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Same same but different: credit risk provisioning under IFRS 9

7th Workshop of ESCB Research Cluster 3,

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* The views expressed are those of the authors and do not necessarily reflect the views of the ECB or the Eurosystem.

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Motivation

- Adequate and timely provisioning of credit risk is key for banks: it ensures they can withstand shocks and makes ‘hidden’ balance sheet risks transparent for investors and supervisors
- Provisioning practices and their implications are prominently discussed since the pandemic:
  - Possible procyclicality vs adequacy of credit risk management (e.g., ECB 2020, Enria 2021, 2022)
  - **Question:** are banks adequately provisioned against further possible shocks?
- Longer standing debate and substantial revision of standards since financial crisis of 2007-09:
  - Introduction of expected credit loss accounting to increase transparency and tackle “too little, too late”
  - **Question:** how did the introduction of IFRS 9 affect banks’ provisioning practices?

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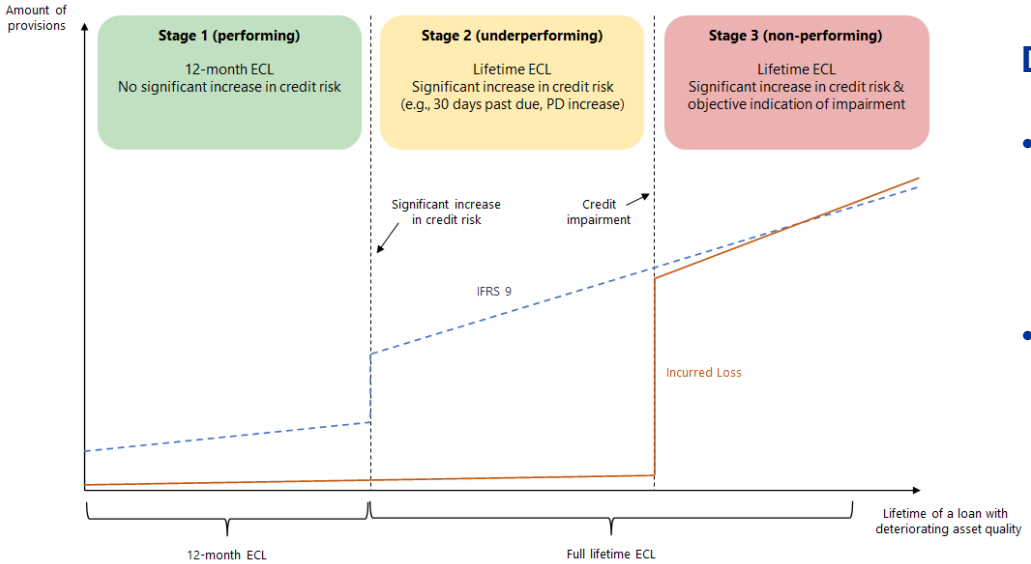
Overview of IFRS 9 – provisions based on estimated future credit losses

Aim: recognise potential losses earlier in the life of a loan, to avoid sizable jumps in provisioning at default



Discussion on possible side effects:

- Cliff effects and possible procyclicality if many exposures moved to Stage 2 soon after shock
  - Capital erosion may induce banks to constrain loans
- Reliance on internal provisioning models may enhance discretion and induce heterogeneity

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What this paper does

- Assess the performance of IFRS 9 in period since 2018 (characterised by pandemic and war)
- Use granular loan-level data from AnaCredit (with up to 30 million observations)
  - Compare dynamics of IFRS 9 to those of national Generally Accepted Accounting Principles (nGAAP)
  - Examine differences between well- and less-capitalised banks (‘capital management’ practices?)
- Use granular set of fixed effects & control variables to capture firm, bank & loan heterogeneity
  - Compare provisioning for loans to same firm in same period to systematically control for borrower risk

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Results

(i) determinants of provisioning in full sample

(ii) dynamics around default events

(iii) dynamics around macroeconomic shocks

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Determinants of provisioning in the full sample

Accounting standards and bank capital affect provisioning

Determinants of loan-level provisioning:

$$\text{Prov}_{b,f,t} = \alpha_{f,t} + \beta X_{b,f,t-1} + \gamma Z_{b,t-1} + \epsilon_{b,f,t}, \quad \text{with f the firm, b the bank, t the quarter}$$

- Provisioning ratios under IFRS 9 generally higher for similar types of loans to the same firm (~0.5 PP)
- Better capitalised banks provision more, consistent with capital management motives (1 S.D. → ~0.5 PP)

Model:	All (1)	IFRS 9 (2)	nGAAP (3)
Variables			
nGAAP	-0.5287*		
	(0.2885)		
CAP HEAD	0.0815***	0.0836***	0.0703**
	(0.0240)	(0.0296)	(0.0319)
Fixed effects			
Firm-Quarter	Yes	Yes	Yes
Fit statistics			
Observations	30,001,022	24,699,885	3,912,655
R^2	0.78063	0.79438	0.65817
Within R^2	0.01217	0.01589	0.00612

Clustered (Firm-Quarter & Bank) standard errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

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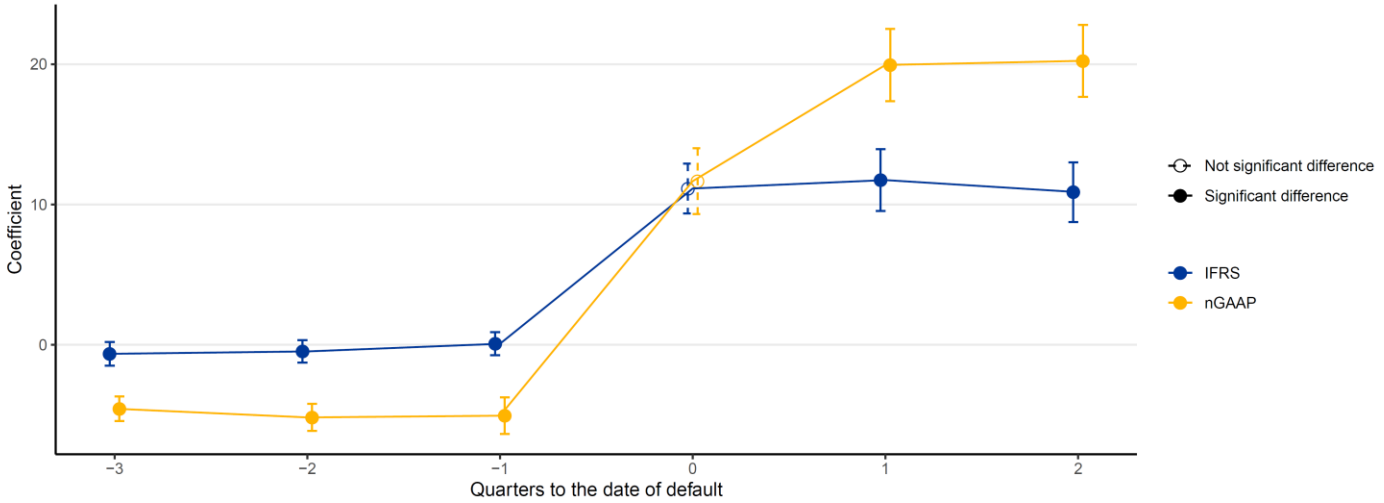
Dynamics of provisioning around credit events

