

Duality And Modern Economics

This highly original book develops a systematic zero-net-profit comparative statics theory of the firm that challenges many widely held views in microeconomics. It builds a bridge between the marginalist long-run theory of the firm and Sraffian theory to create a unified theoretical framework that explains how firms react to exogenous shocks resulting in new equilibrium positions of the whole economy. The central message of the book is that too often economists expect more from the microeconomic laws of input demand and output supply than they can really give. The authors show that the zero-net-profit condition requires a more articulated analysis that sometimes yields qualitative results contrary to those of familiar economic laws. Written for academic researchers and graduate students, the book will be of particular interest to those working on the microeconomics of industry equilibrium, comparative statics and Sraffian economics.

This book expounds trade theory emphasizing that a trading equilibrium is general rather than partial, and is often best modelled using dual or envelope functions. This yields a compact treatment of standard theory, clarifies some errors and confusions, and produces some new departures. In particular, the book (i) gives unified treatments of comparative statics and welfare, (ii) sheds new light on the factor-price equalization issue, (iii) treats the modern specific-factor model in parallel with the usual Heckscher-Ohlin one, (iv) analyses the balance of payments in general equilibrium with flexible and fixed prices, (v) studies imperfect competition and intra-industry trade.

A novel theme of Harmony of society and its economy on spiritual basis is highlighted for the first time in scientific literature in this book. Thanks God, based on a synthesis of scientific knowledge and spiritual essence, the features and the global paradigm and the laws of Harmony «D + 3D», wrote the entire book. Special attention is paid to the study of huge role of spiritual and moral and intellectual development of individuals, social groups in building of harmonious social economy in countries with four «D». The monograph shows the ways of disharmonies elimination in the modern world, beginning of new epoch and civilizational changes and the need for broad partnership of East and West, all continents in the face of global challenges to the Nations is based here. The book is intended for workers of science and education, PhD candidates, graduate students, students engaged in scientific research in the fields of economics, finance, sociology, political science, demography and other branches of social Sciences and Humanities. It is of great interest to practitioners and to all the readers who are conscious about the choice of vector of harmonious development of the countries.

Designed to give second-year undergraduates an intuitive understanding of basic mathematical techniques, and when and why they are applicable. Building on the traditional framework of calculus, the notion of a concave function is used to link the new algebraic methods with the more familiar graphical approach and to introduce the modern use of duality in economic analysis. Final sections on consumer theory and the theory of the firm offer solutions to problems set earlier in the book. Contents: Sets, functions and their graphs; Differential calculus and local optima; Concave functions, global and constrained optima; Duality;

Integration, first order differential and difference equations; Consumer theory and the theory of the firm; Appendix: Linear algebra^R

Why the United States has developed an economy divided between rich and poor and how racism helped bring this about. Foundations of Dynamic Economic Analysis presents a modern and thorough exposition of the fundamental mathematical formalism used to study optimal control theory, i.e., continuous time dynamic economic processes, and to interpret dynamic economic behavior. The style of presentation, with its continual emphasis on the economic interpretation of mathematics and models, distinguishes it from several other excellent texts on the subject. This approach is aided dramatically by introducing the dynamic envelope theorem and the method of comparative dynamics early in the exposition. Accordingly, motivated and economically revealing proofs of the transversality conditions come about by use of the dynamic envelope theorem. Furthermore, such sequencing of the material naturally leads to the development of the primal-dual method of comparative dynamics and dynamic duality theory, two modern approaches used to tease out the empirical content of optimal control models. The stylistic approach ultimately draws attention to the empirical richness of optimal control theory, a feature missing in virtually all other textbooks of this type.

