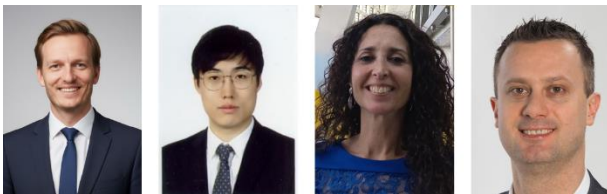


# Robust design of countercyclical capital buffer rules



Dominik Hecker | Kiel University

Hun Jang | Bank of Korea

Margarita Rubio | University of Nottingham

Fabio Verona | Bank of Finland

*Keywords:* Countercyclical capital buffers, Macroprudential policy, Model uncertainty, Robust rules, DSGE models

*JEL codes:* E32, E44, E47, E60, G20, G28

## Abstract

Policymakers face significant uncertainty when implementing countercyclical capital buffer (CCyB) rules. Different models often provide conflicting guidance, and relying on a single framework may result in policy errors. Using twelve state-of-the-art Dynamic Stochastic General Equilibrium (DSGE) models with banking frictions, we identify CCyB rules that perform well across models. These robust rules suggest only moderate increases in capital buffers of around 10–20 basis points for a one-percentage-point increase in the credit-to-GDP ratio. This cautious approach balances financial stability with growth while reducing risks from model uncertainty. Our findings can guide policymakers in implementing macroprudential policy: robust CCyB rules exist, and they favor prudence over activism.

---

Disclaimer: This policy brief is based on [Bank of Finland Research Discussion Papers, No. 9/2024](#). The views expressed are those of the authors and not necessarily those of the institutions the authors are affiliated with.

## Countercyclical buffers and the challenge of model uncertainty

Introduced under Basel III, countercyclical capital buffers strengthen the resilience of the banking sector by requiring banks to build additional capital during credit booms. These buffers can then be released during economic downturns, thereby dampening the financial cycle and limiting spillovers to the real economy. Despite their importance, policymakers face challenges in calibrating the buffers. Academic studies propose a wide range of approaches, often with conflicting recommendations. Without a benchmark model for macroprudential policy, authorities must make decisions amid considerable uncertainty. The key question is how to design effective rules when it is unclear which model best represents economic reality.

### A multi-model approach

To address this challenge, we employ twelve modern DSGE models featuring banking frictions. These models differ in their representation of financial intermediation, featuring monopolistic competition, costly state verification, or moral hazard. Our model suite covers both closed and open economies. In our analysis, the macroprudential authority is assumed to prioritize financial stability, macroeconomic stability, and smooth policy implementation. We model the CCyB as a simple rule responding to the credit-to-GDP gap.

For each model, we compute the optimal CCyB response and then identify rules that perform well across all models. This mirrors the real-world dilemma of policymakers, who must act without knowing which (if any) of these models is the most accurate. Table 1 reports the results.

**Table 1. Optimized model-specific and model-robust  $\phi_{ccyb}$  coefficients**

Model	$\kappa_1=0$ , $\kappa_2=0.1$	$\kappa_1=0.1$ , $\kappa_2=0.1$	$\kappa_1=0.1$ , $\kappa_2=0.5$	$\kappa_1=0.5$ , $\kappa_2=0.5$	$\kappa_1=1$ , $\kappa_2=1$
M_1	6.9	6.9	3.1	3.1	2.1
M_2	1.2	1.6	0.6	1	1
M_3	9.3	9.3	4	4	2.5
M_4	10	10	10	7	3.7
M_5	10	10	7.2	7.3	5
M_6	0.9	1	0.2	0.4	0.3
M_7	0	0	0	0	0
M_8	10	10	10	10	10
M_9	0.8	1	0.2	0.4	0.3
M_10	1.3	1.2	0.9	0.8	0.6
M_11	10	10	6.1	6.1	4.2
M_12	0.6	0.6	0.1	0.1	0.1
<b>Robust</b>	<b>0.3</b>	<b>0.4</b>	<b>0.1</b>	<b>0.2</b>	<b>0.1</b>

Note: The table reports the optimized model-specific  $\phi_{ccyb}$  coefficients for models M\_1–M\_12, and the model-robust coefficients in the last row, for different loss functions of the macroprudential authority. All loss functions stabilize the volatility of credit-to-output with a unit weight.  $\kappa_1$  refers to the weight attached to stabilizing output volatility and  $\kappa_2$  the weight attached to stabilizing volatility of the policy instrument.

