

## HOW DO CHANGES IN FINANCIAL REPORTING STANDARDS AFFECT RELATIONSHIP LENDING?

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8<sup>TH</sup> RESEARCH WORKSHOP

**TASK FORCE ON BANKING ANALYSIS FOR MONETARY POLICY**

Bank of Greece, Athens

13 September 2022



- There is ample evidence on the consequences of RL
  - i) RL reduces information asymmetries between banks and firms
  - ii) RL helps preserving a fluent loan contracting over time
  - iii) Benefits and costs may be heterogeneous along different dimensions

... But little is known about how bank regulation may shape the benefits and costs of RL for banks

- IFRS 9 (2018) introduced a new impairment model by which banks have to raise provisions at loan origination
  - **Incurred** Credit Loss (ICL) model → **Expected** Credit Loss (ECL) model

***Does the new impairment model under IFRS 9 affects relationship lending?***

*Focus on Spain: the effect on credit growth*

- **Negative effect:** Provisioning at origination increases the cost of lending for ex-ante risky borrowers.
- **Positive effect:** Soft information may be key to estimate expected credit losses with precision.

- Our paper is related with the studies that document that the implications of RL on the supply of credit is heterogeneous along different dimensions.

***RL may be most  
valuable***

*During downturns → Beck et al. (2018), Bolton et al. (2016), Sette and Gobbi (2015)*  
*For opaquer firms → López-Espinosa et al. (2017), Beck et al., (2018).*  
*For firms with a high PD → Bolton et al. (2016)*  
*For highly indebted firms during a crisis → Banerjee et al. (2021).*

- **We contribute to this literature by inspecting how bank regulation may affect relationship lending.**
- Our paper builds on the literature that studies the effect of loan loss provisioning methodologies on bank's lending behavior.
  - Abad and Suarez (2018) inspect how provisioning approaches affect the procyclicality of bank's profits and capital.
  - Morais et al. (2020) inspect the effect of the ECL model on the supply of credit and bank's risk taking.
- **Our focus is not on the effect of the ECL model on the supply of credit but on how it may have affected relationship lending.**

## ICL model (IAS 39)

- Provisioning under objective evidence of impairment
- Loan losses considered when PD close to 100 %

## ECL model (IFRS 9)

- Forward-looking provisions raised at loan origination
- Expected Loss =  $PD \times LGD \times EAD$  (1)
  - PD and LGD are scenario based
    - ✓ Macroeconomic forecasts
    - ✓ Professional judgement
- Three-stage asset classification:

### Stage 1

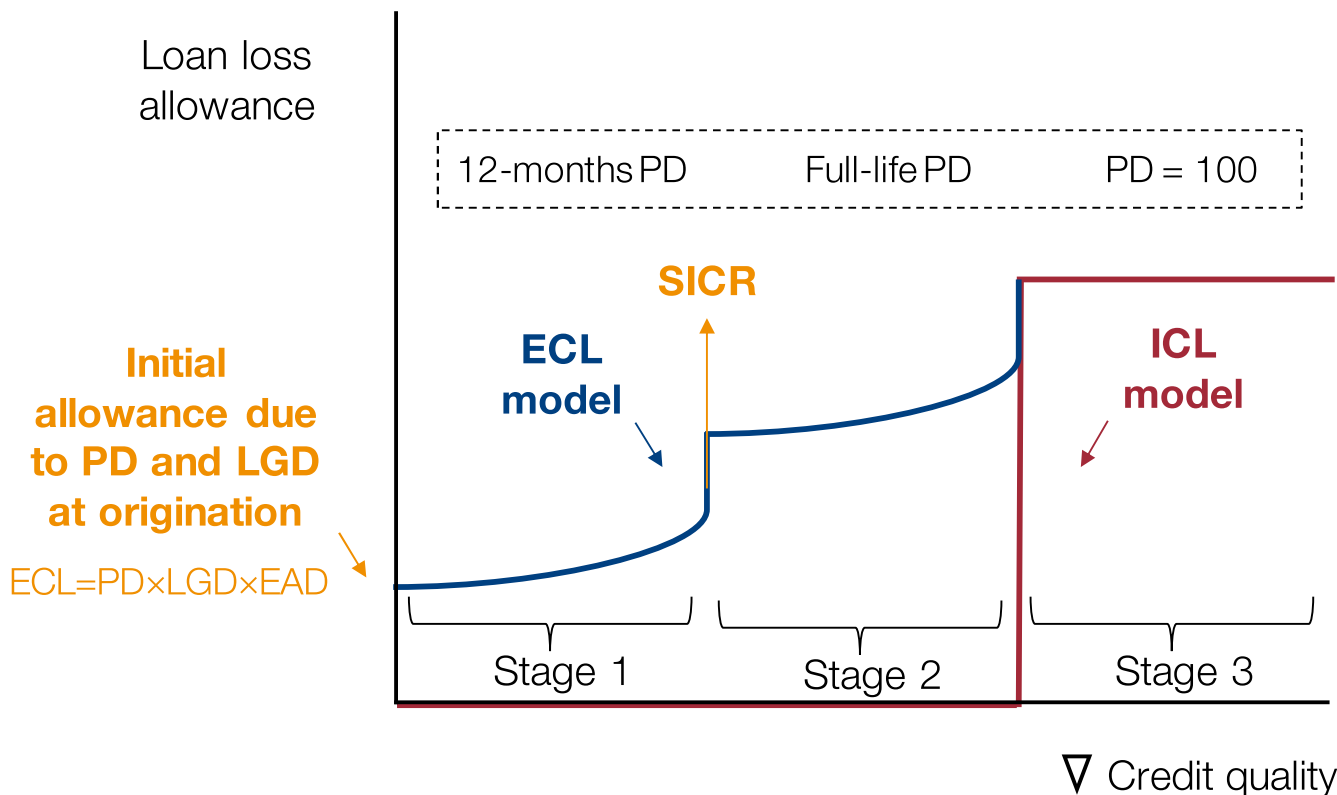
*New loans and  
loans without a  
SICR*  
12-month PD

