EUROPEAN CENTRAL BANK

EUROSYSTEM

Countercyclical capital buffer, quo vadis?

MPPG Workshop

Institutional and operational framework for macroprudential policies and tools in Europe

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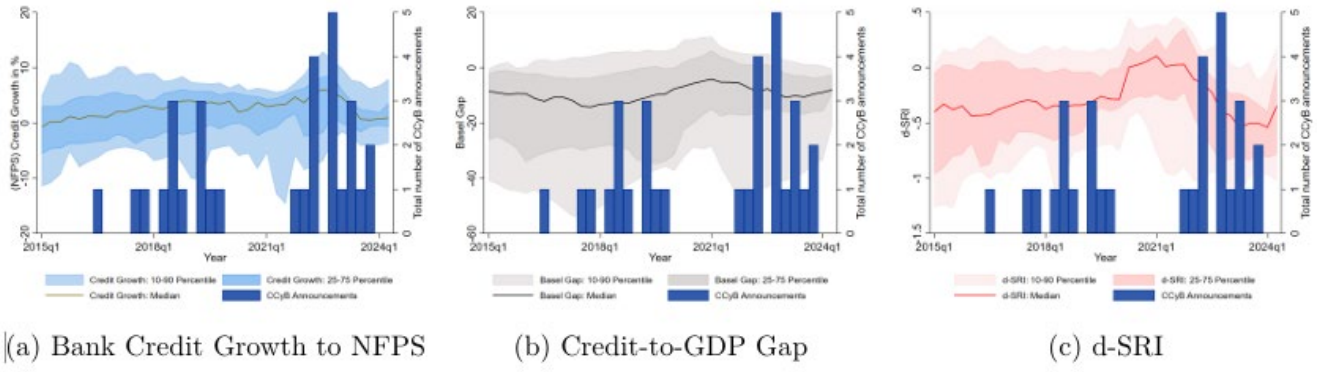
Introduction and motivation

The countercyclical capital buffer (CCyB) is a macroprudential buffer originally designed to be accumulated in times of an exuberant financial cycle.

- 2015 - 2019: weak correlation between the evolution of cyclical systemic risk indicators and CCyB activations.
- Since 2021: surge of CCyB activations, despite decline in cyclical systemic risks

Figure 1 – CCyB announcements and evolution of cyclical systemic risk in the euro area



(a) Bank Credit Growth to NFPS (b) Credit-to-GDP Gap (c) d-SRI

Source: authors' calculations

Research questions

- Can one identify specific indicators of cyclical systemic in guiding the setting of the CCyB for euro area countries?
- Have other than cyclical risk or political economy factors influenced the decisions of national macroprudential authorities?
  - Accumulated risks
  - Characteristics/performance of the banking sector
  - Institutional framework
- Has the balance between risk and other considerations in the setting of the CCyB changed over time?
- What has been the time lag in decision making?

➢ This paper: empirical analysis using 1) a conditional fixed effects logit model with local projections and 2) a pooled logit model for euro area countries in the period 2015-2024

Related literature

- Indicators to guide the setting of the CCyB:
  - Credit-to-GDP gap: BCBS (2010), Drehmann et al. (2011)
  - Role of other credit indicators, equity and house prices as well as banking sector variables in predicting banking crises

    (Behn et al. 2013, Detken. et al. 2014, Ferrari and Pirovano 2016, Castro et al. 2016, Tölö et al. 2018, Anundsen et al. 2016, Coudert and Idier 2018)
- Research on determinants of CCyB decisions:
  - Edge & Liang (2022): 58 countries, pooled cross section, focus on role of governance.
    - ➢ CCyB activation less likely if powers to activate it lies with the central bank/prudential authority, compared to FSC.
  - Herz and Keller (2023): EU countries, ESRB indicators, 2015-2019.
    - ➢ No role of credit GAP, rather house price developments (+) and NPLs (-). Confirm results Edge&Liang on governance.
  - Döme and Sigmund (2024): EU countries, 2015-2019
    - ➢ CCyB decisions mainly driven by supervisory funding structure

Methodology

Conditional logit model integrating local projections approach (Jorda, 2005).

