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Introduction

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Seven years have passed since the inception of the *Annual Review of Resource Economics*, and we are proud to present our sixth volume of the journal. The purpose of this review is to provide authoritative and critical evaluation of the most significant research developments in resource economics, defined broadly to include natural resource management and the economics of natural resources, the environment, agriculture, energy, and development. The journal highlights research on crucial issues of current concern, including sustainable development, climate change, food security, green energy, inequality, and poverty. The articles assess advancements in analytical methods and showcase public policy and political economic approaches related to each of our research themes. The reviews emphasize multidisciplinary perspectives and the integration of broad scientific knowledge into economic modeling and analysis. Our editorial committee pays particular attention to the bridge between research discoveries in the natural and biophysical sciences and economics. As is customary in the Annual Reviews journals, the editorial committee selects the topics and gives authors much latitude, benefiting readers with diverse opinions from leading scholars while subjecting all prepared manuscripts to a rigorous peer review process.

The first article in this volume is dedicated to the career and contributions of a leading scholar: In this issue, we chose to highlight the work and accomplishments of Irma Adelman. The interview with Irma highlights the transitions she has experienced during her life, moving from Eastern Europe, to Israel, and to the United States and living through the Holocaust, the post–World War II era, the emergence of the Asian Tigers, and the feminist movement. Also covered extensively are Dr. Adelman’s significant contributions to development economics, econometrics, and computable general equilibrium. Following this article, the volume is organized along five themes: resources, energy, environment, agriculture, and economic development.

Within the resource economics theme, several articles present new methodologies to measure the dynamics of natural resources. The first article, by Dasgupta, introduces a unified normative theory for sustainability and resource policy analysis. It emphasizes that measurement of growth and wealth should go beyond traditional measurement of GNP to include all measures of capital. The proposed framework radically changes the computation and interpretation of natural accounts and is demonstrated with a study of wealth accumulation in India. The Brock et al. article reviews the use of optimal control methods over space and time. This methodology allows for the formation of spatially dependent regulations, taking into account both growth processes and dynamic spillover. The general methodology also deals with various forms of uncertainty and allows for robust policy designs. The next article, by Nillesen & Bulte, presents both theoretical and empirical findings on the relationship between natural resources and conflicts. Historical case studies strongly suggest that discovery of natural resources can accentuate conflicts. Insightful literature emphasizes microeconomic studies that allow for identification of the role of resources in the initiation and accentuating conflicts. The article by de Zeeuw presents new modeling frameworks that take into account regime shifts in ecological systems in designing optimal management rules for natural resources. The analysis recognizes the need to address common property issues, complex dynamics, and uncertainty in studying systems that undergo regime shifts. It covers applications from the management of lakes and fisheries to climate change. Chile is an example of a natural resource–producing country that has escaped the resource curse. Céspedes et al. give an overview of studies that analyze the Chilean experience. They find that the Chile government has acted responsibly, has considered long-run impacts in its design of policies, and has accumulated sufficient optionality so that fiscal policy could play a stabilizing role in the short run. They also derive lessons from the Chilean experience for other nations.

The energy theme begins with Kilian's excellent survey of the growing literature on oil price shocks. The literature is becoming more sophisticated in its use of econometric tools and data sources, and recent empirical analysis emphasizes that oil price shocks are not exogenous but are a result of the interaction between oil markets and the global economy. The Metcalf article on energy security emphasizes its various dimensions, incorporating both economic and political forces. The article suggests that there are material differences in the perspectives of policy makers and economists on energy security. The literature reveals that energy security is enhanced by reducing consumption, not by reducing imports. It also suggests that use of taxation to enhance energy security may be inherently inefficient. The paper by Hendricks & Porter overviews the literature on designing mechanisms for allocating resource rights, focusing on studies of development rights designed for oil and gas leases in the United States. Designing these mechanisms must address problems of adverse selection as well as moral hazard while still selecting the bidder with the highest valuation. A major challenge in designing these mechanisms is solving the moral hazard problem of assuring that the rights holders make efficient investment decisions. Finally, Newell et al. overview the literature on carbon markets. These markets are slowly maturing, and the resulting empirical evidence provides valuable lessons. Trading markets require adjustment, monitoring, and careful allocation of free allowances. Different trading mechanisms may serve different constituents, and carbon markets have to be designed to coexist with accompanying policy measures, particularly the myriad of policies introduced by the Kyoto Protocol.