IFRS 9 has higher provisioning pre-default, but dynamics are similar

$$Prov_{b,f,t} = \alpha_{f,t} + \sum_{h=-3}^{2} \delta_h \, I_h W_{b,f} + \delta W_{b,f} + \beta X_{b,f,t-1} + \gamma Z_{b,t-1} + \varepsilon_{b,f,t}$$

- f: firm, b: bank, t: quarter, h: number of quarters to default, and $W_{b,f}$ indicating the accounting framework
- Result is robust to several checks: e.g., PSM to account for bank heterogeneity; excluding pandemic period



Note: The sample includes all firm-bank pairs reporting a default and without missing values in the interval between [-3; +2] quarters around default. The x-axis reports the distance in quarter to the quarter in which the bank starts reporting default. The vertical lines report the 90% confidence interval. Solid (dashed) confidence interval if the Wald-test for difference of the coefficients is (non)-significant at the 10\% level.

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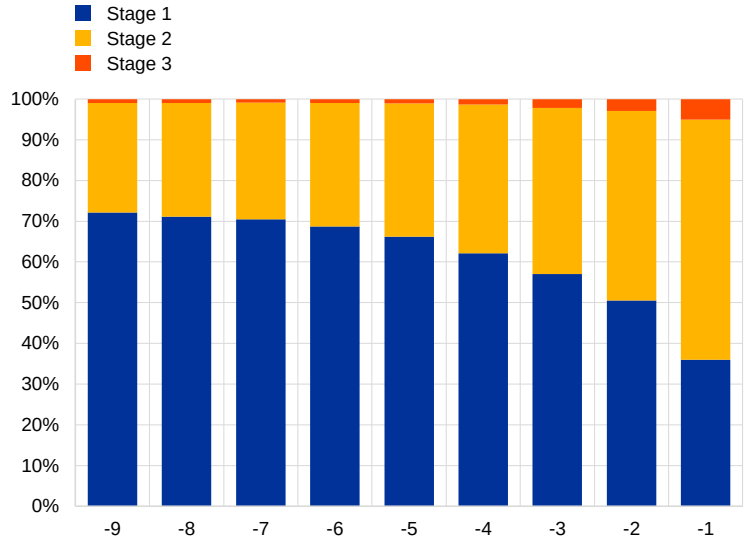
What explains the similar dynamics for IFRS 9 and nGAAP loans?

- Timing of move to Stage 2 differs across loans and tends to occur rather late or not at all
- Still sizeable jump at default also for loans from stage 2:
  - Ø ratios: 1.5% (stage 1); 6.0% (stage 2), 24.5% (stage 3)

Implications and interpretation:

- IFRS9 did not fundamentally change provisioning patterns
- Inherent reluctance to impair assets can prevent timely loss recognition also in ECL approach if incentives unchanged
  - Built-in discretion (relying on internal models) may facilitate this

IFRS 9 loans in different stages ahead of default



Note: Distance to default measured in quarters. The sample is an unbalanced panel with 53,088 bank-firm observations nine quarters before default and 207,201 observations one quarter before default.

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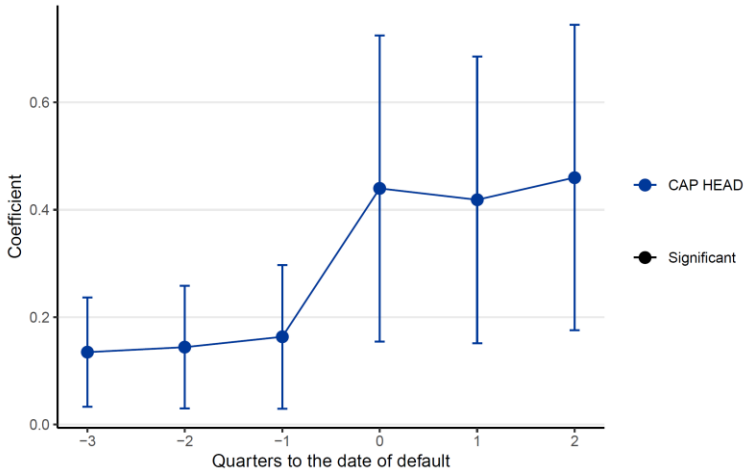
Banks with more excess capital provision more conservatively

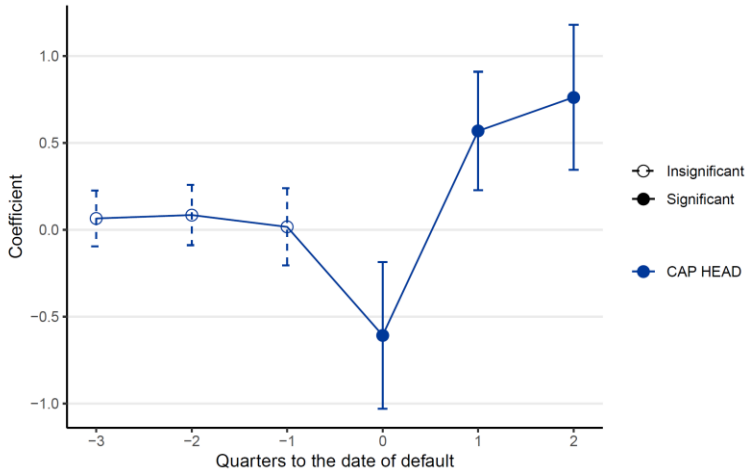
- Banks with more capital headroom provision more before and after default under IFRS 9
- Effect is more muted and occurs only after default for loans using nGAAP

→ Consistent with “provisioning as much as you can afford”, facilitated by discretion under IFRS 9

IFRS 9



nGAAP



Note: The sample includes all firm-bank pairs reporting a default and without missing values in the interval between [-3; +2] quarters around default. The x-axis reports the distance in quarter to the quarter in which the bank starts reporting default. The vertical lines report the 90% confidence interval. Solid (dashed) confidence interval if the coefficient is (non)-significant at the 10% level.