- Binary dependent variable $CCyB_{i,t}$=1 if positive announced or implemented CCyB rate

$$\Pr\left(CCyB_{i,t+k} = 1 \middle| \boldsymbol{x}_{i,t}, \beta, \alpha_i\right) = \frac{\exp(\alpha_i + \boldsymbol{x}_{i,t}^T \beta)}{1 + \exp(\alpha_i + \boldsymbol{x}_{i,t}^T \beta)}$$

Lags from $t+1$ to $t+4$ to account for lags in policy implementation

- Conditional likelihood removes unobservable cross-country heterogeneity
- Focuses exclusively on within-country variation
- Consistent estimation as $N \rightarrow \infty$ for fixed T.
  - Avoids incidental parameter problem

Data: 19 EA countries from 2015-2024 at quarterly frequency

Summary Statistics

Variable	Mean	Std. Dev.
Systemic Risk and Vulnerabilities		
d-SRI	−0.324	0.502
Credit-to-GDP gap	−14.327	18.553
Credit Growth (in%)	1.965	5.671
RRE Price Growth (in%)	5.835	5.435
Credit-to-GDP ratio (in%)	79.090	31.381
CA-to-GDP	1.061	4.918
Banking Sector Characteristics		
Capital Headroom	5.456	3.632
NPL ratio (in%)	4.802	7.559
ROA (in%)	0.398	0.429
Share Assets Held by Foreign Subsidiaries	0.215	0.241
Total Assets to GDP ratio	2.588	2.011
Macrofinancial Variables		
GDP Growth (in%)	2.424	4.754
Euribor (in%)	0.387	1.502
Observations	676	

Notes: This table presents summary statistics for the variables used in the regression analysis.

Dependent variable:

$CCyB_{i,t} = 1$ if positive CCyB has been **announced or is implemented**

Time variant regressors (conditional logit):

- Cyclical and structural systemic risk
- banking sector characteristics
- external imbalances
- other macropru requirements (RWs/SyRB)
- macro controls

Time invariant regressors (pooled logit):

- Relative size banking sector;
- Share of assets held by foreign subsidiaries;
- Institutional framework for CCyB decisions: Central bank (1), Supervisory authority (2), Committee (3), Political authority (4)

Measures of cyclical systemic risk

Basel credit-to-GDP gap

- Deviation credit-to-GDP ratio from long-term trend (HP filtered)
- Positive gap indicates excessive credit growth relative to economic activity
- Primary reference indicator to guide CCyB setting (BCBS, 2010)

Shortcomings (Lang & Welz, 2017)

- Downward bias following periods of prolonged credit growth (role of statistical trend)
- Can overestimate excessive credit in economic transition phases (strong credit growth justified by economic fundamentals)

Domestic systemic risk indicator (Lang et al. 2019)

Composite indicator, constructed as the weighted average of 6 normalised early warning indicators:

- Bank credit-to-GDP (2yr change): 36%
- RRE price-to-income (3yr change): 17%
- Real equity prices (3yr growth): 17%
- Current account-to-GDP: 20%
- Debt service ratio (2yr change): 5%
- Real total credit (2yr growth): 5%

➢ Weights selected to maximise early-warning properties for systemic banking crises

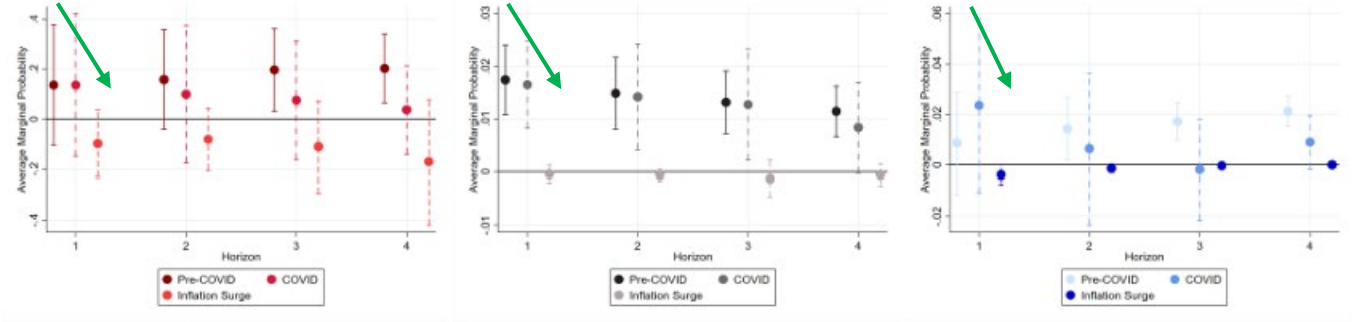
➢ Captures several dimensions of cyclical risk

Results I: Role of cyclical systemic risk over time

Parsimonious model, focus on interactions between systemic risk variable and time dummies for:

- Pre covid: 2015 – 2019 Q4
- Pandemic: 2020 Q1 – 2021 Q4
- Post-pandemic: 2022 Q1 – 2024 Q4

Statistically significant impact of systemic risk on CCyB activation pre-pandemic, not after (advent of PN CCyB strategies)



(a) d-SRI (b) Credit-to-GDP Gap (c) Credit Growth

Average effect of a marginal increase of the d-SRI (a), the Credit-to-GDP gap (b) and credit growth (c) on the probability to activate or maintain a positive CCyB rate. The model also controls for GDP growth and RRE price growth.

