

Bayesian Estimation Of Dsge Models The Econometric And Tinbergen Institutes Lectures

Greater data availability has been coupled with developments in statistical theory and economic theory to allow more elaborate and complicated models to be entertained. These include factor models, DSGE models, restricted vector autoregressions, and non-linear models.

Hayashi's Econometrics promises to be the next great synthesis of modern econometrics. It introduces first year Ph.D. students to standard graduate econometrics material from a modern perspective. It covers all the standard material necessary for understanding the principal techniques of econometrics from ordinary least squares through cointegration. The book is also distinctive in developing both time-series and cross-section analysis fully, giving the reader a unified framework for understanding and integrating results. Econometrics has many useful features and covers all the important topics in econometrics in a succinct manner. All the estimation techniques that could possibly be taught in a first-year graduate course, except maximum likelihood, are treated as special cases of GMM (generalized methods of moments). Maximum likelihood

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estimators for a variety of models (such as probit and tobit) are collected in a separate chapter. This arrangement enables students to learn various estimation techniques in an efficient manner. Eight of the ten chapters include a serious empirical application drawn from labor economics, industrial organization, domestic and international finance, and macroeconomics. These empirical exercises at the end of each chapter provide students a hands-on experience applying the techniques covered in the chapter. The exposition is rigorous yet accessible to students who have a working knowledge of very basic linear algebra and probability theory. All the results are stated as propositions, so that students can see the points of the discussion and also the conditions under which those results hold. Most propositions are proved in the text. For those who intend to write a thesis on applied topics, the empirical applications of the book are a good way to learn how to conduct empirical research. For the theoretically inclined, the no-compromise treatment of the basic techniques is a good preparation for more advanced theory courses.

In this paper we adopt the Hamiltonian Monte Carlo (HMC) estimator for DSGE models by implementing it into a state-of-the-art, freely available high-performance software package. We estimate a small scale textbook New-Keynesian model and the Smets-Wouters model on US data. Our results and

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sampling diagnostics confirm the parameter estimates available in existing literature. In addition we combine the HMC framework with the Sequential Monte Carlo (SMC) algorithm which permits the estimation of DSGE models with ill-behaved posterior densities.

This volume of *Advances in Econometrics* contains articles that examine key topics in the modeling and estimation of dynamic stochastic general equilibrium (DSGE) models. Because DSGE models combine micro- and macroeconomic theory with formal econometric modeling and inference, over the past decade they have become an established framework for analysis.

Bayesian Multivariate Time Series Methods for Empirical Macroeconomics provides a survey of the Bayesian methods used in modern empirical macroeconomics.

This is a compact presentation of a large body of research that has been published over the last several decades. The material is almost entirely self-contained, so that a reader with the proper mathematical background can have access to virtually all of the technical results in this field in a compact and organized framework.

The last twenty years have witnessed tremendous advances in the mathematical, statistical, and computational tools available to applied macroeconomists. This

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rapidly evolving field has redefined how researchers test models and validate theories. Yet until now there has been no textbook that unites the latest methods and bridges the divide between theoretical and applied work. Fabio Canova brings together dynamic equilibrium theory, data analysis, and advanced econometric and computational methods to provide the first comprehensive set of techniques for use by academic economists as well as professional macroeconomists in banking and finance, industry, and government. This graduate-level textbook is for readers knowledgeable in modern macroeconomic theory, econometrics, and computational programming using RATS, MATLAB, or Gauss. Inevitably a modern treatment of such a complex topic requires a quantitative perspective, a solid dynamic theory background, and the development of empirical and numerical methods--which is where Canova's book differs from typical graduate textbooks in macroeconomics and econometrics. Rather than list a series of estimators and their properties, Canova starts from a class of DSGE models, finds an approximate linear representation for the decision rules, and describes methods needed to estimate their parameters, examining their fit to the data. The book is complete with numerous examples and exercises. Today's economic analysts need a strong foundation in both theory and application. *Methods for Applied Macroeconomic Research* offers the

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essential tools for the next generation of macroeconomists.

