage 2, we repeat our baseline regression focusing on investment grade firms with stable credit quality and high yield firms whose credit quality has deteriorated. In line with our intuition, we find that the effect of IFRS 9 on relationship banking is present in the latter sample but not in the former one. Finally, we study the impact of the new impairment model on high yield firms that have experienced a threefold increase in their PD. Consistent with the hypothesis that banks internalize the likely migration of new credit classified in Stage 1 to Stage 2, we observe that the negative effect of IFRS 9 on relationship lending for this profile of firms is three times larger than the one found in our baseline specification.

We have argued that the negative effect of IFRS 9 on relationship lending may be mediated by the higher cost of lending that the new regulation brings. For this reason, it could be the case that the effect of IFRS 9 on relationship banking is more pronounced for banks that are worse capitalized. We assess whether the negative impact of the new impairment model on relationship banking is heterogenous depending on the level of regulatory capital of banks. Our results suggests that the negative impact of IFRS 9 on relationship banking is negative and significant for good and bad capitalized banks. Thus, even if the negative association between provisions and regulatory capital may be the key channel mediating the

⁴ We rely on the CQS methodology followed by the ECB to define investment grade and high yield firms. The correspondence between a borrower having a low credit risk and being rated as investment grade is also contemplated by the IFRS 9 accounting standard (B5.5.23, IFRS9).

effect of IFRS 9 on credit growth, we find that the impact of the new impairment model on relationship lending is present over and above the capital position of the lender. This does not mean that the effect of regulatory capital on the supply of credit has remained constant after the introduction IFRS 9. Directly testing for this possibility stands out of the scope of our paper, which focuses on relationship lending and controls for bank-specific characteristics with the inclusion of bank-time fixed effects.

To assess the robustness of our findings we conduct two identification tests. First, we inspect the possibility of an anticipation effect. We perform our baseline regression without the last semester of the year 2017, when the anticipation effect could be most pronounced. Our results are robust to this alternative sample. Second, we analyse the effect of the ECL model on relationship lending considering firms with all their credit exposures being impaired (non-performing status). Thus, we test for the effect of IFRS 9 focusing on borrowers with their credit classified in Stage 3. Notably, the ICL model already contemplated raising life-time provisions at origination for this type of borrowers. We find no effect of the new regulation. This result confirms the correct identification of the effect of IFRS 9 on relationship lending.

Our analysis relates to several strands in the literature. Many studies have focused on the value and consequences of relationship lending. Petersen (1994) and Berger and Udell (1995) were the first to corroborate that relationship banking may help firms to overcome the credit restrictions that arise from information frictions. Posterior studies have extensively documented that the actual benefits of relationship lending on the availability and pricing of loans is heterogenous along different dimensions. First, the characteristics of the relationships may shape their value. In this direction, López-Espinosa et al. (2017) show that borrowers start to capitalize the benefits of a relationship only after some period of time. Second, the insulation effect of relationship lending may differ in the cross-section of firms and banks. Bolton et al. (2016), using Italian credit register data, show that the roll-over effects of relationship lending are mostly present for firms with a high PD, which will in general face more difficulties to access external finance. The results of Banerjee et al. (2021) suggest that soft information may be particularly useful when granting credit to highly indebted firms in a crisis while López-Espinosa et al. (2017) and Beck et al., (2018) show that the gains in terms of the pricing of loans due to relationship lending are higher for firms that are opaquer. Finally, some studies show that relationship lending may be most valuable in providing liquidity insurance to firms during downturns, when information asymmetries tend to be exacerbated (Beck et al., 2018; Bolton et al., 2016; Sette & Gobbi, 2015).

We contribute to this literature by inspecting how bank regulation may affect relationship lending. To the best of our knowledge, this is the first paper to consider this research question. In particular, we focus on the implications of the new impairment model under IFRS 9 introduced in the year 2018. Our findings suggest that relationship banking facilitates firms to access 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 their relationship borrowers. The negative effect of IFRS 9 on relationship

lending is heterogenous across firms. Namely, it is more pronounced for ex-ante risky firms and firms that have experienced a deterioration in their credit quality. Overall, we observe that the new impairment model has induced a novel asymmetry in terms of the effect of relationship lending on credit growth, depending on the risk profile of the borrower.

Our paper builds on the literature that studies the effect of loan loss provisioning methodologies on bank's lending behaviour. Using simulation techniques, Abad and Suarez (2018) inspect how different provisioning approaches affect the procyclicality of bank's profits and regulatory capital. An abrupt correction of the accrual in the beginning of an unexpected recession may hinder bank's capital buffers, potentially resulting in a credit crunch. From an empirical perspective, Morais et al. (2020) inspect the effect of the ECL model on the supply of credit and bank's risk taking, focusing on a Colombian reform in the year 2007.⁵ In response to the higher cost of lending induced by the rule, banks tighten all new lending conditions. Considering firm's cross-sectional characteristics, the effect is found to be stronger for borrowers belonging to sectors with less tangible assets and smaller borrowers with defaulted loans. Different to these studies, our focus is not on the effect of the ECL model on the supply of credit but on how the new impairment model may have affected relationship lending. We show that the ECL model negatively affects relationship banking. Our mediating channel, the increase in the cost of lending after the ECL model, has been documented in the work of Morais et al. (2020). We contribute to this work by focusing on a different regulation of major importance and of ample geographical scope, IFRS 9. Furthermore, the three-stage asset classification under IFRS 9, inexistent in the methodology inspected by Morais et al. (2020), enables us to study the role of the different buckets in shaping our results. Our paper is novel in inspecting both the role of both the ex-ante level of risk and the variation in the PD of a borrower, which may be very relevant due to the higher likelihood that a new loan migrates from Stage 1 to Stage 2 ("cliff-effect"). Finally, over and above the role of regulatory capital in mediating the effect of provisions on the supply of credit documented by the previous literature, we find that the negative effect of IFRS 9 on relationship lending is present for both good and bad capitalized banks.

The rest of the paper is organized as follows. Section 2 describes the institutional background to our analysis, explaining the main differences between the ICL and the ECL model under IFRS 9. Section 3 describes our dataset and the variables employed in the analysis. Section 4 presents our methodology and main results. Section 5 provides a series of extensions and robustness tests. Section 6 concludes.

⁵ To the best of our knowledge, only two other studies have considered the effect of IFRS 9 on bank's lending behavior (Ertan 2020; López-Espinosa, Ormazabal, and Sakasai 2021).

