

Article

## Intergenerational Justice: How Reasonable Man Discounts Climate Damage

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**Abstract:** Moral philosophers and economists have evaluated the intergenerational problem of climate change by applying the whole gamut of theories on distributive justice. In this article, however, it is argued that intergenerational justice cannot imply the application of moral ideal theories to future generations. The formal principle of equality simply requires us to treat like cases as like. If intergenerational justice is to have *any* meaning, it would require future generations to receive the same treatment under the law and the same treatment from the authorities, as far as cases are like. In the context of climate change, the reasonable man standard from tort law is of particular relevance. There is no justification to handle pollution across generational boundaries according to norms which differ from the (international) laws for handling pollution across national borders. It is argued that this implies, for example, that a zero social rate of time preference should be used in cost-benefit analysis of climate policy: climate damage experienced by future generations should be discounted neither for their higher expected wealth, nor purely for their being remote.

**Keywords:** intergenerational justice; equity; climate change; social rate of time preference; reasonable man; risk; tort law; future generations

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## 1. Introduction

Our present emissions of greenhouse gases involve substantial risk of damage to human health and property due to climate change [1,2]. It is hardly ourselves who will face these risks, however. Because of the inertia of the climatic system, most of the impacts of our present acts will not be clearly felt for another 50 years or more, when the planet is occupied by future rather than present generations [3–6]; *if we are already experiencing climate change today, it is primarily due to the actions of our ancestors.* However, although the future costs of climate change may be substantial, so too are the present costs of mitigating such change, for there is no cheap ‘technological fix’ available. The use of fossil fuels is closely intertwined with our modern lifestyles. Climate policy making, such as setting an objective for emissions reductions or emission taxes, is therefore pre-eminently a matter of intergenerational justice.

The objective of this article is to argue that justice towards future generations cannot start from scratch on the basis of moral ideal theories. Instead, intergenerational justice requires governments to regulate the risk of climate change consistent with the general standards of conduct deemed acceptable for handling risks to others, as laid down in tort law, for example. The set-up of this article is as follows. In Section 2, I first explain the formal principle of equality, *i.e.*, the principle that requires like cases to be treated as like. In section 3, I argue that governments are justified in addressing climate damage as *wrongful* harms to future generations, *i.e.*, as violations of their rights to bodily integrity and personal property. In Section 4, I argue that although it is more straightforward to handle the risk of climate change through regulation, the argumentation behind such regulation ought to be consistent with the reasonable man standard from tort law. In Section 5, I apply the idea of handling risk to future generations according to the reasonable man standard to one topic in particular: the social rate of time preference, which is commonly used in cost-benefit analysis of climate policy. In Section 6, I draw some conclusions.

## 2. The Formal Principle of Equality

Moral philosophers and economists have evaluated the intergenerational problem of climate change by applying the whole gamut of theories on distributive justice. It has been argued, for example, that climate policy should maximize utility over all generations [7–9], following Sidgwick [10] who argued “that the interests of posterity must concern a Utilitarian as much as those of his contemporaries”. Prioritarians, however, would argue for less stringent climate policy, believing that future generations will be wealthier than we are today [11,12]. Prioritarians hold the view that benefiting people (increasing their utility level) matters less the better off those people are [13,14]. The risks of climate change would matter even less to sufficientarians, according to whom social benefits and burdens should be redistributed only in so far as redistribution is required to let people attain a sufficient level of well-being [14–18]. Similar views have been expressed by economists such as Baumol [19], according to whom:

“a redistribution to provide more for the future may be described as a Robin Hood activity stood on his head—it takes from the poor to give to the rich. Average real per capita income a century hence is likely to be a sizeable multiple of its present value. Why should I give up part of my income to help support someone else with an income several times my own?”

Finally, some have defended an ‘agent-relative ethics’, according to which we are justified to care less about the risks of climate change for the simple reason that future generations are remote from us [20–23].

