

## Advances in Economics and Econometrics

This is the first of three volumes containing edited versions of papers and commentaries presented at invited symposium sessions of the Ninth World Congress of the Econometric Society, held in London in August 2005. The papers summarize and interpret key developments, and they discuss future directions for a wide variety of topics in economics and econometrics. The papers cover both theory and applications. Written by leading specialists in their fields, these volumes provide a unique survey of progress in the discipline.

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Cambridge University Press & Assessment  
 978-0-521-69208-3 — Advances in Economics and Econometrics  
 Edited by Richard Blundell, Whitney K. Newey, Torsten Persson  
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*Theory and Applications, Ninth  
World Congress, Volume I*

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**CAMBRIDGE**  
UNIVERSITY PRESS

Cambridge University Press & Assessment  
 978-0-521-69208-3 — Advances in Economics and Econometrics  
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 Frontmatter  
[More Information](#)



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 314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India  
 103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

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 Information on this title: [www.cambridge.org/9780521692083](http://www.cambridge.org/9780521692083)

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First published 2006

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloging-in-Publication data*

Advances in economics and econometrics : theory and applications, Ninth World Congress / edited by Richard Blundell, Whitney K. Newey, Torsten Persson.  
 p. cm. – (Econometric Society monographs; no. 41)

Edited versions of papers and a commentary presented at invited symposium sessions of the ninth World Congress of the Econometric Society, held in London in 2005.

Includes bibliographical references and index.

ISBN 0-521-87152-2 (hardback) – ISBN 0-521-69208-3 (pbk.)

1. Econometrics – Congresses. 2. Economics – Congresses. I. Blundell, Richard.

II. Newey, Whitney K. III. Persson, Torsten. IV. Econometric Society.

World Congress (9th : 2005 : London, England) V. Title. VI. Series.

HB139 .A35 2005  
 330–dc22 2006014485

ISBN 978-0-521-87152-5 Hardback

ISBN 978-0-521-69208-3 Paperback

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## Introduction by the Editors

These volumes constitute the invited proceedings from the Ninth World Congress of the Econometric Society held on the campus of University College London on August 19–24, 2005.

As co-chairs of the Program Committee for the Congress, one of our most pleasant tasks was to select topics and authors for fifteen invited symposia – each organized around two papers. We chose topics for these invited papers that we thought were important, of current research interest, and where we could see a prospective long-run impact on the profession. All of the scholars that we first contacted agreed to contribute a paper. We encouraged them to write papers that would be of broad interest but would not necessarily be comprehensive literature surveys.

In the event, all symposia ran for two hours during which the authors presented their papers and an invited discussant made comments on both of them. This book collects revised versions of the thirty papers presented in the fifteen invited symposia, as well as some of the comments by the discussants.

In all but one day of the congress, three invited symposia were run in parallel: one in economic theory, one in an applied field, and one in econometrics. The three volumes making up the book are organized by the same principle.

Volume I contains the papers on economic theory, broadly defined. In Chapter 1, “The Economics of Social Networks,” Matthew Jackson discusses a central field of sociological study, a major application of random graph theory, and an emerging area of study by economists, statistical physicists, and computer scientists. The chapter provides an illuminating perspective on these literatures, with a focus on formal models of social networks, especially those based on random graphs and those based on game-theoretic reasoning. Jackson highlights some of the strengths, weaknesses, and potential synergies between these two network modeling approaches.

Chapter 2, “Multi-Contracting Mechanism Design” by David Martimort, surveys the literature on common agency. Martimort describes the features that make common-agency games special, reviews the tools needed to describe equilibrium allocations under common agency, and uses a set of simple examples to

illustrate such equilibrium allocations – under complete as well as asymmetric information – and their efficiency properties. The chapter concludes that common agency might perform quite well, especially in the presence of collusion or limited commitment.

Chapter 3, by Philippe Jehiel and Benny Moldovanu, is entitled “Allocative and Informational Externalities in Auctions and Related Mechanisms.” Such externalities arise naturally in models embedding (multi-object) auctions in larger economic contexts, e.g., when bidders interact downstream once the auction has closed. In such settings, traditional auction formats need no longer be efficient and may give rise to multiple equilibria and strategic non-participation. Jehiel and Moldovanu discuss which allocations are possible and impossible to achieve under different approaches to implementation and in different information environments.

