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IFRS 9, banking risk and COVID-19: Evidence from Europe

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ABSTRACT

We explore whether the shift to the Expected Credit Loss model (ECL) helps Loan Loss Provisions (LLPs) anticipate future overall banking risk as compared to the Incurred Credit Loss model (ICL). Using a sample of European banks from 2015–2021, we find that ECL is more effective than ICL. We are pioneer to find evidence that stage 2 Loan Loss Allowance (LLA) is a good driver of future overall banking risk and that provisions moratoria due to the COVID-19 pandemic diminished the identified significant effect of LLPs and stage 2 LLA on banking risk, as expected.

1. Introduction

International Financial Reporting Standard (IFRS) 9, effective since 2018, has required replacing the Incurred Credit Loss model (ICL) used in International Accounting Standards (IAS) 39 by the Expected Credit Loss model (ECL) for the recognition of Loan Loss Provisions (LLP). LLP are expenses recognized in the income statement (Angklomkliew et al., 2009; Ozili and Outa, 2017) - i.e., impairment losses. In the ICL model, impairment losses could only be recognised when there was clear evidence that they already existed (Giner and Mora, 2019), so this model was catalogued as "too little, too late" (Gebhardt, 2016). However, IFRS 9 (superseding IAS 39) implies a forward-looking methodology because it recognizes not only the losses incurred but also the expected future credit losses, using a three-stage approach (EBA, 2021b). Hence, for each stage, the Loan Loss Allowance (LLA) is a contra-asset in the balance-sheet (Angklomkliew et al., 2009; Ozili and Outa, 2017), which is updated periodically in accordance with the Indications of Significant Increased Risk (SIRC) for ECL changes (Novotny-Farkas, 2016).

In the context of this recent normative change, the objective of this paper is to analyze the LLPs reported under IFRS 9 and IAS 39 as drivers of future overall banking risk, with a sample of European banks in the period 2015–2021. In addition, in the specific new context of IFRS 9, we study the disclosures of LLA by stage as drivers of future overall banking risk. Our results confirm that the ECL model is more powerful to explain future overall banking risk than ICL and that stage 2 LLA is a good driver of banking risks. However, this significant power is clearly diminished if provisions moratoria are applied to avoid volatile impairments and the subsequent negative impact on the earnings quality of a bank, as has been indeed the case because of the COVID-19 pandemic in 2020 (EBA, 2021a).

In the new IFRS 9, the LLA depends on the loans being classified into the so-called three stages. In stage 1, an ECL is recognized in relation to 12 months for productive loans (non-defaulted assets), where the credit risk has not increased. In stage 2, a lifetime ECL is recognized in the event of evidence of a significant increase in credit risk arising from the loans- it can include defaulted and non-

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defaulted assets. Finally, stage 3 includes non-performing loans (defaulted assets) and lifetime ECL, similarly to the ICL model in IAS 39 (Schutte et al., 2020).

The ECL approach conceptually leads to higher accounting quality for all firms (Onali et al., 2017), decreasing the discretionary LLP use made under IAS 39 (Pandey et al., 2022), and avoiding high levels of procyclicality in LLP, which is one of the main concerns of prudential authorities. Most research to date has focused on procyclicality effects, regarding the application IFRS 9 in relation to IAS 39 or other standards, obtaining mixed findings (Basel Committee on Banking Supervision, 2021). Buesa et al. (2019) compare the accounting standards IAS 39, IFRS 9 and US GAAP, concluding that effectively IFRS 9 is less procyclical than IAS 39, but it implies more procyclicality than US GAAP which is based on the Current Expected Credit Losses Model (CECL). This is because the latter determines expected credit losses for life at the time the loan is originated. Gaffney & McCann (2019) in a simulation study show that the provisions of IFRS 9 (as compared to the ones of IAS 39) are smoother yet with a higher correlation with the state of the economy.

Regarding the specific role of IFRS 9, research is rather limited, yet some insights have been gleaned. Pastiranová & Witzany (2022) who evaluate the dynamics of the accounting cycle from 2015 to 2020 in European banks, conclude that IFRS 9 has a procyclicality impact contrary to the expected countercyclical effect. In this sense, the COVID-19 worldwide pandemic has introduced a scenario of economic slowdown where banks have faced high uncertainty by having to analyze various risk components in bad debts in order to consider a migration stage in LLA (Stander, 2021). The final aim of the LLP and LLA disclosures in relation to the three stages of IFRS 9 is to provide detailed information on banking risk which would lead to more transparency than in the previous ICL model in IAS 39. However, when there are changes as the application of guidelines on provisions moratoria in response to a crisis (COVID-19), the analysis of this interaction is of great interest to understand banking reporting and accounting decisions, creating an opportunity to contribute to the literature.

The remainder of this paper is structured as follows. Section 2 provides information on theoretical framework and hypotheses. Section 3 provides information on the data, variables and methodology used in the empirical analysis and discusses the main results obtained. Section 4 presents the conclusions of the paper.