Although each of these theories of distributive justice may be defensible as theories about the *general* organization of society, their application to the particular case of climate policy is misplaced. The reason is that climate policy is not about setting new rules for the general organization of society, but about applying moral standards to a specific group, in this case future generations. In that case the formal principle of equality, originating in the writings of Aristotle, simply requires us to treat like cases as like (see also [24]). Imagine, for example, that in former times, when debate did not revolve around justice between the generations but around justice between the sexes, men had discussed whether social security for women should be based upon utilitarian or sufficientarian principles. Clearly, such a discussion would have been inappropriate. Justice would have required granting women equal rights to the *existing* social security already open to men. A discussion whether social security should be based upon utilitarian or sufficientarian principles could only apply to the general structure of society, *i.e.*, for both men and women simultaneously, not for one of the sexes in isolation. In this respect, the debate on intergenerational justice differs fundamentally from the debate on global justice. In the latter debate, the principles of distributive justice are to be applied to all and not to a particular group.

What *can* be discussed is whether cases are in fact like, requiring equal treatment. First, it may be debated whether the new group under consideration is morally alike. In former times it had been questioned whether slaves or women were morally equal to white male citizens. After centuries of emancipatory processes, increasing numbers of white male citizens started to acknowledge that slaves and women were in fact morally equal to themselves, *i.e.*, that there were no morally relevant differences between them that could justify excluding them from equal consideration in the organization of society. In the present era there is discussion as to whether future generations or animals ought to be treated as moral equals (on animals, see [25]). Second, it may be debated whether there are morally relevant differences in *circumstances* which may justify different treatment. While sex or skin colour may be morally irrelevant when obtaining social security, one’s level of income or wealth is, for example. Likewise, even if we were to acknowledge moral equality between the species, it would be meaningless to grant animals the right to vote [25].

Similarly, we can debate whether future generations are morally equal to present generations and whether there are differences in circumstances justifying different treatment. However, if intergenerational justice is to have *any* meaning, it would require future generations to receive the same treatment under the law and the same treatment from the authorities, as far as cases are like. Obviously, even if we consider future generations as moral equals, differences in circumstances may still justify different treatment. For example, just as in the case of animals it is meaningless to grant future generations an equal right to vote, since future generations physically cannot participate in our present elections. Neither does the formal principle of equality require us to provide for social security to be enjoyed by future generations equal in quality to the social security we ourselves enjoy. In this case, there are morally relevant differences in circumstances between present and future generations, in the same way as there are morally relevant differences between citizens and foreigners. Within a country, there is a strong degree of social cooperation: citizens not only have equal rights to social

security, but also equal duties to contribute to its maintenance, via income taxes for example. Since foreigners and future generations are not part of this social cooperation, there is justification for excluding them from claims to social security. However, particularly in the case of climate policy, there are general standards of conduct and laws which can be meaningfully applied. Since the emission of greenhouse gases involves risk of harm to others' health and property, and this harm is not an intentional wrong-doing but an unintentional side-effect of our actions, the obvious directions to consider are the general standards of conduct and (international) laws regarding the handling of risk to others, such as *tort law*. Before turning to the requirements of tort law in Section 3, the following section first discusses the question whether risk of harm to contemporaries and future generations are like cases to be treated alike. Is climate damage a wrongful harm to the property and health of future generations just as trans-national air pollution, for example, is a wrongful harm to contemporaries living across the border [26]?