In Chapter 4, “The Economics of Relationships,” Larry Samuelson discusses recent work in the theory of repeated games, which provides the tools for studying long-run relationships. He examines folk theorems for games with imperfect public and private monitoring and new techniques for studying equilibria when folk theorems are not helpful because players are not sufficiently patient or well informed. The chapter illustrates a number of recent applications that have moved the literature on repeated games from technical questions to findings of economic relevance. It concludes with a discussion of outstanding problems.

Following these chapters on game theory are two chapters on economic design. Chapter 5, “Information in Mechanism Design,” written by Dirk Bergemann and Juuso Välimäki, examines endogeneity of private information and robustness to private information in mechanism design. The authors view information acquisition and robustness to private information as two distinct but related aspects of information management, which are important in many design settings. The chapter not only surveys the existing literature, but also points out directions for future work.

In Chapter 6, “Communication in Economic Mechanisms,” Ilya Segal argues that full revelation of privately held information about preferences may often be impractical or undesirable. He then asks what minimal information must be elicited from agents to achieve the social goals of the mechanism designer. Segal relates this question to the work on communication complexity in computer science and dimensionality of message space in economics, where communication is measured in bits and real numbers, respectively. He outlines existing results on the topic, a substantial body of related work, and some extensions.

The next two chapters deal with macroeconomic theory. Chapter 7, by Naryana Kocherlakota, is entitled “Advances in Dynamic Optimal Taxation.” It surveys the recent literature concerning the structure of optimal taxes in dynamic economies. As in the literature following Mirrlees’s path-breaking work on optimal static taxation, there are no restrictions on the available policy instruments, and the optimal tax schedules are designed subject only to the private information held by private agents about skills and effort. Kocherlakota



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illustrates and explains the major results achieved so far and suggests where the literature may go next.

In Chapter 8, “Quantitative Macroeconomic Models with Heterogeneous Agents,” Per Krusell and Tony Smith review recent work on dynamic stochastic macroeconomic models with individual heterogeneity in income, employment status, and wealth, to approximate empirical models in the applied consumption and labor literatures. They focus on the properties of such models – especially so-called approximate aggregation – and the computational methods for analyzing them. The chapter also presents a simple two-period setting that serves as a useful laboratory to examine the implications of the distribution of income in different economic settings.

The final section of the volume concerns political economy. In Chapter 9, “Modeling Inefficient Institutions,” Daron Acemoglu asks why inefficient institutions emerge and persist, and he develops a simple framework to provide some answers to this question. He illustrates how a group may want to pursue inefficient policies to increase their income and directly or indirectly transfer resources from the rest of the society to themselves, and how the preferences over inefficient policies may translate into inefficient economic institutions. The chapter also provides a framework for the analysis of institutional change and institutional persistence.

While Acemoglu emphasizes the macro side of political economy, Chapter 10, “Whither Political Economy? Theories, Facts and Issues,” by Antonio Merlo emphasizes the micro side. Merlo reviews current research on four of the fundamental institutions of a political economy: voters, politicians, parties, and governments. He identifies and discusses salient questions posed in the literature, presents some stylized models and examples, and summarizes the main theoretical findings. Moreover, the chapter describes available data, reviews relevant empirical evidence, and discusses challenges for empirical research in political economy.

Volume I ends with a discussion of Chapters 9 and 10, by Tim Besley.

Volume II contains papers on applied economics and applied econometrics, again broadly defined. For example, the first six chapters present a broad review and evaluation of developments in modern industrial economics. There is then an assessment of behavioral economics. This is followed by a detailed review of progress in dynamic labor economics. The volume rounds up with two insightful chapters on progress and new ideas in empirical development economics.

In Chapter 1 of Volume II, “Empirical Models of Auctions,” Susan Athey and Phil Haile review some of the most innovative of the recent empirical applications and present three key insights that underlie much of the progress in the econometrics of auction models. The first is the usefulness of casting the identification problem as one of learning about latent distribution functions based on observation of certain order statistics. The second is the observation that equilibrium can be thought of as a state of mutual best responses. The third is the value of additional variation in the data beyond the realizations of bids.