2. Institutional Background

2.1. The new impairment model under IFRS 9

In contrast to the ICL model, prevalent before 2018, the new provisioning methodology under IFRS 9 requires banks to raise loan loss provisions at loan origination or purchase, reflecting expected credit losses. The new accounting regime, which is forward-looking in nature, attempted to alleviate the "too little, too late" concern that the ICL model induced, as clearly observed in the aftermath of the 2008 financial crisis. Namely, the ICL model mandated banks to raise provisions under verifiable evidence of impairment. As a result, loan losses were primarily considered when the probability of default (PD) was close to 100% (Novotny-Farkas, 2016). The ECL model eliminates the "loss event" constraint of the old methodology. A key input for the estimation of expected credit losses is the probability that a borrower defaults in the future (PD). Under IFRS 9, financial intermediaries 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 12-months PDs 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. As in the ICL model, a PD=100% is considered in the third bucket.

Figure 1 illustrates the loan loss allowance associated with a financial instrument under both the ICL methodology and the ECL model under IFRS 9 (y-axis) as the credit quality of the instrument deteriorates (x-axis). The diagram uncovers 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. Irrespectively of the ex-ante credit risk of a borrower, provisions are not raised until there is objective evidence of impairment, as of the balance-sheet date. At this point, banks must sharply update the accrual. In contrast, the ECL model under IFRS 9 yields a smoother pattern of loan loss provisions as credit quality deteriorates (blue line). At origination, when the loan has still not suffered any change in its credit risk, banks must already estimate the PD of the borrower and expected credit losses, raising provisions accordingly. This is reflected in the intersection of the allowance scheme with the y-axis in the origin (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 due to the consideration of life-time PDs in this second bucket (after a SICR occurs, as depicted in B in Figure 1). Finally, a loan that becomes non-performing is allocated in Stage 3 and deemed credit impaired. Thus, a PD=100% is considered at this point, coinciding with the ICL methodology.

2.2. Identifying stages at the borrower level

To estimate the impact of the ECL model under IFRS 9 on relationship banking we would ideally control for the classification of loans in the different stages. Each stage considers different horizons for the estimation of PDs and may substantially affect the estimated expected credit losses. Controlling for the stage classification in our empirical framework would require two main aspects. First, it should be possible to correctly mimic the different buckets before the implementation of IFRS 9. Second, the researcher should be able to observe the actual allocation of each financial instrument after the introduction of the rule and to aggregate the information at the borrower level. Notably, a non-impaired firm is not uniquely identified with a single stage but, rather, it may have loans classified in Stage 1 and Stage 2.⁶ The distinction of the two buckets would allow for the correct characterization of the outstanding credit of a borrower. In this case, the researcher would be able to control for the distinct role of the stages in driving the effect of the new rule and the potential carry-over effect of new credit to borrowers with loans already allocated in Stage 2.

The absent classification of stages prior to IFRS 9 and the fact that, afterwards, banks do not disclose the stage classification at the financial instrument or borrower level poses a challenge to our identification strategy. We circumvent this limitation by focusing on Stage 1. We approximate this bucket using observable information before and after the introduction of the new rule. Namely, we classify a borrower in the first bucket if it satisfies two criteria. First, we demand that all its loan exposures are performing. Second, we further eliminate high yield firms that have experienced a three-fold increase in their credit risk. This latter restriction attempts to capture borrowers whose outstanding credit may have already migrated from Stage 1 to Stage 2, as regulators propose this criterion as an indicator of a SICR (e.g. the AQR Manual and the EBA Stress Test Methodological guidance). To perform a falsification test, we further proxy the third stage. Firms with all their credit exposures being impaired (non-performing status) or firms with all their credit exposures with a given bank being impaired are considered to belong to Stage 3.

Our framework does not allow to identify sharply the role of Stage 2 in the impact of IFRS 9 on relationship banking. For this, we would need to impute this second bucket assuming the rule that banks follow to transfers instruments between the first and the second stage. The ample room for discretion and professional judgement in IFRS 9 makes such precise imputation very difficult.⁷ For this reason, we restrict our baseline analysis to firms classified in our approximated Stage 1. Still, we inspect the likelihood that the new credit initially classified in the first stage may migrate to the second bucket. To this end, we first

⁶ In contrast, borrowers with non-performing loans will classify all their loan exposures in Stage 3. New loans to borrowers with credit impaired outstanding credit (Stage 3) are not classified in Stage 1. The accounting treatment of impaired POCIs impaired purchased or originated financial assets) was similar under both the ICL and ECL model.

⁷ While the standard provides a rebuttable presumption that the credit risk of a loan has increased significantly since initial recognition when contractual payments are more than 30 days past due, it further clarifies that the lender should rely on other quantitative and qualitative information. Also, despite supervisors provide general guidance to banks regarding what should be deemed a significant credit deterioration (a threefold increase in the lifetime PD from initial recognition), such application still requires the judgement of banks regarding the estimation of borrowers' PD and other relevant information that may shape the transition decision.

exploit the ex-ante credit risk of borrowers in our proxied Stage 1. Borrowers with a higher PD may be closer to the threshold that determines a transition between stages, as suggested by credit risk transition matrices. Additionally, we consider whether the change in the credit risk of a borrower, the key input determining the likelihood of a transition from Stage 1 to Stage 2, play an important role in our results. In particular, we focus on investment grade borrowers whose credit risk has remained low (i.e. whose outstanding loans exhibit a low probability of migrating to Stage 2) and high yield firms that have experienced a deterioration in their credit quality. Finally, we explicitly inspect the effect of IFRS 9 on relationship lending considering high yield firms that have experienced a threefold increase in the PDs. Very likely, these are borrowers with their credit exposures already classified in the second bucket.

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. We can claim that we virtually have the whole population of loans to firms. From the CIR we have detailed information about each loan, including the amount (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. Together with this, the database provides information about the borrower and bank identity, which will permit matching each loan with characteristics of the bank and the firm. We take into account all merges 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 due to merges and acquisitions.

We complement the information from the Spanish Credit Register with firm-level data from the Banco de España's Central Balance Sheet Data Office (CBSDO). This database provides information on the financial accounts of more than 750,000 non-financial corporations with an adequate reporting quality on an annual basis by combining administrative data at the annual level from accounts filed with the mercantile registries in Spain with information coming from surveys to non-financial firms conducted by the Central

Balance Sheet Office of Banco de España. We match this firm-level information with loan-level data using the unique firm identifier (CIF). In addition to this, we rely on the information of the balance sheets and income statements of banks collected by the Banco de España in its role of banking supervisor. We fix annual firm and bank characteristics in the beginning of the pre-IFRS 9 period and use information as of December 2015 whereas for the post-IFRS 9 window we use information as of December 2017.