2. Theoretical framework and hypotheses

In banking theory, there are different types of risks inherent in risk management- e.g., credit risk, liquidity risk, market risk, country risks (see for instance Boďa and Zimková, 2021; Boussaada et al., 2022; Galletta et al., 2021; Bakry et al., 2022; Engelhardt et al., 2021, Nijskens and Wagner, 2011; Sahin et al., 2020; Gambetta et al., 2019). As part of banking risk management, it is essential to moderate excessive procyclicality in the LLPs (Olszak et al., 2017), which are specifically related to credit risk.

In this sense, López-Espinosa et al. (2021) is the first study, to our knowledge, that evaluates the LLPs of the new IFRS 9 regulation and future overall banking risk. These authors, with a worldwide sample of systemically important (SI) banks covering the period 2014–2018, conclude that the LLPs of the ECL model are more powerful to explain future banking risk than the LLPs of the ICL model. However, there is a need to check with a longer sample after the IFRS 9 implementation if these results hold. LLP are the largest items related to accruals accounting in banks' reporting (Beatty and Liao, 2014), so they have a significant impact on variability in banks' accruals and risk. Also, a higher degree of managerial judgment is needed in the modeling process of the ECL approach (ESRB, 2017), which may result in discretion and opportunistic behavior with a final impact on overall banking risk, especially when considering a longer period of IFRS 9 application.

Based on this framework, we put forward the following hypothesis:

H1: The use of the ECL required by IFRS 9 and the amount of LLP are positive drivers of future overall banking risk.

With H1 we aim to evidence that LLPs are significant drivers for future banking risk for IFRS 9 and IAS 39 (e.g., Badia et al., 2019) and that the ECL model helps also to this end proving the superiority of IFRS 9 (López-Espinosa et al., 2021).

On the other hand, Loan Loss Allowances are crucial components of banking activities, as they mitigate credit risk and ensure the liquidity of the financial institution in case of defaults (Beck and Narayanamoorthy, 2013). Additionally, the implementation of the IFRS 9 accounting standard has introduced a three-stage accounting model for loan losses, where information on loans in Stages 1 and 2 is particularly relevant due to its influence on the provision of loans (Gaffney et al., 2018).

Consequently, the information content of Stage 2 is especially important, as it identifies significant increases in the credit risk of loans that are not in default and reserves for expected losses over the entire life of the asset, as the probability of future default increases (Gebhardt et al., 2016) . Information on LLA for stage 1 and 3 can be expected to be non-significant as it is mostly an indicator of new lending (for stage 1, and not necessarily more credit risk) or it confirms the fact that the market has already discounted the information (for stage 3, as the loans are already defaulted). On the contrary, one may expect that information on stage 2 LLA should be very relevant to anticipate future banking risk as it is signaling that loans have deteriorated (from "good loans" to "bad loans").

H2: The new information regarding the LLA stages are positive drivers of future overall banking risk.

In addition, we also investigate the effect of the application of the guidelines on provisions moratoria because of the COVID-19 crisis. To provide more details on this topic, it is important to highlight that the moratorium provides a period of time in which payments can be suspended, postponed or reduced, which may affect credit risk of the loans having an impact on LLA and LLP's informational power. Note also that the moratorium covers only a limited period of time, in which the situation is exceptionally difficult- as in the pandemic. The prospective effect of the information on LLA stages could be affected by lower provisioning

Table 1
Sampling procedure and number of banks per country.

Panel A Sample selection								
					Subtracted		Remaining Banks	
List of reporting institutions							110	
Less institutions that are not the group mother company					25		80	
Less institutions with missing data					21		64	
Panel B Banks per country								
Country	n	Country	n	Country	n		County	n
Austria	4	France	4	Italy	9		Portugal	1
Belgium	3	Germany	8	Luxembourg	1		Spain	6
Denmark	5	Greece	3	Netherlands	4		Sweden	5
Finland	3	Ireland	3	Norway	5			
Total Banks								**64**
Total Countries								**15**

requirements due to moratoria in times of a sudden economic crisis such as the one derived from the COVID-19 pandemic. In this sense, bank regulators softened the cliff effects of the pandemic with a moratorium stating that if specific requirements are met, this situation should not be considered a trigger for a significant increase in risk (EBA, 2021a). Therefore, one may expect that future risk explanatory power of the new information disclosed because of the new ECL model (i.e., LLP and LLA) is reduced, as in 2021 the economic situation had improved as compared to that of the end of 2020.

H3: Provisions moratoria because of COVID-19 diminish the explanatory power of LLP or LLA regarding future overall banking risk.

3. Materials, methods and results

3.1. Sample selection and data source

Our sample covers the banks in the list of institutions with a reporting obligation for the purpose of the 2021 EU supervisory benchmarking exercise[1] (EBA, 2022). This list includes most of the significant banks that are under the direct supervision of the European Central Bank (ECB), covering more than 80% of total assets of the banking sector in the European Union. After eliminating banks which are not the mother company or have missing data, our sample includes 64 listed banks from 15 countries (Table 1), for the period between 2015 and 2021. The financial data of the banks were obtained from the Thomson Reuters' financial database (Eikon). LLA values at different stages were obtained from the Bank-Focus database and hand-collected from annual reports.