Motivated by practical problems in engineering and physics, drawing on a wide range of applied mathematical disciplines, this book is the first to provide, within a unified framework, a self-contained comprehensive mathematical theory of duality for general non-convex, non-smooth systems, with emphasis on methods and applications in engineering mechanics. Topics covered include the classical (minimax) mono-duality of convex static equilibria, the beautiful bi-duality in dynamical systems, the interesting tri-duality in non-convex problems and the complicated multi-duality in general canonical systems. A potentially powerful sequential canonical dual transformation method for solving fully nonlinear problems is developed heuristically and illustrated by use of many interesting examples as well as extensive applications in a wide variety of nonlinear systems, including differential equations, variational problems and inequalities, constrained global optimization, multi-well phase transitions, non-smooth post-bifurcation, large deformation mechanics, structural limit analysis, differential geometry and non-convex dynamical systems. With exceptionally coherent and lucid exposition, the work fills a big gap between the mathematical and engineering sciences. It shows how to use formal language and duality methods to model natural phenomena, to construct intrinsic frameworks in different fields and to provide ideas, concepts and powerful methods for solving non-convex, non-smooth problems arising naturally in engineering and science. Much of the book contains material that is new, both in its manner of presentation and in its research development. A self-contained appendix provides some necessary background from elementary functional analysis. Audience: The book will be a valuable resource for students and researchers in applied mathematics, physics, mechanics and engineering. The whole volume or selected chapters can also be recommended as a text for both senior undergraduate and graduate courses in applied mathematics, mechanics, general engineering science and other areas in which the notions of optimization and variational methods are employed.

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This comprehensive volume covers a wide range of duality topics ranging from simple ideas in network flows to complex issues in non-convex optimization and multicriteria problems. In addition, it examines duality in the context of variational inequalities and vector variational inequalities, as generalizations to optimization. Duality in Optimization and Variational Inequalities is intended for researchers and practitioners of optimization with the aim of enhancing their understanding of duality. It provides a wider appreciation of optimality conditions in various scenarios and under different assumptions. It will enable the reader to use duality to devise more effective computational methods, and to aid more meaningful interpretation of optimization and variational inequality problems.

Industrial Price, Quantity, and Productivity Indices: The Micro-Economic Theory and an Application gives a comprehensive account of the micro-economic foundations of industrial price, quantity, and productivity indices. The various results available from the literature have been brought together into a consistent framework, based upon modern duality theory. This integration also made it possible to generalize several of these results. Thus, this book will be an important resource for theoretically as well as empirically-oriented researchers who seek to analyse economic problems with the help of index numbers. Although this book's emphasis is on micro-economic theory, it is also intended as a practical guide. A full chapter is therefore devoted to an empirical application. Three different approaches are pursued: a straightforward empirical approach, a non-parametric estimation approach, and a parametric estimation approach. As well as illustrating some of the more important concepts explored in this book, and showing to what extent different computational approaches lead to different outcomes for the same measures, this chapter also makes a powerful case for the use of enterprise micro-data in economic research.

These essays in the purest tradition of political economy consider three major themes from the multiple relationships between the state and the economy: duality, myth, and crisis. The state is a complex mix of dualisms: the welfare versus the warfare state; the agency of both social integration and exploitation; and public versus private institutions. The editors aim to distinguish true from false dualisms. Myths in modern society are important as they enables whites to dominate blacks, men to dominate women, warplanners to dominate peacemakers, the rich to dominate the poor. The editors consider the myth that the state and the market are separate, the state as a single, monolithic structure, and that we can all identify and share in a national interest. The crisis of the state is the third major theme. The state is in crisis, because we have no fully-developed theory of the state, because its welfare and warfare functions are undergoing profound change. The essays are all written from the point of view of radical institutionalism and emphasise the need for increased participation in the policymaking and policy evaluating processes of the state.

Symmetry and Economic Invariance (second enhanced edition) explores how the symmetry and invariance of economic models can provide insights into their properties. Although the professional economist of today is adept at many of the mathematical techniques used in static and dynamic optimization models, group theory is still not among his or her repertoire of tools. The authors aim to show that group theoretic methods form a natural extension of the techniques commonly used in economics and

that they can be easily mastered. Part I provides an introduction that minimizes prerequisites including prior knowledge of group theory. Part II discusses recent developments in the field.

