

that is why I still have reservations about the view, despite Joyce's compelling defence.

Unfortunately, there is so much more of interest in *Newcomb's Problem* than I am able to discuss in any depth in this brief review. Chrisoula Andreou relates Newcomb's problem to Kavka's toxin puzzle and Quinn's puzzle of the self-torturer in a discussion of whether rationality could require you to bring about an outcome which you disprefer to another outcome you could have had instead. Ahmed defends paying the evil genius the £1,000 by noting that those who do so tend to end up with more money than those who don't. Melissa Fusco has an ingenious discussion of *time bias* in causal decision theory. She notes that causalists will gladly keep their money, but will be distressed to learn that they kept their money. Fusco uses some delightful examples to operationalize these preferences before defending this form of time-bias. Preston Greene defends paying the evil genius even when the envelope is see-through, and you can see that she has written you a cheque for only £1,000. Robert Stalnaker has a fascinating discussion of the relationship between causal decision theory and game theory. And there's still more. The collection is a must-read for anyone interested in any of these topics.

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Debates about justice are increasingly seen as vital to policy-making and international dialogue on climate change and how we should respond to it. While many disciplines have participated in these debates, philosophers and economists are often the most vocal. However, given the many historical disagreements between these disciplines this raises the question of whether we are fighting on the same team. This important volume of essays, edited by a philosopher and an economist who have contributed to both academic debates and real-world policy forums on climate change, argues that we are.

The editors take inspiration from their participation in the 2013 Mary Robinson Foundation's international Dialogue on Climate Justice, which they argue 'brought climate change and its development impact, including climate justice, centre stage in global discussions'. Their stated aim for this volume is to build on this progress and demonstrate what philosophy and economics can jointly contribute. Indeed, they

contend that these may be the two most important academic disciplines, after the natural sciences, in determining how we should respond to climate change.

These lofty ideals aside, the essays presented here defend one or both of two key claims. Firstly, that climate justice must account for both intragenerational justice (between rich and poor) and intergenerational justice (between successive generations) so that, as the editors put it, 'attempts to address justice between generations through various interventions designed to curb greenhouse emissions today [should] not end up creating injustice in our time by hurting the currently poor and vulnerable'. Secondly, that it must consider issues both at the scale of global and intergenerational equity and at the individual scale, such as the values and norms that motivate people to make ethical decisions. At both levels, the book sets out to critique what it sees as the long-held assumptions of economics: that the distribution of resources is relatively unimportant and that individuals are predominantly motivated by self-interest.

The first chapter ('Poor People on the Front Line' by Julie Rozenberg and Stéphane Hallegatte) considers the near-term impacts of climate change on global poverty, by offering a sophisticated microsimulation of how it will affect health, economic development and disasters to 2030. It finds that the magnitude of these effects depends greatly on current policies, with the potential for a relatively limited overall impact (+3–16 million additional people living in poverty) to far more extreme impacts (up to +122 million) depending on how successful current development efforts are. This implies that present development policies may also be effective climate adaptation policies, since poverty elevation now will have a significant impact on people's vulnerability to climate change in the near future.

Chapter 2 ('Governing the Commons to Promote Global Justice' by Michael Jakob *et al.*) considers one means of driving a more equitable approach to climate change mitigation, by effectively charging a global social rent on use of the atmosphere as a common pool resource. It finds that this would be both efficient, in that the benefits from charging and redistributing such rents would exceed the costs of imposing them on emitters, and equitable, in that they would encourage a fairer distribution of wealth and emissions reductions. The main objection to such a regime would be its political feasibility, but the authors respond that in this respect it is at least as feasible as any proposal that required a robust global governance mechanism to implement, although that is hardly a very high bar for feasibility.

Chapter 3 ('Equity Implications of the COP21 Intended Nationally Determined Contributions to Reduce Greenhouse Gas Emissions' by Adam Rose, Dan Wei and Antonio Bento) focuses on the equity of climate change mitigation pledges under the Paris agreement. It both takes account of the initial allocation of emissions reduction pledges and simulates the effects of allowing emissions trading to meet these pledges. Its findings highlight how pledges are already inconsistent with key principles of international fairness, despite the statements of most pledging nations that their pledges were both ambitious and equitable. This is even more concerning given that many wealthy countries are expected to renege on these emissions targets. Modelling the effects of emissions trading indicates that this is only likely to make things even less equitable (though more efficient) by

benefiting wealthy nations more than poorer ones. Different technological trajectories were found to make surprisingly little difference to this result.