Results II: Determinants of CCyB decisions ($t + 2$)

Variables	(1)	(2)	(3)	(4)
SRI	✓	✓	✓	✓**
Pandemic	✓**	✓**	✓**	✓***
High Inflation	✓*	✓	✓	✓**
Pandemic × SRI	✓	✓	✓	✓
High Inflation × SRI	✓***	✓***	✓***	✓**
RRE Price Growth	✓***	✓***	✓***	✓***
GDP Growth	✓	✓	✓	✓
Capital Headroom	-0.683***	-0.674***	-0.662***	-0.898***
	(0.170)	(0.172)	(0.175)	(0.225)
NPL Ratio	-0.785***	-0.817***	-0.817***	-1.276***
	(0.220)	(0.240)	(0.252)	(0.338)
ROA	1.986***	2.104***	2.137***	0.0619
	(0.678)	(0.719)	(0.736)	(1.048)
CA-to-GDP Ratio	–	0.0779	0.0902	0.211**
	–	(0.0768)	(0.0795)	(0.0989)
Credit-to-GDP Ratio	–	0.0532	0.0571	0.207**
	–	(0.0442)	(0.0530)	(0.0827)
RRE Dummy	–	–	1.033	0.861
			(0.806)	(0.896)
Structural Dummy	–	–	-0.125	-1.004
			(0.934)	(1.073)
Euribor	–	–	–	3.103***
				(0.842)
Observations	404	404	404	404
Number of countries	12	12	12	12

Notes: Independent variable: CCyB dummy. Table presents coefficients from conditional logit estimation. Standard errors in parentheses. All specifications include country fixed effects. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Authorities are more likely to raise the CCyB when banks, on average:

- hold relatively small voluntary buffers
- are profitable and can generate new capital through retained earnings (lower cost of activation)
- bank balance sheets are healthy

Some role of private sector indebtedness (structural rather than cyclical vulnerability)

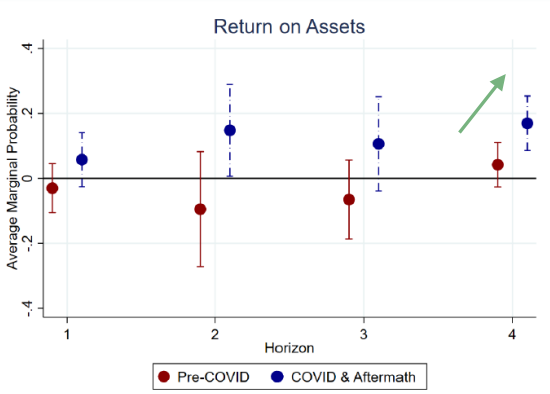
- even in the absence of excessive credit growth, high private sector leverage may amplify the severity of financial stress

Role of d-SRI, external imbalances and other macropru requirements stronger at longer horizons *(t+4)*:

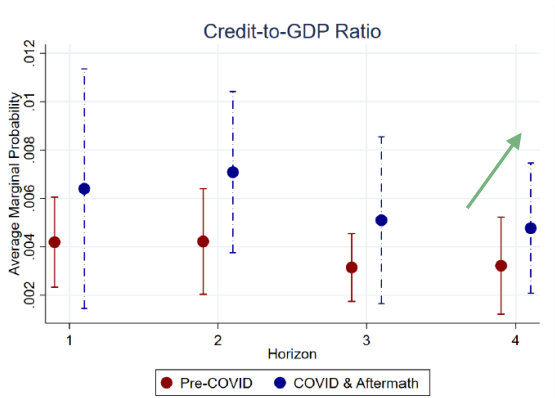
- Lags in policy implementation (persistent signals or slow decision process)
- Consideration of different macroprudential tools more relevant for medium-term planning of CCyB implementation

