BOOK REVIEWS

Regulation Theory and Sustainable Development—Business Leaders and Ecological Modernization, by Corinne Gendron. (Routledge, 2012) Hardback, 211 pages. ISBN: 978-0-415-61770-3.

It is not only in the recent past that—for instance, as a result of the Fukushima accident, increasing air pollution in mega-cities, or concerns related to groundwater quality accompanied with the production of gas from unconventional shale resources—environmental awareness increases. The Club of Rome was founded in 1968, the United Nations Framework Convention on Climate Change was negotiated in the early 1990s, and many dimensions of environmental and ecological challenges continue to gain an ever increasing attention. To contribute to the existing body of theoretical literature addressing different dimensions of environmental challenges, possible remedies, and politics, Corinne Gendron puts forward a *socio-economic theory of the environment* which aims at explaining the transformation dynamics brought about by ecological crises.

This book belongs to the *Routledge Research in Environmental Politics Series* which intends to present "innovative research for high-level specialist readership". The author is a Professor in the Department of Strategy, Social and Environmental Responsibility at the University of Quebec in Montreal. As Head of the Research Center in Social Responsibility and Sustainable Development, she has directed a number of research programs focusing amongst others on sustainable development, corporate social responsibility and new social economic movements. In this new book, Corinne Gendron argues that traditional economic theories do not sufficiently take account of the socially constructed nature of the debate surrounding the environment and environmental policy. She proposes an alternative theory of environmental politics by linking economic and social sciences.

The book is divided into two equal parts, with three chapters belonging to Part I and two chapters to Part II. It starts with a general presentation and critical discussion of three distinct fields of research, i.e. environmental economics, regulation theory and approaches related to new social movements, before eventually combining them to a socio-economic approach to environmental crises.

Chapter 1 is devoted to contemporary approaches to environmental economics. The author briefly discusses classical economics, different schools belonging to the so-called ecological economics approach, as well as institutional economics, which explicitly takes account of the institutional setting within which economic actors take their decisions. Chapter 2 then presents regulation theory from a perspective that recognizes the existence of socially situated individuals who interact through a network of constraints, and that suggests to link ideas rooted in economics with ideas coming from sociology. The author moreover argues that while environmental economists tend to ignore the social dimensions of ecology, environmental sociologists, in contrast, still have paid only limited attention to the study of the economic system.

After having identified limitations of these traditional approaches in explaining dynamics caused by ecological crises, and building on findings of the major theories on social movements, the author finally suggests a new framework, outlining an "economic sociology of the environment" in Chapter 3. Her starting point is the connection of economic and social spheres as suggested in her discussion of regulation theory. This new theory aims to offer a

framework for examining—from a rather sociological perspective—the role of (economic but also social) actors in the transformation of economic institutions caused by environmental and ecological challenges and to anticipate the forms that the modernization of institutions will take.

Part II is dedicated to the topic of "Sustainable Development as a Social Compromise", studying business leaders. It investigates the importance they give to environmental issues, as well as their conception of economic development. The author argues that it is vital to understand not only the way business leaders enter into the field of the environment, but also the setting into which the environment is integrated, which she refers to as the "business leaders' social paradigm". She explores—via a series of interviews—amongst others the business leaders' understanding of the State, their position towards globalization and deregulation, and their general perception regarding pressure groups.

Survey results provide some useful insights. They show that environmental and ecological issues have truly been recognized as subjects of concern. Interestingly, however, business leaders tend to see the responsibility for ecological problems with third parties such as governments or consumers rather than with companies. Whereas non-interventionist business leaders accept State intervention only as a means of last resort that has to be justified by exceptional circumstances, interventionists, in contrast, understand the economy as being embedded in a political system that in turn shapes it. Moreover, business leaders tend to entrust the State with a regulatory responsibility for environmental protection while being concerned about the State's capacity to fulfill this role, given increasingly globalized markets. The author concludes that "the model of society espoused by the economic elite tends to be interlocked with globalized economic growth, where State intervention is increasingly considered as a support to the international activities of companies."

