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Give it up for climate change: a defence of the beneficiary pays principle

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Abstract: This article focuses on the normative problem of establishing how the burdens associated with implementing policies designed to prevent, or manage, climate change should be shared amongst states involved in ongoing international climate change negotiations. This problem has three key features: identifying the nature and extent of the burdens that need to be borne; identifying the type of agent that should be allocated these burdens; and distributing amongst the particular ‘tokens’ of the relevant ‘agent type’ climatic burdens according to principles that none could reasonably reject. The article defends a key role in climatic burden-sharing policy for the principle that states benefiting most from activities that cause climate change should bear the greatest burden in terms of the costs of preventing dangerous climate change. I outline two versions of this ‘beneficiary pays’ principle; examine the strengths and weakness of each version; and explore how the most plausible version (which I call the ‘unjust enrichment’ account) could be operationalized in the context of global climate governance.

Keywords: Global justice, climate change, unjust enrichment, remedial responsibility

Give it up for climate change: a defence of the beneficiary pays principle

It is now beyond reasonable doubt that the human cost of unmanaged climate change would be both substantial and adverse in aggregate terms (Parry, Canzani and Palutikof, 2007; Solomon et al., 2007). Those bearing the greatest disadvantages will be residents of developing states and vulnerable social groups located in all regions (Stern, 2007, 65-103; World Bank, 2010b, 5-6; Adger, 2010, 282-3). Within this context of vulnerability and risk, a growing consensus has emerged on the need to fund, and subsequently implement, a coordinated set of policies that prevent adverse climate changes that are still avoidable, and limit the human costs of climate changes that are no longer avoidable, in a manner that is consistent with norms of justice and equity (UNFCCC, 1992, Article 2 and 3; UNFCCC, 2011, 2-3). The relevant norms can be usefully viewed as arising from three normative challenges for just climate policymaking. First, to determine the share of the capacity of the Earth's atmosphere to assimilate carbon dioxide (CO₂) and other greenhouse gases that morally relevant agents should be able to exploit over the coming decades as a matter of distributive justice (Shue, 1993, 48-50; Caney, 2009, 125-6).¹ Second, the burdens associated with managing climate change and its adverse effects should be equitably allocated amongst the relevant agents. The idea here is that an account of justice in emissions would be theoretically incomplete, as well as practically useless, without an accompanying account of how the agential and institutional burdens associated with achieving the preferred distribution of emissions rights - and the implementation of effective policies of climate adaptation - should be distributed within and between generations (Caney 2005, 751-2; Page, 2008). Third, the duties and entitlements of climatic justice, if they are to be of genuine relevance for policymakers, must be incorporated into the process whereby national, regional and global climate policies are selected. An important aspect of this 'justice in governance' problem is that, in absence of an integration of normative theory and climate policymaking, attempts to maintain an atmosphere free of 'dangerous anthropogenic interference' (UNFCCC, 1992, Article 2) may undermine established norms of international society such as global poverty reduction and international security.

The focus of this article is the second challenge. Following Miller (2009, 97-107), I assume that a promising method of understanding the climate burden-sharing problem is to view it as one of allocating, in a just manner, duties of 'remedial responsibility.' As Miller explains, the application of remedial responsibility attribution to the climate problem involves the search for normative principles 'that can distribute the responsibility in such a way that each person or group knows what they have to do in order to produce the collective result we want to achieve - namely, a greenhouse regime that keeps emissions below the level at which damaging climate change occurs' (Miller, 2009, 120). Using Miller's general account of remedial responsibility as a starting point we can say that a normatively defensible and policy relevant account of climatic burden sharing lies in providing convincing responses to three key questions:

- (i) what are the burdens associated with climate change and policies for its management? (the 'burden identification' question).
- (ii) which type(s) of agent should bear these burdens? (the 'level of agency' question).
- (iii) how should the burdens identified in (i) be shared amongst tokens of the agent type identified in (ii)? (the 'burden-sharing' question).

