Università di Cagliari

The Impact of Capital-Based Macroprudential Policy on Banks' Balance Sheet Composition

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The Paper in a Nutshell

Research Question

- How do capital-based macroprudential policies affect the banks' balance sheets composition?

Preliminary Findings

- **CET1 Ratio:** Macroprudential policy shocks positively impact the CET1 ratio.
- **Asset Allocation:** Banks adjust from higher-risk loans to safer, more liquid assets.
- **Risk-Weighted Assets:** Reduction in risk-weighted assets leads to an increased capital ratio.
- **Regulatory Response:** Regulators raise capital requirements in response to increased bank lending and profitability.

Methodology

Model: Bank-level panel vector autoregressive model

Scope: 188 macroprudential actions

Period and Region: 178 banks from 30 European countries between 2013 and 2022

Policy Implications:

- Capital-based macroprudential policies are effective in enhancing bank stability.
- However, they may have unintended consequences on lending practices and profitability.

Literature

Bank-level or loan-level data studies

- **Quasi-experimental methodologies:** (Mesonnier and Monks, 2015; Jimenez et al., 2017; Gropp et al., 2019; Auer et al., 2022; Behncke, 2023; Mathur et al., 2023; Couaillier et al., 2024)
- **Two-step process:** First, estimating individual exogenous changes in bank capital ratios. Then, include them in a dynamic and general equilibrium model to estimate the effects (Berrospide and Edge, 2010; Francis and Osborne, 2012; Mesonnier and Stevanovic, 2017; Baros et al., 2023).

Country-level data studies

- **Vector Autoregressive Models:** Cholesky decomposition, sign and narrative restrictions to estimate the exogenous regulatory shocks (Meeks, 2017; Eickmeier et al., 2018; Kanngiesser et al., 2020; Conti et al., 2023).
- **UK case:** time-varying regulatory capital requirements imposed on UK banks during the 90s provide an ideal setting for estimating the effects of changes in microprudential capital requirements on banks' behavior (Francis and Osborne, 2012; Aiyar et al., 2014; Bridges et al., 2014; Noss and Toffano, 2016; Meeks, 2017;).

Contributions

1. Novel Methodology:

- First study to apply a VAR model to bank-specific data incorporating capital-based macroprudential policy.

2. Regulatory Impact Analysis:

- Isolates the effects of macroprudential policies on on lending, asset allocation, and profitability by providing a comprehensive understanding of regulatory effects.
- Considers endogenous interactions among capital ratio, liquidity, bank lending, and profitability.

3. Cross-Country Applicability:

- Suitable for analyzing macroprudential policies across multiple countries.
- Avoids limitations of single national context studies.

Data

Bank-level Variables

- **Combined Buffer Requirements (CBR)**: Sum of the active capital-based measures (CCyB, O-SII, G-SII, and SRB capital buffers) imposed by national macroprudential authorities (Source: ESRB Notifications)
- **Common Equity Tier 1 Ratio (CET1)**: Common Tier-1 capital divided by total risk-weighted assets (Source: FITCH Connect)
- **Liquid to Total Assets (LIQ)**: Total liquid assets, such as cash and cash equivalents, short-term investments, and other highly liquid assets, divided by total assets (Source: FITCH Connect)
- **Return on Average Assets (ROAA)**:Net income divided by average total assets (Source: FITCH Connect)
- **Net Loans to Total Assets (LOAN)**: Total net loans divided by total assets (Source: FITCH Connect)