### Stage 2

*Loans with a  
SICR since  
origination*  
Life-time PD

### Stage 3

*Non-performing  
loans*  
~ ICL model  
PD = 100 %



1. Data and Variables
2. Identification Strategy
3. Main results
4. Extensions and robustness
5. Conclusions

# 1. DATA AND VARIABLES

- Sources: Spanish Credit Register, Central Balance Sheet Data Office and supervisory bank balance sheets
- Sample: *June 2016-June 2019*
  - Include **existent relationships** (Gobbi and Sette, 2015)
  - Take into account all **merges and acquisitions** of banks that took place between 2016 and 2019
  - Aggregate the outstanding amount of credit of each firm in each bank at the end of each semester
- Variables

<b>Biannual change in credit</b> <i>as in Arce, Mayordomo and Gimeno (2020)</i>	$\Delta Credit_{fbt} = \frac{Credit_{fbt} - Credit_{fbt-1}}{(Credit_{fbt} + Credit_{fbt-1}) / 2} \quad (2)$	
<b>Relationship lending</b>	<i>Perspective of the borrower</i>	"Main bank" "Main Bank > 50%"
	<i>Perspective of the lender</i>	"High exposure 90th percentile" "High exposure 95th percentile"
<b>Firms' probability of default</b> <i>as in Fernandez et al. (2022)</i> <i>CQS methodology followed by the ECB</i>	<i>Safe firms (IG)</i>	CQS1 – CQS3 (PD ≤ 0,40 %)
	<i>Risky firms (HY)</i>	CQS4 – CQS8 (PD > 0,40 %)

# 1. DATA AND VARIABLES

## Descriptive statistics

		PRE-IFRS 9 PERIOD JUNE 2016 - DECEMBER 2017					POST-IFRS 9 PERIOD DECEMBER 2017 - JUNE 2019				
	Units	Mean	Std. Dev.	Median	5th percentile	95th percentile	Mean	Std. Dev.	Median	5th percentile	95th percentile
<b>Relationship lending</b>											
Main bank	0/1	0.557	0.497	1.000	0.000	1.000	0.549	0.498	1.000	0.000	1.000
Main bank credit > 50 %	0/1	0.513	0.500	1.000	0.000	1.000	0.504	0.500	1.000	0.000	1.000
High exposure 95th percentile	0/1	0.102	0.303	0.000	0.000	1.000	0.101	0.302	0.000	0.000	1.000
High exposure 99th percentile	0/1	0.047	0.212	0.000	0.000	0.000	0.046	0.210	0.000	0.000	0.000
<b>Credit</b>											
Biannual credit growth (bank-firm level)	%	-24.046	73.900	-10.801	-200.000	84.780	-24.891	73.020	-11.796	-200.000	82.230
<b>Credit risk</b>											
Firm's probability of default	%	1.802	7.484	0.936	0.075	2.988	1.448	6.675	0.766	0.057	2.261
High yield firms (PD>0.4%)	0/1	0.818	0.386	1.000	0.000	1.000	0.757	0.429	1.000	0.000	1.000
<b>Credit risk transition</b>											
Safe firms (PD=<0.4%)	0/1	0.099	0.298	0.000	0.000	1.000	0.162	0.369	0.000	0.000	1.000
Risky firms(PD>0.4%) and:											
Increase in credit risk	0/1	0.158	0.365	0.000	0.000	1.000	0.223	0.416	0.000	0.000	1.000
Threefold increase in credit risk	0/1	0.035	0.184	0.000	0.000	0.000	0.040	0.195	0.000	0.000	0.000