Results III: Covid pandemic as regime shift

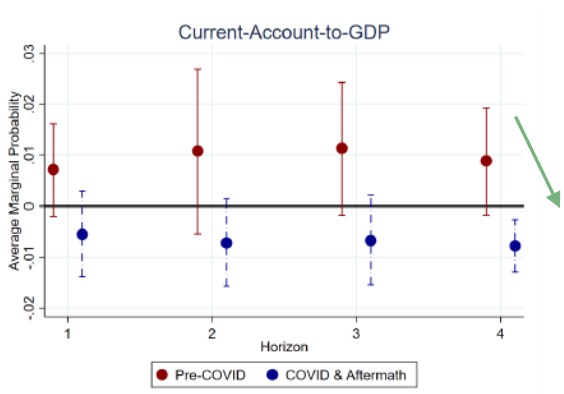
All model variables interacted with time dummy: pre-covid until 2019 Q4, post-covid from 2020 Q1



Variables	(1) CCyB at $t+2$	(2) CCyB at $t+4$
ROA	-2.263*	1.079
Post-Covid × ROA	6.959***	4.141**



Variables	(1) CCyB at $t+2$	(2) CCyB at $t+4$
Credit-to-GDP Ratio	0.100	0.0827
Post-Covid × Credit-to-GDP Ratio	0.125***	0.0641***



Variables	(1) CCyB at $t+2$	(2) CCyB at $t+4$
CA-to-GDP Ratio	0.256*	0.226*
Post-Covid × CA-to-GDP Ratio	-0.483***	-0.465***

CA/GDP: Pre-covid export and foreign asset dependence; Covid & aftermath risk of sudden stops and bubbles

Results IV: Pooled logit model

	CCyB at t			
Variables	(1)	(2)	(3)	(4)
d-SRI	✓	✓	✓	✓
Time Dummies	✓	✓	✓	✓
Interaction Terms	✓	✓	✓	✓
RRE Price Growth	✓	✓	✓	✓
GDP Growth	✓	✓	✓	✓
Capital Headroom	✓	✓	✓	✓
NPL Ratio	✓	✓	✓	✓
ROA	✓	✓	✓	✓
CA-to-GDP Ratio	✓	✓	✓	✓
Credit-to-GDP Ratio	✓	✓	✓	✓
RRE Dummy	✓	✓	✓	✓
Structural Dummy	✓	✓	✓	✓
Euribor	✓	✓	✓	✓
Banking Sector Structure				
Share of Assets by Foreign Subsidiaries	1.090*	–	–	–
	(0.615)			
Size of Banking Sector Relative to GDP	–	-1.764***	–	–
		(0.416)		
Institutional Framework				
Supervisory Authority	–	–	-0.0702	–
			(0.571)	
Committee	–	–	-0.277	–
			(0.449)	
Political Authority	–	–	-1.054*	–
			(0.600)	
Government Involvement	–	–	–	-0.521
				(0.321)
Observations	504	656	656	656

Notes: The table presents coefficient estimates from pooled logit estimation on the contemporaneous relationship between the CCyB and the regressors. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

- Countries with a higher proportion of banking assets held by foreign subsidiaries are more likely to activate the CCyB
  - Ringfencing of capital?
  - Lower lobbying power?
  - Cost of higher requirements borne by foreign institutions?
- A larger banking sector is associated with a lower probability of activating the CCyB
  - Greater lobbying power of banking sector?
- Institutional framework for CCyB decisions:
  - no significant effect of decision-maker being supervisory authority or committee compared to a central bank
  - Weak evidence that were a political authority is in charge of CCyB decisions, likelihood of activation is lower

Conclusion

This study provides new insights for the drivers of CCyB decisions in the euro area, from 2015 to 2024

- Results suggest a regime shift in how macroprudential authorities operate the CCyB following the COVID-19 pandemic:
  - Less focus on cyclical, more on stock vulnerabilities
  - Stronger role of bank profitability considerations,
  - Switch of sign for external imbalances
- Most significant results found for one-year lag between indicator signals and policy activation
- No statistically significant effect of institutional framework
- A couple of political economy findings: Size of banking sector negative, share of foreign subsidiaries positive effect on CCyB decisions

Background slides

Results II: determinants of CCyB decisions ($t + 4$)