3.2. Definition of variables

Our dependent variable is future overall banking risk $Total\_Risk_{i,y+1}$ (Haq and Heaney, 2012), calculated as the yearly standard deviation of the daily stock returns after the closing of each fiscal year, where overall banking risk is defined as:

$$Total\_Risk_{i,y} = \sqrt{\frac{1}{n}\sum_{d=1}^{n}\left(R_{i,d} - R_{i,y}\right)^2}$$

Where $Total\_Risk_{i,y}$ is the annualized standard deviation of daily bank returns in the year y for bank i, $R_{i,d}$ is the return of bank i in day d of year y, $R_{i,y}$ is the average of returns of bank i in the year y and n is the number of trading days in year y.

The independent variables *LLP, LLA, ECL,* and *Year2020* are essential for our study. *LLP* is the annual loan loss provisions divided by total gross loans. *ECL* is a dummy variable, which equals 1 if the amount of LLPs is reported in that year in accordance with IFRS 9- note that 2018 is the first reporting year that IFRS 9 required use of ECL, whereas before that year IAS 39 required use of the ICL. *Year 2020* is a dummy that we use to consider the effect of moratorium and government support, considering the massive government protection measures put into place to isolate banks and their debtors from the effects of the deep recession. These moratoria isolated banks' balance sheets and stock prices from the true effects of the recession caused by the COVID-19 pandemic in 2020. *LLA* is considered with variables *stage 1, stage 2,* and *stage 3*, defined as the annual loan loss allowance in each of the stages divided by total gross loans.

Several factors can affect the overall bank risk proxied in our case by stock volatility of banks (*Total_Risk*). In our case, we pay special attention to the credit risk proxied by *LLP* and *LLA*. However, there are more components in overall banking risk, so we need to control for the Loan-to-deposit (*LTD*), market risk (*Market_Risk*), and the volatility of the country stock market index (*Volatility_Country*). To measure *LTD*, we use the loan-to-deposit (LTD) ratio, which is a proxy of funding strategy in the banking sector and sometimes is also considered an indicator of liquidity risk (Boďa and Zimková, 2021; Boussaada et al., 2022; Galletta et al., 2021).

[1] https://www.eba.europa.eu/eba-updates-list-institutions-involved-2022-supervisory-benchmarking-exercise

Table 2
Variable definitions.

Variable	Description	Source
Dependent variable (measure of bank risk)		
$Total\_Risk_{y+1}$	Calculated as the yearly standard deviation of the daily stock returns (in percentage) in the year following the close of each fiscal year.	Computed from Eikon
Independent variables		
LLP	Annual loan loss provisions divided by total gross loans*100 (i.e., in percentage).	Computed from Eikon
ECL	Dummy variable which equals 1 if the amount of LLPs are reported in that year in accordance with IFRS9.	Hand-collected from Annual financial report.
Stage1	LLA of the stage 1 divided by total gross loans, at year-end *100 (i.e., in percentage).	BankFocus and Hand-collected
Stage2	LLA of the stage 2 divided by total gross loan, at year-end*100 (i.e., in percentage).	BankFocus and Hand-collected
Stage3	LLA of the stage 3 divided by total gross loans, at year-end*100 (i.e., in percentage).	BankFocus and Hand-collected
Year2020	Dummy variable corresponding to the year 2020- i.e., moratorium year.	
Control Variables		
Bank-specific control variables		
Size	Logarithm of the equity market value at year-end.	Computed from Eikon
BM	Defined as book value of equity in relation to market value of equity at the end of the fiscal year. *100 (i.e., in percentage).	Computed from Eikon
Past_Return	Average daily stock return for a year prior to the fiscal year.	Computed from Eikon
Net Interest Income	Net interest income in relation to total assets *100 (i.e., in percentage).	Computed from Eikon
IncomeVolatility	Standard deviation of ROA over the last five years.	Computed from Eikon
Loans	Amount of loans divided by total assets *100 (i.e., in percentage).	Computed from Eikon
Common Equity	Common equity divided by total assets*100 (i.e., in percentage).	Computed from Eikon
LTD	Loan-to-deposit (LTD) ratio at the end of the year *100 (i.e., in percentage).	Computed from Eikon
Market_Risk	Beta coefficient at the end of the year- i.e., sensitivity of a bank's performance in relation to overall market volatility.	Computed from Eikon
Country-specific control variables		
Volatility_Country	Volatility percentage of the stock markets by country at the end of each fiscal year. (i.e., in percentage).	Computed from Eikon
Δ CDS	Variation of the daily average for one year of the 5-year CDS index by country *100 (i.e., in percentage).	Computed from Eikon
Δ GDP	Change in GDP at the end of the year*100 (i.e., in percentage).	Computed from Eurostat

Country_Volatility is defined as the stock market's volatility per country (Bakry et al., 2022; Engelhardt et al., 2021). Additionally, we control for the sensitivity of a bank's performance in relation to overall market volatility, represented by each bank's beta coefficient, *Market_Risk* (Nijskens and Wagner, 2011; Sahin et al., 2020), and for country credit risk with Δ_CDS- defined as the variation of the daily average for one year of the 5-year CDS index by country (Ballester et al., 2021). Also, some additional variables of control have been taken into account in line with existing research and their definitions can be found in Table 2, together with the rest of variables used in our study.