Does the book provide food for thought? This absolutely is the case. What makes the book especially interesting is its interdisciplinary perspective in explaining a without doubt extremely complex issue, that is, the transformation of institutions brought about by ecological and environmental crises. Corinne Gendron gives an insightful analysis and discussion of environmental movement and ecological modernization, putting it into a more comprehensive perspective of social dynamics and social relations. While recognizing the key role of economics in understanding such crises, one of the author's main messages is that traditional (pure) economic theories do not take account of the socially constructed nature of the debate surrounding the environment and environmental policy. Therefore, as she argues, the analysis must be broadened to include the social processes that shape socio-economic organization. She makes two important points, namely that the "economic system is embedded in a social dynamic which precedes it and determines its framework of operation" and that "ecological modernization of economic institutions cannot be considered without taking into account social relations and processes."

Over the recent years, environmental politics has become an increasingly central concern, also on the international agenda. This book is an inspiring reference not only for the high-level specialist readership and scholars of environmental policy and governance, but also for everybody who is not afraid of going beyond his or her core domain—be it economics or sociology—and willing to explore new routes of thinking.

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Handbook of Research on Environmental Taxation, edited by Janet E. Milne and Mikael Skou Andersen. (Cheltenham: Edward Elgar Publishing, 2012). 528 pages. ISBN: 9781848449978.

Green Taxation and Environmental Sustainability, edited by Larry Kreiser, Ana Yábar Sterling, Pedro Herrera, Janet E. Milne and Hope Ashiabor. (Cheltenham: Edward Elgar Publishing, 2012). 304 pages. ISBN: 9781781009024.

These two collections of essays on different aspects of environmental taxation are the latest in a series of edited collections on the topic. The Milne and Andersen Handbook, as the title suggests, is more substantial, not only in length and wide-ranging coverage, but also in the depth of experience and recognition of its authors. The editors of both books are primarily academic lawyers, with Milne of the Vermont Law School as an editor of both volumes, although Andersen is an expert in political science and policy analysis and Kreiser is an academic accountant, who has edited several of the earlier volumes.

The Handbook is just what one might expect as a practical guide for tax experts and policy makers. It covers the topic from its conceptualisation in economic theory to the application to actual economies, the expected effects of the taxation and finally to *ex post* assessments of its implementation. Many interesting issues are covered in detail in 26 chapters: environmental fiscal reform; the legal authority for such taxation; the earmarking of revenues; special problems of developing countries; effects on inequality; the politics of such taxation (both national and international); the double dividend debate; transactions costs; the databases available; the decoupling of economic growth and degradation of the environment, inducing technological change; effects on sectoral and national competitiveness; the policy mix, especially the mix of regulation and taxation; and the role of bounded rationality. It excludes a detailed treatment of the reduction of environmentally damaging subsidies (e.g. on fossil fuels), but it does consider "tax expenditure", i.e. subsidies via exemptions or allowances in the tax system (e.g. to incentivise renewable sources of power).

The standard of exposition and editing is high and the editors of the Handbook can reasonably claim to report the state of the art. The book opens with the approach taken and a paragraph summary of the content of each chapter and concludes with an agenda for future research. The chapter authors are from academia and governments, mostly in Europe, where governments have shown the most commitment to tax reform and which has had the most experience in environmental taxation at national and international levels. The authors generally take a practical approach to the subject, as befits a guide for policymakers, and there are few digressions into neoclassical mathematical models.

I will not repeat the content summary, but review some selected chapters that are critical to the introduction, modelling and assessment of environmental taxation. I shall do it from three points of view, taking the editors' guide as to which groups of people are being urged to read and use the Handbook. Firstly, there is the interested general reader from a wide range of disciplines including law, economics, political science, public finance and even engineering. Secondly, there are policy makers and analysts in government seeking to understand, implement and assess environmental taxation. Thirdly, I shall consider its usefulness to economists in academia, research centres and business, specialising in the topic.