### 3. Climate Damage as a Wrongful Harm

It has been argued that present generations cannot violate future generations' rights, simply because future generations do not yet exist and therefore presently do not have any rights. According to De George [27], see also [28] "[t]his follows from the briefest analysis of the present tense form of the verb 'to have'." However, as Feinberg [29], Partridge [30] and Meyer [31], for example, have argued, the non-actuality of future generations is in itself insufficient grounds for claiming that we cannot now violate the rights of future people. This is because there is no need for future generations to have rights *now* for us to be able, presently, to violate the rights those people will have in the *future*. Clearly, future people will have interests and there is no logical impossibility entailed in our present acts affecting those future interests. More troubling, however, is Parfit's notorious *non-identity problem* [32,33]. According to Parfit, long-term policy can never be in the interest of future generations, since if we implement it, history will take a different course and different people will be born and populate the future. In other words, the future individuals whose lives we wanted to improve will cease to exist as a result of our change of actions. Parfit coined his argument a 'problem', because it showed a strong disequilibrium between theoretical reasoning and moral intuitions. And as John Rawls [24] argued, we can never be satisfied with either our theory or our intuitions until they are in reflective equilibrium with each other. Since there are very few moral philosophers whose moral intuitions have shifted towards Parfit's theoretical findings, there has been an ongoing search up to the present day for solutions to Parfit's non-identity problem. To my mind, however, no satisfactory solution has yet been found. There are two ways to deal with this problem. First, governments can follow Parfit's theoretical argument that we can neither harm nor benefit future generations, *i.e.*, that no practical meaning can be given to the objective of intergenerational justice. However, the first governmental report or policy paper has yet to appear in which a government publicly expresses its desire to abandon the objective of intergenerational justice on the basis of Parfit's analysis. A more sensible and justifiable approach would be *precautionary* [26]. In the absence of a reflective equilibrium, we should not apply in public policy making a highly contested theoretical finding which asks us to *exclude* a group, *i.e.*, future generations, from the application of established principles and regulations. The potential negative consequences of erring on the side of Parfit's theoretical findings

would be much greater than erring on the side of our intuitions. In other words, before a reflective equilibrium is reached in moral philosophy on the issue of intergenerational justice we should treat the risk of climate change according to the same standards as we treat all contemporary risk.

The second issue is more practical. Climate change will not only result in increased morbidity and mortality, but also in damage to future property. Some have argued that since we are entitled to our own property and all future property depends on (originates from) present property, damage to future property cannot be considered a wrongful harm. Narveson [34], for example, states: “Obviously the property of future persons is not harmed by anything we can do now, for, since they do not yet exist, they own nothing, and by the time they get here, whatever it is that is currently destroyed will not be available to be owned by anyone.” In a similar vein, Farber and Hemmersbaugh [35] have argued: “If your great-grand parents squandered the family fortune, you may feel that they acted reprehensibly, but you would have difficulty charging them with violating a personal obligation toward you or with violating a “right” that you possessed.” If emitting greenhouse gases were a mere ‘squandering of the family fortune’, then climate policy would indeed be a supererogatory savings programme for future generations [36], simply making them wealthier than they would otherwise have been. This line of reasoning is a little too straightforward, however, since climate change violates future generations’ rights to the fruits of their own labour. Although we bring future generations into this world, we do not own them. Consequently, we are entitled neither to harm future generations physically nor to harm the fruits of their labour. *If* we were only to leave behind damaged property, future generations could build on this damaged property without us harming the fruits of their labor. We would not directly affect the results of their efforts. In that case, Narveson’s observation would make sense that “by the time [future persons] get here, whatever it is that is currently destroyed will not be available to be owned by anyone.” However, future climate damage does not result directly from latent damage inflicted on present personal property, such as overdue maintenance of a house, but indirectly from polluting the unowned atmosphere. The fact that climate change might damage future property is not an intrinsic quality of present property. Although present generations may have no particular duty to leave any of their possessions behind, neither are they particularly entitled to bequeath an alteration of the Earth’s atmosphere. The global atmosphere is not a ‘family fortune’ which the present generations can legitimately squander. Polluting the global atmosphere creates the risk of damage to *anything* that future generations will produce by their labour and consequently own. Since future generations have no alternative but to build on what previous generations have left them, this violates their right to the fruits of their own labour. The damage to the fruits of their labour is, for them, unavoidable. Therefore, damage to future property constitutes a wrongful harm.

#### 4. The ‘Reasonable Man’ Standard

In our society, everyone has a legal duty not to cause injury to others, whether negligently or with intent. This legal duty does not imply the impossible task of avoiding all risk of harm to others. Instead, common law requires us to take the care that a *reasonable man* would exercise under the circumstances. According to the Second Restatement of Torts (§ 291) of U.S. common law, for example:

“Where an act is one which a reasonable man would recognize as involving risk of harm to another, the risk is unreasonable and the act is negligent if the risk is of such magnitude as to outweigh what the law regards as the utility of the act or of the particular manner in which it is done.”