Financial markets respond to information virtually instantaneously. Each new piece of information influences the prices of assets and their correlations with each other, and as the system rapidly changes, so too do correlation forecasts. This fast-evolving environment presents econometricians with the challenge of forecasting dynamic correlations, which are essential inputs to risk measurement, portfolio allocation, derivative pricing, and many other critical financial activities. In *Anticipating Correlations*, Nobel Prize-winning economist Robert Engle introduces an important new method for estimating correlations for large systems of assets: Dynamic Conditional Correlation (DCC). Engle demonstrates the role of correlations in financial decision making, and addresses the economic underpinnings and theoretical properties of correlations and their relation to other measures of dependence. He compares DCC with other correlation estimators such as historical correlation, exponential smoothing, and multivariate GARCH, and he presents a range of important applications of DCC. Engle presents the asymmetric model and illustrates it using a multicountry equity and bond return model. He introduces the new FACTOR DCC model that blends factor models with the DCC to produce a model with the best features of both, and illustrates it using an array of U.S. large-cap equities. Engle shows how overinvestment in

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collateralized debt obligations, or CDOs, lies at the heart of the subprime mortgage crisis--and how the correlation models in this book could have foreseen the risks. A technical chapter of econometric results also is included. Based on the Econometric and Tinbergen Institutes Lectures, *Anticipating Correlations* puts powerful new forecasting tools into the hands of researchers, financial analysts, risk managers, derivative quants, and graduate students.

This comprehensive Handbook presents the current state of art in the theory and methodology of macroeconomic data analysis. It is intended as a reference for graduate students and researchers interested in exploring new methodologies, but can also be employed as a graduate text. The Handbook concentrates on the most important issues, models and techniques for research in macroeconomics, and highlights the core methodologies and their empirical application in an accessible manner. Each chapter is largely self-contained, whilst the comprehensive introduction provides an overview of the key statistical concepts and methods. All of the chapters include the essential references for each topic and provide a sound guide for further reading. Topics covered include unit roots, non-linearities and structural breaks, time aggregation, forecasting, the Kalman filter, generalised method of moments, maximum likelihood and Bayesian estimation, vector autoregressive, dynamic stochastic general equilibrium and

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dynamic panel models. Presenting the most important models and techniques for empirical research, this Handbook will appeal to students, researchers and academics working in empirical macro and econometrics.

This volume of *Advances in Econometrics* contains articles that examine key topics in the modeling and estimation of dynamic stochastic general equilibrium (DSGE) models. Because DSGE models combine micro- and macroeconomic theory with formal econometric modeling and inference, over the past decade they have become an established framework for analyzing a variety of issues in empirical macroeconomics. The research articles make contributions in several key areas in DSGE modeling and estimation. In particular, papers cover the modeling and role of expectations, the study of optimal monetary policy in two-country models, and the problem of non-invertibility. Other interesting areas of inquiry include the analysis of parameter identification in new open economy macroeconomic models and the modeling of trend inflation shocks. The second part of the volume is devoted to articles that offer innovations in econometric methodology. These papers advance new techniques for addressing major inferential problems and include discussion and applications of Laplace-type, frequency domain, empirical likelihood and method of moments estimators. Bayesian econometric methods have enjoyed an increase in popularity in recent

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years. Econometricians, empirical economists, and policymakers are increasingly making use of Bayesian methods. This handbook is a single source for researchers and policymakers wanting to learn about Bayesian methods in specialized fields, and for graduate students seeking to make the final step from textbook learning to the research frontier. It contains contributions by leading Bayesians on the latest developments in their specific fields of expertise. The volume provides broad coverage of the application of Bayesian econometrics in the major fields of economics and related disciplines, including macroeconomics, microeconomics, finance, and marketing. It reviews the state of the art in Bayesian econometric methodology, with chapters on posterior simulation and Markov chain Monte Carlo methods, Bayesian nonparametric techniques, and the specialized tools used by Bayesian time series econometricians such as state space models and particle filtering. It also includes chapters on Bayesian principles and methodology.