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Capital headroom also affects likelihood of moving a loan to Stage 2

Logit regression:

$$D(moved\ to\ stage\ 2)_{b,f} = \alpha_f + \beta X_{b,f} + \gamma Z_b + \varepsilon_{b,f}$$

- Lower capital headroom is associated with a lower probability of moving the loan to stage 2

Dependent Variable:	Bank reports Stage 2
Variables	
CAP HEAD	0.0333*
	(0.0171)
Fixed effects	
Firm	Yes
Fit statistics	
Observations	567,439
Squared Correlation	0.14705
Pseudo R^2	0.11478
BIC	3,381,251.0

Clustered (Firm & Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The sample includes loans to firms for which at least one bank moves its respective loan to stage 2 in at least one quarter loans. The explanatory variables are fixed at their value at the time when this first move occurred. That is, there is no time dimension in this regression, which includes one observation for each bank × firm pair.

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Provisioning dynamics around macroeconomic shocks (pandemic, energy price shock)

Relevance of looking at systemic shocks

1. Need to confirm micro findings at macro level

- Correlated credit risk events of particular interest from financial stability perspective

  → potential systemic repercussions if a lot of banks adjust their behaviour simultaneously

2. Need to study evolution of stage 2 provisions around macro shocks in more detail

- Micro results show similar provisioning patterns for defaulting IFRS 9 and nGAAP loans
  - IFRS 9 has not solved concerns about procyclicality late in a crisis (when a lot of loans default)
  - Concerns about procyclicality early in a crisis may have been exaggerated (not much frontloading)
- But: concerns could remain if many loans suddenly moved to stage 2 (without defaulting)

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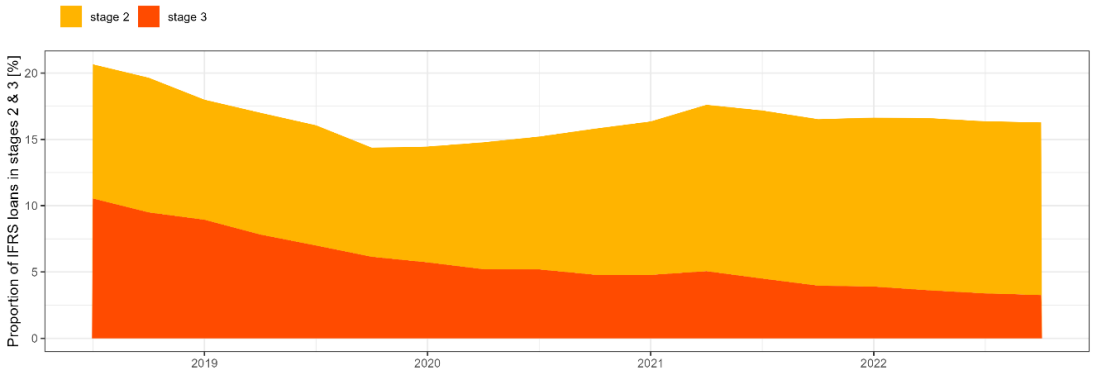
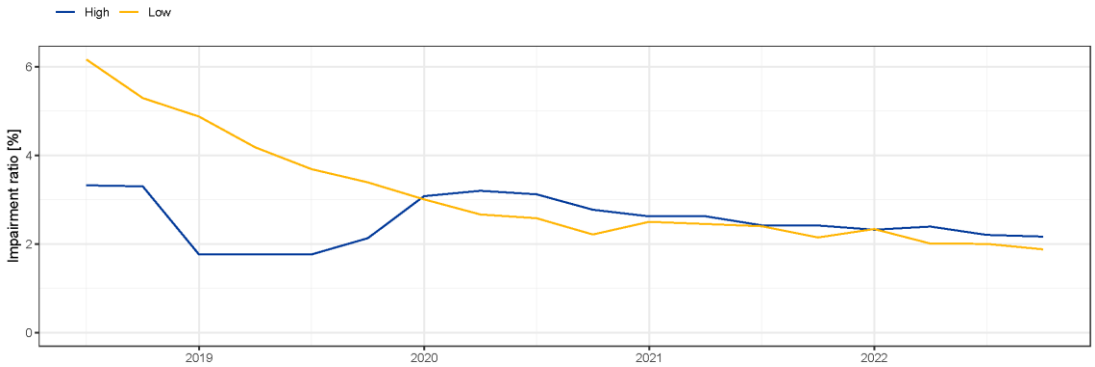
Overall provision increases modest & mostly for well capitalised banks





- Share of stage 2 provisions up from 9.2% in 20-Q1 to 13.7% in 21-Q2
- Back-of-the-envelope calculation: this reduces CET1 ratio by 0.14 pp
- Modest effect, even when doubling or tripling (capital relief of 0.7 pp)
- Absolute provisioning ratios rather stable throughout the pandemic
- Increases only for well-capitalised banks that can afford it

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Capital headroom main determinant of provisions after outbreak of war

Change in provisioning due to energy price shock in 2022:

$$\Delta Prov_{b,f} = \delta_f + \theta W_{b,f} \times E_f + \delta W_{b,f} + \beta X_{b,f} + \gamma Z_b + \epsilon_{b,f}$$

b the bank, f the firm, E a measure of energy dependence

- Better capitalised banks with broader reaction to shock
- No difference between IFRS 9 and nGAAP for average loan
- IFRS 9 provisions react more risk sensitively to the shock

Dependent Variable:	Δ provisioning ratio	
Period:	2022 Q1 - 2022 Q4	
Model:	(5)	(6)
Variables		
IFRS	-0.0154	-0.2025***
	(0.1113)	(0.0726)
CAP HEAD	0.0162*	0.0174**
	(0.0096)	(0.0083)
IFRS × Energy		0.0287**
		(0.0138)
Energy × CAP HEAD		-0.0002
		(0.0012)
Fixed effects		
Firm	Yes	Yes
Fit statistics		
Observations	2,415,775	2,415,775
R^2	0.82711	0.82712
Within R^2	0.00250	0.00254

Clustered (Firm & Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Full table

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Conclusion

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Conclusion

- IFRS 9 partly delivered on objective to foster transparency and prompt timelier provisioning
  - Higher ex ante (precautionary) provisioning and more risk-sensitive reaction around exogeneous shock
  - But bulk of provisioning still occurs at default, and IFRS 9 and nGAAP exhibit overall similar dynamics …

  → Implication of IFRS 9 in terms of procyclicality may not be much different from nGAAP
- Evidence for ‘capital management’ & higher discretion under IFRS 9; ambiguous implications:
  - Discretion may help to prevent procyclical increases at the onset of a shock …
  - … but reduces transparency and conflicts with objective of fostering timelier / more adequate provisions
- Difficult to assess overall adequacy of current provisions, but banks with less capital headroom may be at greater risk of being under-provisioned (partly due to discretion offered by IFRS 9)