The reasonable man or reasonable person standard is a legal fiction, a person appropriately informed, capable, aware of the law, and fair-minded. The reasonable man is allowed to exercise self-interest and is not required to give his money to the poor. He exercises due care, however, to ensure that his acts do not injure others. He may weight the risk itself and the cost of alleviating it [37]. In some instances legal formulations require a quantitative cost-benefit analysis. According to a famous ruling by judge Learned Hand [38], the defendant is found negligent if the cost of precautions is less than the damage multiplied by its probability:

“[T]he owner’s duty, as in other similar situations, to provide against resulting injuries is a function of three variables: (1) The probability that she will break away; (2) the gravity of the resulting injury, if she does; (3) the burden of adequate precautions. Possibly it serves to bring this notion into relief to state it in algebraic terms: if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: *i.e.*, whether B is less than PL.”

Cost-benefit analysis is thus an accepted tool in tort law, although judges often undertake their task in a broad, impressionistic manner [39].

In contrast to the case of social security and civic rights, the legal duty to exercise the care of a reasonable man does not stop at national borders; international treaties also oblige us to take reasonable care when our acts involve the risk of harm to people living abroad, as in the case of transboundary air pollution. Principle 21 of the 1972 UN Conference on the Human Environment (Stockholm Convention [40]), for example declares that “States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.” This principle was reaffirmed at the UN Conference on the Environment and Development (UNCED) convened in Rio de Janeiro in 1992 [41]. The reason why the duty not to inflict harm does not stop at national borders and does not diminish with distance is that there is no morally relevant difference between fellow-citizens and foreigners when it comes to this duty. No social cooperation is required, for example, for the right not to be harmed. If the duty to exercise the care of a reasonable man does not stop at national borders, neither is there reason to assume it stops at *generational* borders. On what grounds is pollution crossing national borders to be deemed any different from pollution crossing generational borders, thus justifying different treatment?

As yet, our *legal* duties towards future generations are not as well defined as our legal duties towards our contemporaries. And even if they were, climate litigation would face various practical hurdles (see e.g., [42,43]). For example, in the case of climate change it is highly problematic to prove the precise causal link between the specific harm of the plaintiff and the act or omission of the specific defendant in the sense of a *condicio sine qua non*-relationship (or *but for* causation). Risk and risk creation are dispersed over many potential victims and defendants. Moreover, due to the inertia of the climatic system, present risk creators will already be deceased by the time the damage has occurred, making it virtually impossible for future generations to hold present risk creators liable. For these and

other reasons, tort litigation is not very well suited to handle climate change. Instead, climate change is better handled through government regulation, such as emission taxes and technology standards [44]. However, although we do not have *legal* duties towards future generations, the formal requirement of justice assumes that types of reasoning that are considered unreasonable under negligence tort law must likewise be unreasonable for government regulation. Standards for good governance include the principle of due care and the same formal principle of equality ('equal cases must be treated equally and different cases with due observance of their difference'). Moreover, the reasons why regulation is more appropriate than tort law for handling the risk of climate change are all *practical* reasons rather than morally relevant reasons justifying a different level of 'due care'. Intergenerational justice therefore implies that types of reasoning which are considered 'unreasonable' in tort law are to be considered 'unreasonable' in climate policy making as well.