Dynamic stochastic general equilibrium (DSGE) models have become one of the workhorses of modern macroeconomics and are extensively used for academic research as well as forecasting and policy analysis at central banks. This book introduces readers to state-of-the-art computational techniques used in the Bayesian analysis of DSGE models. The book covers Markov chain Monte Carlo

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techniques for linearized DSGE models, novel sequential Monte Carlo methods that can be used for parameter inference, and the estimation of nonlinear DSGE models based on particle filter approximations of the likelihood function. The theoretical foundations of the algorithms are discussed in depth, and detailed empirical applications and numerical illustrations are provided. The book also gives invaluable advice on how to tailor these algorithms to specific applications and assess the accuracy and reliability of the computations. Bayesian Estimation of DSGE Models is essential reading for graduate students, academic researchers, and practitioners at policy institutions.

Macroeconomics tries to describe and explain the economywide movement of prices, output, and unemployment. The field has been sharply divided among various schools, including Keynesian, monetarist, new classical, and others. It has also been split between theorists and empiricists. Ray Fair is a resolute empiricist, developing and refining methods for testing theories and models. The field cannot advance without the discipline of testing how well the models approximate the data. Using a multicountry econometric model, he examines several important questions, including what causes inflation, how monetary authorities behave and what are their stabilization limits, how large is the wealth effect on aggregate consumption, whether European monetary policy has been

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too restrictive, and how large are the stabilization costs to Europe of adopting the euro. He finds, among other things, little evidence for the rational expectations hypothesis and for the so-called non-accelerating inflation rate of unemployment (NAIRU) hypothesis. He also shows that the U.S. economy in the last half of the 1990s was not a new age economy.

This is a book on deterministic and stochastic Growth Theory and the computational methods needed to produce numerical solutions. Exogenous and endogenous growth models are thoroughly reviewed. Special attention is paid to the use of these models for fiscal and monetary policy analysis. Modern Business Cycle Theory, the New Keynesian Macroeconomics, the class of Dynamic Stochastic General Equilibrium models, can be all considered as special cases of models of economic growth, and they can be analyzed by the theoretical and numerical procedures provided in the textbook. Analytical discussions are presented in full detail. The book is self contained and it is designed so that the student advances in the theoretical and the computational issues in parallel. EXCEL and Matlab files are provided on an accompanying website (see Preface to the Second Edition) to illustrate theoretical results as well as to simulate the effects of economic policy interventions. The structure of these program files is described in "Numerical exercise"-type of sections, where the output of these

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programs is also interpreted. The second edition corrects a few typographical errors and improves some notation.

High-frequency trading is an algorithm-based computerized trading practice that allows firms to trade stocks in milliseconds. Over the last fifteen years, the use of statistical and econometric methods for analyzing high-frequency financial data has grown exponentially. This growth has been driven by the increasing availability of such data, the technological advancements that make high-frequency trading strategies possible, and the need of practitioners to analyze these data. This comprehensive book introduces readers to these emerging methods and tools of analysis. Yacine Aït-Sahalia and Jean Jacod cover the mathematical foundations of stochastic processes, describe the primary characteristics of high-frequency financial data, and present the asymptotic concepts that their analysis relies on. Aït-Sahalia and Jacod also deal with estimation of the volatility portion of the model, including methods that are robust to market microstructure noise, and address estimation and testing questions involving the jump part of the model. As they demonstrate, the practical importance and relevance of jumps in financial data are universally recognized, but only recently have econometric methods become available to rigorously analyze jump processes. Aït-Sahalia and Jacod approach high-frequency

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econometrics with a distinct focus on the financial side of matters while maintaining technical rigor, which makes this book invaluable to researchers and practitioners alike.