3.3. Empirical models

The model presented by Eq. (1) is our base model for H1, analyzing LLPs of IFRS 9 and IAS 39 as drivers of future banking risk (Badia et al., 2019; López-Espinosa et al., 2021). Eq. 2 presents a variation of the base model, considering LLP of IFRS 9 in the period of EBA's moratoria (H3). In response to the COVID-19 pandemic, the EBA issued guidelines for general payment moratoria conditions to mitigate the economic impact of the pandemic. We consider the year 2020 because the guidelines were issued and approved for application in March 2020 to be applied during a limited period -i.e., until March 2021 (EBA, 2020).

$$\begin{aligned} &Total\_Risk_{y+1} \\ &= \beta_0 + \beta_1 LLP_y \times ECL_y \; + \; \beta_2 \, LLP_y + \beta_3 ECL_y \\ &+ \beta_4 \Delta CDS_y + \beta Controls_y \; + \beta Fixed \; \text{Effects} + \varepsilon_y \end{aligned} \tag{1}$$

$$\begin{aligned} &Total\_Risk_{y+1} \\ &= \beta_0 + \beta_1 LLP_y \; \times ECL_y \; \times Year2020 + \beta_2 \, LLP_y \times ECL_y + \beta_3 \, LLP_y \\ &+ \beta_4 ECL_y + \; \beta_5 \Delta CDS_y + \beta_6 \; \Delta CDS_y \times Year2020 + \\ &+ \beta Controls_y + \beta Fixed \; Effects + \varepsilon_y \end{aligned} \tag{2}$$

For assessing the new LLA disclosures as drivers of future banking risks, we estimate the following regressions, with a base model (Eq. 3, H2) and a variation including the effect of the 2020 EBA's moratorium tested by H3 (Eq. 4):

$$\begin{aligned} &Total\_Risk_{y+1} = \\ &\beta_0 + \beta_1 \; Stage1_y + \beta_2 \; Stage2_y + \beta_3 \; Stage3_y + \beta_4 \;\; \Delta\_CDS_y \\ &+ \beta Controls_y + \beta Fixed \; Effects + \varepsilon_y \end{aligned} \tag{3}$$

Table 3
Descriptive statistics.

Variable	Mean	Std.Dev.	Min	Max
$Total\_Risk_{y+1}$	2.241	1.129	0.859	6.893
LLP	0.590	1.145	-3.617	11.036
Stage1	0.184	0.189	0.001	0.922
Stage2	0.304	0.311	0.001	1.578
Stage3	2.498	4.236	0.008	25.788
Size	22.196	1.581	16.881	25.196
BM	82.098	79.981	-108.03	730.831
Past_Return	-0.017	0.172	-1.699	0.625
Net_Interest_Income	1.639	0.733	0.367	5.277
Income_Volatility	0.501	0.759	0.008	5.729
Loans	57.650	14.279	4.845	86.530
Common Equity	7.551	3.056	1.652	16.806
LTD	79.074	32.273	12.514	277.149
Market_Risk	1.340	0.454	0.186	2.957
Volatility_Country	19.688	6.467	7.421	45.472
Δ_CDS	-9.692	24.317	-99.547	45.220
Δ_GDP	1.818	4.173	-10.800	25.200

$$\begin{aligned} Total\_Risk_{y+1} &= \beta_0 + \beta_1 Stage1_y + \beta_2\ Stage2_y + \beta_3\ Stage3y + \ \beta_4\ \Delta\_CDS_y \\ &+\beta_5 Stage1_y \times Year2020 + \beta_6\ Stage2_y\ \times Year2020 \\ &+\beta_7\ Stage3_y \times Year2020 + \beta_8\ \Delta\_CDS_y \times Year2020 \\ &+ \beta Controls_y + \beta Fixed\ Effects + \varepsilon_y \end{aligned} \tag{4}$$

3.4. Methods

After performing the Hausman test which analyzes the correlation between the independent variables with the error term (Hausman, 1978), with p-value lower than 0.05, a fixed-effects panel data regression was run for each model. The variance inflation factors (VIFs) confirm the absence of multicollinearity in our dataset (always below 10).

3.5. Empirical results and analysis

3.5.1. Descriptive statistics and Pearson correlation

The descriptive statistics and the Pearson's correlations of the studied variables are indicated in Tables 3 and 4 respectively.

3.6. Results of the regression

3.6.1. Loan loss provision and future banking risk

Regarding the LLPs of IFRS 9 and IAS 39 as drivers of future banking risk, results are shown in Table 5 column (1) for the base model (Eq. 1). We find that the interaction between LLP*ECL is positive and significant at 5%. This finding suggests that with the entry into force of IFRS 9, the application of ECL provides LLPs that significantly anticipate better future overall banking risk, so we can accept H1- i.e., the use of the ECL required by IFRS 9 and the amount of LLP are positive drivers of future overall banking risk.

We also go a step forward and examine the effects of economic contraction EBA's moratoria guidance because of COVID-19 (EBA, 2020-i.e., H3), as shown in Table 5 column (2) (Eq. 2). The variable LLP*ECL*Year2020 is negative and significant at 5%, suggesting that the moderating effect of the 2020 moratorium reduces the explanatory power of the ECL (positive in Eq. 1 and Eq. 2). However, note that the ΔCDS*Year2020 is non-significant, so we can assume that the moratoria do not affect the type of country risk prediction proxied by ΔCDS.

