

Handbook of
MACROECONOMICS

Handbook of **MACROECONOMICS**

Volume 2A

Edited by

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The aim of the *Handbooks in Economics* series is to produce Handbooks for various branches of economics, each of which is a definitive source, reference, and teaching supplement for use by professional researchers and advanced graduate students. Each Handbook provides self-contained surveys of the current state of a branch of economics in the form of chapters prepared by leading specialists on various aspects of this branch of economics. These surveys summarize not only received results but also newer developments, from recent journal articles and discussion papers. Some original material is also included, but the main goal is to provide comprehensive and accessible surveys. The Handbooks are intended to provide not only useful reference volumes for professional collections but also possible supplementary readings for advanced courses for graduate students in economics.

Kenneth J. Arrow and Michael D. Intriligator

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Second-from-last: Manuel Amador, Marty Eichenbaum (slightly stepping forward), Guido Lorenzoni, Luigi Boccola, Satyajit Chatterjee, Campbell Leith, Lawrence Christiano, Christopher House

Forth row: Marios Angeletos, Hal Cole, Markus Brunnermeier, Lars Hansen, Jeff Campbell

Third Row: Volker Wieland, Douglas Diamond, Anil Kashyap, Rüdiger Bachmann, Harald Uhlig, Nobu Kiyotaki

Second row: Frank Smets, Michele Tertilt, Eric Leeper, Jing Zhang, Enrique Mendoza

First row: Mathias Doepke, Veronica Guerrieri, Amir Sufi, Michael Weber, John Taylor

Not Pictured:

Authors: Ivan Werning, Christopher House, Erik Hurst, Raf Wouters, Yuliy Sannikov, Alberto Alesina, Andrea Passalacqua

Discussants: Stavros Panageas, Eric Sims, Thibaut Lamadon, Alessandra Voena, Kinda Cheryl Hachem, Casey Mulligan, Alp Simsek



Participants-Stanford

Left to right

Last row: Fabrizio Perri, Pablo Kurlat, Mikhail Golosov, Patrick Kehoe, Gary Hansen, Tarek Hassan, Pete Klenow, Christopher Meissner, Frank Schorfheide, Lee Ohanian (somewhat behind), Robert Hodrick

Middle row: Kurt Mitman, Dirk Krueger (slightly behind), Tony Smith, Harald Uhlig (slightly behind), Nicolas Werquin, Mark Watson (somewhat in front), Nicola Fuchs-Schündeln, Ellen McGrattan, Valerie Ramey (somewhat in front), Sebastian DiTella (to the right/behind Valerie Ramey), Pedro Brinca (somewhat in front), Charles Kolstad, Bob Hall, John Hassler, Carl Walsh

Front row: Chad Jones, Per Krusell, Jim Hamilton, Jim Stock, John Taylor, Steve Davis, Ed Prescott, Michael Bordo, Chari, Oscar Jorda, Serguei Maliar, Amir Kermani

Not Pictured:

Authors: Monika Piazzesi, Martin Schneider, Jesus Fernandez-Villaverde, Juan Rubio-Ramirez, Aleh Tsyvinski

Discussants: Bart Hobijn, Pierre Siklos, Arvin Krishnamurthy, Christopher Tonetti, Yuriy Gorodnichenko, John Cochrane, Michael Bauer, Cosmin Ilut

PREFACE

This *Handbook* aims to survey the state of knowledge and major advances during the past two decades in the field of macroeconomics. It covers empirical, theoretical, methodological, and policy issues, including fiscal, monetary, and regulatory policies to deal with unemployment, economic growth, and crises, taking account of research developments before, during, and after the global financial crisis of 2007–2009. It can serve as a textbook and as an introduction to frontier research.

THE STATE OF MACRO, THE FINANCIAL CRISIS, AND NEW CURRENTS

The *Handbook* displays an amazing range of new and different ideas. There are neoclassical chapters on real business cycles and there are new Keynesian chapters on monetary business cycles. There are also chapters extending well beyond traditional macro, including the macroeconomics of the family, natural experiments, environmental issues, time allocation, and the fast moving areas of the connection between financial and real factors, incomplete markets, incomplete contracts, heterogeneous agents, and recursive contracts. There are also treatments of macroprudential policies, the impact of fiscal policy at the zero lower bound on interest rates, the fiscal theory of the price level, and the political economy of bailouts and debt. And there are chapters essential for research on the latest estimation and solution techniques (in continuous and discrete time), as well as encyclopedic reviews of the key facts of economic growth and economic fluctuations both at the aggregate and individual level.

A widely debated question for macroeconomics is whether the 2007–2009 financial crisis demonstrated a failure of the field or whether there was a failure of policy to follow the advice implied by the field. The chapters in the *Handbook* written by active and experienced researchers in macroeconomics can help answer that question in ways that informal policy debates cannot, and we hope that this is an important contribution of the *Handbook*.