In what follows, I seek to contribute to the understanding and solution of the climate 'burden-sharing' question in the light of a preliminary approach to the 'level of agency' and 'burden identification' questions that reflects the established focus of international climate negotiations

on, first, the remedial climate responsibilities of national states rather than non-state actors (whether individuals, firms, civil society groups) operating within and between their territories;² and, second, the financial and other burdens associated with implementing policies of climate mitigation and adaptation that will hold increases in global temperature to 2°C above its pre-industrial level and minimize the global costs of adapting to this higher temperature level.³ I argue that the burdens involved should be distributed amongst states according to the amount of benefit that each has derived from past and present activities that contribute to climate change. This has become known in the literature as the ‘beneficiary pays principle’ (Caney 2006, 471; Meyer and Roser 2010, 252-3; Page, 2011, 420-1).

Before describing the argument in more detail, it is worth explaining why the burden-sharing problem is such an important aspect of the global response to climate change and how normative theorizing can contribute to its solution. Recent research indicates that the total financial cost of managing a global warming of roughly 2°C on its pre-industrial level will exceed \$1 trillion annually by 2020 on the assumption that a coordinated global climate response emerges in the next decade; and far higher costs estimates are associated with international inaction or unexpectedly higher values for global warming (Stern 2007, 220; World Bank 2010a, 10). The selection of normative or other criteria to calculate the climate burdens each state must bear as part of its commitment to the 2°C objective could be expected to influence significantly patterns of well-being across states and generations since selecting one set of criteria over another will alter the flow of very large flows of financial and other resources. Given the significant impacts of such flows on a wide variety of agents, an account is required why one set of burden sharing criteria should be selected over its rivals if the associated distributive mechanisms and outcomes are to be justified to agents whose behavior and interests they regulate. While economic theory, public administration and climate science can clarify many dimensions of the climate response, the selection of an equitable division of adaptation and mitigation burdens is at bottom a normative-political problem. Normative theorizing, for example, can assist in clarifying the justificatory bases and distributive implications of rival burden sharing principles that political representatives of all states must then negotiate over in order to reach a global climate agreement that, ideally, no state can reasonably reject. In this way, although it cannot solve the climate burden sharing problem in isolation, normative theorizing can provide a framework for reasoned dialogue amongst policy actors representing different political traditions and subject to different political constraints (World Bank, 2011, 85; Page, 2011, 429-20).

In the next section, I outline the principle that the beneficiaries of activities that cause climate change should shoulder the principal financial and other costs associated with implementing policies designed to prevent or reduce human disadvantage arising from climate change. This ‘beneficiary-pays principle’ (BPP), I argue in the section thereafter, can be developed in two main forms based respectively on notions of ‘wrongful enrichment’ and ‘unjust enrichment.’ The aim of the argument up to this point is to defend the claim that the BPP not only offers a distinctive alternative to the two most commonly defended burden-sharing principles (the ‘contributor pays principle’ and the ‘ability to pay’ principle) but also that it possesses certain normative qualities that make it superior to rivals in terms of its philosophical justification and distributive consequences. The following section defends the unjust enrichment variant of the BPP from three important normative objections while also paving the way for a penultimate section offering a provisional account of how the ‘unjust enrichment’ BPP might be operationalized in the context of contemporary international relations. A final section concludes.

Benefiting from climate change: the ‘beneficiary pays principle’