The general reader will find much of interest in this book, although some chapters are rather technical and others rather too specialised. The introductions by the editors (chapter 1 and 2) are very illuminating and helpful, written in clear, concise English and summarising both the book and the underlying justification and concepts used in the literature. They trace the historic origins of the topic in the neoclassical work of Pigou in his *The Economics of Welfare* (1920). They explain tax expenditures and the differences between taxation and emission permit trading schemes, which is not a tax. They generally explain what the topic is all about and how to use the book. Barde and Godard (chapter 3) mostly adopt a technical partial equilibrium approach to explaining the economic principles of the taxation, which is not relevant for macroeconomic policy, but their conclusions are interesting, listing five potential dividends from environmental taxation.

The general reader may also be interested in the important choice between taxation and regulation (command and control). This is critical in deciding legal competence – for example in the USA the President through his executive powers cannot unilaterally impose a sulphur dioxide tax or a carbon tax, but can regulate the emissions, even using trading permit schemes. The straightforward message that damaging externalities should be addressed by taxation was challenged by Ronald Coase in 1960, who introduced property rights and the use of institutions into the literature, recognising that society had developed mechanisms for dealing with externalities without the use of taxation. This is essentially self regulation by the free market. Assuming that transactions costs are low or zero (Pigou's assumption), and markets exist through negotiation of rights, Pigou's solution of government intervention and taxation is unnecessary because the market, defined as efficient, will have sorted out necessary compensation. The problem here is explained by Faure and Weishaar (chapter 22), but basically this conclusion is not justified under many prevalent conditions. These include whether pollution is diffused over space and time, whether those who suffer are many or outside the legal jurisdiction of the polluter, when transactions costs are not "low" (i.e. recourse to the courts is not intrinsic for avoidance of the pollution), if the distribution of power and income is not an issue or if the neoclassical assumptions, e.g. of full information, do not hold.

In fact the "free market" leading to environmental degradation, including the threats of climate change and loss of biodiversity, is in fact beset by regulations, usually set or heavily influenced by a few market makers, who can set the rules to favour their own interests. These makers may well be international operators such as energy and pharmaceutical companies or banks aiming for short-term profits and bonuses. A key problem, addressed by Jaccard in chapter 10, is the political acceptability of environmental taxes when the ideology of the free market is pervasive and substantial funding is available to opponents of the tax. Jaccard uses the successful carbon tax in British Columbia as his example and looks at both the short and long-term survival of the tax. This is highly relevant to many political debates, especially on climate change, and illustrates the need for integration in a set of policies and measures, as well as the extraordinary scale of misinformation and scepticism about government intentions in the political campaigns.

Another issue of general interest is that of decoupling economic growth from environmental pollution. Muller, Lofgren and Sterner (chapter 19) explain the idea, and give a review of the tools to understand and measure it (e.g. decomposition analysis using disaggregated data), but the reader will be disappointed that their main contribution is an agenda for future research. Although other chapters in this group are nearly all accessible, they tend to be on particular topics of less general interest.

The second group of readers are concerned with environmental, economic and social policy in government or aiming to influence government. The Handbook is indeed almost designed to cover the state of the art for this group, not surprising given that it covers, extensively and in detail, the legal and political issues involved. Rodi and Ashiabor (chapter 4) set the legal scene by explaining the authority by which the national state can impose these taxes (Chalifour, Grau-Ruiz and Traversa cover multilevel governance in chapter 14). These chapters complement the one on tax design in helping the policymaker decide whether and how the law needs to be changed and to give examples from many jurisdictions of current practice. The design issue is taken up in an excellent chapter by Molina (5), explaining the legal issues generally and concisely, with a broad range of examples across countries.