Chapter 4 ('Climate Change and Inequity' by Nicole Hassoun and Anders Herlitz) argues that considerations of equality should play a more significant role in discussions about climate justice, and not merely concerns about responsibility and ability to pay. However, it notes that there are multiple salient kinds of equity, including inequality between countries, between citizens of each country and between all people in the world. The authors propose a system for modelling and evaluating these three levels of equality via weighted Gini-coefficients, which they argue could point the way towards the most and least equitable outcomes, and that they call 'Inequality Maps'. These can be used to provide a simple intuitive evaluation, both for purposes of assessing the impact of climate change and determining what constitutes sustainable development going forward.

Together these four chapters provide the basis for a quantified assessment of climate injustice at the global scale and the policy options for rectifying it. However, they offer little in the way of engagement with what climate justice entails and how people can be motivated to achieve it. This is the subject of Chapter 5 ('Climate Change and Economic Self-Interest' by Julie Nelson), which argues that standard models of climate change economics misrepresent the motivational structure of individual and collective actors by assuming that rational self-interest is their sole motivation. Sooner or later, it claims, all climate change policies must rely on some level of non-self-interested motivation not to defect. Thus, even the most hard-headed account of how climate change should be addressed must reflect people's actual motivations, such as honouring their relationships with past, present and future people and respecting transcendent values such as love of the environment or posterity. In fact, the paper goes on to argue, while such considerations are often specifically ruled out of economic analysis for fear of appearing sentimental or weak (with all the gender-based baggage this entails), when asked to explain their own actions, economists and non-economists alike almost invariably put such 'irrational' concerns ahead of those that they focus on in their professional lives. This indicates the paucity of current debates about climate justice and the need for such concerns to be taken more seriously in public as well as private.

Chapter 6 ('Noncompliers' Duties' by Anja Carnien) next explores what should happen when people choose to act unjustly, and whether justice can be said to require anything of those who specifically chose to violate their duties to mitigate climate change. It suggests that there is a common intuition that non-compliers face special duties: for instance, when the USA pulled out of the Paris Agreement it violated a further duty of justice by being self-congratulatory. However, it is hard to explain why these duties attach only to agents at the point of their non-compliance with an existing obligation and why they do not replace that agent's continuing duty to comply with climate mitigation efforts. The paper explores four possible accounts of such duties and argues that while all present difficulties, an account based on the notion that an agent's decision not to comply with a duty still leaves them with a 'left-over' part of the same duty, due to a universal imperfect duty of beneficence, is the most hopeful.

Compliance with this residual duty signals to the moral community that, while one is acting immorally, one still identifies with, and wishes to be part of, the wider moral community and is, at least in principle, willing to cooperate in future.

Chapter 7 ('Divest-Invest' by Alex Lenferna) turns to more practical matters by developing a comprehensive moral case for the fossil-fuel divestment movement. From a consequentialist perspective, it argues that investing in fossil fuels contributes to grave, substantial, and unnecessary harm and injustice that should be avoided while divesting from fossil fuels helps fulfil our moral responsibility to promote climate action. From a non-consequentialist perspective, it argues that divestment is the only way to avoid being morally tarnished by complicity in the injustices of the fossil fuel industry. The chapter mainly assesses the divest-invest movement as a manifestation of people's beliefs about, and support for, climate change mitigation in general, rather than any attempt to achieve a specific economic end – something that it suggests would be impractical given the complexity of both the economics and environmental impacts of burning fossil fuels. It thus leaves many questions about this moral case unaddressed, including the nature and limit of people's moral responsibilities (for instance which companies to divest from) and the extent that one can escape causing great harm and being tarnished by injustice while remaining invested in publicly traded equity at all.