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Appendix

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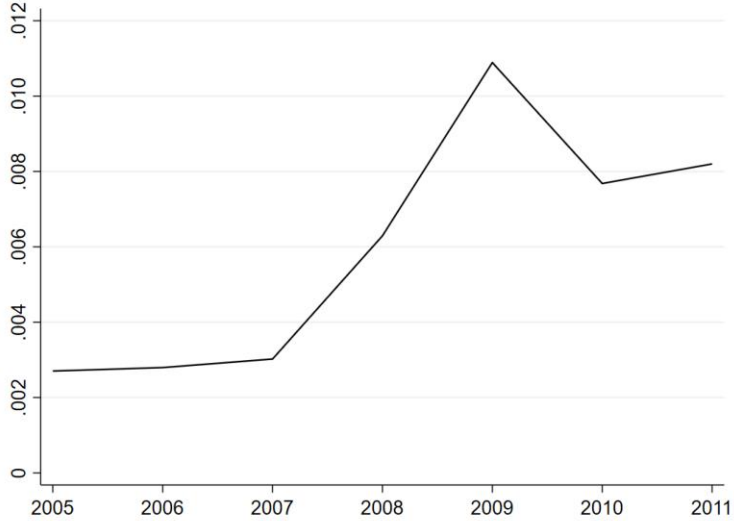
Introduction of ECL accounting approaches after the GFC

- Aggregate provisions quadrupled in the GFC, with material increases rather late in the crisis
- Triggered concerns about procyclicality and a lack of transparency (hidden balance sheet risks)
- ECL accounting meant to be more forward-looking
  - Current Expected Credit Loss (CECL) in the U.S.
  - IFRS 9 around the globe (including in EU)

Aggregate provisions during the GFC



This figure shows the evolution of weighted average provisioning ratios, defined as provisions for loan losses over total gross loans, for a sample 84 European banks that later came under direct supervision by the European Central Bank. The data is sourced from SNL Financial.

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Data

- Granular corporate loan data from Eurosystem's Analytical Credit Database (AnaCredit)
  - Corporate loan exposures > EUR 25,000 from 20 euro area countries
  - Loan characteristics such as carrying amount, impairments, maturity, guarantees, collateral, moratoria
  - Borrower characteristics such as firm size, country of residence, economic sector (NACE-2)
  - Loan data aggregated at firm-bank level (consolidating at ultimate euro area parent level on bank side)
  - Focus on loans to non-financial corporations (excluding intra-financial sector loans)
- Matched with supervisory bank balance sheet and P&L data (COREP/FINREP)
- Firm exposure to energy price shocks constructed at industry sector level using OECD data
- Sample period: 2018-Q3 to 2022-Q4

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Loan-level descriptive statistics (30 mn observations)

	IFRS 9			nGAAP	
	Stage 1	Stage 2	Stage 3	General allowance	Specific allowance
# of observations	20,158,194	3,540,303	1,850,027	4,024,453	593,482

	Mean	S.D.	Min	Q1	Median	Q3	Max
Credit volume	734310.33	2116803.49	429.48	50159.00	141591.03	448511.00	16148537.51
Provisioning ratio	4.31	15.53	0.00	0.07	0.27	1.01	100.00
Default	6.19	24.06	0.00	0.00	0.00	0.00	100.00
Guarantee	14.40	31.37	0.00	0.00	0.00	0.00	100.00
Moratoria	1.70	11.79	0.00	0.00	0.00	0.00	100.00
Maturity	3.53	4.17	0.00	0.46	2.50	4.65	22.27
Protection ratio	158.04	296.63	0.00	0.00	89.74	174.68	200.00

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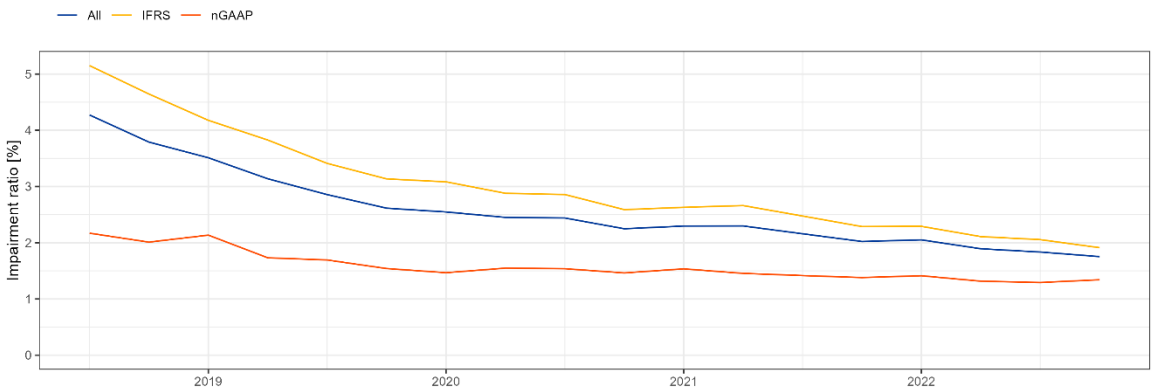
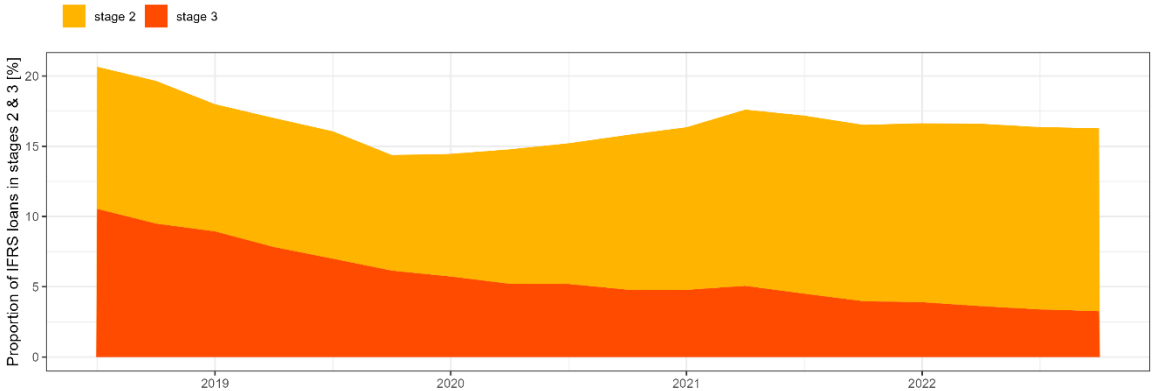
Evolution of aggregate provisioning ratios over the sample period