Regarding the control variables, we find the ΔCDS as credit risk indicator is positive and significant at 10% (Oberson, 2021). *Loans* and *Market_risk* are positive and significant at the 1% level. Loans are generally perceived as risky elements. The greater the amount of loans lending, the higher the exposure of banks in relation to the overall risk, which is consistent with other authors (Misman and Bhatti, 2020; Zarei et al., 2019). *Market_risk* captures the variability of a stock's profitability in relation to the average profitability of the market and as it increases, so does the exposure to overall risk (Sahin et al., 2020).

3.6.2. Loan loss allowance by stages and future overall banking risk

Next, we analyze the behavior of LLA stages as drivers of future overall banking risk for the period 2018–2021. The results are shown in Table 6 column (3) according to our base model (Eq. 3).

As expected, the coefficient for stage 2 is positive and significant at the 1%, whereas for stage 1 and stage 3 coefficients are not significant. Therefore, as regards H2, we can accept that the LLA information related to stage 2 is valuable to anticipate future overall banking risk.

Stage 1 refers to the LLA related to 12-month ECLs of financial assets whose credit risk has not increased since initial recognition,

Table 4
Pearson correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$Total\_Risk_{y+1}$	1															
LLP	0.45***	1.00														
Stage1	0.11	0.28***	1.00													
Stage2	0.23***	0.40***	0.73***	1.00												
Stage3	0.44***	0.43***	0.35***	0.50***	1.00											
Δ_CDS	0.09	-0.06	-0.02	-0.08	-0.07	1.00										
Size	-0.25***	-0.25***	-0.13**	-0.19***	-0.41***	-0.01	1.00									
BM	-0.25***	-0.26***	-0.08	-0.27***	-0.28***	0.04	0.23	1.00								
Past_Return	-0.40***	-0.19***	0.05	-0.01	-0.06	-0.13**	0.11***	0.18***	1.00							
Net_Interest_Income	0.05	0.18***	0.34***	0.34***	0.24***	-0.01	-0.23**	0.02	0.04	1.00						
Income_Volatility	0.37***	0.38***	0.39***	0.44***	0.42***	-0.06***	-0.32***	-0.14***	-0.27***	0.40***	1.00					
Loans	0.03	-0.01	-0.27***	-0.18***	-0.04	0.05	-0.29***	-0.39***	-0.04	0.17***	0.04	1.00				
Δ_GDP	0.06	-0.09*	-0.01	-0.01	-0.05***	-0.23***	0.07***	0.11**	-0.12	0.14***	0.09*	0.04	1.00			
Common Equity	0.10*	0.15***	0.37***	0.40***	0.29	-0.03	-0.26	0.04	-0.02**	0.72***	0.43***	0.11**	0.14***	1.00		
LTD	-0.11**	-0.11**	-0.20***	-0.20***	-0.13	-0.03	0.06***	0.15	0.09*	0.37***	0.03	0.03	0.05	0.14***	1.00	
Market_Risk	0.60***	0.52***	0.25***	0.44***	0.52	0.08	-0.03	-0.32	-0.25***	0.12**	0.33***	-0.16***	-0.08*	0.08	-0.10**	1.00
Volatility_Country	0.20***	0.38***	0.01**	0.17**	0.05	0.06	-0.04	-0.03	-0.23***	-0.15***	0.17***	-0.12**	-0.23***	-0.11**	-0.05	0.25***

Notes: Significance level at.
*** 1%,.
** 5%,.
* 10%.

Table 5
Future overall banking risk and loan loss provision.

Dependent Variable: Total_Risk$_{y+1}$	Base Model (1)	Variation model considering year 2020 (moratorium for COVID-19) (2)
LLP*ECL*Year2020		-0.3118**
LLP*ECL	0.4216**	0.5253**
LLP	0.0738	0.1573
ECL	0.1869	0.2535
Δ_CDS	0.0067*	0.0074*
Δ_CDS* Year2020		-0.0126
Size	0.4130	0.3471
BM	-0.0043	-0.0015
Past_return	-0.7855	-0.7686
Net Interest Income	-0.0057	-0.0056
Return Volatility	0.0867	-0.0113
Loans	0.0927***	0.0920***
Net Common Equity	-0.2690	-0.2464
LTD	-0.00026	-0.0003
Market_risk	1.4793***	1.3929***
Volatility_Country	-0.0774	-0.0742
Δ_GDP	0.0116	-0.0021
Time Fixed Effects	Yes	Yes
Adj.-R2	0.60	0.61
Prob>*F*	0.00	0.00
N	448	448

Notes: Significance level at.
*** 1%.
** 5%.
* 10%.

Table 6
Total risk and loan loss allowances.