Our original reason for writing this book was the desire to write down in one place a complete summary of the major results in duality theory pioneered by Ronald W. Shephard in three of his books, *Cost and Production Functions* (1953), *Theory of Cost and Production Functions* (1970), and *Indirect Production Functions* (1974). In this way, newcomers to the field would have easy access to these important ideas. In addition, we report a few new results of our own. In particular, we show the duality relationship between the profit function and the eight equivalent representations of technology that were elucidated by Shephard. However, in planning the book and discussing it with colleagues it became evident that such a book would be more useful if it also provided a number of applications of Shephard's duality theory to economic problems. Thus, we have also attempted to present examples of the use of duality theory in areas such as efficiency measurement, index number theory, shadow pricing, cost-benefit analysis, and econometric estimation. Much of our thinking about duality theory and its uses has been influenced by our present and former collaborators. They include Charles Blackorby, Shawna Grosskopf, Knox Lovell, Robert Russell, and, not surprisingly, Ronald W. Shephard. We have also benefited over the years from many discussions with W. Erwin Diewert.

The role of fiscal policy in short-run macroeconomic stabilization is, by now, well known in the academic literature and in policy circles. However, this focus on the short-run, especially in a democracy, means that much less attention has been paid to the other consequences of the use of fiscal policy. By studying the intergenerational-welfare aspects of fiscal policy, this book deals with some fundamental issues of fiscal policy. Why does public debt tend to rise over time in democracies? Why is there a tendency for government spending on consumption and on social security to grow? Why do governments fail to invest in public capital adequately? Should a dollar transferred from the young be treated as a dollar transferred to the old? By studying the international aspects of fiscal policy, the book establishes international differences in fiscal policy as determinants of persistent trade imbalances and international indebtedness. It also considers some basic questions on international transfers and austerity in open economies. What criteria should be used to define a successful foreign-aid programme? Why is foreign aid likely to fail in a world of global wealth disparity? Can reliance be placed on the international coordination of austerity to improve welfare in the long run? Is austerity accompanied by international transfers superior to austerity unaccompanied by international transfers? This book based on the OLG model fills a gap on fiscal-policy issues in the recent spate of books on overlapping generations.

Optimal Transport Methods in Economics is the first textbook on the subject written especially for students and researchers in economics. Optimal transport theory is used widely to solve problems in mathematics and some areas of the sciences, but it can also be used to understand a range of problems in applied economics, such as the matching between job seekers and jobs, the determinants of real estate prices, and the formation of matrimonial unions. This is the first text to develop clear applications of optimal transport to economic modeling, statistics, and econometrics. It covers the basic results of the theory as well as their relations to linear programming, network flow problems, convex analysis, and computational geometry. Emphasizing

computational methods, it also includes programming examples that provide details on implementation. Applications include discrete choice models, models of differential demand, and quantile-based statistical estimation methods, as well as asset pricing models. Authoritative and accessible, *Optimal Transport Methods in Economics* also features numerous exercises throughout that help you develop your mathematical agility, deepen your computational skills, and strengthen your economic intuition. The first introduction to the subject written especially for economists Includes programming examples Features numerous exercises throughout Ideal for students and researchers alike

Provides a simple introductory exposition to the basic structure of dual technique analysis - consumer behaviour and producer behaviour - which has been used by many economists since the 1970s. Includes diagrams and an index.

Provides a rigorous treatment of some of the basic tools of economic modeling and reasoning, along with an assessment of the strengths and weaknesses of these tools.

An international trade text that integrates theoretical and applied methods

This handbook brings together contributions from the top researchers in the economics of food consumption and policy. Designed as a comprehensive guide to academics and graduate students, it discusses theory and methods, policy, and current topics and applications.