Our baseline analyses are restricted to firms with all credit exposures classified as performing, excluding those high yield firms that have experienced a threefold increase in their PDs (being likely in Stage 1) and only firm-bank pairs with an existing relationship at the beginning of each semester for which we calculate credit growth. Our focus on existing relationships closely follows the work of Sette a & Gobbi (2015). This strategy eliminates the bias that would result from defining the growth of credit for firms with zero initial outstanding credit. Namely, a mechanistic 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. Our final sample consists of 3,954,700 firm-level observations for the period 2016 H2 to 2019 H1, distributed in a range between 618,489 and 711,962 observations per semester.

3.2. Variables

The dependent variable in our analyses is the biannual 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 semesters⁸. We employ several proxies of relationship lending. First, we construct two measures considering the perspective of the borrower. One of them 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. We propose an alternative measure 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 propose other two measures considering the perspective of the lender: (i) 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) similar to (i) but using the 95th percentile as the threshold.

We also estimate the probability of default (PD) for all the firms in our sample, 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 measure developed by Fernandez et al. (2022) for the Banco de España internal credit assessment. This measure follows – and extends – the approach of Altman (1968) to Spanish firms. Specifically, it derives the estimated probability that a given firm will not be able to honor its debt and missed a payment. As such, this measure captures not the risk of formal default (i.e., a firm filing for bankruptcy), but also the risk of delinquent loans. This measure of risk is obtained for 2015

⁸ Our definition of the growth of credit follows the work of Arce et al. (2021).

and 2017 which are the years used to control for firm characteristics for the pre and post-IFRS9 periods, respectively.

Table 1 provides the descriptive statistics of the main variables that we consider in our analysis, distinguishing between the period before and after IFRS 9. We first present our proxies of relationship lending. From the borrower perspective, approximately half of our bank-firm observations exhibit a relationship according to our definition Main Bank. When considering the perspective of the lender, because we require lenders to have a very large exposition to a borrower (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 both before and after IFRS 9 (around a 24 % decrease in the growth of credit). This is consistent with our focus on a period where the Spanish non-financial sector was still experiencing a significantly deleveraging process. Next, we consider the variables that are measured at the firm level. Focusing on the dummy that defines a high yield firm (i.e. PD>0.4%), we observe that around 80% of the borrowers in our sample fall under this category, before and after 2018. This aspect may be explained by the high presence of SMEs in the Spanish corporate sector. Among firms that are defined as high yield, we observe that a relevant fraction (namely, 16 % of borrowers in this subsample before 2018 and 20% after this date) experience an increase in their PD. Namely, a significant fraction of firms that are ex-ante risky experience a downgrade in their credit quality, as suggested by credit-risk transition matrices.

4. Identifying the effects of IFRS-9 on relationship lending

4.1. Methodology

Our main contribution is to study the effect of IFRS-9 impairment model on relationship lending. Our identification faces several challenges. First, we should restrict our sample to borrowers affected by the new provisioning methodology. Namely, the impact of the ECL model is expected to be concentrated in borrowers with loans classified in Stage 1 and in Stage 2 and it should be potentially higher in the latter case. In contrast, the accounting treatment of new credit to firms classified in stage 3 should not differ between the ICL and the ECL model. Hence, considering these borrowers in our regression would bias our results towards zero. Despite the three-level asset classification was not existent prior to 2018 and unobservable at the borrower level after the introduction of the new rule, we circumvent this limitation by proxying the different buckets using observable information in our period of analysis (see Section 2.2). Our baseline regression considers borrowers classified in Stage 1 whereas the imputation of the third stage is exploited to conduct a falsification test.

The second challenge we face is to disentangle the effect of IFRS 9 on relationship lending from credit demand and supply trends during our period of analysis. If these factors were relevant determinants of the growth of credit and associated with the relationship strength between banks and firms, they would bias our results. For example, from the supply side, the participation of banks in the non-regular open market operations of the ECB would be an example of a factor potentially affecting the supply of credit and the risk-taking decisions of lenders in the considered time frame. To alleviate the concern of credit demand and supply confounding trends, we conduct our analysis on the sample of firms with multiple relationships. Thus, we can control for the demand of credit by introducing firm-time fixed effects and absorb time varying unobserved characteristics of banks with bank-time fixed effects. Finally, if banks changed their lending behavior prior to the introduction of IFRS 9, our estimation would yield biased (attenuated) effects. We alleviate this concern by explicitly considering this possibility, conducting an anticipation test.

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. Namely, we perform the following regression at the bank-firm-semester level, focusing on borrowers with loans classified in Stage 1:

$$\Delta Credit_{fbt} = \beta_1 R L_{fbt-} + \beta_2 R L_{fbt-1} \times IFRS \ 9_t + \alpha_{ft} + \gamma_{bt} + \epsilon_{fbt} \ (2)$$

where 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 term between *RL* and *IFRS-9*, a time dummy variable taking value equal to zero before January 1, 2018 and a value equal to one after this date. Thus, β_2 captures the differential effect of *RL* in the two provisioning regimes. We saturate our regression with firm-time fixed effects, α_{ft} , and bank-time fixed effects, γ_{bt} .

4.2. Results

In this section we present the results from the estimation of equation (1). We test our model pooling all firms that are proxied to be in Stage 1. If the new provisioning methodology dilutes the role of relationship lending, we would expect to observe a negative coefficient of the interaction term. A potential explanation would be that IFRS 9 increases the cost of lending, making banks to reduce their exposition to firms with an ex-ante higher PD. In contrast, a positive effect if the new impairment model on relationship banking would be consistent with the ECL model requiring banks to use soft information, incentivizing banks to preserve their existing relationships. We inspect the higher cost of lending channel after IFRS 9 in a second step, repeating our baseline regression in the sample of firms with a low and a high ex-ante PD, respectively. Finally, we consider the role of the credit deterioration of borrowers,

proxying a more likely migration of a firm's outstanding credit from Stage 1 to Stage 2, on the effect of IFRS 9 on relationship banking.