Dependent Variable: Total_Risk$_{y+1}$	Base Model (3)	Variation model considering year 2020 (moratorium for COVID-19) (4)
Stage1	0.8880	-1.1873
Stage2	2.3519***	6.0972**
Stage3	-0.2628	-0.1448
Δ_CDS	0.0185***	0.0186***
Stage1* Year2020		-0.3432
Stage2* Year2020		-3.4243*
Stage3* Year2020		0.2836
Δ_CDS * Year2020		-0.0102
Size	0.6195*	0.4458
BM	-0.0105*	-0.0041
Past_return	-1.7936***	-2.2783***
Net Interest Income	-0.0042	-0.0011
Return Volatility	0.3726	0.2628
Loans	0.1317***	0.1463***
Net Common Equity	-0.0010	-0.0038
LTD	-0.0091	-0.0104
Market_risk	2.1618***	2.0630***
Volatility_Country	-2.8055	-2.1677
Δ_GDP	-0.0697	-0.0722**
Time Fixed Effects	Yes	Yes
Adj.-R2	0.88	0.90
Prob>*F*	0.00	0.00
N	256	256

Notes: Significance level at.
*** 1%.
** 5%.
* 10%.

and our empirical results indicate that this stage is not significant to explain future risks. However, our findings indicate that Stage 2 has significant explanatory power regarding future overall banking risks, as it refers to loans with significant increases in credit risk. Finally, the allowance for stage 3 is similar to the allowance in the IAS 39 model and this stage would start when the loan has already deteriorated so risks should have been discounted previously, which explains why it is not significant in our model.

Table 7
CDS credit risk and loan loss provision.

Dependent Variable: *CDS_Risk*	Base Model (1.2)	Variation model considering year 2020 (moratorium for COVID-19) (2.2)
LLP*ECL*Year2020		-1.6650*
LLP*ECL	1.7391**	2.1933**
LLP	0.2853	-0.9724
ECL	0.6990	-0.4427
Δ_CDS	0.0258*	0.0278**
Δ_CDS* Year2020		-0.0651
Size	0.5052	2.7646*
BM	-0.0826	-0.0075
Past_return	-5.5932**	-2.2866
Net Interest Income	-0.0063	-0.0262
Return Volatility	-0.7872	4.3689
Loans	0.2523*	0.1174**
Net Common Equity	-0.1881	-0.4670
LTD	-0.0033***	-0.0020
Market_risk	2.7456*	2.5211
Volatility_Country	0.3333	0.1725*
Δ_GDP	-0.0178	-0.2546
Time Fixed Effects	Yes	Yes
Adj.-R2	0.42	0.30
Prob>*F*	0.00	0.00
N	448	448

Notes: Significance level at.
*** 1%.
** 5%.
* 10%.

Table 8
CDS credit risk and loan loss allowances.

Dependent Variable: *CDS_Risk*	Base Model (3.2)	Variation model considering year 2020 (moratoria for COVID-19) (4.2)
Stage1	2.8506	-3.2173
Stage2	7.9493**	8.3069**
Stage3	1.0554	-0.6495
Δ_CDS	0.0101**	0.0162*
Stage1* Year2020		-1.0581
Stage2* Year2020		-1.1786
Stage3* Year2020		2.3425
Δ_CDS * Year2020		-0.0110
Size	5.0824**	6.9326**
BM	-0.0415*	-0.0603***
Past_return	-6.5578	-2.3586
Net Interest Income	-0.0181	-0.0120
Return Volatility	6.3402	7.1621
Loans	0.1789**	0.2798
Net Common Equity	-0.1029	-0.0993
LTD	-0.0948	-0.1028**
Market_risk	6.5274***	3.3780**
Volatility_Country	0.2968	0.2751
Δ_GDP	-0.4235	-0.3129
Time Fixed Effects	yes	Yes
Adj.-R2	0.53	0.56
Prob>*F*	0.00	0.00
N	256	256

Notes: Significance level at.
*** 1%.
** 5%.
* 10%.

In Table 6 column (4), we indicate the results for the model in Eq. (4). We include now in the model the moderating effect of the moratorium in relation to the stages LLA. The results of this model ratify the ones obtained in the model of Eq. (3) and again find that the moratorium diminish the significant effect as posited by H3. In fact, the coefficient for the interaction stage 2*year2020 is negative and significant (at 10%). The moderating effect of the year 2020 because of the COVID-19 provision moratorium (Eq. 4), is in line with

Table 9
Non-performing loans and loan loss provision.

Dependent Variable:NPL_{t+1}	Base Model (1.3)	Variation model considering year 2020 (moratorium for COVID-19) (2.3)
LLP*ECL*Year2020		-5.8521***
LLP*ECL	0.1581**	3.5165***
LLP	-0.6038	0.7502
ECL	0.0004	-0.0053
Δ_CDS	0.0014	-0.0074
Δ_CDS* Year2020		0.0378
Size	0.0067	-0.0074
BM	-0.0157	0.0086
Past_return	-0.0226*	-0.0377**
Net Interest Income	0.0130	0.0083
Return Volatility	0.0375	0.0243
Loans	0.0167	-0.0536
Net Common Equity	-0.2481	-0.1900
Volatility_Country	0.0772	0.0879
Δ_GDP	0.1994	0.0116
Time Fixed Effects	Yes	Yes
Adj.-R2	0.23	0.57
Prob>*F*	0.00	0.00
N	448	448

the results of Eq. 2 where LLP*ECL*Year2020 was found negatively significant.