There is no question that the field of macroeconomics has continued to progress enormously since the advent of rational expectations, microeconomic foundations, dynamic optimization, and general equilibrium models. Using this paradigm macroeconomists—before and after the financial crisis—have been able to introduce real-world rigidities in price setting, learning, incomplete markets, and financial frictions.

Since the global financial crisis and the Great Recession, some view a lack of financial frictions in macroeconomic models as an indication of failure, and of course there is much in this new *Handbook* on financial frictions and the financial sector more generally in

macro models. But the 1999 *Handbook* already included work on financial frictions as evidenced by the chapter written by Ben Bernanke, Mark Gertler, and Simon Gilchrist. And an important finding reported in the chapter in this *Handbook* by Jesper Linde, Frank Smets, and Raf Wouters is that when more financial factors are added to macro models used at central banks, they do not help that much in explaining the financial crisis.

SUMMARY

The 33 chapters of the *Handbook* are divided into five sections. Each chapter starts with a short summary written by its authors, and reading these is the best way to understand what is in the *Handbook*. This short summary of the whole book shows how the chapters are organized and fit together.

Section 1, The Facts of Economic Growth and Economic Fluctuation, starts off with examination of the fundamental facts upon which macroeconomic theories are built and with which they must be consistent. It covers both the long run—going back 100 years—and the short run—tracing how shocks impact and propagate over time and how changes in policy regimes or rules affect economic fluctuations. Emphasizing microeconomic underpinnings, the chapters in this section look at the time allocation by people and families, the impact of longer decisions take on debt or purchases houses, the way wage decisions affect the allocation of labor, and the historical impact of financial and fiscal crises.

Section 2 focuses *The Methodology of Macroeconomics*. It covers factor models, structural VARs, solution methods, estimation of DSGE models, recursive contracts, endogenously incomplete markets, heterogeneous agents, natural experiments, the use of “wedges” as accounting framework for business cycle models, incomplete information, coordination frictions, and comprehensive methods of comparing models and achieving robustness.

Section 3, Financial-Real Connections, covers bank runs, the real effects of financial crises, credit markets, booms and busts, the central role of the housing market, and quantitative models of sovereign debt crises. It also shows different ways to connect the real and the financial sector including through continuous-time methods and models of the term structure of uncertainty.

Section 4, Models of Economic Growth and Fluctuations, covers several approaches to modeling the economy, including neoclassical or real business cycle models and staggered wage and price models or other rigidities that can explain slow recoveries and long slumps. It takes a macroeconomic perspective on environmental issues as well as family decisions.

Section 5, Macroeconomic Policy, contains a thorough review of models used by central banks for conducting monetary policy, the analysis of regulatory policy including liquidity requirements, the fiscal theory of the price level, fiscal multipliers, liquidity traps, currency unions, and the technical sustainability vs the political economy of government debt.

John B. Taylor
Harald Uhlig

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First, we would like to acknowledge the initial encouragement from Kenneth Arrow and Michael Intriligator who, as Co-Editors of the *Handbook of Economics* Series, suggested in May 2007—nearly a decade ago and before the Global Financial Crisis—the need for a new *Handbook of Macroeconomics*. We are also grateful to Scott Bentley, Elsevier Acquisition Editor, who worked closely with us to get helpful comments and reviews of our initial outline, to Michael Woodford, who succeeded Mike Intriligator as Co-Editor of the Series for his helpful suggestions on organization and coverage, and to Joslyn Chaiprasert-Paguio, Editorial Project Manager, who brought the project to completion.

We—along with all the economists and students who will benefit from this volume—owe a great deal of thanks to the 74 accomplished economists who agreed to contribute to this endeavor for the time and creativity they invested in their chapters. We thank them for attending the conferences, presenting draft chapters, and then revising the chapters under strict deadlines. We particularly thank the discussants of the draft chapters whose careful comments helped improve the chapters and the overall book itself, including Manuel Amador, Ruediger Bachmann, Bob Barsky, Michael Bauer, Luigi Bocola, Jeff Campbell, John Cochrane, Sebastian Di Tella, Thorsten Drautzberg, Jonas Fisher, Yuriy Gorodnichenko, Kinda Cheryl Hachem, Zhiguo He, John Heaton, Bart Hobijn, Robert Hodrick, Cosmin Ilut, Oscar Jorda, Amir Kermani, Peter Klenow, Charles Kolstad, Arvind Krishnamurthy, Pablo Kurlat, Thibaut Lamadon, Guido Lorenzoni, Serguei Maliar, Casey Mulligan, Stavros Panageas, Pierre Siklos, Eric Sims, Alp Simsek, Christopher Tonetti, Alessandra Voena, Carl Walsh, and Michael Weber.

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