Of course, the 'reasonable man' standard is neither sharply-defined nor carved in stone. On the contrary, it is constantly being defined by case law. However, although the reasonable man standard is open for interpretation, there are certain types of reasoning in the handling of risk to others which no court will find difficult to judge as *unreasonable*. The reasonable man standard is therefore sufficiently concrete to have consequences for various debates regarding climate policy making. For example, the near-absolute proof of man-made climate change which is sometimes required before making investments in mitigation would be quite foreign to 'reasonable man'. In the case of risk to others, 'indications' are often sufficient to take precautions. If we were producing fireworks or bombs adjacent to a residential area, it would be 'unreasonable' to wait for absolute proof that an accident is bound to happen before taking preventive measures. In 2000, US courts ruled that the *indications* of health risks reported in scientific journals in the 1970s should already have been sufficient for the tobacco industry to change its ways [45]. We may assume that an 'intergenerational court' would consider the first or second assessment report by the Intergovernmental Panel on Climate Change [46,47] as providing at least as much of an indication of risk to future generations as the 1970s reports of the health risks of smoking. The consequences of the reasonable man standard are clearest and most profound, however, for the discussion about the social rate of time preference to be used in cost-benefit analysis [48].

## 5. The Social Rate of Time Preference

The application of a social rate of time preference, also called *consumption rate of interest*, is the procedure of attaching a lower weight to the damage to health and property experienced by future generations owing to climate change than to the consumption lost by the present generations as a result of preventive measures. Let me stress that I am not referring to the procedure to be used to account for the productivity of capital over time. Obviously, climate policy making has to take into account that some of the assets diverted for mitigation measures are at the expense of alternative investment opportunities, which would offer benefits for future generations as well. However, the integrated assessment models (IAMs) used to evaluate different policy scenarios already take into account the losses of alternative investments due to climate policy. What remains in such IAMs are different paths of consumption over time. It is for comparing the consumption occurring at different points in time that a social rate of time preference is used. Choice of a particular social rate of time preference in

climate policy analysis does not therefore depend on the need to take into account the returns on alternative investments. See for a thorough explanation of the difference between the social rate of time preference, the marginal rate of return on private investment and the social discount rate: [49].

How far-reaching are the consequences of applying a positive social rate of time preference? This can be readily illustrated with a simple numerical example: at 6%, the rate advocated by William Nordhaus [50], a million dollars of climate damage 200 years from now is given the same weight as less than *nine* dollars of consumption losses today. The influence can also be illustrated by estimates of the social costs of carbon, or the ‘optimal’ carbon tax. In 1996, the IPCC Working Group III already noted in its review of estimates that the wide range of \$5–\$125 per ton of carbon (in 1990 prices) was due mainly to different assumptions about the social rate of time preference. Guo *et al.* [51] tested five different discount schemes on the FUND 2.8 IAM and found results varying from *minus* \$2.6 to *plus* \$226 per ton of carbon (in 2005 prices). Nordhaus [50] calculated the ‘optimal’ carbon price with his DICE IAM for both his own advocated social rate of time preference and the social rate of time preference advocated in the Stern Review [9] and found values of \$35 and \$360 per ton carbon, respectively. It may come as no surprise, then, that the issue of attaching a lower weight to the damage to health and property experienced by future generations as a result of climate change than to the consumption lost by the present generations as a result of preventive measures is of decisive importance for climate policy making.

Although economists disagree widely over the extent to which future climate damage should be discounted, virtually all economists agree that some discounting should be applied. Basically, there are two views, coined by Arrow *et al.* [52] *descriptive* and *prescriptive*, respectively. Economists with the *prescriptive* view *prescribe* a certain social rate of time preference on the basis of one of the moral theories discussed at the beginning of this article, generally utilitarianism [8,9,53–55]. Utilitarians believe that all utility should be weighted equally. However, if future generations are expected to be wealthier than we are today, this provides a reason for discounting, following Marshall’s observation that “a pound’s worth of satisfaction to an ordinary poor man is a much greater thing than a pound’s worth of satisfaction to an ordinary rich man” [56]. Put differently: there is a declining marginal utility of additional wealth. Economists with the *descriptive* view believe we should not only discount for differences in wealth, but also for the fact that the present generations simply care less about the future, *i.e.*, that future utility should be discounted as well. Economists with the descriptive view justify both considerations, because in their opinion these considerations reflect society’s actual preferences as expressed by monetary interest rates observed in financial markets (see e.g., [50,57]). Ever since, there has been a debate and unbridgeable gap between the two camps. The prescriptionists argue that it is immoral to attach a lower weight to future utility or well-being. The descriptionists argue that the prescriptionists behave like ‘philosopher kings’, imposing their ethical judgment on society [23,50,58,59] and that their advice would require governments to increase savings to absurdly high rates [55,60,61].