Regarding the control variables, Table 6 shows, as in previous models (Eq. 1 and Eq. (2), Table 5), that *Δ_CDS, Loans* and *Market_risk* are positive and significant (Eq. (3) and Eq. (4)), but we also find some other variables significant. In model 3, *size* turns significant at 10% suggesting that, in general, even though larger banks have greater capacity to diversify their risk, they may also face higher risks due to their size and complexity (Balasubramnian et al., 2019). *Book-to-market* and *past return* are significant in line with (López-Espinosa et al., 2021) in model 3, whereas in model 4 are significant *past return* also, and *Δ_GDP* (which is consistent with Dong and Oberson, 2022; López-Espinosa et al., 2021).

Based on our empirical evidence, conclusions can be drawn in the sense that stage 2 LLA is a significant driver of future banking risk. However, in periods of provision moratoria because of a sudden economic contraction such as COVID-19, its explanatory power diminishes.

Once more, our findings are in line with our expectations as an increase in stage 1 loans is not necessarily a driver of an increase in future overall banking risk given that stage 1 loans are loans that are not at risk of immediate or future default. LLA are precautionary measures considering past experience. Hence, an increase in stage 1 LLA simply means a material increase in new lending. An increase in stage 3 LLA means migration from stage 2 to the worst-case scenario, for which the bank usually has already set aside enough cushion so as no critical effects on the profit and loss are expected to compromise the bank's capital position. On the contrary, an increase in stage 2 LLA means that "good loans" migrate to "bad loan" positions. This is in fact an effective indicator of future bank losses and, therefore, risk.

3.6.3. Robustness analyses

Several robustness analyses have been carried out, as explained below. They are all consistent with the findings already discussed in the previous section.

3.6.3.1. Credit default swaps CDS. In this subsection, we replicate the models with an alternative measure of future overall banking risk. For this purpose, we take Credit Default Swaps (CDS) for each bank as a measure of banking risk (*CDS_Risk*) which is now the dependent variable in the regressions. Following Oberson (2021), we consider the variation of the daily average for one year of the 5-year CDS index by bank. The results of the tests are presented in Tables 7 and 8.

We analyze the results obtained in Table 7 next. The results of our base model (1.2) are consistent with those obtained in Table 5 (model 1). The interaction between LLP*ECL is positive and significant at 5%, suggesting that the IFRS 9 LLPs capture banking credit risks better than the IAS 39 LLPs. When we examine the effect of moratoria guidelines during the COVID-19 pandemic, we find that the interaction of LLP*ECL*Year2020 is negative and significant at 10%. This result is in line with what we obtained in our model 2 (Table 5), indicating that the effect of the moratoria application in 2020 reduces the power of ECL estimates in LLP as capturers of banking credit risk. Our results are consistent with EBA (2021a), which indicates that the adoption of measures and support for banks during the peak of the COVID-19 pandemic delayed loan impairment provisions.

On the other hand, we have evaluated the stages of Loan Loss Allowance in Table 8. In our base model (3.2), the coefficient of stage 2 is positive and significant at 5%, while the coefficients of stage 1 and stage 3 are not significant. This is in line with our results from model 3 (Table 6), indicating that stage 2 LLA captures credit risks at the banking level. Contrary to model 4 (Table 6), no significant effects of the COVID-19 moratoria is found for stage 2 in model 4.2 (Table 8).

3.6.3.2. Non-performing loans NPL. Since ECL, LLP and LLA could be argued to be mostly associated with credit risk and maybe not so

Table 10
Non-performing loans and loan loss allowances.

Dependent Variable: NPL_{t+1}	Base Model (3.3)	Variation model considering year 2020 (moratorium for COVID-19) (4.3)
Stage1	1.8625	3.5661
Stage2	1.4583**	6.8344**
Stage3	1.1338***	1.0249***
Δ_CDS	0.0168**	0.0159
Stage1* Year2020		0.0911
Stage2* Year2020		-4.4536**
Stage3* Year2020		-0.5799*
Δ_CDS * Year2020		-0.0193
Size	0.3272	0.3800
BM	1.6055	0.0142
Past_return	0.5098	1.0918
Net Interest Income	-0.2840	-0.2813
Return Volatility	0.9221	0.8611
Loans	-6.5616	-6.7666
Net Common Equity	-0.2273	-0.0350
Volatility_Country	-0.0893	-0.0588
Δ_GDP	-0.0915	-0.0471
Time Fixed Effects	Yes	Yes
Adj.-R2	0.68	0.71
Prob>*F*	0.00	0.00
N	256	256

Table 11
Total risk and loan loss provision.