- Identifying Stages at the Borrower Level
  - Proxy **Stage 1** focusing on firms with all loan exposures classified as performing
  - Inability to proxy **Stage 2**, but inspect the role of ex-ante credit risk and credit quality deterioration
  - Proxy **Stage 3** focusing on firms with all loan exposures classified as non-performing
- Study the effect of IFRS-9 impairment model on relationship lending

$$\Delta Credit_{fbt} = \beta_1 RL_{fbt-1} + \beta_2 RL_{fbt-1} \times IFRS\ 9_t + \alpha_{ft} + \gamma_{bt} + \epsilon_{fbt} \quad (3)$$

- Endogeneity concerns
  - Credit demand and supply:  $\alpha_{ft}, \gamma_{bt}$
  - Anticipation effect
  - Measurement error in IFRS-9 stages

### 3. MAIN RESULTS

#### Relationship lending after IFRS 9

RL (relative to non-RL)  
facilitates the flow of credit

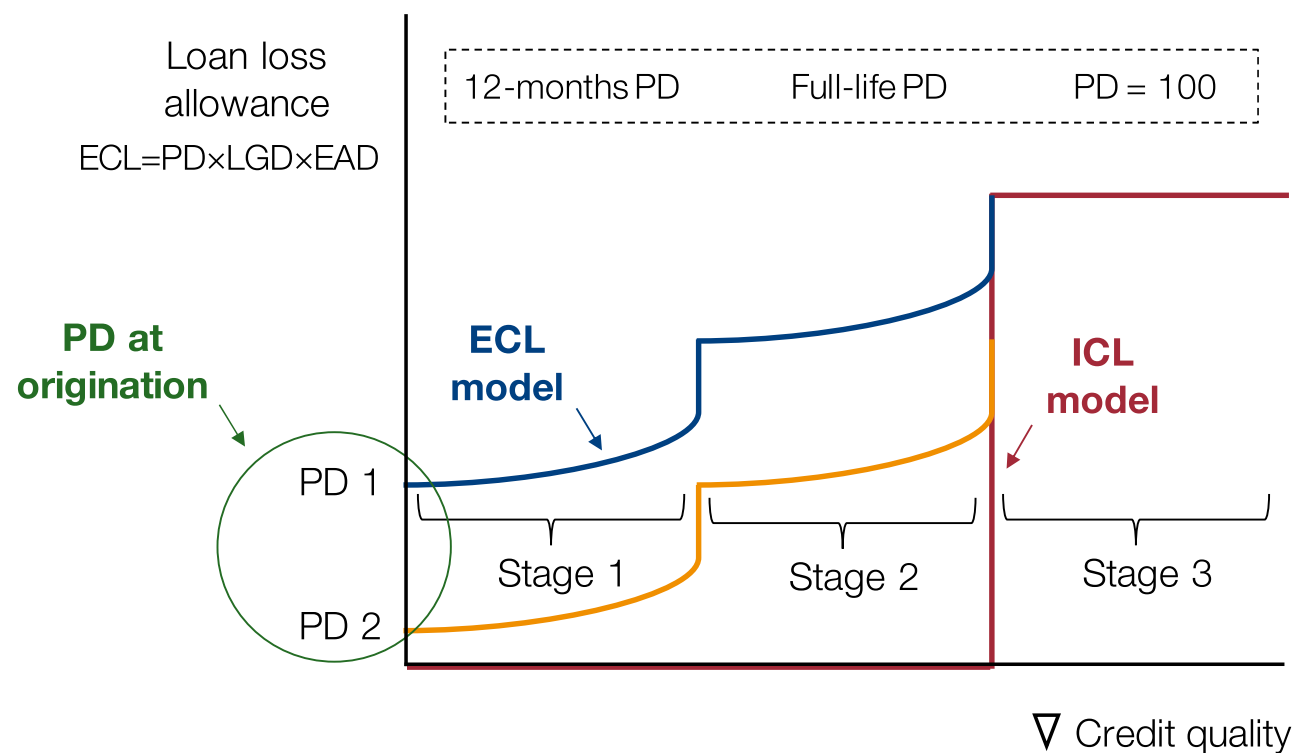
IFRS 9 increases the  
cost of lending

	Proxy for RL			
	From the borrower's perspective		From the lender's perspective	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.1003*** (0.0039)	0.1275*** (0.0036)	0.0890*** (0.0085)	0.0861*** (0.0091)