Country-level variables

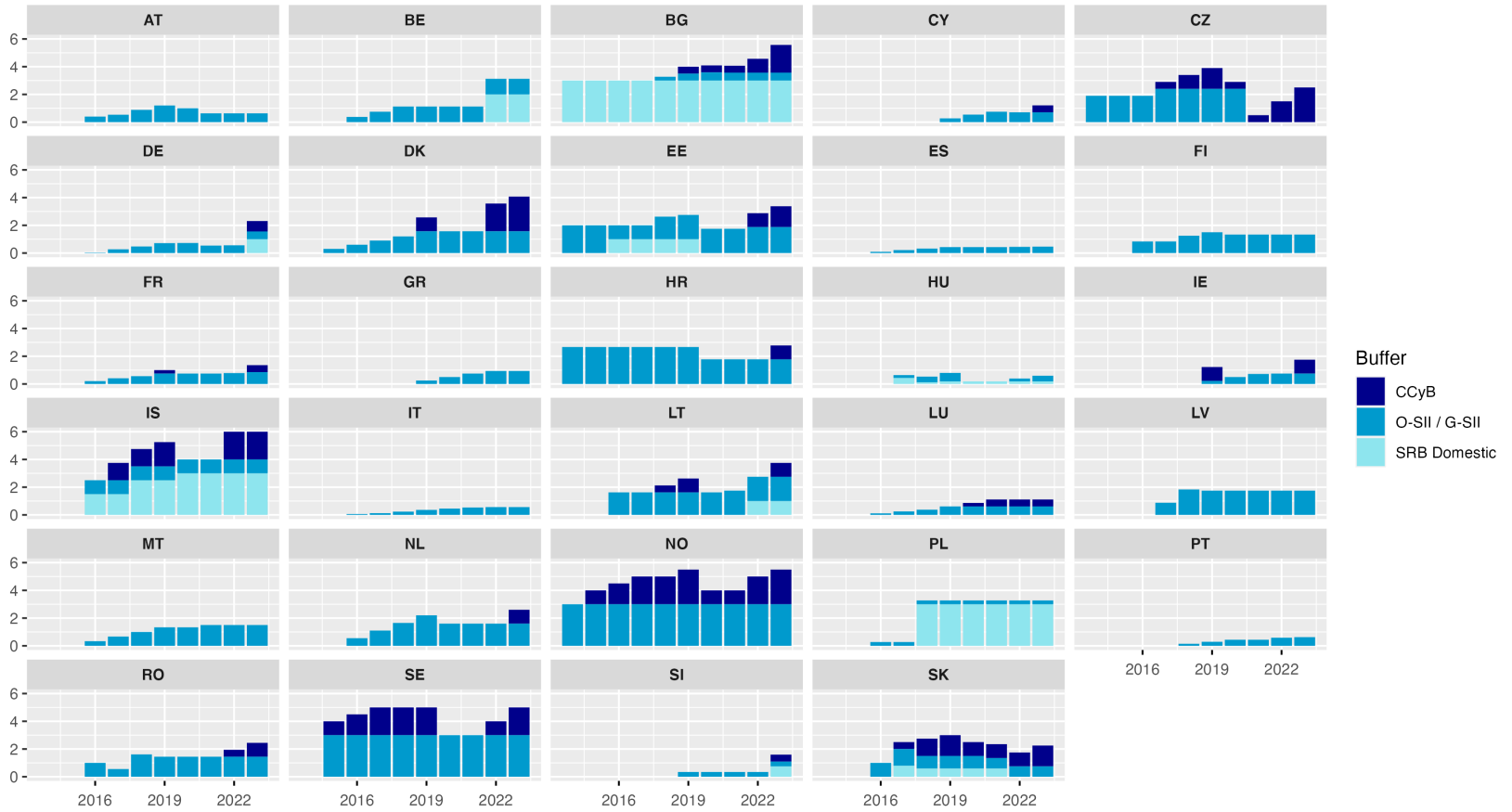
- **Real GDP Annual Growth (RGDP)**: Annual rate of growth of the real gross domestic product (Source: SDW, WB)
- **CPI Annual Growth (CPI)**: Annual rate of growth of the consumer price index (Source: SDW, BIS)
- **Country Level Index of Financial Stress (CLIFS)**: Economic indicator that reflects the level of financial stress at the country level (Source: SDW)

The Combined Buffer Requirements

- The **Combined Buffer Requirements (CBR)** variable is the sum of capital buffers mandated by national macroprudential authorities at the time of implementation.
- This measure considers the **Countercyclical Capital Buffer (CCyB),** buffers for **Other Systemically Important Institutions (OSII)** and **Global Systemically Important Institutions (GSII),** the **Systemic Risk Buffer (SRB)** and the **Domestic Systemic Risk Buffer (SRB_{DOM})**

$$CBR = CCyB + SRB_{DOM} + max(OSII, GSII, SRB)$$

The Combined Buffer Requirements



The Model

$$y_{i,t} = \alpha_i + \sum_{l=1}^{p} \beta_l y_{i,t-l} + C s_{i,t} + \varepsilon_{i,t}$$