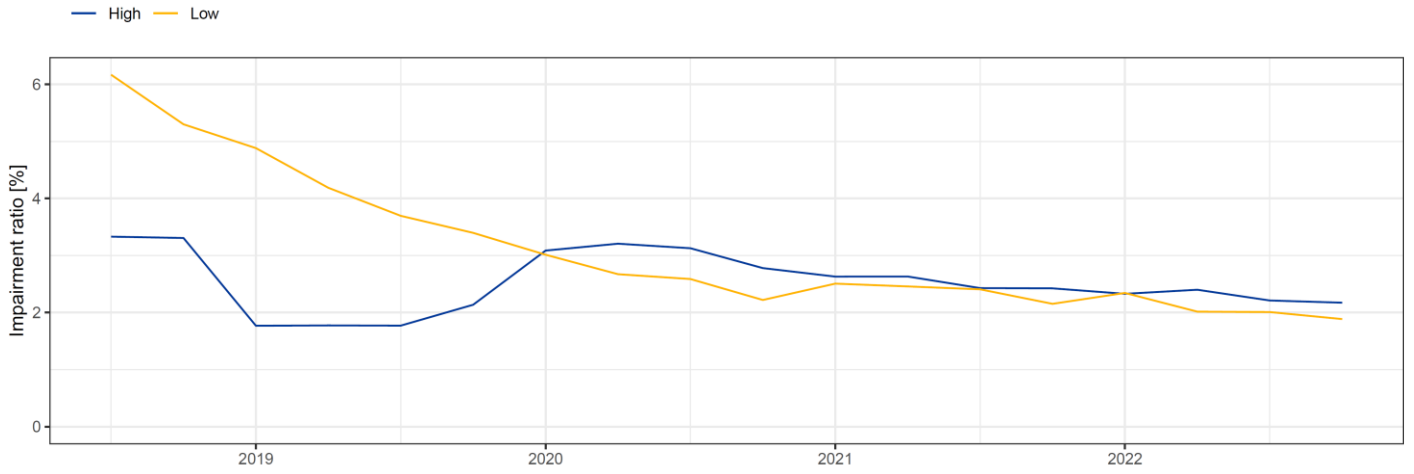




- IFRS 9 provisions generally higher than nGAAP provisions
- Aggregate provisioning ratios declined over sample period
- Driven by continued reduction of NPL portfolios (stage 3)
- COVID pandemic triggered a marked increased in stage 2 without substantial impact on aggregate provisioning ratio

Capital headroom and aggregate provisioning

- Less capitalised banks started off with higher provisions, due to legacy issues (NPLs)
- Provisioning of better capitalised banks more responsive to shock of the pandemic



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Exposure to energy price shocks at the industry level

- Sectoral measure (NACE-2 x country), computed as the sum of (direct and indirect) input from the electricity, gas, steam and air conditioning industries, as a share of sectoral output
- Data on input and output taken from OECD's Trade in Value Added (TiVA) data base
- A higher value of the indicator implies that energy plays a larger role in the sector's inputs, hence a stronger exposure of the sector to an energy supply shock

Exposure to energy of euro area borrowers (by NACE-2 x country)

	N	Mean	SD	Min	Q1	Median	Q3	Max
A Agriculture	136	11.42	7.98	1.66	7.41	9.97	13.02	62.82
B-F Industry and Construction	1561	28.54	42.29	1.66	7.67	11.56	20.57	157.99
G-N Services (excl. financial & real estate)	816	11.81	12.60	1.66	4.32	7.45	14.30	95.85

Source: https://www.oecd.org/industry/ind/TiVA-2021-industries.pdf
Note: For more details, see also https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.ebbox202201_04~63d8786255.en.html

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IFRS 9 – support measures during the pandemic

20 March 2020: ECB recommends banks to avoid procyclical assumptions in IFRS9 models and to opt for IFRS9 transitional rules

1 April 2020: ECB letter to banks providing further guidance on application of IFRS9 transitional rules and the use of forecasts in estimating provisions to avoid procyclicality

3 April 2020: BCBS states that public guarantees / moratoria should not automatically imply transfer to Stage 2; provides guidance on the use of forecasts to avoid procyclicality

26 June 2020: 'CRR quick fix' extended IFRS9 transitional arrangements by two years, and allowed additional addbacks to CET1 capital of stage 1 and stage 2 provisions that were due to COVID-19

4 December 2020: ECB letter placing greater emphasis on sound credit risk management and the need to allocate exposures to the appropriate IFRS9 stages based on all relevant information

Role of support measures implemented during the pandemic

- Pandemic hit while banks still transitioning to IFRS 9 and prompted several support measures to prevent excessive procyclicality and facilitate banks' ability to support the economy
  - Banks encouraged to make use of flexibility embedded in IFRS 9; guidance to avoid excessive procyclicality in models
  - Extension of IFRS 9 transitional arrangements and expanded set of provisions that could be added back to CET1 capital
- Impact on provisioning likely to vary over time and across measures (e.g., potentially lower provisioning due to initial supervisory guidance; neutral or positive impact of addbacks)
- Our analysis considers the possible impact of these measure in various ways:
  - Robustness test excluding the imminent period of the pandemic in 2020 (strongest impact of supervisory guidance)
  - Exploiting cross-sectional variation: e.g., support measures apply to well- and less-capitalised banks in similar manner
  - Controlling for the impact of COVID-related guarantees and moratoria by including corresponding control variables
  - Conduct an additional test on period less affected by support measures: energy price shock after outbreak of war

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Impact of bank characteristics on provisioning

Provisioning ratio as the main variable of interest:

$$Prov_{b,f,t} = \alpha_{f,t} + \beta X_{b,f,t-1} + \gamma Z_{b,t-1} + \epsilon_{b,f,t}$$

$Prov_{b,f,t}$: quarterly provisioning ratio at the loan-level (defined as provisions over carrying amount plus provisions)

$X_{b,f,t-1}$: loan-level variables (accounting standard, loan volume, residual maturity, protection ratio, COVID-guarantee/moratoria)

$Z_{b,t-1}$: bank-level variables including capital headroom, total assets (in log), risk weight density, deposit ratio, return on assets, ratio of cash over total assets, ratio of credit over total assets and ratio of central bank funding over total assets

$\alpha_{f,t}$: firm x quarter fixed effects

Standard errors clustered at the firm-quarter and bank levels

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Impact of capital headroom particularly strong in higher IFRS 9 stages

Model:	stage 1 (1)	stage 2 (2)	stage 3 (3)
Variables			
CAP HEAD	0.0344	0.1832***	0.5327***
	(0.0230)	(0.0418)	(0.1841)
Fixed effects			
Firm-Quarter	Yes	Yes	Yes
Fit statistics			
Observations	17,893,082	1,252,261	1,332,183
R^2	0.41469	0.52903	0.61709
Within R^2	0.04308	0.03938	0.07579