Table 2 shows the results of our baseline regression. To inspect the effect of IFRS 9 on relationship banking we consider both proxies of a relationship from the perspective of the borrower (column 1 and 2) and of the lender (column 3 and 4). Consistently across the different definitions, our results suggest a negative and statistically significant effect of the new impairment model on relationship lending.⁹ Column 1 captures the effect of a dummy variable (Main bank) 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. Relationship banking entails a 10 percentage points (pp) higher semiannual credit growth before the introduction of IFRS 9. The effect shrinks by 1.3 pp in the aftermath. In column 2 we employ a refinement of the previous measure and demand that the credit exposure with the main lender was more than 50% of the total amount outstanding (Main bank credit > 50 %). These are borrowers that are more exclusively exposed to a given bank and, thus, the lender may benefit more from its private information (Bolton et al., 2016; Thakor, 1996). In line with our previous finding, we observe that IFRS 9 negatively impacts relationship lending, accounting for a 1.4 pp decrease in the semiannual growth of credit after 2018. Column 3 inspect the role of the new impairment model from the perspective of the lender. We consider a dummy 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 (High exposure 90th percentile). Consistent with our previous results, IFRS 9 has a negative effect on relationship banking. Namely, the effect on credit growth shrinks by 1.7 pp after the new regulation is introduced. Alternatively, we consider the 95th percentile as the threshold to define our proxy of a relation (High exposure 95th percentile). The negative impact of IFRS 9 appears to be accentuated, accounting for a 2.3 pp decrease. In line with the literature (e.g. Banerjee et al., 2021; Sette & Gobbi, 2015), our findings corroborate that relationship lending is a key mechanism enabling firms accessing external finance, as suggested by the positive and significant coefficient of our relationship proxies before and after 2018. The new impairment model, however, seems to reduce the effect of relationship baking on credit growth.

To further inspect the relevance of our findings, we repeat our baseline regression considering the sample of microenterprises and the rest of firms (Table A.1. in Appendix). Ample evidence in the literature suggest that opaquer and smaller firms may specially benefit from relationship banking (e.g. Beck et al., 2018; López-Espinosa et al., 2017). This hypothesis is corroborated both before and after IFRS 9, confirming that we are correctly proxying for the notion of relationship lending. Before 2018, we observe that relationship banking entails 12 pp higher credit growth when focusing on microenterprises, in contrast with an effect of 7 pp for the rest of firms. In the aftermath, relationship banking continues playing a relevant role although the effect on credit growth is partially diluted. Namely, the introduction of IFRS 9 has a negative effect on relationship lending for both profiles of firms. We observe a 0.9 pp decrease in the coefficient

⁹ This result remains unaltered if considering as our dependent variable the log difference of credit (see table A2 in the Appendix)

of relationship baking for microenterprises and a 1.2 pp decrease for the rest of the firms. As expected, given the higher value of soft information for the case of microenterprises, relationship lending continues being more important for this group of firms after IFRS 9.

Our first result suggests a negative effect of the new impairment model on relationship lending. We next inspect the channels that may be driving this finding. In contrast to the ICL model, IFRS 9 mandates banks to raise provisions at origination or purchase of financial instruments. The higher the initial PD of a borrower, the higher the estimated ECL and the initial rise of provisions. Thus, the increase in the cost of credit due to IFRS 9 will be most prevalent for ex-ante riskier firms. If this is the main mechanism driving our results, we should observe that the effect of IFRS 9 on relationship lending is concentrated in the sample of firms with a higher ex-ante PD. Table 3 tests for this hypothesis. To this end, we repeat our baseline regression splitting the sample into investment grade and high yield firms. Consistent with our intuition, we observe that the effect of the new impairment model on relationship lending is present in the sample of borrowers with a high ex-ante PD. Across the different definitions, the effect of relationship lending on the growth of credit for investment grade borrowers is akin before and after IFRS 9. In sharp contrast, the role of relationship baking appears to be significantly diluted after 2018 for the case of high yield borrowers. The negative impact of IFRS 9 ranges from a 1.5 pp decrease (considering the proxy Main *bank)* to a shrink in the coefficient of 2.5 pp (looking at the variable *High exposure 95th percentile*). Our results suggest that the effect of the new impairment model on relationship lending introduces a novel asymmetry in the way a firm may benefit from holding a relationship to access external finance. Before 2018, we observe that this mechanism benefited investment- grade and high yield firms in a similar way. After IFRS 9, a significant gap regarding the effect of relationship lending on the supply of credit emerges. We observe that the higher cost of lending after IFRS 9 and the impact on relationship banking is mainly borne by high yield firms. This is a relevant finding as riskier borrowers may face higher difficulties in accessing external finance and relationship banking could insulate their flow of credit over time, especially so during recessions (Banerjee et al., 2021; Bolton et al., 2016).

A complementary channel that could be reinforcing the negative effect of the ECL model on relationship lending relates to the three-stage design of IFRS 9, the so called "cliff-effect". The literature has referred to the transition between the first and the second bucket as a "cliff", as provisions may sharply increase when the migration occurs (ESRB, 2017). Hence, when a lender estimates the cost of risk associated with granting a new loan under IFRS 9, it must consider both the raise in provisions at origination and the probability that the loan migrates from Stage 1 to Stage 2 in the future. Arguably, the probability that a transition occurs may depend on the initial PD level of the borrower (as suggested by credit migration matrices) and the deterioration of the outstanding credit of the borrower, very much related with existing loan exposures for a given firm being close to be classified in Stage 2. We assess the relevance of this second aspect in Table 4 and Table 5. Table 4 studies the effect of IFRS 9 on relationship lending considering the sample of ex-ante safe firms whose credit risk has remained low. As expected, we observe that the new impairment model does not affect relationship banking. Relations have a positive and similar effect on the growth of credit before and after 2018. This result is consistent with the channel highlighted in Table 3: the increase in the cost of credit that results from provisioning at origination under IFRS 9 may depend on the ex-ante risk of a borrower. For the case of safe firms, little implications are expected. In addition to this, our finding relates to the mechanism associated with the "cliff-effect" of IFRS 9: the anticipation of lenders to the possibility that a loan migrates from the first to the second stage. Notably, the considered sample in Table 4 is based on safe firms that have not experienced an increase in their credit risk. Very likely, all their outstanding credit will be classified in Stage 1. Banks may perceive that a future transition is unlikely to occur when granting new credit to this profile of borrowers. Hence, the absent effect of IFRS 9 on relationship banking would be in line with the incentives of lenders not being affected by the "cliff-effect" that the new methodology brings.

Table 5 offers contrasting results. We now focus on ex-ante risky firms that have experienced an increase in their PD. We consider the variation in the PD between 2014 and 2015 for the pre-IFRS 9 period and between 2016 to 2017 for the post-IFRS 9 window. Thus, we are refining the sample considered in Table 3 (borrowers proxied to be in Stage 1 and with a high PD at loan origination) by further focusing on firms that exhibit a deterioration in their credit quality. These are borrowers with a higher likelihood of having their outstanding migrating to Stage 2 in the future. New lending in this context may acknowledge a higher probability that a transition between Stage 1 and Stage 2 occurs. Our results seem to corroborate the significant role of the "cliff-effect" on the decision of banks to preserve their lending relationships. Focusing on panel A, we observe that IFRS 9 has a negative and significant effect on relationship lending. Notably, the magnitude of the impact of IFRS 9 is found to be slightly accentuated, relative to the results of Table 3. For example, the effect of *Main bank credit > 50 %*, which captures a strong and exclusive relationship between a borrower and a lender, raises from 2 pp (Table 3) to 3 pp in the present case.