In essence, the apparently unbridgeable gap between the prescriptive and descriptive approaches originates in their common point of departure that there is but one social rate of time preference, to be applied consistently across all policy issues. This rate may be time-dependent [62,63], but at any given moment it is assumed to be the same for different changes in welfare [64–67]. As a *description* of society’s actual preferences and behaviour, a single social rate of time preference for the distant future is clearly wrong. It can readily be observed in everyday life that people are *not* indifferent to how

distributions of welfare come about and that most people behave like the ‘reasonable man’ from law, generally exercising self-interest, but also exercising due care to ensure that their acts do not injure others. It is true that people are generally biased in how much they care about themselves, their friends, their fellow countrymen and foreigners. They can be egoistic and spend all their resources on their own well-being and nothing on others. Or they may spend most on themselves, less on their friends and relatives and even less on those in need in poor countries. Alternatively, they may spend much on the poor and nothing on the rich because the latter do not need it. However, when it comes to imposing risks of harm to other people’s health and property, people do not discount this harm. All harm is then weighted equally, regardless of whether the other is wealthy or poor and whether the other is nearby or far away [68,69]. Few people consider Marshall’s observation that “a pound’s worth of satisfaction to an ordinary poor man is a much greater thing than a pound’s worth of satisfaction to an ordinary rich man” to be a justification to outlaw the rich. It is important to note that the different preferences on how to handle harm to others and other cases are not the preferences of a philosopher king; they are observable social preferences, which are reflected in the reasonable man standard. If economics should be based on the principle that preferences count [61], then economists should not ignore these general moral preferences.

The origin of the error that there is but one social rate of time preference for different policy issues lies in the descriptionist’s belief that the social rate of time preference for the distant future can be deduced from market interest rates. However, market interest rates only reflect how people weigh changes in their present consumption against changes in their *own* future consumption. Climate policy making is about weighing up changes in our present consumption against changes in the consumption of future generations. There is no way social preferences regarding such matters of intergenerational justice can be expressed through market interest rates; instead, they are expressed through the political process, such as elections.

Although economists assume a single rate of time preference, whether policy aims at preventing harm or not, there are indications that economists do in fact notice the difference. Weitzman [70], for example, observed that “to think about the distant future in terms of standard discounting is to have an uneasy intuitive feeling that something is wrong, somewhere.” Remarkably, Weitzman made his observation in the context of “global climate change, radioactive waste disposal, loss of biodiversity, thinning of stratospheric ozone, groundwater pollution, [and] minerals depletion”. These are precisely the kind of issues where people have an intuitive feeling that our present acts involve *wrongs* to future generations. If, on the other hand, the examples involved benefits to future generations resulting from fiscal policy, increased investments in communication or transport technologies, or even life-saving medical developments, few people would share the same ‘uneasy intuitive feeling’ about discounting. In fact, if we believe future generations are not ‘entitled’ to certain benefits, we can discount as much as we like. A social rate of time preference much higher than market interest rates would then do just as well. Until it accepts different rates of time preference for different policy areas, therefore, the descriptive camp will be unable to remove its ‘uneasy intuitive feeling that something is wrong, somewhere’.

As a *prescriptive* view, the idea of a single social rate of time preference is wrong as well. At the very least, it violates the formal principle of equality preceding any elaboration of the concept of intergenerational justice as explained at the beginning of this article. If intergenerational justice is to