Vos (chapter 18) gives an overview of the databases relevant for environmental taxation. He presents criteria for assessing the databases: coverage, ease of use, reliability and "providing what the user might want", which as this suggests is largely unknown, but Vos gives a good guess, i.e. assessment and access to time-series data. It is clear that the data are largely descriptive and fragmented, with cross-country data mainly for Europe (European Commission *Taxes in Europe*), and the US data focused on renewables and energy efficiency.

The third group of readers, which partly overlaps the second, is that of professional economists. There is also much of use here, especially in correcting the highly stylised treatment of the subject in the neoclassical literature. A key message is that many disciplines are needed to understand the complexity of topic and that there is no optimum tax or tax design because of legal issues and because there is seldom a benign dictator to plan social welfare. Another is that there are many insights from the behavioural approach to economics given by Nielsen in chapter 24. One good corrective to stylised modelling is in Olsen's chapter 11 on intergovernmental acceptance. She states the obvious that "global harmonisation of tax levels must be considered impossible" (p. 192). This, the prevalence of regulation, and the difficult boundary between taxes and regulation make the common assumption by General Equilibrium and other neoclassical economists of a common global carbon tax absurdly simplistic for policy. The tax is supposed to have a common rate and last indefinitely to address global warming. She goes into the technicalities of international trade rules and environmental taxation. Thalmann (chapter 25) considers a global carbon tax, ending with a hope for tax harmonisation. There is more hope for international permit trading.

The conclusion of Vollebergh's chapter 20 on introducing technological change into environmental models also warns against simple conjectures based on theoretical propositions, and notes the paucity of empirical studies. Understanding of technologies is intrinsic to the effects on the environment and ways of reducing both the emissions and their impacts, especially over long periods of time when technologies can evolve, given economic signals and R&D expenditures. Clearly there is much research to be done.

The competition literature is especially relevant for environmental taxation because pollution is often international, and trade carries with it environmental implications in the form of embedded pollution. Ekins and Speck (chapter 21) address the understanding of the topic from the empirical modelling, summarising the concept, reviewing the literature, and covering the Porter hypothesis that brings in the aspect of quality as well as price competitiveness. This aspect is crucial to many arguments put forward by interest groups seeking to weaken or influence policy for their own interests.

The regressivity of the taxes is another important issue and is addressed by Kosonen (chapter 9) for Europe, where many such taxes have been studied and introduced. Her con-

clusions are worth reading for the qualifications to the simple assumption that the taxes are inevitably regressive.

Jaeger's contribution (chapter 12) is a review of the double dividend debate, which is relevant to green fiscal reform. The double dividend here is not the simultaneous environmental benefit and the tax-raising benefit for the government needing to finance the provision of public goods and services. It is instead a feature of neoclassical tax theory: the first dividend comes from the correction of the damaging environmental externality associated with the tax, e.g. waste destined for landfill, and the second dividend is the economic benefit from reducing another tax, which is a burden on the economy because it is taxing a social good, such as employment. Green fiscal reform envisages a general shift of taxation from taxing socially desirable activities, such as providing employment, to taxing the undesirable ones, such as activities that degrade the environment. Jaeger' chapter is a major contribution to the literature in that he carefully assesses the models and their results that claim that the apparent dividends are much reduced by so-called tax interaction effects. The literature is an example of extensive neoclassical theorising on the basis of highly unrealistic assumptions (e.g. perfect competition, representative agents, maximised social welfare), with almost no empirical content, and different papers relaxing different assumptions in an incoherent order. Jaeger concludes that "a large, previously unnoticed distortionary tax interaction effect existed was based on mistaken inferences and misleading evidence" (p. 216). He has discovered an algebraic error in some papers, confusing a tax rate ($/tonne) with a tax ratio (price without tax divided by price with tax), but more importantly, he finds that the models use unreliable benchmarks and overlook compounding effects of direct and indirect taxes.