Variations in the foreign exchange market influence all aspects of the world economy, and understanding these dynamics is one of the great challenges of international economics. This book provides a new, comprehensive, and in-depth examination of the standard theories and latest research in exchange-rate economics. Covering a vast swath of theoretical and empirical work, the book explores established theories of exchange-rate determination using macroeconomic fundamentals, and presents unique microbased approaches that combine the insights of microstructure models with the macroeconomic forces driving currency trading. Macroeconomic models have long assumed that agents--households, firms, financial institutions, and central banks--all have the same information about the structure of the economy and therefore hold the same expectations and uncertainties regarding foreign currency returns. Microbased models, however, look at how heterogeneous information influences the trading decisions of agents and becomes embedded in exchange rates. Replicating key features of actual currency markets, these microbased models generate a rich array of empirical predictions concerning trading patterns and

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exchange-rate dynamics that are strongly supported by data. The models also show how changing macroeconomic conditions exert an influence on short-term exchange-rate dynamics via their impact on currency trading. Designed for graduate courses in international macroeconomics, international finance, and finance, and as a go-to reference for researchers in international economics, Exchange-Rate Dynamics guides readers through a range of literature on exchange-rate determination, offering fresh insights for further reading and research. Comprehensive and in-depth examination of the latest research in exchange-rate economics Outlines theoretical and empirical research across the spectrum of modeling approaches Presents new results on the importance of currency trading in exchange-rate determination Provides new perspectives on long-standing puzzles in exchange-rate economics End-of-chapter questions cement key ideas

Dynamic Stochastic General Equilibrium (DSGE) models have become a standard tool in various fields of economics. This type of models has a superior theoretical foundation when compared to the Keynesian models which are traditionally used for policy analysis and forecasting. Although a lot has been done to improve the empirical properties of DSGE models, there is still a need for further research in this field. In this book, the author first considers a closed economy general equilibrium framework to

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empirically validate the alternative mechanisms for introducing nominal rigidities. As the comparison is done in the context of the Euro area aggregate data, the results provide guidance to researchers dealing with estimation of Euro area DSGE models in general. In the second part of the book, a coherent economic and statistical framework that approximates the structure of the EMU and explicitly accounts for the historical monetary regime change is presented. In such a framework the disaggregate information on the Euro area can be utilized, so that one can explain the area-wide aggregates, and also examine the cross-region linkages.

Bayesian Estimation of DSGE Models Princeton University Press

In *Monetary and Fiscal Policy Through a DSGE Lens*, Harold L. Cole develops and extends versions of a classic quantitative model of economic growth to take on a wide range of topics in monetary and fiscal policy. Bridging the gap between current undergraduate and graduate texts in the field, this comprehensive book covers the basic elements of advanced macroeconomics and equips readers to understand the debate on key policy questions. By using the simple DSGE, or dynamic stochastic general equilibrium, framework to build a series of quantitative models, the book combines a gradual introduction to advanced analytic methods with computer programming and quantitative policy analysis. In a clear discussion of the sophisticated interaction between theory and data, Cole explains how to gauge how well a model captures key elements in the data and how to reverse engineer a model to data. The

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book covers costs of inflation, optimal monetary policy, the impact of labor and capital taxes, and optimal fiscal policy. It systematically discusses technical material including the new Keynesian liquidity shock models, standard analytic methods, such as Lagrangian methods, and computational methods using Matlab and Python. With a strong computational emphasis, the volume teaches how to program up and solve systems of non-linear equations and develop models to study the macroeconomy. Knowing how to deeply understand and analyze models and develop computational code to evaluate the implications of those models is essential for students of macroeconomics. This book connects the standard undergraduate material to the elaborate models of advanced graduate courses with systematic and logical coverage of the basics of advanced modern macroeconomics.

The Oxford Handbook of Computational Economics and Finance provides a survey of both the foundations of and recent advances in the frontiers of analysis and action. It is both historically and interdisciplinarily rich and also tightly connected to the rise of digital society. It begins with the conventional view of computational economics, including recent algorithmic development in computing rational expectations, volatility, and general equilibrium. It then moves from traditional computing in economics and finance to recent developments in natural computing, including applications of nature-inspired intelligence, genetic programming, swarm intelligence, and fuzzy logic. Also examined are recent developments of network and agent-based computing in

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economics. How these approaches are applied is examined in chapters on such subjects as trading robots and automated markets. The last part deals with the epistemology of simulation in its trinity form with the integration of simulation, computation, and dynamics. Distinctive is the focus on natural computationalism and the examination of the implications of intelligent machines for the future of computational economics and finance. Not merely individual robots, but whole integrated systems are extending their "immigration" to the world of Homo sapiens, or symbiogenesis.