## What the evidence shows

Our results consistently point toward moderation. Across the models, robust rules recommend only small increases in the capital buffer, typically 10–20 basis points for each one-percentage-point deviation of the credit-to-GDP ratio from its steady state. While larger responses may be beneficial in some models, they can prove destabilizing in others. The broader the set of models considered, the more cautious the robust response becomes, reflecting the principle that greater model uncertainty calls for greater prudence.

Importantly, the cost of insuring against model uncertainty is relatively low. Although the robust rule is rarely the optimum of a single model, it performs adequately across all models. The additional volatility from adopting a cautious rule is modest and falls within the range considered acceptable in related monetary policy debates. Even when interest-rate shocks drive the cycle, robust CCyB rules remain effective and cautious.

## Lessons for policymakers

The message is clear: countercyclical buffers should be adjusted prudently rather than aggressively. Small, steady increases in capital requirements strengthen resilience without unnecessarily constraining credit. Policymakers do not need to identify the “true” model to act effectively; robust rules provide reliable guidance, even under considerable uncertainty. In short, prudence, not activism, is the path to macro-financial stability.

## About the author(s)

**Dominik Hecker** is a PhD candidate in Quantitative Economics at Kiel University and guest researcher at the Deutsche Bundesbank. His research explores questions in monetary policy, financial stability, and economic forecasting, combining modern econometric and machine learning methods. During his PhD, he has visited the Bank of Finland and the ifo Institute.

**Hun Jang** is an economist at the Economic Research Institute of the Bank of Korea. His research interests span macroeconomics, monetary economics, public finance, and financial stability. His recent work examines the impact of population aging on bank soundness, the heterogeneous effects of recurrent property taxation across households with differing liquidity conditions, and the role of fiscal instruments in promoting financial stability. He received his PhD in Economics from the University of Nottingham in 2024.

**Margarita Rubio** works as an Associate Professor at the University of Nottingham. Previously, she held a full-time position at the Bank of Spain. She has also worked as a visiting researcher at the US Federal Reserve, the Deutsche Bundesbank, the Central Bank of Luxembourg, the National Bank of Poland, the Bank of Lithuania, the ECB, Bank of Finland and the International Monetary Fund. She obtained her PhD in Economics in 2008 at Boston College (USA) with a dissertation entitled: “Housing Markets, Business Cycles and Monetary Policy”. She also holds an M.Sc. in Economics with Distinction at the University College London. Margarita’s research fields are Macroeconomics and Monetary Economics. Her research focuses on Dynamic Stochastic General Equilibrium Models with financial frictions. Her topics of interest include housing markets, housing finance, and its interrelation with business cycles and monetary policy, as well as macroprudential policies and its effects on the real economy, financial stability and welfare.

**Fabio Verona** is an Adviser in the Research Unit of the Bank of Finland. His research focuses on macro-finance, combining both theoretical and applied perspectives. His recent work examines the implications of model uncertainty for monetary and macroprudential policy, as well as the use of wavelet methods to forecast stock market returns and to analyze the dynamics of inflation and investment. His earlier research concentrated on incorporating informational and financial frictions into DSGE models. At the Bank of Finland, he has contributed to the development of the DSGE models *Aino 2.0* and *Aino 3.0*, which are used for forecasting and policy simulations. Before joining the Bank, he was a Robert Solow Post-Doctoral Fellow at the Institute for Monetary and Financial Stability, Goethe University Frankfurt. He holds a PhD in Economics from the University of Porto (2011) and was a visiting PhD student at Columbia University in 2009-2010.

---

SUERF Policy Notes and Briefs disseminate SUERF Members' economic research, policy-oriented analyses, and views. They analyze relevant developments, address challenges and propose solutions to current monetary, financial and macroeconomic themes. The style is analytical yet non-technical, facilitating interaction and the exchange of ideas between researchers, policy makers and financial practitioners.

SUERF Policy Notes and Briefs are accessible to the public free of charge at <https://www.suerf.org/publications/suerf-policy-notes-and-briefs/>.

The views expressed are those of the authors and not necessarily those of the institutions the authors are affiliated with.

© SUERF – The European Money and Finance Forum. Reproduction or translation for educational and non-commercial purposes is permitted provided that the source is acknowledged.

Editorial Board: Ernest Gnan, David T. Llewellyn, Donato Masciandaro, Natacha Valla

Designed by the Information Management and Services Division of the Oesterreichische Nationalbank (OeNB)

SUERF Secretariat

c/o OeNB, Otto-Wagner-Platz 3A-1090 Vienna, Austria

Phone: +43 1 40 420 7206

E-Mail: [suerf@oenb.at](mailto:suerf@oenb.at)

Website: <https://www.suerf.org/>