Optional: Back to t+2

	CCyB at $t+4$			
Variables	(1)	(2)	(3)	(4)
SRI	✓*	✓***	✓***	✓***
Pandemic	✓	✓*	✓**	✓**
High Inflation	✓**	✓**	✓	✓
Pandemic × SRI	✓	✓	✓*	✓**
High Inflation × SRI	✓***	✓***	✓***	✓*
RRE Price Growth	✓***	✓***	✓***	✓***
GDP Growth	✓	✓*	✓**	✓**
Capital Headroom	-0.403***	-0.466***	-0.476***	-0.503**
	(0.124)	(0.126)	(0.153)	(0.204)
NPL Ratio	-0.402**	-0.453*	-0.666**	-1.012***
	(0.199)	(0.237)	(0.295)	(0.364)
ROA	2.232**	2.034**	2.869***	2.566**
	(0.868)	(0.884)	(1.042)	(1.215)
CA-to-GDP Ratio	–	0.184**	0.264***	0.329***
		(0.0844)	(0.0932)	(0.105)
Credit-to-GDP Ratio	–	0.0432	0.0873	0.132
		(0.0521)	(0.0704)	(0.0872)
RRE Dummy	–	–	5.106***	6.259***
			(1.866)	(2.323)
Structural Dummy	–	–	-1.918*	-2.594**
			(1.000)	(1.121)
Euribor	–	–	–	5.886
				(3.730)
Observations	380	380	380	380
Countries	12	12	12	12

Notes: The table presents coefficients from conditional logit estimation. Standard errors in parentheses. All specifications include country fixed effects. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Results III: Covid pandemic as regime shift

Variables	(1) CCyB at $t+2$	(2) CCyB at $t+4$
SRI	7.323***	7.321***
Post-Covid	-1.765	4.232
Post-Covid × SRI	-12.62***	-12.04***
RRE Price Growth	0.635***	0.689***
Post-Covid × RRE Growth	-0.585***	-0.595***
GDP Growth	-0.518**	-0.252
Post-Covid × GDP Growth	0.501**	0.349**
Capital Headroom	-1.181***	-0.575***
Post-Covid × Capital Headroom	0.0775	0.108
NPL Ratio	-1.192***	-0.613**
Post-Covid × NPL Ratio	-6.154***	-5.182***
ROA	-2.263*	1.079
Post-Covid × ROA	6.959***	4.141**
CA-to-GDP Ratio	0.256*	0.226*
Post-Covid × CA-to-GDP Ratio	-0.483***	-0.465***
Credit-to-GDP Ratio	0.100	0.0827
Post-Covid × Credit-to-GDP Ratio	0.125***	0.0641***
Observations	404	380
Number of Countries	12	12

Notes: Coefficient estimates from regression models with sample split interactions.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness

Variables	Model 1		Model 2		Model 3	
	$t+2$	$t+4$	$t+2$	$t+4$	$t+2$	$t+4$
SRI	✓**	✓***	✓**	✓***	✓**	✓***
Pandemic	✓***	✓**	✓***	✓**	✓***	✓***
High Inflation	✓**	✓	✓*	✓	✓**	✓
Pandemic × SRI	✓	✓*	✓	✓*	✓	✓**
High Inflation × SRI	✓**	✓*	✓	✓	✓**	✓*
RRE Price Growth	✓***	✓***	✓***	✓***	✓***	✓***
GDP Growth	✓	✓**	✓	✓**	✓	✓**
Capital Headroom	✓***	✓**	✓***	✓**	✓***	✓**
NPL Ratio	✓***	✓**	✓***	✓**	✓***	✓***
ROA	0.0519	2.608**	-0.164	2.455**	–	–
	(1.032)	(1.212)	(1.088)	(1.209)		
CA-to-GDP Ratio	0.208**	0.318***	0.255**	0.409***	0.209**	0.341***
	(0.100)	(0.106)	(0.112)	(0.134)	(0.0990)	(0.106)
Credit-to-GDP Ratio	0.180**	0.118	–	–	0.208**	0.127
	(0.0839)	(0.0905)			(0.0826)	(0.0856)
RRE Dummy	0.804	6.136***	1.156	6.195***	0.847	6.281***
	(0.893)	(2.335)	(0.878)	(1.974)	(0.900)	(2.306)
Structural Dummy	-1.184	-2.638**	-0.0813	-2.319**	-0.990	-2.556**
	(1.121)	(1.134)	(0.962)	(1.056)	(1.072)	(1.116)
ECB Policy Pressure Dummy	1.274**	0.720	–	–	–	–
	(0.607)	(0.642)				
Euribor	2.922***	5.538	3.191***	6.570	3.245***	5.813
	(0.765)	(3.605)	(0.880)	(4.142)	(0.844)	(3.610)
HH-Debt-to-Disposable-Income	–	–	0.126**	0.0949	–	–
			(0.0611)	(0.0882)		
ROE	–	–	–	–	-0.0461	0.198*
					(0.0982)	(0.104)
Observations	404	380	404	380	404	380
Number of countries	12	12	12	12	12	12

Notes: The table presents coefficient estimates from three different model specifications. Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.