The section on environmental economics addresses several major topics. The first two articles focus on human health and the environment. The paper by Currie et al. presents evidence of the implications of early-life exposure to pollution. It provides both theoretical and conceptual modeling as well as econometric estimates of exposure to pollution in early ages, emphasizes the challenges of identification, and distinguishes between direct and indirect effects of such exposure. The article by Cameron presents a comprehensive overview on the literature addressing the main issues of valuating reductions in morbidity risk. It distinguishes between valuation of illness versus valuation of attributes of diseases, and it discusses how these valuations can be incorporated into benefit-cost analysis. In the context of climate change, the Gollier & Hammit article addresses the controversies regarding the choice of discount rate and its implication for the cost of carbon in developing climate change mitigation strategies. The authors identify a convergence of opinion on the appropriate discount rate, depending on maturities, and overview some of the approaches to address uncertainty in discounting. The synthesis provided by Jakob et al. evaluates the design of carbon policies that target emissions from consumption (for example, driving cars) versus production (for example, mining for fossil fuel). Although regulation of consumption can address issues of carbon leakage, attempts at such regulation may encounter obstacles from political economic forces. The multiple considerations emerging in the design of effective systems suggest the need for policy portfolios that include both consumption and production governmental intervention policies. The following article, by Noussair & van Soest, investigates findings on the value of economic experiments as the foundation of support for the implementation of environmental policies. Experiments have been used to investigate whether government intervention is necessary for environmental protection and is effective in doing so and to what extent humans are concerned only with their own private welfare. Experiments have been quite useful in assessing market-based policy solutions, especially in the design of water allocation and tradable permit schemes. A critical issue in the design of environmental policies is the associated structure of monitoring and enforcement. An insightful analysis by Shimshack provides a lens of state-of-the-art knowledge on such monitoring and enforcement. Although this area has grown, much is still unknown, and the article reviews findings both on enforcement as part of a regulation effort and on the performance of alternative mechanisms for both monitoring and enforcement. The final article within the environmental economics theme, by Alix-Garcia & Wolff, reviews the theory and evidence surrounding forest-related payments for ecosystem services schemes, which intend to slow and reverse deforestation. They cover research on targeting, contract design, the effectiveness of and challenges to program implementation, spillovers, and distributional considerations of conditional cash transfers. They also highlight areas of potential future research.

The four papers on agricultural economics emphasize informational issues. Lusk et al. survey the expanding literature on acceptance of new food technologies. They demonstrate how the literature has evolved from earlier work that emphasized the role of risk perception to more recent studies that emphasize the role of emotions and moral judgment, integrating psychological knowledge to assess

attitudes and willingness to pay for controversial technologies. The paper by Roe et al. addresses a related topic: voluntary versus mandatory labeling. These authors focus on the growing literature comparing the welfare implications of alternative labeling systems, identifying situations in which different types of labeling are socially optimal, and investigate the distributional effects of labeling systems as well as the political economic forces behind labeling programs. The Waldman & Kerr article investigates research on an important type of labeling: ecolabeling. Ecolabels are used to certify that certain activities in the production process meet some desirable environmental or social criteria. The literature evaluates the performance of various agrifood programs and finds that the heterogeneity of agricultural production systems and their complexity limit the effectiveness of labeling efforts, both in controlling pollution and in achieving efficient outcomes. The last paper on agricultural economics, by Mérel & Howitt, surveys the literature using an important empirical tool: positive mathematical programming. They demonstrate that, although these methods have experienced important applications, there are new challenges in the methodology's capacity to capture complex realities that require further improvements in model specification.

For the development theme, the first article, by Dercon & Gollin, investigates the role of agriculture in development strategies for sub-Saharan Africa, given the dominance of this sector in many of the countries within this region. They find that optimal development strategies should vary across countries and that, in some countries, agricultural growth is a prerequisite for advancement in the rest of the economy. The paper by Winters & Martuscelli addresses a key policy question: Does trade liberalization alleviate poverty? Studies support that globalization generally boosts income and reduces poverty, but trade liberalization has had heterogeneous effects on very poor households, depending on the nature of the policies and the employment landscape that these households face. Interestingly, female workers tend to gain from trade liberalization. Anderson surveys a vast literature on trade, price volatility, and food security. He presents empirical evidence showing the failures of unilateral attempts by individual countries to insulate themselves from price volatility. These efforts collectively imperil global food security. The article authored by Nakasone et al. provides an overview of findings regarding the role of information and communication technologies (ICT) in enhancing development, particularly in the agricultural sector. There is evidence that in some countries improved price information from ICT leads to efficiency gains and that in other cases it may increase the effectiveness of extension programs.

The *Annual Review of Resource Economics* ideally acts as a dialogue between the authors and you, the reader. Your input and responses are very valuable, as we strive to utilize new technologies and make our journal more visible. We wish to thank those who have supported the growth and success of the *Annual Review of Resource Economics*, as well as those who work behind the scenes, contributing to the production of this stimulating and thoughtful publication. We thank our authors for their insights and ingenuity, as well as their willingness to be clear, up to date, and responsive to our peer approval process. We always appreciate feedback and advice on how we can further develop this unique venue, to best allow leading scholars to advance their work and ideas and readers to interpret the frontier developments emerging from our field.

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