Chapter 8 ('Justice and Posterity' by Simon Caney) sketches its author's approach to combining intergenerational and intragenerational justice in relation to climate change. It argues that the notion of intergenerational justice is misleading since it suggests that generations can be discerned and exist as moral agents and subjects; when in fact they are merely labels for groups of people. This leads to the following 'person-centred' approach:

There is a duty on the part of the powerful and affluent to ensure that current people enjoy the maximal equal standard of living that is consistent with leaving future people with a standard of living that is at least as good.

The chapter argues that, in practice, this approach would lead to greater effort to both mitigate climate change and reduce global inequality, and especially more transfer of clean technologies that will allow poor regions to develop both quickly and sustainably. It also argues that while these principles are demanding, they will bring significant co-benefits including enhanced energy security and improved air quality, that the prosperity of the poor and of future generations are interlinked and that simple reforms to international institutions may be able to discharge many of these duties without imposing significant economic burdens.

The next two chapters deal with two especially thorny issues in the field of climate justice: the ethical significance of time and uncertainty. Chapter 9 ('Discounting and the Paradox of the Indefinitely Postponed Splurge' by Matthew Rendall) considers one of the most widely cited arguments in favour of applying a pure time preference for welfare. This is based on the claim that in the absence of such a preference the returns on future investment could be infinite making any activity other than saving irrational. The paper argues that this ignores the fact that, in reality, our species will surely come to an end

eventually, making the returns on investment finite, albeit still potentially very significant. Furthermore, it is clear that a policy of extreme social savings will be disastrous for future people by stifling further economic growth and technological development. Thus, despite the high marginal returns on savings, an absolutely, high social savings rate would not be utility maximizing. However, if it is not utility maximizing, then a utilitarian does not need any further instrument, such as a pure time preference for welfare, to conclude that implementing this policy would be irrational. The paper concludes that the optimal social savings rate will be moderate, even in the absence of such a preference, but that the real challenge is that we don't know what it should be. In part this is because we don't know when our species will end.

Chapter 10 ('The Controllability Precautionary Principle' by Eujen Pissarskoi) defends the view that in such circumstances we should exercise a degree of precaution, characterized by the following 'Controllability Precautionary Principle':

1. If, even when taking account only outcomes that are seriously possible decision makers are in a situation of Knightian uncertainty;
2. And if the worst possible consequences of all available options lead to severe harm and neither the worst or best possible consequences of these options can be ranked in terms of their moral value.
3. And some available options could potentially push global systems across a tipping point that would trigger a non-controllable causal chain leading to an irreversible state with severely harmful consequences, while at least one available option would avoid crossing any tipping points
4. Then the decision maker ought to choose the option that avoids crossing a tipping point.

The chapter argues that this version of the precautionary principle is better able to discriminate between different climate policies than standard versions already articulated in the literature, because they demand that we assess the best and worst possible outcomes that could be produced by each policy option. However, all climate mitigation options can potentially bring about both catastrophic losses (up to and including human extinction) and significant benefits, but only the most aggressive mitigation policies can rule out the possibility that we will cross a climate tipping point. Yet, this view seems to overstate our degree of certainty about where climatic tipping points lie, and how tipping points across the global climate, ecological, geophysical and economic systems are interrelated. Still the basic idea lying behind this principle, that when one cannot determine the value of different outcomes it is preferable to avoid steps that diminish our ability to control complex global systems on the brink of catastrophic collapse, seems unassailable.

Chapter 11 ('The Social Cost of Carbon from Theory to Trump' by J Paul Kelleher) provides a philosophical introduction to the economic principles behind the concept of the 'Social Cost of Carbon' (SCC). This is a framework for evaluating the optimum level of carbon dioxide emissions by balancing the costs of reduced overall consumption from lower emissions with the costs of additional climate change from higher emissions. It argues that debate about the SCC often focuses on the problem of determining the correct social discount rate, while overlooking the role

that discounting plays in determining the SCC. In the first section, the author shows how selecting the correct value function is key to the notion of the SCC. Different approaches to deriving value functions include: using a utilitarian, prioritarian or maximin axiology; taking the perspective of a representative agent or a social planner; and using revealed preferences or a-priori moral reasoning. Since each of these approaches have different implications for what the SCC should be, the chapter argues, it is wrong to talk about 'The SCC' without stating that this is value function relative. It then goes on to show how disagreements between people who accept different value functions but fail to acknowledge this are a major source of unnecessary controversy in the climate justice literature and provides examples of how such disagreements can be traced through contemporary climate policy debates, such as those surrounding the Stern Review and the policy choices of the Trump administration.

