Hanno Kase

hanno.kase@ecb.europa.eu | www.hannokase.com

OFFICE CONTACT INFORMATION

Forecasting and Policy Modelling Division
ECB Tower, Sonnemannstraße 20,
60314 Frankfurt am Main, Germany

RESEARCH INTERESTS

Quantitative Macroeconomics, Monetary Policy, Macroprudential Policy, Machine Learning

EDUCATION

2016 - 2021	**PhD in Economics**, European University Institute Supervised by Prof. David Levine and Prof. Jesús Bueren
2016 - 2017	**MRes in Economics**, European University Institute
2011 - 2013	**MA in Finance**, Tallinn University of Technology
2008 - 2011	**BA in Economics**, Tallinn University of Technology

RESEARCH EXPERIENCE AND OTHER EMPLOYMENT

2023 -	**Senior Economist**, Forecasting and Policy Modelling Division, ECB
2021 - 2023	**Postdoctoral Associate**, Department of Economics, University of Minnesota
2020 - 2021	**Research Associate**, European University Institute COVID-19 Social Sciences and Humanities Data Portal
2020	**Research Assistant to Aldo Rustichini and Andrea Ichino**, European University Institute
2019 - 2021	**High Performance Computing Tutor**, European University Institute
2019	**Visiting Researcher**, Bank of Estonia, Research Department
2018 - 2019	**Research Assistant to Andrea Mattozzi**, European University Institute
2012 - 2016	**Economist**, Bank of Estonia, Financial Stability Department

PROFESSIONAL ACTIVITIES

Seminars and Conferences

2022	The Society for Nonlinear Dynamics and Econometrics (SNDE) Symposium, The Society for Economic Measurement (SEM) Annual Conference, The European Economic Association (EEA) and European meeting of the Econometric Society (ESEM) Conference, Conference on Non-traditional Data, Machine Learning and Natural Language Processing in Macroeconomics at Sveriges Riksbank, Midwest Macro Meeting
2023	ASSA, NBER Summer Institute, DSE
2023 - 2024	CEF, CEF
2024	SED, SEM, Goethe University Frankfurt, Numerical Methods in Macroeconomic
2024 - 2025	ECB, ECB
2025	Dynare Conference
2026	IMAEF 2026, SEM 2026, DLMacro 2026

Refereeing

Baltic Journal of Economics, Journal of Applied Econometrics, Open Economies Review

HONOURS, SCHOLARSHIPS, AND FELLOWSHIPS

2019 - 2020 PhD Completion Grant, European University Institute
2016 - 2020 PhD Grant, Archimedes
2014 5th Lindau Meeting on Economic Sciences

SKILLS

Research software:	Python, R, Matlab, Julia, Stata
Machine learning software	PyTorch, JAX
Computer skills:	LaTeX, Git
Language skills:	English, Estonian

WORKING PAPERS

Estimating Nonlinear Heterogeneous Agent Models with Neural Networks

with Leonardo Melosi and Matthias Rottner

Status: Econometrica, conditionally accepted

We leverage recent advancements in machine learning to develop an integrated method to solve globally and estimate models featuring agent heterogeneity, nonlinear constraints, and aggregate uncertainty. Using simulated data, we show that the proposed method accurately estimates the parameters of a nonlinear Heterogeneous Agent New Keynesian (HANK) model with a zero lower bound (ZLB) constraint. We further apply our method to estimate this HANK model using U.S. data. In the estimated model, the interaction between the ZLB constraint and idiosyncratic income risks emerges as a key source of aggregate output volatility.

Beyond Averages: Heterogeneous Effects of Monetary Policy in a HANK Model for the Euro Area

with Rodolfo Rigato

We introduce an estimated medium scale Heterogeneous-Agent New Keynesian model for forecasting and policy analysis in the Euro Area and discuss the applications of this type of models in central banks, focusing on two main exercises. First, we examine an alternative scenario for monetary policy during the early 2020s inflationary episode, showing that earlier hikes in interest rates would have affected more strongly households at the lower end of the wealth distribution, whose consumption our model suggests was already depressed relative to the rest of the population. To provide intuition for this result, we introduce a new decomposition of the effects of monetary policy on consumption across the wealth distribution. Second, we show that introducing heterogeneous households does not come at the cost of forecasting accuracy by comparing the performance of our model to its exact representative-agent counterpart and demonstrating nearly identical results in predicting key aggregate variables.

Generative Economic Modeling

with Fabio Stohler and Matthias Rottner

We introduce a novel approach for solving quantitative economic models: generative economic modeling. Our method combines neural networks with conventional solution techniques. Specifically, we train neural networks on simplified versions of the economic model to approximate the complete model's dynamic behavior. Relying on these less complex sub-models circumvents the curse of dimensionality, allowing the use of well-established numerical methods. We demonstrate our approach across settings with analytical characterizations, nonlinear dynamics, and heterogeneous agents, employing asset pricing and business cycle models. Finally, we solve a high-dimensional HANK model with financial frictions to highlight how aggregate risk amplifies the precautionary motive.

The Perils of Narrowing Fiscal Spaces

with Leonardo Melosi, Sebastian Rast and Matthias Rottner

When public debt is elevated, the fiscal cost of fighting inflation rises sharply, as interest rate hikes increase government interest expenditures. We formalize this mechanism in a nonlinear New Keynesian model with a state-dependent fiscal constraint on monetary policy. High debt may dampen the monetary response to inflation, generating an inflationary bias even though government debt remains fully fiscally backed. The interaction between high debt and inflationary cost-push shocks makes the fiscal limit more likely to bind, amplifying inflation. In demand-driven downturns, the fiscal constraint may become more restrictive than the zero lower bound, forcing the central bank to either print money to purchase excess debt or accept fiscal dominance.