<b>RL x Post</b>	<b>-0.0123***</b> (0.0035)	<b>-0.0140***</b> (0.0040)	<b>-0.0171***</b> (0.0053)	<b>-0.0227***</b> (0.0056)
RL + RL x Post	0.0880*** (0.0041)	0.113*** (0.0037)	0.0718*** (0.0094)	0.0635*** (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

Standard errors clustered at the bank-firm level

### 3. MAIN RESULTS

The role of ex-ante credit risk



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The role of ex-ante credit risk

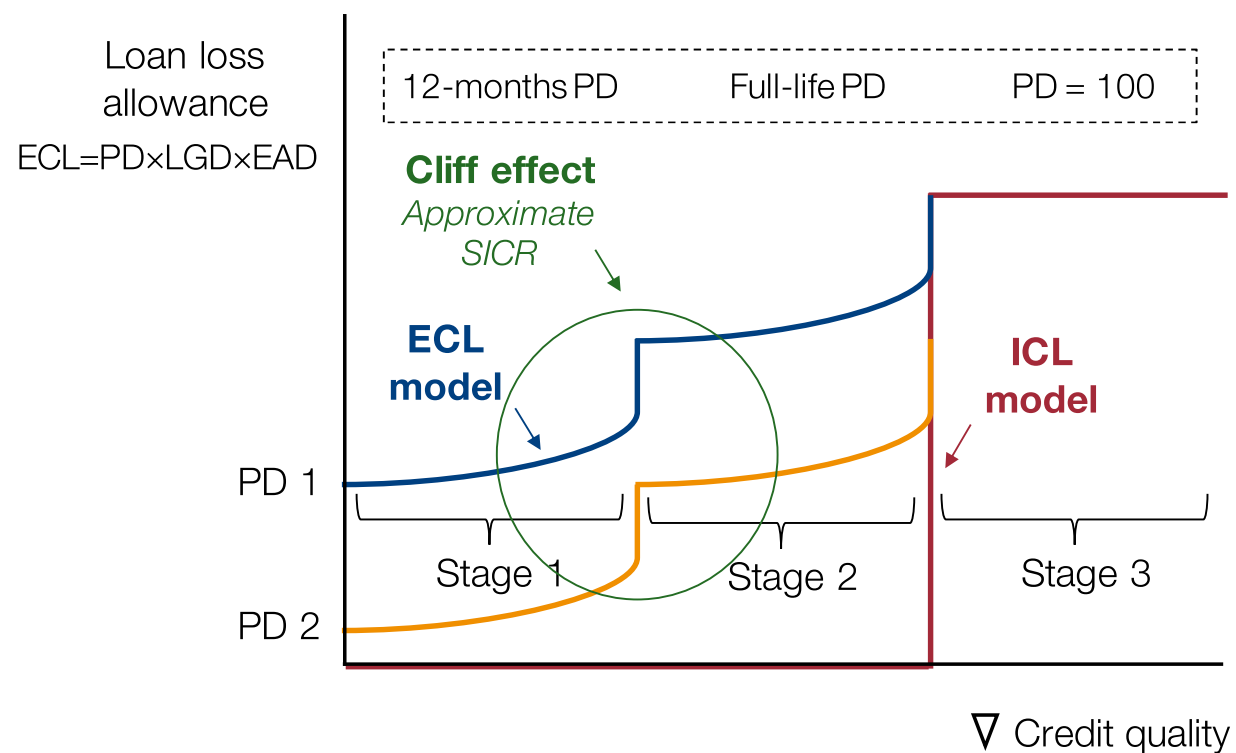
	Proxy for RL							
	From the borrower's perspective				From the lender's perspective			
	Main bank		Main bank credit > 50 %		High exposure 90th percentile		High exposure 95th percentile	
	IG (1)	HY (2)	IG (3)	HY (4)	IG (5)	HY (6)	IG (7)	HY (8)
RL	0.1088*** (0.0072)	0.0987*** (0.0038)	0.1318*** (0.0068)	0.1267*** (0.0037)	0.0984*** (0.0138)	0.0873*** (0.0083)	0.0827*** (0.0204)	0.0859*** (0.0085)
<b>RL x Post</b>	<b>0.0019</b> (0.0060)	<b>-0.0157***</b> (0.0036)	<b>0.0017</b> (0.0060)	<b>-0.0180***</b> (0.0042)	<b>-0.0159</b> (0.0113)	<b>-0.0174***</b> (0.0053)	<b>0.0005</b> (0.0175)	<b>-0.0251***</b> (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