have any meaning, it would require future generations to receive the same treatment under the law and the same treatment from the authorities, as far as cases are like. This would imply different social rates of time preference for different policy areas, in accordance with the reasonable man standard. That the recommendations by the prescriptive camp are counterintuitive can be illustrated by an example. Imagine that a Mexican factory is considering emissions reduction to prevent damage to both health and property of US citizens living across the border. And imagine economists advocating discounting the harm to US citizens for the following two reasons. First, Mexicans simply care less about the well-being of US citizens than the well-being of their fellow citizens to whom they have stronger emotional ties. Therefore, on the basis of an agent-relative ethics [20–23], the welfare losses US citizens experience due to health and property damage should be discounted in comparison to the welfare losses Mexicans experience due to investments. Second, US citizens are about five times as wealthy as Mexicans and therefore a dollar of health and property damage will matter less to them than a dollar of investment costs will matter to Mexicans [7–9]. On the basis of these two considerations, our economists advise *against* emission reduction. This is ill advice. Why? Because apart from being morally outrageous, none of these arguments would hold in court. Neither in everyday morality nor in (international) law is it acceptable to harm others in health and property because they are wealthier or strangers to us. Please note that these considerations do not depend upon the proximity of the two parties. The same conclusion would be reached if large distances would separate the countries.

This example also works the other way round. Imagine that the costs to US citizens to be entered into the cost-benefit analysis are due not to wrongful harms, such as health damage, but to *wrongless* harms, such as negative effects on US employment or competitive power. After all, US citizens are not *entitled* to their employment or competitive power. In that case, the Mexican factory would be entirely justified in applying an *infinite* discount rate and disregarding these costs entirely. In this case, there would be no need for Mexicans to ‘treat the welfare of US citizens on a par with their own’, as the Stern Review advocates the present generations should do regarding the welfare of future generations [9] (Part I, p. 31). As moral philosophers have argued, such a general plea to weight everyone’s welfare equal to one’s own would be too demanding and alienating from our personal projects and commitments [71]. Certainly, such a self-sacrificing and self-denying attitude is rarely found in this world and thus hardly corresponds to public (moral) preferences. If taken seriously in policy making, it would indeed require absurdly high saving rates and government investments across the board. Using different social rates of time preference for different policy areas, in accordance with the reasonable man standard, would not require this general increase in savings. When rights are *not* at stake, as in the case of present investments in transport or communications technology, there is no decisive moral reason to apply a lower social rate of time preference than observed in savings behaviour. When rights *are* at stake, though, there is good reason to apply a zero social rate of time preference. In other words, the social rate of time preference advocated by descriptionists is too high in the case of future harm and too low in all other cases. It should be stressed that throughout this article, in line with the reasonable man standard, wrongful harms are restricted to bodily integrity and property [72], and thus do not encompass harms to fundamental interests in e.g., health, subsistence and being economically independent. See for a defence of the latter view: [73].

Some may argue that we should not apply the reasonable man standard to future generations because the standard is *wrong* in itself. In fact, in the case of negligence liability it has been argued that

making the standard of ‘reasonable care’ dependent on differences in wealth between defendant and victim would improve total social utility (see e.g., [68,69,74,75]). However, legal-scientific debate about such adaptations has so far been without consequence for the standard of ‘reasonable care’ in current law [68]. It would be in strong violation of the demands of justice if instead of applying the general standards of conduct to a certain group of people we were to apply our own preferred standards. Just as a civil servant cannot award social security to clients according to his personal political views, we cannot apply weighting for differences in wealth in the case of climate policy *before* we have changed the laws which are applicable to ourselves.

Others may argue that the reasonable man standard does not hold for people who are below a social minimum, a certain threshold in welfare, resources or capabilities. In that case, moving above the threshold would have priority. If people are starving, we may sympathize with Robin Hood. However, even if this were the case, it would not justify discounting by governments in the developed countries. There is no justification for developed countries like the United States or the Netherlands to consider themselves too poor to take reasonable care in the face of climate risks [76].

And of course, individuals and governments are often inconsistent in their application of principles. In the case of war, it is obvious that governments do not attach equal weight to the lives of foreigners and those of their own citizens. At other times, governments may hope to get away with applying lesser principles to the risks imposed on foreigners than in the case of their fellow citizens. Such behaviour of governments is irrelevant in the present context, however. Climate policy evaluation is not about what governments may do *off the record*. It is about the transparent and documented *justification* for government policy. While it may be conceivable that many nations secretly endeavour to shift costs onto their neighbours, it is unthinkable that the Mexican government in our hypothetical example would publicly publish cost-benefit analyses in which damage to US citizens is discounted. And such public justifications are what we are talking about. The fact that there is no intergenerational court that can call governments to account, just as international courts presently do in international disputes, is no excuse.