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. Namely, they suggest that a threefold increase in the lifetime PD from initial recognition should be used as a rule of thumb. Despite this is not a sharp rule that banks must follow, it enables us to further explore the impact of the "cliff-effect". To this end, we repeat our baseline regression in 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. In contrast with our attempt to focus on Stage 1, we now restrict our attention to borrowers whose outstanding credit may have very likely transitioned to the second bucket. New credit to this profile of borrowers, initially classified in Stage 1 according to IFRS 9, may migrate to Stage 2 with a high probability. The results presented in panel B of Table 5 seem to support the hypothesis that the negative impact of IFRS 9 on relationship lending is significantly exacerbated 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 impact of relationship banking after IFRS 9, as captured by the variable *Main bank credit > 50 %,* is found to decrease the growth of credit by 4.6 pp. This magnitude is twice as large as the negative impact of IFRS 9 on relationship lending that was observed when pooling together all firms with a high ex-ante credit risk (Table 3).

5. Extensions and robustness

In this section we inspect whether the effect of IFRS 9 on relationship lending depends on bank's capitalization adequacy. We also propose two robustness tests to ensure that our main finding, the negative impact of IFRS 9 on relationship lending, is not driven by alternative factors. Namely we first test whether our results are robust to a potential anticipation of banks to the IFRS 9 regulation. Second, we conduct our analysis on the sample of firms with all their outstanding loans classified as non-performing. These are, very likely, loans classified in Stage 3 (credit impaired assets). Notably, the accounting treatment of these instruments and the new lending to borrowers with a non-performing status was akin under the ICL model and the new impairment model of IFRS 9. Hence, no significant impact of IFRS 9 should be observed when considering this profile of borrowers.

5.1. Heterogenous effects and bank's capital level

The negative impact of IFRS 9 on relationship lending that we uncover is consistent with the new impairment model increasing the cost of lending due to provisioning at origination based on expected credit losses. We have argued that this mediating channel relates to the negative impact of provisions on regulatory capital. This is also the key mechanism considered in the work of Beatty & Liao, (2011), focusing on the ICL model, or the work of Morais et al., (2020), that focus a Colombian accounting reform in the year 2007, similar in spirit to IFRS 9. Despite we control in all our regressions for bank-time fixed effects, absorbing the direct effect of bank specific characteristics, it could be the case that the impact of IFRS 9 on relationship banking is more pronounced for banks that are worse capitalized. To test this hypothesis, Table 6 extends our baseline regression interacting our main coefficient of interest with a dummy variable that takes value equal to 1 if the bank capital ratio is below the median. Focusing on the effect of IFRS 9 on relationship lending as captured by the proxy Main bank credit > 50 %, we find that the level of regulatory capital does not play a significant role in shaping our results. Our result suggests that the channel we inspect, the effect of the new impairment model on relationship lending, is similarly present for both good and bad capitalized banks. This does not mean that the finding of Morais et al. (2020), the differential effect of regulatory capital on the supply of credit after the introduction of the ECL model in Colombia, is not present for the case of IFRS 9. However, our focus on relationship lending and the inclusion of bank-fixed effects makes this issue to stand out of the scope of the paper.

5.2. Anticipation effect

IFRS 9 (Financial Instruments) was issued by the International Accounting Standards Board on 24 July 2014 and was implemented for the first time in the financial reports corresponding to the 2018 fiscal year.¹⁰ Given the relevance of this regulatory switch, financial institutions made an important effort to develop new provisioning methodologies and to understand the consequences of the ECL model in their business models prior to the adoption of the new regulation. Also, academics and policy makers highlighted the potential effects of the new impairment model on the behavior of banks upon adoption, emphasizing the impact of the higher cost of credit that results from provisioning at origination and the possible unintended consequences of the "cliff-effect" feature of IFRS 9 (ESRB, 2017). These aspects could suggest that banks, before adopting IFRS 9, may have changed their lending behavior to smooth the adoption process and to reduce the day-one-impact on their loan loss allowance. Considering the effect of the ECL model on relationship lending, banks could have anticipated the higher cost of credit associated with new lending after IFRS 9 by reducing, ex-ante, their exposition to their risky relationship borrowers.

The existence of an anticipation effect would be biasing our results towards zero. Hence, if such anticipation was present, our estimates would constitute a lower bound of the true effect of IFRS 9 on relationship lending. Still, we explicitly test for this possibility. To this end, we repeat our baseline regression excluding all observations that belong to the last semester of the year 2017, when the anticipation effect may have been most prevalent. The results are presented in panel A of Table 7. We find no evidence of an anticipation effect occurring in the semester immediately before the introduction of the new accounting standard. Namely, the estimated coefficients are qualitatively and quantitatively similar to those obtained in our baseline analysis (Table 2). Relative to non-relationship borrowers, banks holding a relation with a given firm extended new credit at a 10 pp higher rate before IFRS 9. Afterwards, the effect decreases by 1.8 pp, depending on the considered proxy of relationship banking. Overall, this evidence attenuates the concern that our results may be severely affected by a strong anticipation effect of IFRS 9.

5.3. Falsification test: Stage-3

We have shown that the negative effect of IFRS 9 on relationship lending increases with the ex-ante risk of the borrower. This result was found to be present in the sample of borrowers with all their loan exposures classified as performing (proxying the notion of Stage 1). Furthermore, our findings seemed to corroborate the role of a "cliff-effect" due to the second stage: the impact of the new regulation on performing firms was found to be larger when the firm had experienced a significant deterioration in his credit score, potentially affecting the actual (unobserved to the econometrician) allocation of his outstanding credit and the probability that a transition from Stage 1 to Stage 2 occurs in the future. The three-stage asset classification under IFRS 9 further allows for the possibility of conducting a falsification

¹⁰ See López-Espinosa et al., (2021) for a review of the implementation process of the ECL model under IFRS 9.

test. Namely, when the ex-ante credit risk of a borrower is sufficiently high, as proxied by his nonperforming status, we would not expect to observe an effect of IFRS 9 on relationship banking. Provisioning under the ICL methodology was restricted and akin to the estimation of the accrual for loans classified in Stage 3 under IFRS 9. For the case of non-performing loans, banks must estimate lifetime expected losses assuming that the PD of the borrower is equal to 100% in both methodologies. Furthermore, the accounting treatment of new credit considered impaired POCIs (impaired purchased or originated financial assets), received a similar treatment both under IAS 39 and IFRS 9.