Clustered (Firm-Quarter & Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

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Robustness tests

Model:	Propensity Score Matching			Banks using both IFRS & nGAAP			Bank-quarter FEs	Controlling by credit type		
	All	IFRS 9	nGAAP	All	IFRS 9	nGAAP	All	All	IFRS 9	nGAAP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Key Variables										
nGAAP	-0.5982***			-3.641***			-2.877***	-0.4539**		
	(0.1880)			(1.103)			(0.4753)	(0.2028)		
CAP HEAD	0.1228***	0.1743**	0.0961***	0.3615*	0.5525*	-0.0835		0.1152***	0.1225***	0.0716***
	(0.0355)	(0.0767)	(0.0266)	(0.1845)	(0.3036)	(0.0593)		(0.0234)	(0.0279)	(0.0263)
Bank control variables	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Loan control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects										
Firm-Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Firm-Quarter-Loan Type								Yes	Yes	Yes
Bank-Quarter							Yes			
Fit statistics										
Observations	1,554,100	472,284	807,574	139,542	70,006	36,788	5,944,892	31,625,863	27,203,092	3,200,757
R^2	0.71096	0.74394	0.69732	0.64937	0.70011	0.75516	0.80725	0.85007	0.85435	0.80316
Within R^2	0.02343	0.09081	0.01069	0.07983	0.12392	0.01428	0.02229	0.01189	0.01271	0.01447

Clustered (Firm-Quarter & Bank) standard errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

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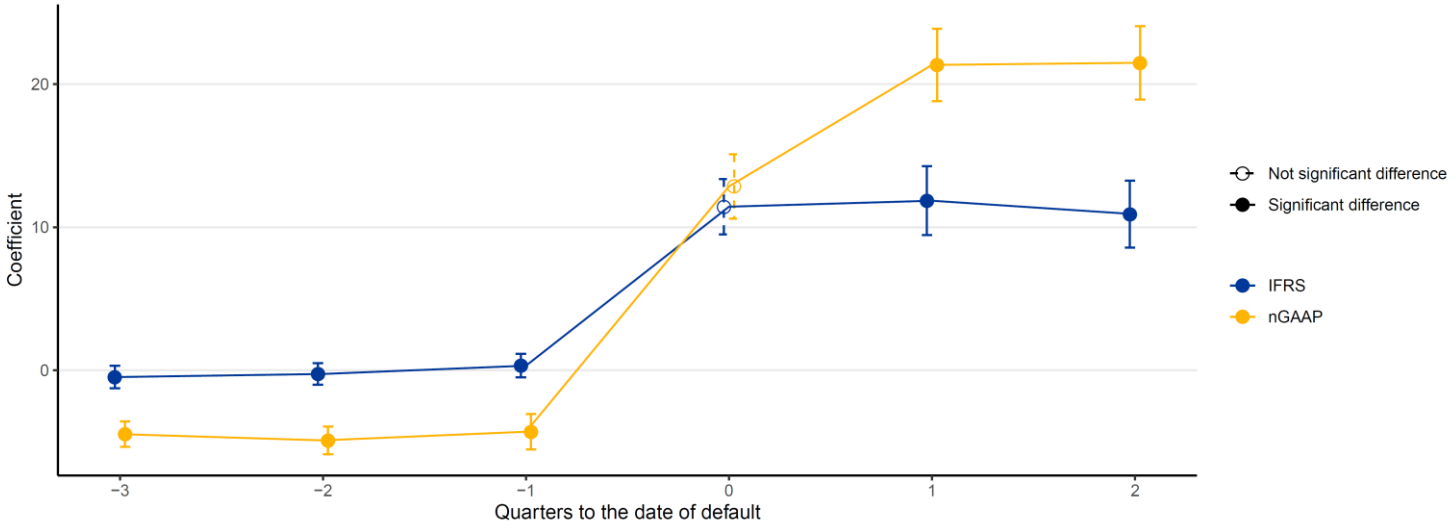
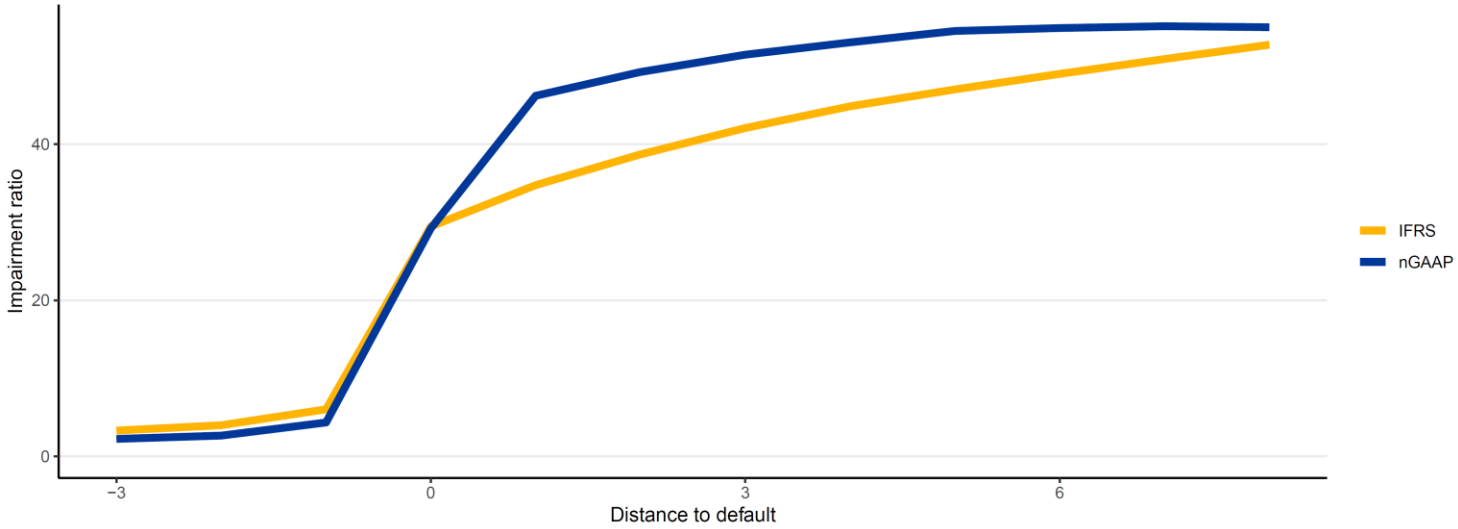
Excluding the imminent phase of the pandemic

$$Prov_{b,f,t} = \alpha_{f,t} + \sum_{h=-3}^{2} \delta_h I_h W_{b,f} + \delta W_{b,f} + \beta X_{b,f,t-1} + \gamma Z_{b,t-1} + \varepsilon_{b,f,t}$$