Endogenous Variables ($y_{i,t}$):

- Combined Buffer Requirements (CBR)
- ROAA
- Loans to Total Assets Ratio (LOAN)
- Liquid to Total Assets Ratio (LIQ)
- Common Equity Tier 1 Ratio (CET1)

Exogenous Variables ($s_{i,t}$):

- Gross Domestic Product annual rate of growth (GDP)
- Consumer Price Index annual rate of growth (CPI)
- Country Financial Stress Index (CLIFS)

The Generalized Impulse Response Functions

- The Generalized Impulse Response Function (GIRF) measures the reaction of endogenous variables in a vector autoregressive (VAR) model to shocks in the system.
- GIRF are derived using Monte Carlo integration and are calculated as the differences between conditional expectations by simulating the model under a shock scenario and a baseline, no-shock scenario:

$$GIRF_j(h) = E[y_{t+h}|\varepsilon_{j,t} = 1] - E[y_{t+h}]$$

- It shows how shocks propagate through the system over time.
- It is used to study the impact of shocks to bank-specific variables such as capital buffers, liquidity, and profitability.
- Helps in understanding the dynamic effects of macroprudential policies on bank balance sheets.

Results

	ROAA	Liquidity	Loans	CET1	CBR
lag1_ROAA	0.3159*	-0.1603	-0.0686	0.2842	0.0960
	(0.1447)	(0.4495)	(0.4802)	(0.2913)	(0.1013)
lag1_Liquidity	-0.0010	0.3669*	0.2026	-0.1739	0.0123
	(0.0128)	(0.1627)	(0.1581)	(0.1106)	(0.0175)
lag1_Loans	0.0018	-0.2353	0.9809***	-0.2544*	0.0678**
	(0.0195)	(0.1618)	(0.1992)	(0.1017)	(0.0224)
lag1_CET1	-0.0168	0.3315	-0.0327	0.3934*	-0.0112
	(0.0236)	(0.1769)	(0.2431)	(0.1723)	(0.0189)
lag1_CBR	-0.0824	1.6342**	-2.0229***	0.8977**	0.6816***
	(0.0480)	(0.5265)	(0.5191)	(0.2925)	(0.0744)
RGDP	0.0262**	0.0698	0.1259*	-0.0501	0.0243**
	(0.0082)	(0.0556)	(0.0641)	(0.0268)	(0.0080)
CPI	0.0414**	-0.0534	0.1379	-0.0432	0.0556***
	(0.0128)	(0.0845)	(0.0889)	(0.0449)	(0.0129)
CLIFS	-0.7701	-4.4220	0.6389	-0.2970	0.4071
	(0.5829)	(3.5042)	(3.7570)	(1.7983)	(0.6051)

Additional Information:

Transformation: First-differences
Number of observations = 1,025
Number of banks = 178
Obs per bank: min = 1, avg = 5.758, max = 8

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. Standard errors in parentheses.