Linear Optimization and Duality: A Modern Exposition departs from convention in significant ways. Standard linear programming textbooks present the material in the order in which it was discovered. Duality is treated as a difficult add-on after coverage of formulation, the simplex method, and polyhedral theory. Students end up without knowing duality in their bones. This text brings in duality in Chapter 1 and carries duality all the way through the exposition. Chapter 1 gives a general definition of duality that shows the dual aspects of a matrix as a column of rows and a row of columns. The proof of weak duality in Chapter 2 is shown via the Lagrangian, which relies on matrix duality. The first three LP formulation examples in Chapter 3 are classic primal-dual pairs including the diet problem and 2-person zero sum games. For many engineering students, optimization is their first immersion in rigorous mathematics. Conventional texts assume a level of mathematical sophistication they don't have. This text embeds dozens of reading tips and hundreds of answered questions to guide such students. Features Emphasis on duality throughout Practical tips for modeling and computation Coverage of computational complexity and data structures Exercises and problems based on the learning theory concept of the zone of proximal development Guidance for the mathematically unsophisticated reader About the Author Craig A. Tovey is a professor in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Institute of Technology. Dr. Tovey received an AB from Harvard College, an MS in computer science and a PhD in operations research from Stanford University. His principal activities are in operations research and its interdisciplinary applications. He received a Presidential Young Investigator Award and the Jacob Wolfowitz Prize for research in

heuristics. He was named an Institute Fellow at Georgia Tech, and was recognized by the ACM Special Interest Group on Electronic Commerce with the Test of Time Award. Dr. Tovey received the 2016 Golden Goose Award for his research on bee foraging behavior leading to the development of the Honey Bee Algorithm.

This book presents an unorthodox identity economics that approaches social identity through a non-classical psychology. Garai applies the modern physics concept of wave-particle duality to economic psychology, finding a corresponding duality in object-oriented activity and historically generated social identity. These two factors interconnect to create a double-storied structure of social identity and its behavioral manifestations. The book then presents a calculation device for mediating between behavioral and identity economics. Garai then applies all these factors to two socioeconomic systems developed during the second modernization: Bolshevik-type “socialism” and post-Bolshevik “capitalism.” In this context, he examines the Eastern Bloc nomenklatura as a duality of bureaucratic and patron-client organization (“state and party”) and the establishment of both today's material capitalism and its other half: human capital economics.

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Dramatic changes or revolutions in a field of science are often made by outsiders or 'trespassers, ' who are not limited by the established, 'expert' approaches. Each essay in this diverse collection shows the fruits of intellectual trespassing and poaching among fields such as economics, Kantian ethics, Platonic philosophy, category theory, double-entry accounting, arbitrage, algebraic logic, series-parallel duality, and financial arithmetic.

This thoroughly revised second edition of Applied International Trade presents the leading theoretical and applied methods used in the field of international trade. It highlights the importance of linking theory to data and of verifying theoretical predictions through empirical investigation. The book also draws out and highlights the theoretical and policy implications that arise from empirical findings. Features of the second edition include: ? Expanded focus on emerging topics such as firm heterogeneity, intrafirm trade, and the basis and structure of multinational production ? Increased coverage of gravity models and international factor movements, including labor migration ? Fully updated presentation and discussion of the most recent empirical findings, data methods and sources Rigorous and analytical, yet written in an accessible manner with ample use of graphs throughout, Applied International Trade is an ideal text for courses at advanced undergraduate and masters level. For instructors: A companion website is available at www.palgrave.com/economics/AIT2, comprising lecture slides and an Instructor's Manual with solutions to end-of-chapter problems.

Symmetry and Economic Invariance: An Introduction explores how symmetry and invariance of economic models can provide insights into their properties. While the professional economist is nowadays adept at many of the mathematical

techniques used in static and dynamic optimization models, group theory is still not among his or her repertoire of tools. The authors aim to show that group theoretic methods form a natural extension of the techniques commonly used in economics and that they can be easily mastered.

This book explores analytical methods used in transportation economics and policy analysis. Encompassing fields of economics such as Industrial Organisation, Welfare Economics, General Equilibrium Theory and Input-Output-Analysis, the study of transport from an economic point of view serves as a test bench for applying methodologies of economic science to the real world. Each chapter opens with a brief theoretical introduction before evaluating case studies, using the state-of-the-art statistical and econometric techniques.