Standard errors clustered at the bank-firm level

Impact of IFRS 9  
concentrated on  
ex-ante risky firms

### 3. MAIN RESULTS

The role of a significant increase in credit risk



### 3. MAIN RESULTS

The case of ex-ante safe firms whose credit has remained low

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

Standard errors clustered at the bank-firm level

No impact of IFRS 9  
on IG firms with  
stable credit risk

### 3. MAIN RESULTS

The case of ex-ante risky firms that had experienced an increase in credit risk

Impact of IFRS 9 is higher if a firm is more likely to experience a SICR (transition from Stage 1 to Stage 2)

#### *Risky firms (PD>0.4%) which have experienced an increase in their PDs*

Proxy for RL

	From the perspective of the borrower		From the perspective of the lender	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.0993*** (0.0048)	0.1263*** (0.0049)	0.0822*** (0.0106)	0.0815*** (0.0119)
<b>RL x Post</b>	<b>-0.0247***</b> (0.0049)	<b>-0.0270***</b> (0.0054)	<b>-0.0171**</b> (0.0084)	<b>-0.0265**</b> (0.0124)
RL + RL x Post	0.0746*** (0.00462)	0.0992*** (0.00451)	0.0651*** (0.0114)	0.0550*** (0.0131)
Observations	555,997	555,997	555,997	555,997
R-squared	0.3992	0.3997	0.3973	0.3970
Firm x Time FE	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes

Standard errors clustered at the bank-firm level

#### *Risky firms (PD>0.4%) which have experienced a threefold increase in their PDs*

Proxy for RL

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

Standard errors clustered at the bank-firm level

1. The role of bank's capital ratio in shaping our results

*Is the impact of IFRS 9 on RL more pronounced for banks with a capital ratio below the median?*

2. Robustness to an anticipation of banks to the IFRS 9 regulation

*Have banks anticipated the higher cost of credit after IFRS 9 by reducing, ex-ante, their exposition to their risky relationship borrowers?*

3. Falsification test

*Is there any effect of IFRS 9 on RL when the ex-ante credit risk of a borrower is sufficiently high, as proxied by his nonperforming status?*

4. The role of the firms' size

*Is the effect of RL on credit growth larger for microenterprises, relative to the rest of firms?*

5. Robustness to an alternative definition of credit growth

*Does our main result remain unaltered if considering as our dependent variable the log difference of credit?*



## 5. CONCLUSIONS

<b><i>Motivation</i></b>	Previous studies have not inspected whether and how a banking regulation may shape the benefits and cost of RL
<b><i>Research question</i></b>	What is the effect of IFRS-9 impairment model on relationship banking?
<b><i>Identification strategy</i></b>	Focus on firms with all their loans being performing (~ Stage 1)
	Study the differential effect of RL on credit growth before and after IFRS 9 estimating bank-firm level regressions
<b><i>Results</i></b>	New impairment model negatively affects RL
	The effect is concentrated on ex-ante risky firms and it is higher for those experiencing a SICR

THANK YOU FOR YOUR ATTENTION



## APPENDIX

### 1. The role of Banks' capital ratio

- The level of regulatory capital does not play a significant role in shaping our results. The effect of IFRS 9 on RL is similarly present for both good and bad capitalized banks.