Table 8 presents our results considering the sample of borrowers whose outstanding credit may be allocated in Stage 3. We approximate the third bucket considering that a borrower is classified in Stage 3 if all his outstanding credit is non-performing. This is a conservative definition, as 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. Thus, we are confident that this sample may be very likely capturing credit impaired firms with a PD very close to 100%. Prior to the introduction of IFRS 9 and considering *Main bank credit > 50 %*, we observe that holding a relationship entailed a growth of credit 20 pp higher than the one observed for non-relationship borrowers.¹¹ This result corroborates the significant role of relationship lending in extending credit to very risky borrowers that would, otherwise, have no access to external finance. This finding could also relate to the incentives of a bank to prevent a firm going bankrupt, either to preserve the existing relationship or to avoid the recognition of loan losses. Crucially, in this case we do not observe a significant differential impact 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.

6. Conclusions

An ample literature has studied the benefits and costs that relationship lending may bring to firms and banks, both at the theoretical and empirical level. In a context characterized by asymmetric information, the repeated interaction between a borrower and a lender may help reducing this friction, enhancing a fluent loan contracting over time. Previous studies, however, have not inspected whether and how a banking regulation may shape the benefits and cost of relationship lending. This is a relevant question given the central role of relationships in facilitating firms' access to external finance, specially so when they are opaque or risky and during an economic recession.

¹¹ The results are akin when considering the other proxies of relationship lending except for the case of *High exposure 95th percentile*, where we find a significant result at the 5% significance level. Very likely, this may be driven by the reduced sample employed in these regressions and the fact that few lenders may have a very high exposure to given borrower with all their outstanding loans classified as non-performing. Thus, the category *High exposure 95th percentile* may be severely affected from the variability of a number of observations potentially driving our results.

We fill this gap in the literature by focusing on the effect the ECL model under IFRS 9 on relationship lending. Due to the absent IFRS 9 three-stage classification prior to 2018 and the fact that banks do not disclose this information at the loan level in the posterior period, we propose a novel strategy to identify Stage 1 before and after 2018. Namely, we proxy the first bucket by restricting our sample to borrowers with all their outstanding loans classified as performing and whose credit risk has not significantly deteriorated. Our baseline analysis enables us to disentangle the change in the supply of credit of banks to their relationship borrowers allocated in Stage 1, relative to their non-relationship borrowers, before and after the introduction of IFRS 9.

No matter the definition of relationship lending, our results suggests that the new impairment model has negatively impacted relationship banking. In line with the existing literature, we show that holding a relationship appears to be a relevant mechanism allowing firms accessing external finance. Despite such role remains after the introduction of IFRS 9, the positive effect of relationship lending on the growth of credit is reduced. Next, we inspect whether the effect of IFRS 9 depends on the ex-ante risk of a borrower. The impact of the new regulation on provisions and the supply of credit is expected to be stronger for firms with a high PD due to larger expected credit losses at origination. Consistent with this hypothesis, we find that the negative effect of IFRS 9 on relationship banking is only present when considering high yield borrowers within our proxy of Stage 1. We document a novel asymmetry in the role of relationship banking after IFRS 9. Before 2018, relationships played a similar role regarding its positive effect on the growth of credit for investment grade and high yield firms. In the aftermath, high yield firms appear to benefit less from relationship lending.

Together with this, we assess whether the impact of IFRS-9 is higher if a firm is more likely to experience a significant increase in credit risk, implying a transition from Stage 1 to Stage 2. Consistent with banks internalizing the probability that new credit initially classified in Stage 1 shifts to the second bucket, we find that the effect of IFRS 9 on relationship banking is present when considering high yield firms whose credit quality has deteriorated. Furthermore, when focusing on borrowers whose outstanding credit may have already shifted to Stage 2 (high yield borrowers with a threefold increase in their PDs), the effect of IFRS 9 on relationship lending is severely accentuated.

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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. Point B in the chart represents the moment in where a loan classified in Stage 1 migrates to Stage 2. The IFRS 9 standard defines this specific deterioration in credit quality as a significant increase in credit risk (SICR).



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 0.4% that have remained below this threshold in each period, firms with PD above 0.4% that have either increase or present 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. Panel A contains the descriptive statistics for the pre-IFRS9 period, while Panel B refers to the post-IFRS9 period.

Variable	Units	Mean	Std. Dev.	Median	5th	95th
					percentile	percentile
Relationship lending						
Main bank	0/1	0.553	0.497	1	0	1
Main bank credit > 50 %	0/1	0.508	0.500	1	0	1
High exposure 90th percentile	0/1	0.102	0.303	0	0	1
High exposure 95th percentile	0/1	0.047	0.212	0	0	0
Credit						
Biannual credit growth (bank-firm level)	-	-23.911	73.925	-10.805	-200.000	85.213
Credit risk						
Firm's probability of default	%	1.558	6.205	0.929	0.073	2.803
High yield firms (PD>0.4%)	0/1	0.811	0.391	1	0	1
Credit risk transition						
Safe firms (PD=<0.4%)	0/1	0.099	0.298	0	0	1
Risky firms(PD>0.4%) and:						
Increase in credit risk	0/1	0.158	0.365	0	0	1
Threefold increase in credit risk	0/1	0.035	0.184	0	0	0

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

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	0.545	0.498	1	0	1
Main bank credit > 50 %	0/1	0.500	0.500	0	0	1
High exposure 90th percentile	0/1	0.102	0.303	0	0	1
High exposure 95th percentile	0/1	0.046	0.210	0	0	0
Credit						
Biannual credit growth (bank-firm level)	-	-24.734	72.972	-11.808	-200.000	82.558
Credit risk						
Firm's probability of default	%	1.212	5.331	0.758	0.055	2.110
High yield firms (PD>0.4%)	0/1	0.747	0.435	1	0	1
Credit risk transition						
Safe firms (PD=<0.4%)	0/1	0.162	0.369	0	0	1
Risky firms(PD>0.4%) and:						
Increase in credit risk	0/1	0.223	0.416	0	0	1
Threefold increase in credit risk	0/1	0.040	0.195	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. 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 x Post) contains the linear combination of the two estimated coefficients. 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 borrow	ver's perspective	From the lender	r's perspective	
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile	
	(1)	(2)	(3)	(4)	
BI	0 1003***	0 1975***	0 0800***	0.0861***	
	(0.0039)	(0.0036)	(0.0085)	(0.0091)	
RL x Post	-0.0123***	-0.0140***	-0.0171***	-0.0227***	
	(0.0035)	(0.0040)	(0.0053)	(0.0056)	
RL + RL x Post	0.0880***	0.113***	0.0718***	0.0635***	
	(0.0041)	(0.0037)	(0.0094)	(0.0096)	
Observations	2,565,456	2,565,456	2,565,456	2,565,456	
R-squared	0.3945	0.3951	0.3921	0.3917	
Firm x Time FE	Yes	Yes	Yes	Yes	
Bank x Time FE	Yes	Yes	Yes	Yes	