The Kreiser volume is the twelfth in the series *Critical Issues in Environmental Taxation*, previous published by Oxford University Press (volumes 5 to 8) and Richmond Law Publishers (volumes 1 to 4). It has a slight emphasis on reporting research on Spanish provinces, reflecting the location of the annual conference on environmental taxation, from which the papers presumably originated. The "environmental sustainability" in the title is addressed indirectly and without any overview or conclusion. There is an index, but no summary of the 17 chapters. However, the standard of the chapters is high and the editing also well done.

One of the problems of green taxation is the fact that environmental problems are highly specific to what pollutant, where the flow is emitted, how it diffuses across the environment, who is affected and when, but most seriously, how the flows accumulate into serious if not catastrophic environmental problems. This means that there is a huge range of potential analyses for different pollution problems in different institutional settings across and within countries. The *Critical Issues* volumes well illustrate this and have maintained a high standard over the years, reflecting developing concerns as environmental problems have become more pressing. The book is focused on five issues: measurement of green taxes (part I), including a useful chapter by Braathen on the OECD database; sustainable mobility (parts II and III), pointing the direction of travel rather than a destination; technologies (parts IV and V) with the concerns of encouraging new renewable technology and identifying nuclear power externalities; and finally waste and waste management (part VI). Specialists in these areas will find useful material here.

In conclusion, both books are worth including in collections devoted to environmental taxation, but for a more general coverage of the state of the art, choose the Handbook.

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Climate Change and Common Sense: Essays in Honour of Tom Schelling, edited by Robert Hahn and Alistar Ulph (Oxford: Oxford University Press, 2012), 296 pp. Hardback. ISBN 978-0-19-969287-3.

The ideas in this book are nothing short of a revelation to me. As an engineering economist who works in the "trenches" of power system planning and electricity market design, I immensely enjoyed clampering out of those trenches in order to listen in on discussions and debates among the intellectual "generals" in this (moral equivalent of) war against climate warming. The book's title may be "Common Sense", yet many of the conclusions surprised me. Delightfully, the arguments mustered in their favor were often convincing and nearly always clearly presented. This book is a wonderful demonstration of how economic ideas that are counterintuitive at first glance can, through effective argument, evolve towards "Common Sense" and potentially affect policy. For readers like me who haven't paid the attention they should have in recent years to the intellectual debates about "whence climate policy?", this volume will be an enjoyable way to catch up with the latest thinking on several key questions in those debates.

This book honors Nobel Prize winner Tom Schelling. During his career at Yale, Harvard, and Maryland wrote books [1,2] that changed how we think about conflict and cooperation, and have influenced policy design in an astonishingly wide range of public problems. One is climate. He thought early, hard, and creatively about the climate risks posed by greenhouse gas emissions, and what governments might do together and separately [3,4]. As the preface to the book notes, "he was asked to chair a committee on what was then called the 'the carbon dioxide problem' for President Jimmy Carter." The ideas I found revelatory in this book are contained in three groups of essays. Each group focuses on one of three immensely important general questions that reflect Prof. Schelling's interests in, respectively, cooperative game theory; ethics and distribution; and effective policy:

1. *How might we move forward to completing and implementing effective international agreements on climate change?* This is particularly timely given the stalemate and drift we now see in the UN Framework Convention on Climate Change.
2. *How ought we think about fairness in climate policy?* In particular, what's the right objective function for evaluating policies, especially concerning the weighting of benefits and costs at different times to different people?
3. *What are effective policy instruments at the national level for containing carbon and sustaining economic growth in the face of climate change?*

The answers the authors give in the essays often surprised me. Even if they didn't always convince me, those answers changed how I think about the above questions. For this reason, I highly recommend this book both to (relative) outsiders like myself, as well to those who eat, breathe, and sleep climate policy.