This book introduces one of the most powerful tools of modern economics to a wide audience: those who will later construct or consume game-theoretic models. Robert Gibbons addresses scholars in applied fields within economics who want a serious and thorough discussion of game theory but who may have found other works overly abstract. Gibbons emphasizes the economic applications of the theory at least as much as the pure theory itself; formal arguments about abstract games play a minor role. The applications illustrate the process of model building--of translating an informal description of a multi-person decision situation into a formal game-theoretic problem to be analyzed. Also, the variety of applications shows that similar issues arise in different areas of economics, and that the same game-theoretic tools can be applied in each setting. In order to emphasize the broad potential scope of the theory, conventional applications from industrial organization have been largely replaced by applications

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from labor, macro, and other applied fields in economics. The book covers four classes of games, and four corresponding notions of equilibrium: static games of complete information and Nash equilibrium, dynamic games of complete information and subgame-perfect Nash equilibrium, static games of incomplete information and Bayesian Nash equilibrium, and dynamic games of incomplete information and perfect Bayesian equilibrium.

We survey Bayesian methods for estimating dynamic stochastic general equilibrium (DSGE) models in this article. We focus on New Keynesian (NK)DSGE models because of the interest shown in this class of models by economists in academic and policy-making institutions. This interest stems from the ability of this class of DSGE model to transmit real, nominal, and fiscal and monetary policy shocks into endogenous fluctuations at business cycle frequencies. Intuition about these propagation mechanisms is developed by reviewing the structure of a canonical NKDSGE model. Estimation and evaluation of the NKDSGE model rests on being able to detrend its optimality and equilibrium conditions, to construct a linear approximation of the model, to solve for its linear approximate decision rules, and to map from this solution into a state space model to generate Kalman filter projections. The likelihood of the linear approximate NKDSGE model is based on these projections. The projections and likelihood are useful inputs into the Metropolis-Hastings Markov chain Monte Carlo simulator that we employ to produce Bayesian estimates of the NKDSGE model. We

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discuss an algorithm that implements this simulator. This algorithm involves choosing priors of the NKDSGE model parameters and fixing initial conditions to start the simulator. The output of the simulator is posterior estimates of two NKDSGE models, which are summarized and compared to results in the existing literature. Given the posterior distributions, the NKDSGE models are evaluated with tools that determine which is most favored by the data. We also give a short history of DSGE model estimation as well as pointing to issues that are at the frontier of this research. The global financial crisis highlighted the impact on macroeconomic outcomes of recurrent events like business and financial cycles, highs and lows in volatility, and crashes and recessions. At the most basic level, such recurrent events can be summarized using binary indicators showing if the event will occur or not. These indicators are constructed either directly from data or indirectly through models. Because they are constructed, they have different properties than those arising in microeconometrics, and how one is to use them depends a lot on the method of construction. This book presents the econometric methods necessary for the successful modeling of recurrent events, providing valuable insights for policymakers, empirical researchers, and theorists. It explains why it is inherently difficult to forecast the onset of a recession in a way that provides useful guidance for active stabilization policy, with the consequence that policymakers should place more emphasis on making the economy robust to recessions. The book offers a range of econometric tools and

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techniques that researchers can use to measure recurrent events, summarize their properties, and evaluate how effectively economic and statistical models capture them. These methods also offer insights for developing models that are consistent with observed financial and real cycles. This book is an essential resource for students, academics, and researchers at central banks and institutions such as the International Monetary Fund.