TABLE 3. 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 similar to those defined in Table 2. We split the firms in Table 2 in two groups based on their probability of default (PD). Thus, investment grade (IG) firms are those with a one-year PD below 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 x Post) contains the linear combination of the two estimated coefficients. 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 borrow	er's persp	ective	Fror	n the lende	r's perspec	ctive
	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	0.1088***	0.0987***	0.1318***	0.1267***	0.0984***	0.0873***	0.0827***	0.0859***
RL x Post	(0.0072) 0.0019	(0.0038) -0.0157***	(0.0068) 0.0017	(0.0037) -0.0180***	(0.0138) -0.0159	(0.0083) -0.0174***	(0.0204) 0.0005	(0.0085) -0.0251***
	(0.0060)	(0.0036)	(0.0060)	(0.0042)	(0.0113)	(0.0053)	(0.0175)	(0.0057)
RL + RL x Post	0.111*** (0.0082)	0.0829*** (0.0034)	0.133*** (0.0073)	0.109*** (0.0032)	0.0825*** (0.0145)	0.0699*** (0.0090)	0.0832*** (0.0160)	0.0608*** (0.0094)
Observations	389,041	2,176,280	389,041	2,176,280	389,041	2,176,280	389,041	2,176,280
R-squared	0.4322	0.3859	0.4329	0.3865	0.4292	0.3836	0.4289	0.3832
Firm x Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 4. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE CASE OF EX-ANTE SAFE FIRMS WHOSE CREDIT RISK HAD REMAINED LOW

This table reports the results obtained from the estimation of equation (1) based on the subsample of firms used in Table 2. More specifically, corporates used in a given period (pre- or post-IFRS-9) are safe firms for which their PD remained low in that period. The dependent variable, the explanatory variables of interest and the set of fixed effects are similar to those defined in Table 2. The group of firms considered (from those of Table 2) had an ex-ante 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 row below the coefficients (RL + RL x Post) contains the linear combination of the two estimated coefficients. 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 perspect	tive of the borrower	From the perspec	ctive 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***			
RL x Post	(0.0099) -0.0027 (0.0075)	-0.0063 (0.0085)	-0.0170 (0.0155)	-0.0022 (0.0286)			
RL + RL x Post	0.122*** (0.00865)	0.145*** (0.00779)	0.0904*** (0.0171)	0.0829*** (0.0186)			
Observations R-squared	227,085 0.4397	227,085 0.4405	227,085 0.4358	227,085 0.4354			
Firm x Time FE Bank x Time FE	Yes Yes	Yes Yes	Yes Yes	Yes Yes			

TABLE 5. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE CASE OF EX-ANTE RISKY FIRMS THAT HAD EXPERIENCED AN INCREASE IN CREDIR RISK

This table reports the results obtained from the estimation of equation (1) based on different subsamples of the firms used in Table 2. More specifically, firms used in a given period (pre- or post-IFRS-9) are those for which their PD experienced an increase in that period. The dependent variable, the explanatory variables of interest and the set of fixed effects are similar to those defined in Table 2. The group of firms considered in Panel A (from those of Table 2) had an ex-ante probability of default (PD) above 0.4% in 2014 (for the pre-event period) and in 2016 (for the post-event period) and this PD increased one year later (i.e., in 2015 and 2017, respectively). The group of firms considered in Panel B (from those of Table 2) had an ex-ante probability of default (PD) and in 2016 (for the post-event period) and in 2016 (for the post-event period) and this PD increased one year later (i.e., in 2015 and 2017, respectively). The group of firms considered in Panel B (from those of Table 2) had an ex-ante probability of default (PD) above 0.4% in 2014 (for the pre-event period) and in 2016 (for the post-event period) and in 2016 (for the post-event period) and in 2016 (for the post-event period). The group of firms considered in Panel B (from those of Table 2) had an ex-ante probability of default (PD) above 0.4% in 2014 (for the pre-event period) and in 2016 (for the post-event period) and this PD experienced a threefold increase one year later (i.e., in 2015 and 2017, respectively). The row below the coefficients (RL + RL x Post) contains the linear combination of the two estimated coefficients. 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 perspec	tive of the borrower	From the perspec	From the perspective of the lender		
	Main bank	Main bank credit > 50 %		High exposure 95th percentile		
	(1)	(2)	(3)	(4)		
RL	0.0993*** (0.0048)	0.1263***	0.0822***	0.0815***		
RL x Post	-0.0247*** (0.0049)	-0.0270*** (0.0054)	-0.0171** (0.0084)	-0.0265** (0.0124)		
RL + RL x Post	0.0746*** (0.00462)	0.0992*** (0.00451)	0.0651*** (0.0114)	0.0550*** (0.0131)		
Observations R-squared Firm x Time FE	555,997 0.3992 Yes	555,997 0.3997 Yes	555,997 0.3973 Yes	555,997 0.3970 Yes		
Bank x Time FE	Yes	Yes	Yes	Yes		

Panel A: Risky firms (PD>0.4%) which have experienced an increase in their PDs

Panel A: Risky firms (PD>0.4%) which have experienced a threefold increase in their PDs

		Proxy for RL					
	From the perspec	tive of the borrower	From the perspec	ctive of the lender			
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile			
	(5)	(6)	(7)	(8)			
RL	0.1324*** (0.0112)	0.1518*** (0.0113)	0.1560*** (0.0209)	0.1286*** (0.0218)			
RL x Post	-0.0405** (0.0161)	-0.0462*** (0.0165)	-0.0663** (0.0283)	-0.0762** (0.0351)			
RL + RL x Post	0.0919*** (0.00840)	0.106*** (0.00968)	0.0897*** (0.0206)	0.0524*** (0.0296)			
Observations R-squared Firm x Time FF	56,147 0.4693 Ves	56,147 0.4698 Ves	56,147 0.4657 Ves	56,147 0.4649 Ves			
Bank x Time FE	Yes	Yes	Yes	Yes			

TABLE 6. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. ROBUSTNESS TO THE LEVEL 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. In panel A 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, whereas in panel B Low capital is a dummy variable that takes the value of 1 if the bank capital ratio is below the set of fixed effects are similar to those defined in Table 2. 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 perspect	ive of the borrower	From the perspec	tive of the lender		
	Main bank (1)	Main bank (2)	High exposure (3)	High exposure (4)		
RL	0.1030***	0.1280***	0.0863***	0.0821***		
RL x Post	(0.0081) -0.0156***	(0.0055) -0.0157** (0.0067)	(0.0086) -0.0182** (0.0077)	(0.0088) -0.0232** (0.0007)		
RL x Low capital	-0.0049	-0.0009	(0.0077) 0.0045	0.0069		
RL x Post x Low capital	(0.0122) 0.0060 (0.0071)	(0.0082) 0.0031 (0.0077)	(0.0103) 0.0019 (0.0091)	(0.0110) 0.0011 (0.0106)		
Observations	2,565,456	2,565,456	2,565,456	2,565,456		
R-squared	0.3945	0.3951	0.3921	0.3917		
Bank x Time FE	Yes	Yes	Yes	res Yes		

TABLE 7. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. ROBUSTNESS TO AN ANTICIPATION EFFECT.