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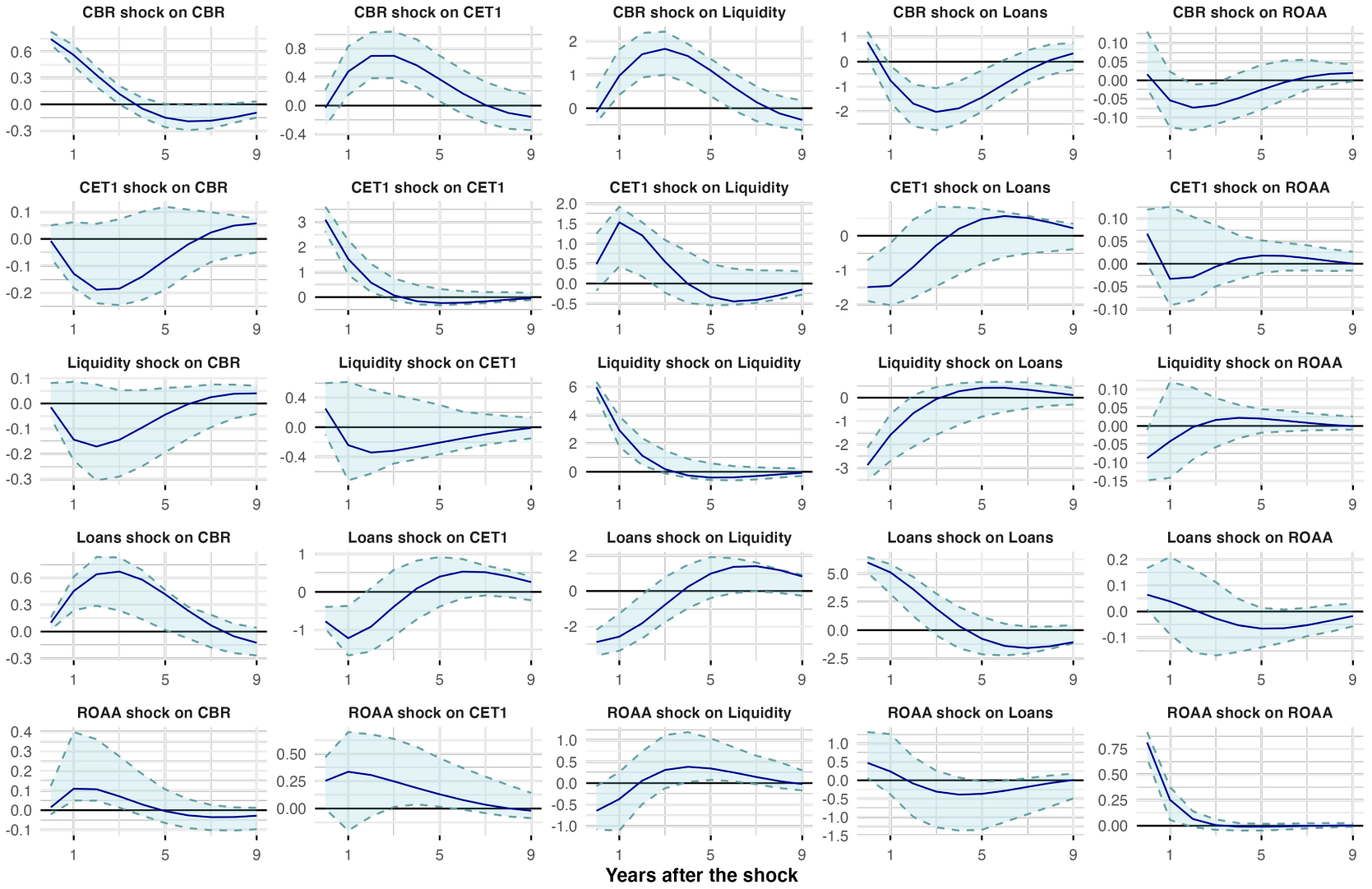
CBR shock on CBR
CBR shock on CET1
CBR shock on Liquidity
CBR shock on Loans
CBR shock on ROAA
CET1 shock on CBR
CET1 shock on CET1
CET1 shock on Liquidity
CET1 shock on Loans
CET1 shock on ROAA
Liquidity shock on CBR
Liquidity shock on CET1
Liquidity shock on Liquidity
Liquidity shock on Loans
Liquidity shock on ROAA
Loans shock on CBR
Loans shock on CET1
Loans shock on Liquidity
Loans shock on Loans
Loans shock on ROAA
ROAA shock on CBR
ROAA shock on CET1
ROAA shock on Liquidity
ROAA shock on Loans
ROAA shock on ROAA
Years after the shock

Conclusions

- **Valuable Insights:** This study offers significant insights into the effects of capital-based macroprudential policies on banks' balance sheets using a Panel Vector Autoregressive (PVAR) model across 178 European banks.
- **Bank Adjustments:** Findings reveal that banks adjust their capital and assets in response to regulatory changes, typically reducing lending and exposure to riskier assets following an increase in capital requirements.
- **Profitability Impact:** The shift from riskier to safer assets impacts banks' profitability, evident from the decline in Return on Average Assets (ROAA) following changes in combined buffer requirements.
- **Policy Implications:** Policymakers must balance stability objectives with potential adverse effects, such as reduced lending and decreased profitability, ensuring an adaptive approach to macroprudential policy formulation.