Although observable variation in auction characteristics might initially seem to be minor nuisances to be dealt with, the authors argue that these kinds of variation often can be exploited to aid identification. Chapter 2, “Identification in Models of Oligopoly Entry” by Steve Berry and Elie Tamer reviews and extends a number of results on the identification of models that are used in the empirical literature. They present simple versions of both static and dynamic entry models. For simple static models, they show how natural shape restrictions can be used to identify competition effects. In the case of dynamic models, they examine existing results on the model with i.i.d. linear errors and then consider more realistic cases, such as when the distribution of fixed costs is unknown. Chapter 3, “Empirical Models of Imperfect Competition: A Discussion,” by Liran Einav and Aviv Nevo discusses the first two chapters of this volume. Einav and Nevo note that in the empirical IO literature much progress has been made on identification and estimation of many different dimensions of firms’ decisions. There are more flexible models of consumer demand and better methods to non-parametrically estimate bidder valuation in auctions, and significant progress has been made on estimating entry and dynamic games.

Chapter 4, “Recent Developments in the Economics of Price Discrimination” by Mark Armstrong, surveys the recent literature on price discrimination. The focus is on three aspects of pricing decisions: the information about customers available to firms; the instruments firms can use in the design of their tariffs; and the ability of firms to commit to their pricing plans. Armstrong notes that developments in marketing technology mean that firms often have access to more information about individual customers than was previously the case. The use of this information might be restricted by public policy toward customer privacy. Where it is not restricted, firms may be unable to commit to how they use the information. With monopoly supply, an increased ability to engage in price discrimination will boost profit unless the firm cannot commit to its pricing policy. Likewise, an enhanced ability to commit to prices will benefit a monopolist. With competition, the effects of price discrimination on profit, consumer surplus, and overall welfare depend on the kinds of information and/or tariff instruments available to firms. The paper shows that the ability to commit to prices may damage industry profit. Chapter 5, “Bounded Rationality in Industrial Organization” by Glenn Ellison, notes that three main approaches are found in the recent literature: rule-of thumb papers specify simple rules for behavior; explicit bounds papers consider agents who maximize payoffs net of cognitive costs; and the psychology and economics approach typically cites experimental evidence to motivate utility-like frameworks. Common to each recent literature is a focus on consumer irrationalities that firms might exploit. The paper then discusses several new topics that have been opened up by the consideration of bounded rationality and new perspectives that have been provided on traditional topics. Chapter 6, “Price Discrimination and Irrational Consumers: Discussion of Armstrong and Ellison” by Ken Hendricks, presents a review of these two chapters. In relation to the Armstrong paper he argues that one of the roles of theory is to classify the kinds of oligopoly markets

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where price discrimination is likely to occur, the form that it is likely to take, and the impact that it is likely to have on profits and welfare. He notes that the theme of firms exploiting consumers is also present in Ellison's chapter, which focuses primarily on irrational consumers. However, the main issues there are methodological, challenging the field to reexamine its traditional approach.

Chapters 7 to 9 turn to the field of behavioral economics. In Chapter 7, Colin Camerer shows how evidence from psychology and other disciplines has been used in behavioral economics to create models of limits on rationality, willpower, and self-interest and explores their implications in economic aggregates. The paper reviews the basic themes of behavioral economics: sensitivity of revealed preferences to descriptions of goods and procedures; generalizations of models of choice over risk, ambiguity, and time; fairness and reciprocity; non-Bayesian judgment; and stochastic equilibrium and learning. He argues that a central concern is what happens in equilibrium when agents are imperfect but heterogeneous. Camerer argues that neuroeconomics extends the psychological data use and suggests that it is likely to support rational choice theory in some cases, to buttress behavioral economics in some cases, and to suggest different constructs as well. In Chapter 8, "Incentives and Self-Control," Ted O'Donoghue and Matthew Rabin investigate the design of incentives for people subject to self-control problems in the form of a time-inconsistent taste for immediate gratification. They argue that because such present-biased people may not behave in their own long-run best interests, there is scope for firms, policymakers, friends and family, and the people themselves to create incentives for "better" behavior. They note that optimal incentive design, therefore, will attend to details that the conventional model would say are essentially irrelevant. The paper goes on to describe some general principles that have emerged in recent and ongoing research on incentives, highlighting the importance of heterogeneity among agents and providing for flexibility, and illustrating these principles with some simple examples. In his discussion presented in Chapter 9, Ariel Rubinstein argues that although there is no reason for economics to hide behind the traditional barriers, for behavioral economics to be a revolutionary program of research rather than a passing episode, it must become more open-minded and much more self-critical.