This table reports the results obtained from the estimation of equation (1) as in Table 2, but with a different estimation sample. It excludes 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 similar to those defined in Table 2. The row below the coefficients (RL + RL x Post) contains the linear combination of the two estimated coefficients. 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 perspect	tive of the borrower	From the perspec	tive of the lender		
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile		
	(1)	(2)	(3)	(4)		
RL	0.1064***	0.1348***	0.0926***	0.0907***		
RL x Post	-0.0184*** (0.0036)	-0.0213*** (0.0041)	-0.0207*** (0.0058)	-0.0272*** (0.0067)		
RL + RL x Post	0.0880*** (0.00413)	0.113*** (0.00367)	0.0718*** (0.00940)	0.0635*** (0.00963)		
Observations R-squared Firm x Time FE Bank x Time FE	2,101,783 0.3942 Yes Yes	2,101,783 0.3948 Yes Yes	2,101,783 0.3917 Yes Yes	2,101,783 0.3913 Yes Yes		

Panel A: Robustness to an anticipation effect

TABLE 8. 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 similar to those defined in Table 2. The row below the coefficients (RL + RL x Post) contains the linear combination of the two estimated coefficients. 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 perspec	tive 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	0.1965***	0.2038***	0.1279**	0.1707***		
RL x Post	-0.0209 (0.0314)	0.0024 (0.0327)	-0.1126 (0.0884)	-0.2463** (0.0966)		
RL + RL x Post	0.176*** (0.0254)	0.206*** (0.0275)	0.0153 (0.0657)	-0.0756 (0.0835)		
Observations R-squared Firm x Time FE	10,266 0.5516 Yes	10,266 0.5524 Yes	10,266 0.5413 Yes	10,266 0.5413 Yes		
Bank x Time FE	Yes	Yes	Yes	Yes		

TABLE A1. RELATIONSHIP LENDING AFTER THE CHANGE IN FINANCIAL REPORTING STANDARDS. THE ROLE OF THE FIRMS' SIZE

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 size. The dependent variable, the explanatory variables of interest and the set of fixed effects are similar to those defined in Table 2. We split the firms in Table 2 in two groups based on their size as defined by the European Commission: i) Microenterprise, defined as a firm which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million and ii) the rest of firms. The row below the coefficients (RL + RL x Post) contains the linear combination of the two estimated coefficients. Standard errors clustered at the bank-firm level are reported in brackets. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

	Microen	terprises	Rest of firms		
	Main bank	Main bank credit > 50 %	Main bank	Main bank credit > 50 %	
	(1)	(2)	(3)	(4)	
RL	0.1172***	0.1367***	0.0704***	0.1065***	
	(0.0037)	(0.0040)	(0.0062)	(0.0062)	
RL x Post	-0.0095**	-0.0117**	-0.0185***	-0.0203***	
	(0.0039)	(0.0046)	(0.0052)	(0.0061)	
RL + RL x Post	0.108***	0.125***	0.0518***	0.0862***	
	(0.0046)	(0.0045)	(0.0053)	(0.0050)	
Observations	1,479,801	1,479,801	1,085,581	1,085,581	
R-squared	0.4401	0.4406	0.3415	0.3420	
Firm x Time FE	Yes	Yes	Yes	Yes	
Bank x Time FE	Yes	Yes	Yes	Yes	

Proxy for RL from the borrower's perspective

TABLE A2. ROBUSTNESS TO THE DEFINITION OF THE DEPENDENT VARIABLE AS THE LOG CHANGE IN CREDIT

This table reports the results obtained from the estimation of equation (1) as in Table 2, but defining the dependent variable as the biannual log change in credit. 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 x Post) contains the linear combination of the two estimated coefficients. 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 borrow	ver's perspective	From the lende	From the lender's perspective		
	Main bank	Main bank credit > 50 %	High exposure 90th percentile	High exposure 95th percentile		
	(1)	(2)	(3)	(4)		
RL	0.5731***	0.6454***	0.6491***	0.6199***		
RL x Post	(0.0117) -0.0578***	(0.0139) -0.0655***	(0.0201) -0.0935***	(0.0239) -0.0959***		
	(0.0125)	(0.0150)	(0.0198)	(0.0243)		
RL + RL x Post	0.515*** (0.0098)	0.580*** (0.0119)	0.556*** (0.0226)	0.524*** (0.0255)		
Observations	2,565,456	2,565,456	2,565,456	2,565,456		
Firm x Time FE	Ves	Ves	Ves	Ves		
Dalik X HIIIEFE	res	res	res	res		

Appendix

1. Institutional Background

1.1 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). (Novotny-Farkas, 2016). (Novotny-Farkas, 2016). (Novotny-Farkas, 2016). (Novotny-Farkas, 2016).

While this accounting rule had the virtue of reducing the room for discretion in raising loan loss provisions (Giner & Mora, 2019)(Giner & Mora, 2019)(Giner & Mora, 2019)(Giner & Mora, 2019), the 'backward-looking' nature of the ICL model was argued to have detrimental effects on financial stability, as witnessed during the financial crisis (de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014)(de Haan & van Oordt, 2018; Gaston & Song, 2014). 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 & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019)(Acharya & Ryan, 2016; Bischof et al., 2020; Huizinga & Laeven, 2019).

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.

1.2 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*LGD*EAD (1)

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.

1.3 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.¹²

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)(ESRB, 2017)(ESRB, 2017)(ESRB, 2017).

¹² Together with this, in stage 3 the amortized cost net carrying amount is used to compute interest revenue (i.e. reduced for expected credit losses). In contrast, in stage 1 and stage 2 interest revenue is still calculated on the gross carrying amount of the asset.