Dependent Variable: $Total\_Risk_{y+1}$	Base Model (1.4)	Variation model considering year 2020 (moratorium for COVID-19) (2.4)
LLP*ECL*Year2020		-7.8167**
LLP*ECL	3.8648**	3.6149**
LLP	1.9471	-6.5290
ECL	0.0296	0.0361
Δ_CDS	0.0464	0.0975*
Δ_CDS* Year2020		-0.2534***
Size	0.0385	0.0714
BM	0.0022	-0.0383
Past_return	-0.1759**	-0.1192
Net Interest Income	0.0339	0.0626
Return Volatility	-0.1301***	-0.1317***
Loans	1.0981**	1.4590**
Net Common Equity	0.6705	-1.8833
LCR_Liquidity_risk	0.0057	0.0011
Market_risk	0.1375***	0.1315***
Volatility_Country	-0.0031	-0.0032
Δ_GDP	0.3258	0.3375
Time Fixed Effects	Yes	Yes
Adj.-R2	0.77	0.79
Prob>*F*	0.00	0.00
N	448	448

much to future overall banking risk, we also perform a robustness check using non-performing loans (NPLs) as the dependent variable in our reference models. Given that NPL is a measure of credit risk (Acheampong and Elshandidy, 2021) and not overall banking risk, we eliminate from the reference models the control variables LTD and market-risk.

The results shown in Tables 9 and 10 remain consistent with our previous findings, thereby confirming that the main conclusions that can be drawn from the study remain unchanged- i.e., ECL is more effective than ICL to explain credit risk, stage 2 LLA is a good driver of credit risk and that provisions moratoria due to the COVID-19 pandemic diminish the identified significant effect of LLPs and stage 2 LLA on credit risk. In addition, in this particular robustness test for credit risk, stage 3 LLA is also found significant with the COVID-19 pandemic also diminishing stage 3 LLA significant explanatory power towards credit risk. The interpretation is that with NPL as dependent variable in the models, we explain credit risk so the stock of provisions for already defaulted loans is a very informative variable, as could be expected, since we are changing the focus from future overall banking risk to specifically credit risk.

3.6.3.3. Total banking risk. In this subsection, we consider the Liquidity Coverage Ratio *LCR* to control for short-term liquidity risk. This ratio was implemented in the Basel III framework (Van den End, 2016; EBA 2019), and we use it in the reference models instead of

Table 12
Total risk and loan loss allowances.

Dependent Variable: Total_Risk$_{y+1}$	Base Model (3.4)	Variation model considering year 2020 (moratorium for COVID-19) (4.4)
Stage1	4.1044	0.8197
Stage2	7.7362*	1.6799**
Stage3	-0.4541	-0.6609
Δ_CDS	0.0185***	0.0223***
Stage1* Year2020		0.2936
Stage2* Year2020		-0.9285**
Stage3* Year2020		0.3176
Δ_CDS * Year2020		-0.0276**
Size	0.0764***	0.8968***
BM	-0.0156**	-0.0148*
Past_return	-0.0198***	-1.8071***
Net Interest Income	0.0012	0.0106
Return Volatility	0.0145	0.1867
Loans	0.1986***	2.4147***
Net Common Equity	0.2314	0.1623
LCR_Liquidity_risk	0.0277**	0.0321**
Market_risk	1.3175***	1.3564***
Volatility_Country	-0.1183	-0.0607
Δ_GDP	-0.0682	-0.0185
Time Fixed Effects	yes	Yes
Adj.-R2	0.96	0.97
Prob>*F*	0.00	0.00
N	256	256

the LTD ratio.

Our findings, presented in Tables 11 and 12, are similar to those obtained in our reference models. In other words, we evidence the relevance of the ECL model and stage 2 LLA diminished by the COVID19 moratoria. Furthermore, liquidity risk, represented by the *LCR* ratio, is also a positive and significant driver in the variation model considering the LLA information, with and without consideration of the year 2020 (moratorium for COVID-19)- base models 3.4 and 4.4.

4. Conclusions

This article expands the literature on the role of LLPs, LLA and bank risk. We evidence that the introduction of IFRS 9 has led to an improvement in the LLP anticipation of future overall banking credit risk, and we are pioneer to find evidence that stage 2 LLA is a significant driver, which can help reduce the procyclical effect of IAS 39. Secondly, our study demonstrates that provisions moratoria diminish the significant power of these drivers. In 2020, EBA's moratoria guidelines were applied to avoid volatile impairments and the subsequent negative impact on the earnings quality, as difficulties were encountered by banks to determine SIRC increases in the COVID-19 period. Consequently, the amounts of the stages were affected therefore limiting the impact of the ECL in the LLPs, according to EBA (2021a), yet with credit risk parameters to calculate LLPs stable during the COVID-19 period, according to Engelmann & Nguyen (2022).

Our results have practical implications for accounting regulators and banking supervisors, as we find confirmation of the superiority of IFRS 9 as compared to IAS 39 in terms of anticipation of future overall banking risks, not only bearing in mind the information on LLP but also because of the new disclosures of stage 2 LLA. The information Loan Loss Provision and Loan Loss Allowances is crucial to understanding the level of risk of financial institutions.

Last but not least, our study shows room for improvement in the wording of standards and guidance. Regulators should be encouraged to clarify terminology matters using always the same wording to refer to the income statement item (for instance, loan loss provision or LLP, as in our study and other previous literature) and the contra-asset (Loan Loss Allowance LLA in our study), since we have detected that sometimes they are used in a non-consistent manner (e.g., EBA, 2021a).

CRediT authorship contribution statement

Yadira Salazar: Conceptualization, Data curation, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Paloma Merello:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Funding acquisition. **Ana Zorio-Grima:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors report there are no competing interests to declare.

Data availability

The authors do not have permission to share data.

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