Longer horizon after default



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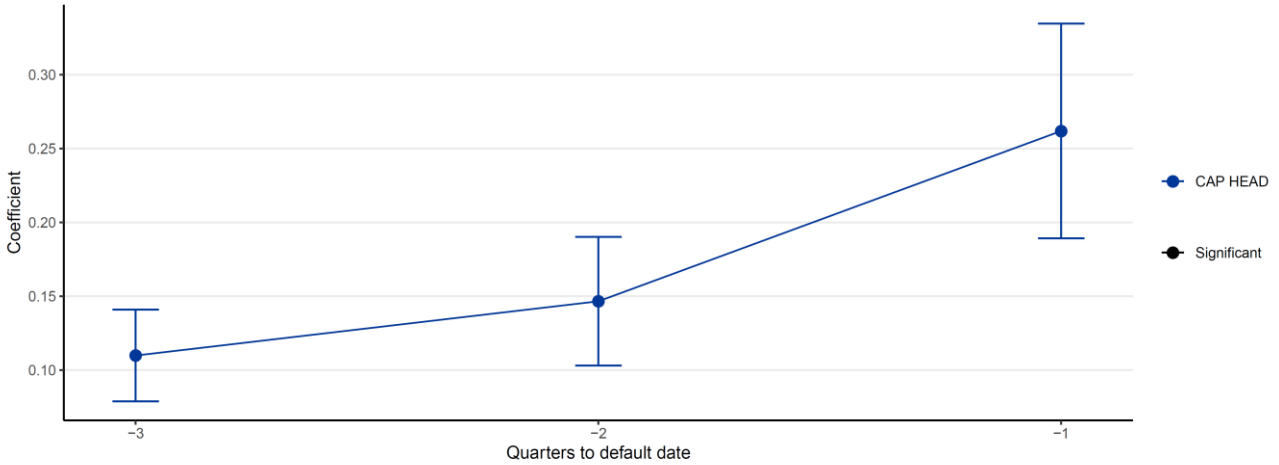
Capital headroom affects likelihood of moving a loan to Stage 2

$$D(loan\ in\ stage\ 2)_{b,f,t} = \alpha_{f,t} + \sum_{h=-3}^{-1} \delta_h\, I_h W_{b,f} + \delta W_{b,f} + \beta X_{b,f,t-1} + \gamma Z_{b,t-1} + \varepsilon_{b,f}$$

- Lower capital headroom is associated with a lower probability of moving the loan to stage 2



Note: The sample includes all firm-bank pairs reporting a default and without missing values in the three quarters before default. The x-axis reports the distance in quarters to the quarter in which the bank starts reporting default. The vertical lines report the 90% confidence interval. Solid (dashed) confidence interval if the coefficient is (non)-significant at the 10% level.

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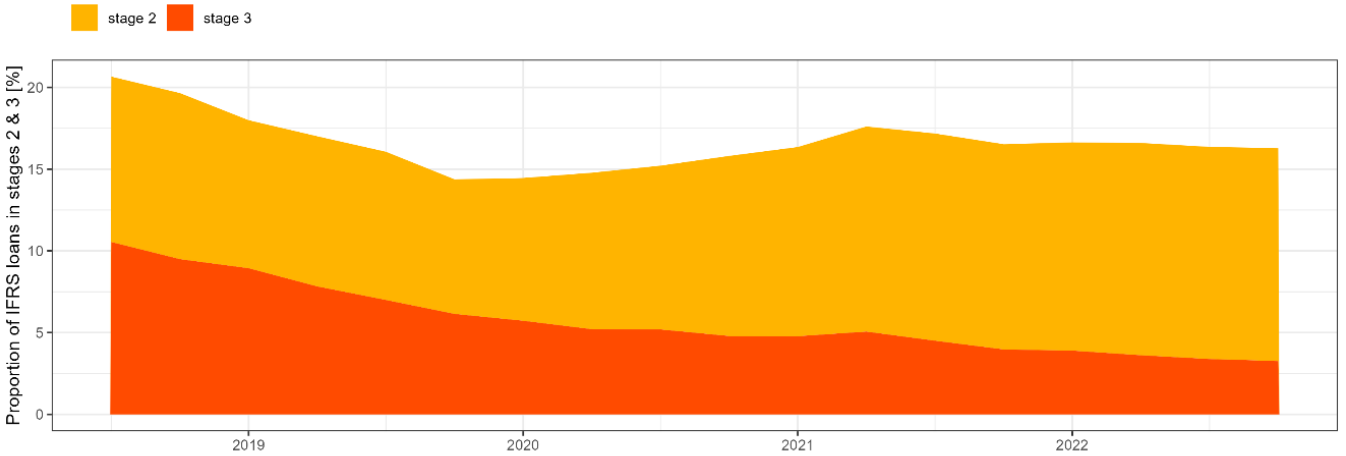
Absolute increases in provisioning rather modest in pandemic

- Recall: absolute provisioning ratios stable during pandemic, also due to decline in stage 3
- Share of stage 2 provisions increased from 9.2% in 2020-Q1 to 13.7% in 2021-Q2
- Back-of-the-envelope calculation shows that this reduces the CET1 ratio by 0.14 pp
- Even doubling or tripling of the effect appears modest, compared with capital relief of 0.7 pp



Provisioning dynamics during the pandemic

Estimate local projection equations:

$$\Delta Prov_{b,f,h} = \alpha_{f,h} + \theta_h W_{b,f} + \beta_h X_{b,f} + \gamma_h Z_b + \varepsilon_{b,f,h}$$

$$D(move\ to\ stage\ 2)_{b,f,h} = \alpha_{f,h} + \theta_h W_{b,f} + \beta_h X_{b,f} + \gamma_h Z_b + \varepsilon_{b,f,h}$$

with h the number of quarters since 2019-Q4 and all other variables defined as before

$W_{b,f,t-1}$ alternatively (i) a dummy indicating the accounting framework (IFRS 9 vs nGAAP), or (ii) the bank's excess capital

$X_{b,f,t-1}$: loan-level variables (accounting standard, loan volume, residual maturity, protection ratio, COVID-guarantee/moratoria)

$Z_{b,t-1}$: bank-level variables including capital headroom, total assets (in log), risk weight density, deposit ratio, return on assets, ratio of cash over total assets, ratio of credit over total assets and ratio of central bank funding over total assets