Turning to dynamic labor economics, in Chapter 10, "Dynamic Models for Policy Evaluation," Costas Meghir shows that the evaluation of interventions has become a commonly used policy tool, which is frequently adopted to improve the transparency and effectiveness of public policy. However, he argues that evaluation methods based on comparing treatment and control groups in small-scale trials are not capable of providing a complete picture of the likely effects of a policy and do not provide a framework that allows issues related to the design of the program to be addressed. Meghir shows how experimental data from field trials can be used to enhance the evaluation of interventions and illustrates the potential importance of allowing for longer-term incentive and general equilibrium effects. In Chapter 11, "Microeconomic Search-Matching Models and Matched Employer-Employee Data," Jean-Marc Robin

suggests that the recent advent of matched employer-employee data has allowed significant progress in our understanding of individual labor earnings. He argues that viewing these empirical analyses through the lens of structural job search models can help clarify and unify some of its recurring findings. Among other things he shows how search frictions combined with a theoretically founded wage formation rule based on renegotiation by mutual consent can account for the widely documented dynamic persistence of individual wages. In his discussion of these two papers in Chapter 12, Joe Altonji argues that they provide useful analyses of developments in two important areas in labor economics and public finance. He examines the potential to utilize a continuum of models between a simple experimental or quasi-experimental analysis on the one hand and a dynamic structural model on the other, even in complicated dynamic settings where reduced form analysis is difficult. He also supplements the research agenda in search/matching models and the application using matched employer/ employee data.

Volume II concludes with two key papers on advances in development economics. Chapter 13, “Field Experiments in Development Economics” by Esther Duflo, observes that over the last decade, the long tradition in development economics of collecting original data to test specific hypotheses has merged with an expertise in setting up randomized field experiments. This in turn has resulted in an increasingly large number of studies where an original experiment has been set up to test economic theories and hypotheses. The paper extracts some substantive and methodological lessons from such studies in three domains: incentives, social learning, and time-inconsistent preferences. It makes the case that we need both to continue testing existing theories and to start thinking of how the theories may be adapted to make sense of the field experiment results, many of which are starting to challenge them. In Chapter 14, “Institutions and Development: A View from Below,” Rohini Pande and Christopher Udry argue the case for greater exploitation of synergies between research on specific institutions based on micro-data and the big questions posed by the institutions and growth literature. They suggest two research programs based on micro-data that have significant potential. The first uses policy-induced variation in specific institutions within countries to understand how these institutions influence economic activity. The second exploits the fact that the incentives provided by a given institutional context often vary with individuals’ economic and political status. The chapter analyzes the way variations in individual responses to the same institution can be used to both identify how institutions affect economic outcomes and to understand how institutional change arises in response to changing economic and demographic pressures.

Volume III contains papers on econometrics. The first five chapters are about identification and estimation when unobserved heterogeneity has non-linear effects. This work is motivated by economic models where the common assumption of additive disturbances is not satisfied. The three chapters that follow concern weak instruments and empirical likelihood. These methods

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provide alternatives to classical instrumental variables inference, which can be important in applications. The next three chapters are about econometrics for financial markets. They summarize powerful approaches to analyzing the time series behavior of asset markets. The last two chapters return to the subject of unobserved heterogeneity, now in the context of nonlinear models for panel data. They consider bias correction methods for fixed effects estimation, a promising method of controlling for unobserved heterogeneity in panel data.

In Chapter 1 of Volume III, “Identification of Nonadditive Structural Functions,” Andrew Chesher reviews recent work on identification of structural models with disturbances that are not additively separable. This chapter focuses on the case where there are no more disturbances than endogenous variables. In the one disturbance per equation case independence of the instrument and a conditional quantile of the disturbance can suffice for identification of the structural equation at a particular value of the disturbance. In the triangular model case, where the number of disturbances entering each equation is equal to the number of endogenous variables in that equation, local independence of instruments and disturbances suffices for identification of structural derivatives. Bounds are also given for the case with a discrete endogenous variable. In Chapter 2, “Nonadditive Models with Endogenous Regressors,” Guido Imbens considers the case where the disturbance in the equation of interest can have any dimension. Identification and estimation with control functions is discussed, a control function being a variable that when conditioned on gives exogeneity. A control function for the triangular system is provided. Identification of certain policy effects is considered.