Many of the chapters are gems of clarity that I would assign as introductions to my students. A couple of chapters are less so, occasionally miring me in derivations and tables of numbers that unnecessarily obscured rather than facilitated insight. However, there are certainly readers who will use or improve upon the technical methods in those chapters, and they will be grateful for the detailed explanations and replicability of results. In the rest of this review, I will summarize some of what I found to be exciting and interesting. I apologize

for neither being balanced or comprehensive. The editors, Robert Hahn and Alistair Ulph, have done a commendable job of summarizing the chapters and relating each to the others and to the questions in their introductory chapter. I can't improve upon their overview, which is readily available on the web [5]—I invite the interested reader to consult their introduction. I congratulate Drs. Hahn and Ulph for having organized this extraordinary book, as well as the October 2010 meeting held at the University of Manchester in honor of Dr. Schelling that lead to the book. The volume appears at a crucial time in both international and national climate policy.

Question 1: What are practical and credible paths forward in international agreements to manage climate change and its impacts? Five essays address this basic question of "how do we get nations to work together?" Of course, this question quickly gets decomposed into several more specific questions. A fundamental one concerns the pessimistic conclusions of a theory of agreement based on rational self-interest and simple conjectures (such as Nash) about what other nations would do in reaction to an action. As the authors point out, the classic model of international agreements assumes that a country will only join a coalition if the benefits to it exceed its costs, but why would anyone agree to sacrifice their short run economic growth for the good of the commons? The essays by Scott Barrett and Charles Kolstad are especially good summary of this theory and its dismal predictions concerning the likelihood of a significant fraction of nations joining forces to voluntarily limit greenhouse gas emissions. However, they and the other essay writers in this section offer reasons for optimism based either on more sophisticated theory that points to possibly more productive ways to enlist self-interest in the cause of agreement, or on empirical evidence that self-interest is not the only motivator. These reasons were guarded good news to me, and by themselves justified reading this book.

Some practical advice that emerges from that group of essays includes the suggestion to study past (relative) successes—such as those governing leaded gasoline, the Montreal protocol, or the UN REDD deforestation agreement. Unlike Kyoto, successful agreements tend to be narrow in scope; have natural "focal points" for fair allocation of burdens; and are relatively easily monitored. I always thought that it was obvious that an international system of emissions trading was the only rational approach; however, Dr. Barrett argues effectively that a simple regulatory approach addressing a subset of important sources (e.g., a requirement to carbon capture at coal plants, or to invest in renewables), while undeniably an inefficient way to get carbon reductions, has the key advantage of actually being achievable. Reading that, I recalled with a shudder the legislation that U.S. Senator George Mitchell proposed in the 1980s as a solution to acid rain—just put scrubbers on the 50 dirtiest plants!—and how many times more costly that would have been than the trading system put in place by Title IV of the U.S. Clean Air Act Amendments of 1990. But the complexity, cost, and number of parties involved in international climate negotiations are orders of magnitude larger than the talks among the power industry, the Environmental Defense Fund, and the first Bush administration that lead to Title IV. Sadly, the brilliant trading solution they came up with is not in sight for CO_2, either within the US or internationally. So perhaps Barrett's approach could be a starting point, with trading introduced around the edges to eliminate the most glaring of the inefficiencies, and then expanded over time? The relative eagerness with which countries have unilaterally or collectively embraced, for instance, renewable subsidies and mandates gives some hope that limiting the scope of agreements could be a way of moving negotiations forward again.

This empirical observation brings me to Dr. Kolstad's essay, where he points out the many ways in which the traditional theory of international environmental agreements fall short of

explaining what has actually happened, and why that is grounds for cautious optimism. Experiments indicate, for instance, that individuals tend to provide public goods at rates higher than predicted by theory, and free ride at lower rates that the same theory would suggest. At the governmental level, a number of states and countries are willing to unilaterally reduce emissions without effective multilateral agreement, and this willingness increases with income, contrary to what theory predicts. This and other anomalies lead Kolstad to conclude that the theory of environmental agreements lacks explanatory power. Could negotiating countries, as he suggests, follow in the footsteps of the literature on the voluntary provision of public goods, especially with regard to 'warm glow' and other social preferences? Could agreements result where traditional theory would pessimistically conclude they are impossible?