During the recession in the years 2008-2009, the most severe for mature economies in the post-war period, housing markets were often mentioned as having a special responsibility. The objective of this book is to shed light on the cyclical behaviour of the housing markets, its fundamental determinants in terms of supply and demand characteristics, and its relationship with the overall business cycle. The co-movements of house prices across countries are also considered, as well as the channel of transmission of house price changes to the rest of the economy. Particular attention is paid to the effects on private consumption, through possible wealth effects. The book is a compilation of original papers produced by economists and researchers from the four main national central banks in the euro area, also with the participation of leading academics.

Solutions to the odd-numbered exercises in the second edition of Economic Dynamics in Discrete Time. This manual includes solutions to the odd-numbered exercises in the second edition of Economic Dynamics in Discrete Time. Some exercises are purely

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analytical, while others require numerical methods. Computer codes are provided for most problems. Many exercises ask the reader to apply the methods learned in a chapter to solve related problems, but some exercises ask the reader to complete missing steps in the proof of a theorem or in the solution of an example in the book. Covers the essentials in understanding Dynamic Stochastic General Equilibrium (DSGE) models It begins with a basic Real Business Cycle model and gradually adds: imperfect competition; frictions in prices and wages; habit formation; non-Ricardian agents; adjustment cost in investment; of not using maximum installed capacity; and Government.

Written by one of the leading experts in the field, this book focuses on the interplay between model specification, data collection, and econometric testing of dynamic asset pricing models. The first several chapters provide an in-depth treatment of the econometric methods used in analyzing financial time-series models. The remainder explores the goodness-of-fit of preference-based and no-arbitrage models of equity returns and the term structure of interest rates; equity and fixed-income derivatives prices; and the prices of defaultable securities. Singleton addresses the restrictions on the joint distributions of asset returns and other economic variables implied by dynamic asset pricing models, as well as the interplay between model formulation and the choice of econometric estimation strategy. For each pricing problem, he provides a comprehensive overview of the empirical evidence on goodness-of-fit, with tables and

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graphs that facilitate critical assessment of the current state of the relevant literatures. As an added feature, Singleton includes throughout the book interesting tidbits of new research. These range from empirical results (not reported elsewhere, or updated from Singleton's previous papers) to new observations about model specification and new econometric methods for testing models. Clear and comprehensive, the book will appeal to researchers at financial institutions as well as advanced students of economics and finance, mathematics, and science.

Resumen Esta tesis presenta tres diferentes experimentos de política utilizando estimaciones Bayesianas de modelos DSGE. En la primera parte, se quiere demostrar que una política fiscal contracíclica es un instrumento importante para la estabilidad macroeconómica. Este resultado es robusto a diferentes controles. En la segunda parte, se demuestra las variaciones de las estimaciones de los parámetros estructurales según la descomposición ciclo-tendencia, si en uno o en dos estadios. Resulta que con un procedimiento a dos estadios la volatilidad del PIB es explicada mayormente por shocks nominales, mientras que con un procedimiento a un estadio por un shock a la inversión. Se argumenta que el procedimiento a un estadio proporciona una estructura probabilística más coherente. La tercera parte de la tesis propone una manera de estimar los parámetros estructurales utilizando la información procedente de distintos filtros. Mientras que con un tipo de estimación con un único filtro el dinero tiene poca influencia en las fluctuaciones de medio plazo, con un sistema

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de múltiples filtros el dinero tiene un papel importante en la transmisión de los shocks.

Abstract This thesis examines three different policy experiments using Bayesian estimates of DSGE models. First, we show that countercyclical fiscal policies are important to smooth fluctuations and that this is true regardless of how we specify the fiscal rule and several details of the model. Second, we show that the sources of output volatility obtained from a cyclical DSGE model crucially depend on whether estimation is done sequentially or jointly. In fact, while with a two step procedure, where the trend is first removed, nominal shocks drive output volatility, investment shocks dominate when structural and trend parameters are estimated jointly. Finally, we examine the role of money for business cycle fluctuations with a single and a multiple filtering approach, where information provided by different filters is joint.