Why do women in contemporary western societies experience contradiction between their autonomous and maternal selves? What are the origins of this contradiction and the associated 'double shift' that result in widespread calls to either 'lean in' or 'opt out'? How are some mothers subverting these contradictions and finding meaningful ways of reconciling their autonomous and maternal selves? In *Modern Motherhood and Women's Dual Identities*, Petra Bueskens argues that western modernisation consigned women to the home and released them from it in historically unprecedented, yet interconnected, ways. Her ground-breaking formulation is that western women are free as 'individuals' and constrained as mothers, with the twist that it is the former that produces the latter. Bueskens' theoretical contribution consists of the identification and analysis of modern women's duality, drawing on political philosophy, feminist theory and sociology tracking the changing nature of discourses of women, freedom and motherhood across three centuries. While the current literature points to the pervasiveness of contradiction and double-shifts for mothers, very little attention has been paid to how (some) women are subverting contradiction and 'rewriting the sexual contract'. Bridging this gap, Bueskens' interviews ten 'revolving mothers' to reveal how periodic absence, exceeding the standard work-day, disrupts the default position assigned to mothers in the home, and in turn disrupts the gendered dynamics of household work. A provocative and original work, *Modern Motherhood and Women's Dual Identities* will appeal to graduate students and researchers interested in fields such as Women and Gender Studies, Sociology of Motherhood and Social and Political Theory.

Studies in generalized convexity and generalized monotonicity have significantly increased during the last two decades. Researchers with very diverse backgrounds such as mathematical programming, optimization theory, convex analysis, nonlinear analysis, nonsmooth analysis, linear algebra, probability theory, variational inequalities, game theory, economic theory, engineering, management science, equilibrium analysis, for example are attracted to this fast growing field of study. Such enormous research activity is partially due to the discovery of a rich, elegant and deep theory which provides

a basis for interesting existing and potential applications in different disciplines. The handbook offers an advanced and broad overview of the current state of the field. It contains fourteen chapters written by the leading experts on the respective subject; eight on generalized convexity and the remaining six on generalized monotonicity.

The relationship between economic growth and the environment is at the forefront of public attention and poses serious challenges for policymakers around the world. *Economic Analysis of Environmental Policy*, a textbook for advanced undergraduate and graduate courses, provides a rigorous and thorough explanation of modern environmental economics, applying this exposition to contemporary issues and policy analysis. Opening with a discussion of contemporary pollution problems, institutional players and the main policy instruments at our disposal, Ross McKittrick develops core theories of environmental valuation and optimal control of pollution. Chapters that follow cover issues like tradable permits, regulatory standards, emission taxes, and polluter liability as well as advanced topics like trade and the environment, sustainability, risk, inequality, and self-monitoring. Throughout, McKittrick uses clear, intuitive, and coherent analytical tools, so that students, academics, and practitioners can develop their policy analysis skills while comprehending the debates and challenges at the frontier of this exciting and rapidly-developing field.

The labour market consists of two tiers. Workers in the upper tier enjoy high wages, good benefits and employment security. The lower tier has low wages, high turnover and little chance of promotion. Saint-Paul looks at the implications. Ordered vector spaces and cones made their debut in mathematics at the beginning of the twentieth century. They were developed in parallel (but from a different perspective) with functional analysis and operator theory. Before the 1950s, ordered vector spaces appeared in the literature in a fragmented way. Their systematic study began around the world after 1950 mainly through the efforts of the Russian, Japanese, German, and Dutch schools. Since cones are being employed to solve optimization problems, the theory of ordered vector spaces is an indispensable tool for solving a variety of applied problems appearing in several diverse areas, such as engineering, econometrics, and the social sciences. For this reason this theory plays a prominent role not only in functional analysis but also in a wide range of applications. This is a book about a modern perspective on cones and ordered vector spaces. It includes material that has not been presented earlier in a monograph or a textbook. With many exercises of varying degrees of difficulty, the book is suitable for graduate courses. Most of the new topics currently discussed in the book have their origins in problems from economics and finance. Therefore, the book will be valuable to any researcher and graduate student who works in mathematics, engineering, economics, finance, and any other field that uses optimization techniques.

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