Other essays in this section emphasize the need to consider the dynamics of agreements—in particular, the existence of tipping points beyond which there would be a rush of countries to join an agreement. Geoffrey Heal and Howard Kunreuther describe how this positive feedback could work to reach a stable equilibrium with all or most countries joining in. Key might be threats of punishments, which expands the simple static Nash framework to a dynamic game; however, Barrett warns us that credible threats are difficult or maybe impossible to establish. Anastasios Xepapadeas presents a formal model of these dynamics for a two country game that also, unlike the other chapters, considers fundamental scientific uncertainty concerning the magnitude and consequences of climate change. His general approach might be the basis of insightful and realistic analyses of the task that lies ahead.

If negotiated agreements fail to be realized, or fail to prevent us from reaching and blowing through a doubling of CO_2 concentrations, could geoengineering (including solar radiation management) save us? Tom Schelling, in whose honor this book was published, provides a chapter in which, with gimlet eye, he identifies a long list of challenges to any international negotiations aimed at such solutions. We have only started to wrestle with those challenges, and Dr. Schelling argues persuasively that we should begin doing so straight away.

Question 2: How should fairness, across generations and among countries, be defined and used to evaluate policies? Prof. Schelling addressed intertemporal fairness in a widely cited article [6], and three essays in this volume address this topic, as well as distribution among income groups. I was grateful for the comprehensive update that these essays provided on my (naïve) understanding based on my schooling in the 1970's era benefit-cost analysis literature on discounting. The essays make clear that some theorists still hold the polar positions that any discounting is immoral, period, or alternatively that discounting at any rate other than the market rate of interest crowds out efficient private investment, and will ultimately frustrate the intention of intergenerational redistribution. However, the nuanced arguments in these essays build on Dr. Schelling's clear-eyed 1995 essay by showing how considerations of fundamental ethics, marginal utility of consumption as a function of income and time, and efficient allocation of capital and actual impacts on capital markets can interact to yield policy-relevant recommendations for appropriate rates of discount between those poles. The authors are not in complete agreement, but there is significant convergence, perhaps more than at least one of the authors would care to admit.

The authors in this section also address fairness across income groups. One quandary is: why is there sometimes more concern over future generations' welfare—when they may be richer than we—than for the numerous poor with us today? Geir Asheim provides an excellent discussion of the ethical bases for differential treatment of people, based for instance on entitlements or rectification of past injustices, and the relevance of ethical theories of Rawls

and others that never got in the door in the resource economics classes I took in the 1970's. I found both his essay and that of Partha Dasgupta eye opening in these respects, although the former is tighter and more effective than the latter.

I am particularly grateful for the essay by David Frame and Cameron Hepburn who avoid the decreasingly relevant focus on poor versus rich countries to instead examine class distinctions within countries. This nuanced discussion yields fascinating insights on how groups in a country can be differentially affected by climate policy, and the resulting implications are for political support for or opposition to deals between the developed North and the G20 Emerging Market Countries ("GEMS"). Using this framing, they then ask what is more likely—a "no deal" scenario, a "North leads" scenario in which developed countries reduce emissions by themselves, or a "North and GEM action" in which GEMS also commit to eventual stabilization of emissions? This essay complements the other two in this section by bringing some of the ethical ideas to bear on analysis of particular policy scenarios, which helps to satisfy this engineering-oriented reviewer's craving for realistic texture and practical conclusions in an analysis.

Question 3: How can a nation structure its climate policy to efficiently contain greenhouse gas emissions? This set of essays is the most diverse of the three groups of essays. But I found as many stimulating and new (at least to me) insights in this group as in the others. One idea, that, like Dr. Barrett's critique, hammered at my faith in emissions trading was Ian Parry and Roberton Williams' statement that "(o)ur intuition about the inevitable superiority, on cost-effectiveness grounds, of economy-wide market-based approaches to reducing CO_2 emissions appears to break down when we take into account inevitable interactions between policies and the broader fiscal system." Although their essay is nearly the longest in the book, reading it was well worth the effort. Reviewing the issues of revenue recycling and the deadweight welfare loss from taxes ("excess burden"), they carefully lay out, step-by-step, a welfare analysis of taxes, emissions trading, and regulation accounting for these issues. An important lesson of their analysis, and some of the other essays in this group, was that the assumption in environmental agreement theory that each nation knows its own cost function for emissions reduction is plainly untrue; does this have implications for the negotiations models when countries are risk averse?