Individuals and families make key decisions that impact many aspects of financial stability and determine the future of the economy. These decisions involve balancing current sacrifice against future benefits. People have to decide how much to invest in health care, exercise, their diet, and insurance. They must decide how much debt to take on, and how much to save. And they make choices about jobs that determine employment and unemployment levels. Forward-Looking Decision Making is about modeling this individual or family-based decision making using an optimizing dynamic programming model. Robert Hall first reviews ideas about dynamic programs and introduces new ideas about numerical solutions and the representation of solved

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models as Markov processes. He surveys recent research on the parameters of preferences--the intertemporal elasticity of substitution, the Frisch elasticity of labor supply, and the Frisch cross-elasticity. He then examines dynamic programming models applied to health spending, long-term care insurance, employment, entrepreneurial risk-taking, and consumer debt. Linking theory with data and applying them to real-world problems, *Forward-Looking Decision Making* uses dynamic optimization programming models to shed light on individual behaviors and their economic implications.

A unified, comprehensive, and up-to-date introduction to the analytical and numerical tools for solving dynamic economic problems. This book offers a unified, comprehensive, and up-to-date treatment of analytical and numerical tools for solving dynamic economic problems. The focus is on introducing recursive methods—an important part of every economist's set of tools—and readers will learn to apply recursive methods to a variety of dynamic economic problems. The book is notable for its combination of theoretical foundations and numerical methods. Each topic is first described in theoretical terms, with explicit definitions and rigorous proofs; numerical methods and computer codes to implement these methods follow. Drawing on the latest research, the book covers such cutting-edge topics as asset price bubbles, recursive utility, robust control, policy analysis in dynamic New Keynesian models with the zero lower bound on interest rates, and Bayesian estimation of dynamic stochastic general

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equilibrium (DSGE) models. The book first introduces the theory of dynamical systems and numerical methods for solving dynamical systems, and then discusses the theory and applications of dynamic optimization. The book goes on to treat equilibrium analysis, covering a variety of core macroeconomic models, and such additional topics as recursive utility (increasingly used in finance and macroeconomics), dynamic games, and recursive contracts. The book introduces Dynare, a widely used software platform for handling a range of economic models; readers will learn to use Dynare for numerically solving DSGE models and performing Bayesian estimation of DSGE models. Mathematical appendixes present all the necessary mathematical concepts and results. Matlab codes used to solve examples are indexed and downloadable from the book's website. A solutions manual for students is available for sale from the MIT Press; a downloadable instructor's manual is available to qualified instructors. Structural vector autoregressive (VAR) models are important tools for empirical work in macroeconomics, finance, and related fields. This book not only reviews the many alternative structural VAR approaches discussed in the literature, but also highlights their pros and cons in practice. It provides guidance to empirical researchers as to the most appropriate modeling choices, methods of estimating, and evaluating structural VAR models. The book traces the evolution of the structural VAR methodology and contrasts it with other common methodologies, including dynamic stochastic general equilibrium (DSGE) models. It is intended as a bridge between the often quite technical

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econometric literature on structural VAR modeling and the needs of empirical researchers. The focus is not on providing the most rigorous theoretical arguments, but on enhancing the reader's understanding of the methods in question and their assumptions. Empirical examples are provided for illustration.

Koop, Pesaran and Smith (2011) suggest a simple diagnostic indicator for the Bayesian estimation of the parameters of a DSGE model. They show that, if a parameter is well identified, the precision of the posterior should improve as the (artificial) data size T increases, and the indicator checks the speed at which precision improves. It does not require any additional programming; a researcher just needs to generate artificial data and estimate the model with different T . Applying this to Smets and Wouters's (2007) medium size US model, we find that while exogenous shock processes are well identified, most of the parameters in the structural equations are not. -- Bayesian Estimation ; Dynamic stochastic general equilibrium models ; Identification

Econometric Modeling provides a new and stimulating introduction to econometrics, focusing on modeling. The key issue confronting empirical economics is to establish sustainable relationships that are both supported by data and interpretable from economic theory. The unified likelihood-based approach of this book gives students the required statistical foundations of estimation and inference, and leads to a thorough understanding of econometric techniques. David Hendry and Bent Nielsen introduce modeling for a range of situations, including binary data sets, multiple regression, and cointegrated systems. In each setting, a statistical model is constructed to explain the observed variation in the data, with estimation