Finally, Chapter 12 ('Long Term Climate Justice' by John Nolt) considers how climate justice can take account of the long-term effects of emissions, which will 'displace, sicken, injure, and kill large numbers of people over the coming centuries'. It argues that contemporary theories of distributive justice are inadequate for addressing this issue because they focus on how well-off people are, rather than whether they have been harmed. On the other hand, contemporary Human Rights Theory, which does focus on harms, is unsuitable because the rights of future people fail to have the same motivational force as those of present people and because future people are unable to enforce a prohibition against violating their rights. The author thus suggests a new approach based on a 'rights-consequentialism': roughly that we should avoid harming future people (by violating basic rights to the opportunity for life, health and livelihood) if we can. This approach could be supported by the psychological force of our reaction to future people's expected moral indignation at any failure to respect this requirement, in much the same way as many have been motivated to seek to avoid the moral indignation of an absent god. Much of the paper is given over to defending the claim that future people can be said to exist, even from the perspective of the present, and that we can harm them despite Derek Parfit's non-identity problem and other difficulties. While the paper acknowledges that human extinction might cause there to be no future people, it dismisses this as 'unlikely' and does not conjecture on whether this would also constitute a rights violation.

Indeed, perhaps reflecting its connection with a dialogue on climate justice dating back to 2013, the contributors to this book almost completely overlook the question of whether catastrophic climate change would imply a special kind of climate injustice. Presently, around the world, people are taking to the streets in the name of Extinction Rebellion and arguing that the social and economic institutions of justice themselves are currently at risk from the worst effects of climate change. I hope it will not take too many years before philosophers and economists begin engaging with this aspect of climate justice as well.

It is also unclear whether the volume really has demonstrated that economists and philosophers are fighting on the same team. While it showcases both philosophers who are willing to engage with the arguments and models of economists and economists who are willing to critically question the philosophical assumptions of their profession, there is little in the way of conversation between these perspectives. Many readers

involved in interdisciplinary efforts to bring together these two areas of research may also share my concern that it invariably depends upon which philosophers and which economists one is talking about, as the breadth of opinion within each discipline is at least as great as that which separates them.

Fittingly, given its ambitions, the book ends with the Mary Robinson Declaration of Climate Justice. However, it is notable that the majority of principles contained in this declaration, such as ‘giving voice’, ‘commitment and accountability’ and ‘the rule of law’, receive little or no attention from the contributors to this volume. One is left with the sense that, even if economists and philosophers can be brought together to fight on the same team, this may not mean they are always playing the same game as the politicians and activists who strive for Climate Justice.

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I nearly fell. Stumbling and searching for balance, I needed both hands: one for grabbing the doorframe in support, the other for counter balance. My shoulder bag hit my left knee. As it dangled above the ground, I slowly regained composure. Gathering my senses, the first thing that I noticed was a caption printed in large letters that read: ‘Thought Experiment Index’. It was printed on the back pages of the book I had let go of whilst stumbling. My freshly arrived copy of Meghan Sullivan’s *Time Biases* had hit the ground on the outer end of its spine, propping open its last page to reveal an overview of the thought experiments contained in it. What had happened? – You see, when I get mailed a package with a book, I open it there and then, downstairs, at the mailbox. I will have finished reading the back cover waiting for the lift. And I am usually deep into the Introduction by the time I am at the front door of my apartment. On this occasion, I did not pay enough attention to where I was going whilst stepping out of the lift, and hence the tumble. Afterwards, during my numerous attempts to come to terms with the book, I could not stop thinking about the fact that I had literally stumbled upon the fact that this book has a ‘Thought Experiment Index’. In hindsight, it perfectly foreshadowed that it is a much more exclusively philosophical book than suggested by the publisher.

Time Biases by Meghan Sullivan is a thorough philosophical treatment of issues in which rationality and time interplay, such as personal planning, preference changes, dynamic decisions, and personal deliberation about the future and the