Michael Hoel introduces an idea that is new to me– the Green Paradox, in which carbon policies, poorly designed, can accelerate rather than decelerate fossil fuel production, as producers might decide that increasingly stringent carbon taxes move up the optimal timing of converting their reserves into sales and thus cash. This essay is particularly timely as it becomes clear that any effective policy other than sequestration must result in most reserves being left in the ground forever. His discussion of how to design policies to avoid this outcome was particularly clearly written.

Another idea this book introduces to me was Linda Cohen and Amihai Glazer's suggestion that inventors of green technology can capture the externalities of their research by using their inside knowledge to bet in the derivatives market that the price of CO_2 allowances will fall. However, given the gross risks in carbon markets that arise from fundamental economic and political uncertainties, I don't see this being a factor in someone's decision to financially support the development of, say, Dr. David Keith of Harvard's machine to capture carbon from the atmosphere. To capture a large return from the small expected difference an individual technology might make in carbon prices would require placing a great deal of capital at risk, capital that would probably better be used for developing and marketing the technology.

This section returns to a topic closer to Dr. Schelling's interests when Robert Mendelsohn, David Anthoff, and Richard Tol devote their essays to development and adaptation. Dr. Mendelsohn pokes fun at the obvious strawman of climate proofing all developing countries, and his essay is an able statement of Schelling's conjecture that the best defense against climate change can be economic growth. However, if regional ecological change is nonlinear and subject to uncertain thresholds (such as the catastrophic loss of Western North America's lodgepole pine forests now underway), relying on growth alone to take care of any contingency seems overly risky to me. Drs. Anthoff and Tol attempt to test this conjecture by looking at the data, something that few other essays in this book do. They calibrate their model of the elasticity of income with respect to climate change damage for 16 regions of the world, and consider years through 2100. In their words, "(i)f the income elasticity (with respect to damages) is negative, Schelling's Conjecture may hold. Development policy would reduce the impact of climate change, and may be preferred over greenhouse gas emission reduction." However, they find that only two regions—the former USSR and sub-Saharan Africa—ever fall in this category, and then only in some future years. Their nuanced look at Schelling's Conjecture is provocative and a definite contribution to the debate, and is a fitting closing to this stimulating and important book of essays.

I close my review by noting that the participants in the meeting that lead to this book did not merely listen to each other's presentations. They also rolled up their sleeves and developed what the book calls "ten key points of consensus that could guide decision makers in climate policy." The editors call these points the "Schelling Consensus." Those points repeat many of the recommendations made by individual essays, indicating that the authors' arguments were convincing not just to me but also to most of their fellow attendees. Their essays will surely help many of these points to become "common sense" among policy makers, as well as among fellow economists.

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References

1. T.C. Schelling, *The Strategy of Conflict*. Cambridge, MA: Harvard University Press, 1960.
2. ———, *Micromotives and Macrobehavior*. NY: W.W. Norton & Co., 1978.
3. ———, "Climate Change: Implications for Welfare and Policy," in The National Academy Press, *Changing Climate: Report of the Carbon Dioxide Assessment Committee*. Washington, DC: John Wiley, 1983.
4. ———, "Some Economics of Global Warming," *American Economic Review*, 82:1–14, 1992.
5. R.W. Hahn and A. Ulph, Thinking Through the Climate Change Challenge, Working Paper, University of Manchester, June 2011, ssrn.com/abstract = 1878484, books.google.com/books?isbn = 0199692874
6. T.C. Schelling, "International Discounting", *Energy Policy*, 23: 395–401, 1995.