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and inference based on the likelihood function. Substantive issues are always addressed, showing how both statistical and economic assumptions can be tested and empirical results interpreted. Important empirical problems such as structural breaks, forecasting, and model selection are covered, and Monte Carlo simulation is explained and applied. Econometric Modeling is a self-contained introduction for advanced undergraduate or graduate students. Throughout, data illustrate and motivate the approach, and are available for computer-based teaching. Technical issues from probability theory and statistical theory are introduced only as needed. Nevertheless, the approach is rigorous, emphasizing the coherent formulation, estimation, and evaluation of econometric models relevant for empirical research. The revised edition of the essential resource on macroeconometrics Structural Macroeconometrics provides a thorough overview and in-depth exploration of methodologies, models, and techniques used to analyze forces shaping national economies. In this thoroughly revised second edition, David DeJong and Chetan Dave emphasize time series econometrics and unite theoretical and empirical research, while taking into account important new advances in the field. The authors detail strategies for solving dynamic structural models and present the full range of methods for characterizing and evaluating empirical implications, including calibration exercises, method-of-moment procedures, and likelihood-based procedures, both classical and Bayesian. The authors look at recent strides that have been made to enhance numerical efficiency, consider the expanded applicability of dynamic factor models, and examine the use of alternative assumptions involving learning and rational inattention on the part of decision makers. The treatment of methodologies for obtaining nonlinear model representations has been expanded, and linear and nonlinear model representations are

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integrated throughout the text. The book offers a rich array of implementation algorithms, sample empirical applications, and supporting computer code. Structural Macroeconometrics is the ideal textbook for graduate students seeking an introduction to macroeconomics and econometrics, and for advanced students pursuing applied research in macroeconomics. The book's historical perspective, along with its broad presentation of alternative methodologies, makes it an indispensable resource for academics and professionals.

Lukas Heim evaluates the performance of a price-level targeting rule compared to that of a standard inflation targeting rule. The comparison is based on a medium-scale DSGE model which has been estimated based on state-of-the-art Bayesian methods. The model for the Swiss economy is an expanded version of the framework proposed by Galì and Monacelli (2005) as well as Monacelli (2005). It is enriched with habit formation in consumption, price indexation, labor market imperfections, and several additional structural disturbances. The results show that – exactly as expected – the volatility of inflation is quite significantly lower under the price-level targeting regime, whereas the volatility of the output gap is markedly higher conditional on either productivity or preference shocks. Therefore, the introduction of a price-level targeting regime would likely produce an increase in the volatility of real economic activity conditional on both supply-side and demand-side shocks. Since inflation and output are targeted simultaneously, none of the two policies is strictly dominant.

Intended primarily to prepare first-year graduate students for their ongoing work in econometrics, economic theory, and finance, this innovative book presents the fundamental concepts of theoretical econometrics, from measure-theoretic probability to statistics. A. Ronald Gallant covers these topics at an introductory level and develops the ideas to the point

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where they can be applied. He thereby provides the reader not only with a basic grasp of the key empirical tools but with sound intuition as well. In addition to covering the basic tools of empirical work in economics and finance, Gallant devotes particular attention to motivating ideas and presenting them as the solution to practical problems. For example, he presents correlation, regression, and conditional expectation as a means of obtaining the best approximation of one random variable by some function of another. He considers linear, polynomial, and unrestricted functions, and leads the reader to the notion of conditioning on a sigma-algebra as a means for finding the unrestricted solution. The reader thus gains an understanding of the relationships among linear, polynomial, and unrestricted solutions. Proofs of results are presented when the proof itself aids understanding or when the proof technique has practical value. A major text-treatise by one of the leading scholars in this field, An Introduction to Econometric Theory will prove valuable not only to graduate students but also to all economists, statisticians, and finance professionals interested in the ideas and implications of theoretical econometrics.

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