	<i>Proxy for RL</i>			
	<i>From the perspective of the borrower</i>		<i>From the perspective of the lender</i>	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.1030*** (0.0081)	0.1280*** (0.0055)	0.0863*** (0.0086)	0.0821*** (0.0088)
<b>RL x Post</b>	<b>-0.0156***</b> (0.0058)	<b>-0.0157**</b> (0.0067)	<b>-0.0182**</b> (0.0077)	<b>-0.0232**</b> (0.0097)
RL x Low capital	-0.0049 (0.0122)	-0.0009 (0.0082)	0.0045 (0.0103)	0.0069 (0.0110)
<b>RL x Post x Low capital</b>	<b>0.0060</b> (0.0071)	<b>0.0031</b> (0.0077)	<b>0.0019</b> (0.0091)	<b>0.0011</b> (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
Firm x Time FE	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes

Standard errors clustered at the bank-firm level

## APPENDIX

### 2. Robustness to an anticipation effect

- We find no evidence of an anticipation effect occurring in the semester immediately before the introduction of IFRS 9. The estimated coefficients are qualitatively and quantitatively similar to those of the baseline analysis.

	<i>Proxy for RL</i>			
	<i>From the perspective of the borrower</i>		<i>From the perspective of the lender</i>	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.1064*** (0.0041)	0.1348*** (0.0039)	0.0926*** (0.0090)	0.0907*** (0.0102)
<b>RL x Post</b>	<b>-0.0184***</b> (0.0036)	<b>-0.0213***</b> (0.0041)	<b>-0.0207***</b> (0.0058)	<b>-0.0272***</b> (0.0067)
RL + RL x Post	0.0880*** (0.00413)	0.113*** (0.00367)	0.0718*** (0.00940)	0.0635*** (0.00963)
Observations	2,101,783	2,101,783	2,101,783	2,101,783
R-squared	0.3942	0.3948	0.3917	0.3913
Firm x Time FE	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes

Standard errors clustered at the bank-firm level

## APPENDIX

### 3. Falsification test

- We do not observe a significant differential impact after the introduction of IFRS 9 when considering the sample of borrowers with all their outstanding loans classified as non-performing.

	<i>Proxy for RL</i>			
	<i>From the perspective of the borrower</i>		<i>From the perspective of the lender</i>	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.1965*** (0.0210)	0.2038*** (0.0211)	0.1279** (0.0511)	0.1707*** (0.0606)
<b>RL x Post</b>	<b>-0.0209</b> (0.0314)	<b>0.0024</b> (0.0327)	<b>-0.1126</b> (0.0884)	<b>-0.2463**</b> (0.0966)
RL + RL x Post	0.176*** (0.0254)	0.206*** (0.0275)	0.0153 (0.0657)	-0.0756 (0.0835)
Observations	10,266	10,266	10,266	10,266
R-squared	0.5516	0.5524	0.5413	0.5413
Firm x Time FE	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes

Standard errors clustered at the bank-firm level

## APPENDIX: THE ROLE OF FIRM'S SIZE

### 4. The role of firms' size

- The effect of RL on the growth of credit is significantly larger for microenterprises, relative to the rest of firms.

	<i>Proxy for RL from the borrower's perspective</i>			
	<i>Microenterprises</i>		<i>Rest of firms</i>	
	Main bank (1)	Main bank credit > 50 % (2)	Main bank (3)	Main bank credit > 50 % (4)
RL	0.1172*** (0.0037)	0.1367*** (0.0040)	0.0704*** (0.0062)	0.1065*** (0.0062)
<b>RL x Post</b>	<b>-0.0095**</b> (0.0039)	<b>-0.0117**</b> (0.0046)	<b>-0.0185***</b> (0.0052)	<b>-0.0203***</b> (0.0061)
RL + RL x Post	0.108*** (0.0046)	0.125*** (0.0045)	0.0518*** (0.0053)	0.0862*** (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

Standard errors clustered at the bank-firm level

## 5. Robustness to the definition of the dependent variable as the log change in credit

- Our main result remains unaltered when considering the log difference of credit as our dependent variable

	<i>Proxy for RL</i>			
	<i>From the borrower's perspective</i>		<i>From the lender's perspective</i>	
	Main bank (1)	Main bank credit > 50 % (2)	High exposure 90th percentile (3)	High exposure 95th percentile (4)
RL	0.5731*** (0.0117)	0.6454*** (0.0139)	0.6491*** (0.0201)	0.6199*** (0.0239)
<b>RL x Post</b>	<b>-0.0578***</b> (0.0125)	<b>-0.0655***</b> (0.0150)	<b>-0.0935***</b> (0.0198)	<b>-0.0959***</b> (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
R-squared	0.4155	0.4151	0.4104	0.4090
Firm x Time FE	Yes	Yes	Yes	Yes
Bank x Time FE	Yes	Yes	Yes	Yes

Standard errors clustered at the bank-firm level