Standard errors clustered at the firm-quarter and bank levels

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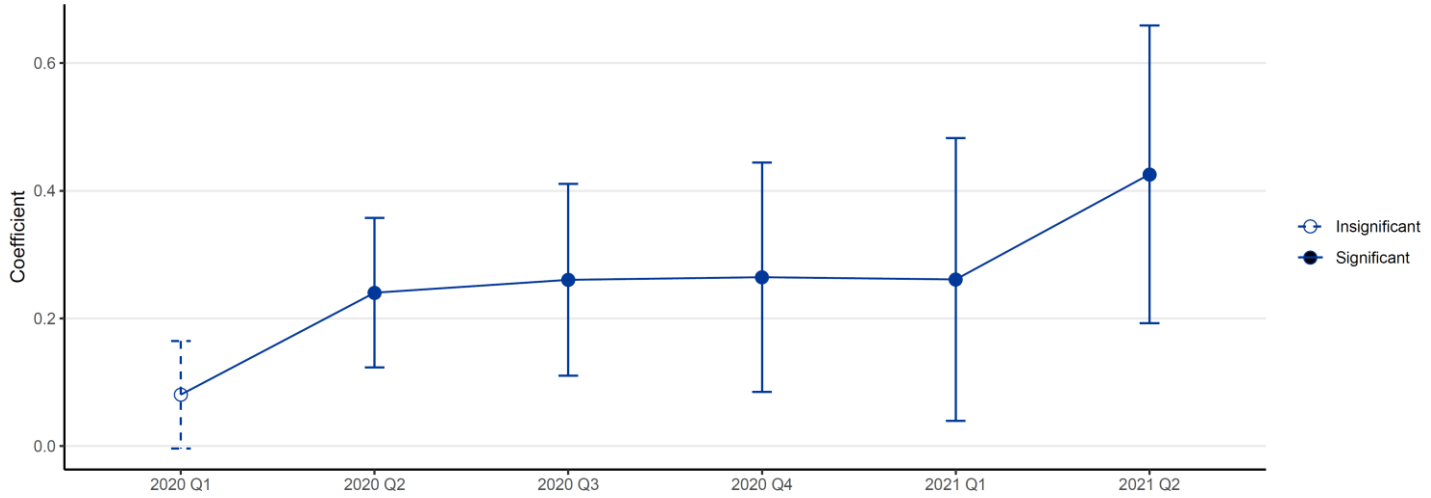
Provisions for IFRS 9 loans increased more strongly in pandemic

$$\Delta Prov_{b,f,h} = \alpha_{f,h} + \theta_h D(IFRS)_{b,f} + \beta_h X_{b,f} + \gamma_h Z_b + \varepsilon_{b,f,h}$$

- Provisions for average IFRS 9 loan increased more strongly as of 2020-Q4
- Cumulative difference of 0.4 pp in 2021-Q2 (translates into 0.46pp decline in CET1 ratio)



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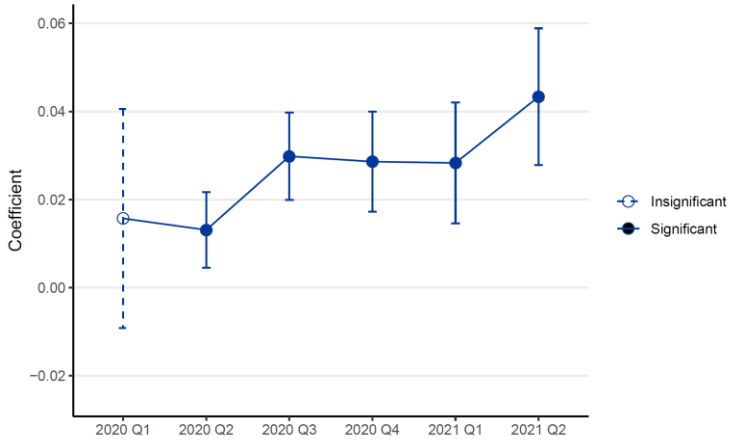
Capital headroom affected provisioning during the pandemic

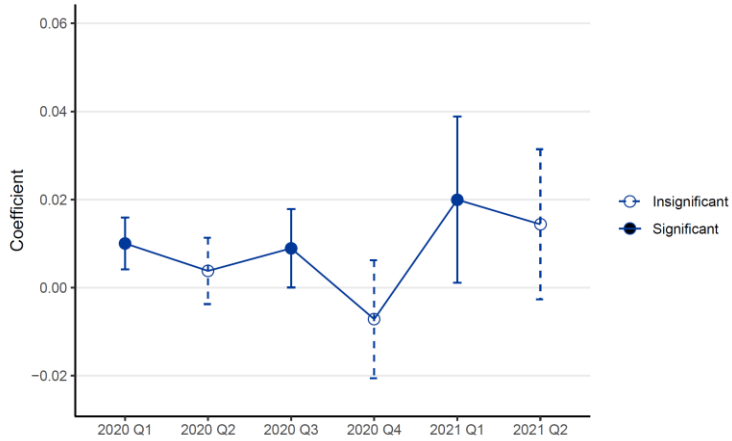
$$\Delta Prov_{b,f,h} = \alpha_{f,h} + \theta_h CAP\ HEAD_b + \beta_h X_{b,f} + \gamma_h Z_b + \varepsilon_{b,f,h}$$

- IFRS 9: one S.D. (5.76 p.p.) increase in capital headroom resulted in an increase of 0.3 p.p. in provisions; better capitalised banks also more likely to move loans to S2 (as of 2020-Q4)
- nGAAP: more muted and only partly significant impact of capital headroom on provisions

IFRS 9



nGAAP



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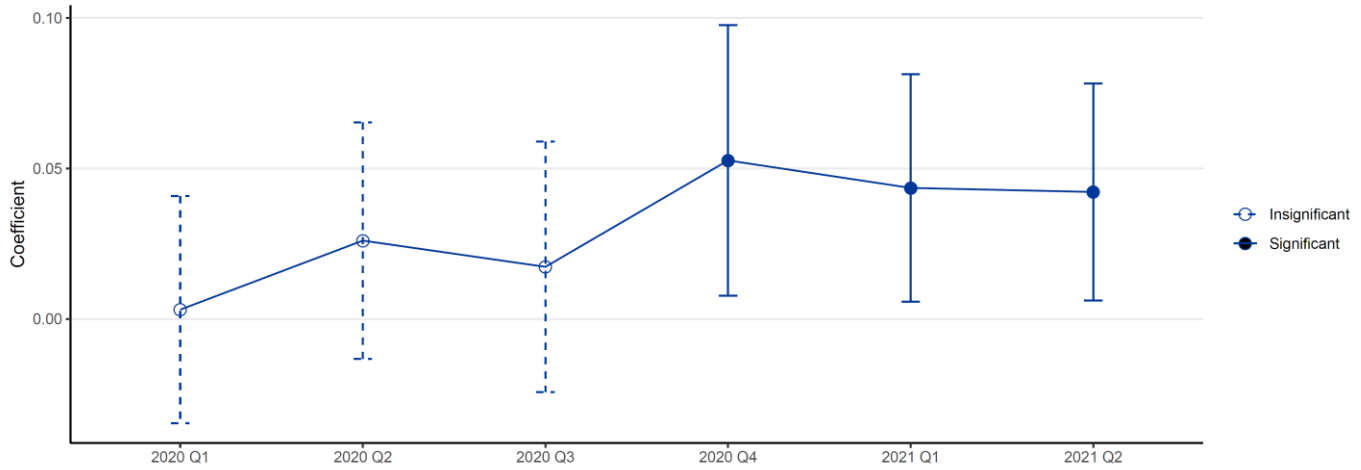
Impact of capital headroom on moving loan to stage 2 in pandemic

$$D(move\ to\ stage\ 2)_{b,f,h} = \alpha_{f,h} + \theta_h W_{b,f} + \beta_h X_{b,f} + \gamma_h Z_b + \varepsilon_{b,f,h}$$



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