The intention of this article is not to argue that governments *must* implement climate policy on the basis of a zero social rate of time preference in line with the reasonable man standard. Justice may require it, but society may be unwilling to do so. In that case, democratic governments are bound by the political preferences of their electorates. It should be noted, though, that public support for intergenerational justice has already led governments to express their commitment to such justice (see e.g., [77–80]). To my knowledge, there is no government or government statement which has expressed the point of view that future generations differ from present generations in any morally relevant respect that might justify different treatment, *i.e.*, that norms regarding the handling of risk to others should not apply equally to future generations. On the contrary, in public debates and policy reports willingness is generally expressed to treat future generations in accordance with justice. Still, there is a possibility that a country’s population is *unwilling* to treat future generations as moral equals, particularly when faced with the costs of equal treatment. However, if this is the case it should not enter cost-benefit analysis. Instead, cost-benefit analysis should indicate the policy which the standard of reasonable man would require, *after which* society may or may not turn down this policy. To confront society with an ‘optimal’ climate policy in which economists already include society’s (presumed) unwillingness to protect future generations from harm is to put the cart before the horse [81].

Finally, it may be argued that a positive social rate of time preference is required on purely arithmetic grounds to arrive at finite marginal damage estimates of present greenhouse gas emissions. However, a zero social rate of time preference would result in *infinite* estimates only if one holds two assumptions simultaneously: global GDP will grow at a rate *greater than* that at which greenhouse gases are removed from the atmosphere, *and* climate damage is directly proportional to GDP. If both assumptions are true, the damage due to a present emission of greenhouse gases will indeed continue to grow forever and a zero social rate of time preference would lead to infinite marginal damage estimates of present emissions [82]. A positive social rate of time preference would then be required to arrive at finite marginal damage estimates of present greenhouse gas emissions. This arithmetic trick does not seem inevitable, however. On the basis of currently available information, reasonable man does not appear to be reckless when taking precautions, as if the future would look like the present apart from climate change. In that case, the impacts of a present emission of greenhouse gases diminish in the distant future at the rate at which greenhouse gases are removed from the atmosphere and the social discount rate is not required on purely arithmetic grounds to arrive at finite results. It is not reckless if we assume that damage is *not* proportional to GDP. Obviously, the richer societies have more wealth that can be damaged by climate change. Moreover, rich societies tend to have a higher willingness to pay for a clean environment and intact nature [83,84]. However, rich societies are also less vulnerable to climate change [84–86]. The share of climate-sensitive sectors such as agriculture will diminish and the vulnerability will diminish, for example through technological progress and adaptation [85]. All these effects are uncertain. To a large extent, however, these countervailing effects are coupled [87]. Vulnerability will decrease and adaptation increase more rapidly with economic growth. Given this coupling and the lack of quantitative information (see for an exception [88]), I do not see sufficient reason to assume that in the future climate change will have different overall impacts on consumption than the same climate change would have today.

## 6. Conclusions

In this article, I have argued that intergenerational justice requires future generations to receive the same treatment under the law and the same treatment from the authorities, as far as cases are like. Particularly when it comes to the handling of the risks we impose on others, there are general standards of conduct and laws which can be applied equally to future generations and to ourselves. Since climate policy is concerned with mitigating the risks imposed by present generations on future generations, the reasonable man standard from tort law is of particular relevance. There is no justification to handle pollution across generational boundaries according to norms different from the (international) laws for handling pollution across national borders. I have argued that this implies, among other things, use of a zero social rate of time preference in cost-benefit analysis of climate policy. Climate damage experienced by future generations should be discounted neither for their higher expected wealth, nor purely for their being remote.

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## Conflict of Interest

The author declares no conflict of interest.

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