In Chapter 3, “Heterogeneity and Microeconomic Modeling,” Martin Browning and Jesus Carro suggest that heterogeneity is more common in applications than usually allowed for, that how it is allowed for can often have large effects on results, and that it is difficult to allow for in a general way. They illustrate these suggestions with applied and theoretical examples. In particular, they consider a stationary first-order Markov chain model that allows for general heterogeneity, where they propose estimators and analyze their properties. Chapter 4, “Heterogeneous Choice” by Rosa Matzkin, gives identification results for nonparametric choice models where disturbances enter nonlinearly. For models where choices are dependent variables, this paper describes very recent results on identification of demand models and discrete choice models that are important for understanding revealed preference with unobserved heterogeneity. For models where the choices are regressors, the paper gives control function and other identification results for structural effects. In Chapter 5, “Modeling Heterogeneity,” Arthur Lewbel discusses the results from Chapters 3 and 4, showing that model interpretation depends critically on how the nonseparable disturbance enters.

Chapter 6, “Inference with Weak Instruments” by Donald Andrews and James Stock, reviews recent developments in methods for dealing with weak instruments (IVs) in IV regression models. The focus is more on tests (and confidence intervals derived from tests) than estimators. Power comparisons of the

conditional likelihood ratio (CLR), Anderson-Rubin, and Lagrange multiplier tests are made. The paper also presents new testing results under “many weak IV asymptotics.” Chapter 7, “Empirical Likelihood Methods in Econometrics: Theory and Practice” by Yuichi Kitamura, gives nonparametric maximum likelihood and generalized minimum contrast interpretations of the empirical likelihood estimator. This chapter presents an asymptotic optimality result for empirical likelihood under a large deviations optimality criterion. Monte Carlo results are given, illustrating substantial gains that can result. Also, the literature on higher-order properties of empirical likelihood is reviewed. Chapter 8, “Weak Instruments and Empirical Likelihood: A Discussion of Papers by D. W. K. Andrews and J. H. Stock and Yuichi Kitamura” by Richard Smith, considers inference for GMM with weak identification based on generalized empirical likelihood. It provides an asymptotic analysis for GMM that is a direct extension of the Andrews and Stock small sample analysis for IV. This chapter proposes a version of the CLR for GMM that is a precise analog to the IV case.

Chapter 9, “Estimating Continuous Time Models with Discretely Sampled Data” by Yacine Ait-Sahalia, starts with a familiar model and describes many of the most recent developments. It begins with identification and estimation of a univariate diffusion. This model is then progressively generalized to allow for different data generating processes (such as multivariate diffusions or jump processes), different observation schemes (such as incorporating market microstructure noise), and different sampling schemes (such as allowing for random time intervals). Chapter 10, “Variation, Jumps, and High Frequency Data in Financial Econometrics” by Neil Shephard and Ole Barndorff-Nielsen, describes the econometrics of realized volatility. This chapter focuses on quadratic variation and considers the detection of jumps. The impact of market frictions is considered. Chapter 11, “Discussion of Ait-Sahalia and Barndorff-Nielsen and Shephard” by Oliver Linton and Ilze Kalnina, considers an approach to allowing for market microstructure noise. It presents consistency results for estimation of quadratic variation in the presence of small measurement errors.

Chapter 12, “Understanding Bias in Nonlinear Panel Models: Some Recent Developments” by Manuel Arellano and Jinyong Hahn, describes and discusses the relationship among recently developed bias adjustments for nonlinear panel data models with fixed effects. These bias adjustments are used to reduce the bias order of fixed effect parameter and marginal effects as the number of time series observations grows with the number of cross-sectional observations. The paper shows that a wide variety of bias adjustments lead to similar results, including those based on profile likelihoods and those based on moment conditions. In Chapter 13, “Fixed and Random Effects in Nonlinear Panels: A Discussion of Arellano and Hahn” by Tiemen Woutersen, an alternative bias reduction approach is discussed. This approach, which predates many of the others, involves integrating the fixed effect over a prior distribution and produces bias reductions equivalent to the other methods.

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We are grateful to Christina Lönnblad, Emma Hyman, and Emily Gallagher for assisting us in our work with putting the papers together into three volumes. We would also like to thank all the authors, not only for writing such excellent papers, but also for delivering in time for this book to appear less than a year after the Congress. Such prompt publication would, of course, not have been possible without the keen support of our Cambridge University Press editor, Scott Parris.

London, Cambridge, and Stockholm, May 2006  
Richard Blundell, Whitney Newey, and Torsten Persson