

J. Paul Kelleher, *The Social Cost of Carbon: Ethics and the Limits of Climate Change Economics*, forthcoming from Oxford University Press

Book Abstract:

Climate change economists have called it “the most important number you have never heard of” and the “holy grail of climate economic analysis.” It is the *social cost of carbon* (SCC), and its purpose is to reflect—in one dollar figure—the harm caused by emitting a single ton of carbon dioxide into the atmosphere. The SCC is an essential concept for environmental cost-benefit analysis, and for the idea of an “optimal tax” on carbon emissions. It is also the subject of fierce debate in the academic literature and in American politics. This book offers the most systematic analysis yet of the social cost of carbon, its theoretical basis, and its proper role in climate economics and climate policy design. It explains that the SCC is not one concept but four, each of which is addressed to a distinct task in climate economics. Moreover, these four concepts can be sorted into two families that correspond to the two main branches of welfare economics, social choice theory and general equilibrium theory. The book explains these radically different theoretical frameworks and how a mathematically identical pair of SCC concepts can emerge from each. It then argues that the analytical power of each SCC concept is limited by its inability to capture the full array of ethical considerations that bear on responsible climate policy. Despite these limitations, the book explains how at least some SCC concepts can and should be put to work in real-world climate change policy analysis.

Book Keywords: climate economics, moral philosophy, ethics, cost-benefit analysis, externalities, optimal taxation, social choice theory, general equilibrium theory, utilitarianism, prioritarianism

Chapter 1 Abstract: This chapter provides a brief introduction to climate change economics and to the integrated assessment models (IAMs) it employs. It then describes the main features of policy-optimization IAMs, which have social cost of carbon estimates as one of their main outputs. It explains the role of objective functions in policy-optimization IAMs and warns against reading too much into the fact that an IAM incorporates an objective function. For example, philosophers tend to assume that the presence of an objective function makes an IAM essentially normative. But that might be a mistake.

Chapter 1 Keywords: integrated assessment models, policy-optimization, objective functions, social welfare functions, discounted utilitarianism

Chapter 2 Abstract: This chapter explains the basis and methods of what it calls social choice climate economics. This framework uses a social welfare function to place intertemporal paths of consumption into a ranked ordering. The chapter explains that the framework requires two key assumptions: that individual well-being is cardinally measurable and that it is interpersonally comparable. It also explains how two different social cost of carbon (SCC) concepts emerge from the framework, and how the economic technique of discounting is involved in this. Finally, it relates each SCC concept to a distinct task in climate economics.

Chapter 2 Keywords: social choice theory, social welfare functions, discounting, consumption discount rates, social discount rates, Frank Ramsey

Chapter 3 Abstract: This chapter explains the basis and methods of what it calls general equilibrium climate economics. This framework is concerned to study Pareto efficient intertemporal allocations of goods, services, and environmental amenities, and the decentralized policy instruments that can steer the world toward any pre-selected Pareto efficient allocation. It explains that each Pareto efficient allocation is the solution to a policy-optimization problem whose objective function *looks* like a social welfare function, but which is fundamentally different. The mathematics of these new functions—which the chapter terms *character functions*—permits the derivation of two new social cost of carbon concepts, only one of which is useful for policy analysis.

Chapter 3 Keywords: general equilibrium theory, social welfare functions, character functions, discounting, Pigouvian taxation, externalities, compensation principle, Kaldor-Hicks principle

Chapter 4 Abstract: This chapter explains and critically examines two different approaches to deriving discounted and undiscounted utilitarian social welfare functions in social choice climate economics. It explains and criticizes Tjalling Koopmans's axiomatic derivation of discounted utilitarianism, as well as his exploration of undiscounted utilitarianism. It then sympathetically explicates John Harsanyi's derivation of a social welfare function that is consistent with weighted and unweighted versions of utilitarianism and its rival prioritarianism. Drawing heavily on work by John Broome, the chapter sympathetically explains assumptions required to vindicate an unweighted utilitarian social welfare function.

Chapter 4 Keywords: social welfare functions, discounted utilitarianism, utilitarianism, prioritarianism, Tjalling Koopmans, John Harsanyi, John Broome

Chapter 5 Abstract: This chapter introduces and explores the concept of a *normatively abridged* social welfare function (SWF). In the context of social choice climate economics, a SWF is normatively abridged when the ranking of consumption or well-being paths that it represents is not a ranking of these paths in terms of all policy-relevant normative considerations. The chapter identifies several versions of normative abridgement present in the philosophical literature on climate economics, and then explains how the concept sheds light on the debate in climate economics over pure time discounting. The chapter argues that SWFs in climate economics should be normatively abridged and temporally impartial.

Chapter 5 Keywords: social welfare functions, social choice theory, normative abridgement, pure time preference, pure time discounting

Chapter 6 Abstract: This chapter explains and critically evaluates social welfare functions (SWFs) that differ from utilitarian SWFs in being in some way averse to inequalities in well-

being. It focuses in particular on three *prioritarian* SWFs: ex ante prioritarianism, ex post prioritarianism, and Marc Fleurbaey's expected equally-distributed equivalent SWF. In each case the chapter examines objections that have been made to these SWFs in the existing literature, and it then argues that the concept of normative abridgement can help to adjudicate between those who endorse distribution-sensitive SWFs and those who accept the utilitarian SWF. The adjudication favors the utilitarian SWF.

Chapter 6 Keywords: utilitarianism, prioritarianism, social welfare functions, Pigou-Dalton principle, normative abridgement

Chapter 7 Abstract: This chapter provides a brief introduction to population ethics, the branch of moral philosophy concerned with when and why the world is improved when new people are added to it. It covers ground that will be well-known to some moral philosophers, but which will be new to most economists. The goal is not to break new ground in population ethics, however, but to use it to evaluate the book's thesis concerning normative abridgement. The chapter argues that population ethics offers new reasons to think that a sound social welfare function will be radically normatively abridged.

Chapter 7 Keywords: population ethics, repugnant conclusion, sadistic conclusion, social welfare functions, critical-level utilitarianism, normative abridgement

Chapter 8 Abstract: This chapter summarizes the book and then puts some of its conclusions to work. It evaluates efforts by the US federal government to produce official social cost of carbon estimates for use by federal agencies. It criticizes a policy that had—until very recently— forbidden the use of social choice climate economics in these federal SCC efforts. Invoking normative abridgement, the chapter then responds to objections to social choice climate economics lodged by economists who peer-reviewed the recent policy change. The chapter ends with a brief but sympathetic discussion of Pareto-improving climate policy.

Chapter 8 Keywords: cost-benefit analysis, Kaldor-Hicks principle, social welfare functions, optimal taxation, Pigouvian taxation, OMB Circular A-4