Philosophical and legal treatments of climate burden-sharing have traditionally been dominated by two rival approaches. According to the first, a ‘contribution to problem principle’ (CPP) applies such that states should bear the costs of managing climate change according to their respective shares of the accumulations of greenhouse gas that drive climate change (Neumayer, 2000; Allen and Lord, 2004). The idea is that, if a state through its environmental impacts causes climatic disadvantage to befall to another state, then remedial action is owed by the former to the latter up to the point where no injustice persists between them. The CPP, as stated, is an application of – and justified normatively by – a deeper principle requiring that remedial duties be assigned to agents who can be held remedially responsible for combating disadvantage arising from the way their behaviour affects other agents (Miller, 2001, 455). Despite the fact that the emissions of all states have contributed to the significant rise in the stock of greenhouse gas in the atmosphere since 1750, over 60 per cent of the total amount of CO₂ released into the atmosphere between 1750 and 2008 originated from human activities in 31 high income developed states (World Bank, 2011, 81; see also Boden, Marland and Andres, 2011). Current greenhouse gas emissions trends indicate, moreover, that the majority of greenhouse gas in the atmosphere will continue to be attributable to activities in this small group of states for a number of decades.⁴ In the light of this skewed distribution of historical climatic responsibility, the CPP provides a strong justification for the unique adaptation and mitigation responsibilities of *developed* states;⁵ and it is notable that the CPP has been strongly defended by China and other developing states⁵ and is articulated as a normative basis of climatic action in the text of the United Nations Framework Convention on Climate Change (UNFCCC).⁶

According to the second approach, an ‘ability to pay’ principle (APP) applies such that states should bear climatic burdens in proportion to their relative capacities to bear such burdens: the more a state is able to remedy climatic disadvantage through undertaking or financing climate mitigation and adaptation, that is, the more they should do so (Shue, 1999, 537; Shue, 2011, 19-20). The APP, as stated, is an application of – and justified normatively by – a deeper principle captured elegantly by Henry Shue (1999, 537) who writes that ‘among a number of parties, all of whom are bound to contribute to some endeavor, the parties who have the most resources should contribute the most to the endeavor’ (see also Miller, 2001, 460-1). Although all states possess at least some capacity to control greenhouse emissions or undertake measures to cope with unavoidable climate change, the APP implies that the developed states and their inhabitants should shoulder the main burdens of climate justice because their greater comparative and absolute wealth puts them in a unique position to finance and undertake policies of mitigation and adaptation. In this regard, it is notable that just 31 high income states accounted for 65 per cent (or \$40.8 trillion) of global world income in 2010 according to the World Bank.⁷ The APP is currently the basis of the European Union’s internal division of climate mitigation measures not covered by emissions trading procedures and is also articulated through the ‘respective capabilities’ element of the UNFCCC’s commitment to climate action based on the ‘common but differentiated responsibilities and respective capabilities’ of Parties to the Convention (European Union, 2009; UNFCCC, 1992, Article 3).

According to the ‘beneficiary pays principle’ (or BPP), a third but relatively neglected principle of climate burden sharing, states should shoulder burdens associated with responding to climate change according to the extent that they have derived economic benefits from activities, such as fossil fuel energy usage, that have released greenhouse gases into the atmosphere since the beginning of the industrial revolution (Caney, 2006, 471; Page, 2008, 562). More precisely, if a state is benefited by activities within or beyond its borders that imposed climatic disadvantage

on others states then the former must remediate the latter's disadvantage by surrendering the requisite amount of benefit up to the point where the benefits that provide the basis of the remedial duty are exhausted. For a state not to pay their fair share of the cost of the climate response as determined by the BPP, on this view, would be unjust as it would amount to profiting from environmental damaging activities originating within and between its territorial boundaries (Gosseries, 2004, 43-6; Page, 2011, 420-2). The BPP, as stated, is an application of – and justified normatively by – a more general principle requiring that duties of remedial justice be assigned to agents who have profited from activities that impose undeserved disadvantages on other agents (Butt, 2007, 135; Anwander, 2005, 45).⁸ Although the economies of all states have benefited from agricultural and industrial activities that have released greenhouse gas into the atmosphere since 1750, developed states are picked out by the BPP as having a peculiarly strong responsibility to bear climate burdens because much of their high development, and associated income and wealth, can be traced fairly directly to past and present activities that drive climate change. Although the BPP has generated a sizable following amongst normative theorists, it is rarely articulated as a self-standing principle of climate burden sharing by UNFCCC negotiators; and it is not mentioned explicitly in the text of the UNFCCC.

When developed as a self-standing principle of burden sharing, the BPP contrasts with the CPP in that the latter does not, and need not, assume that agents must benefit from inflicting damage on the climate system for them to be required to remedy climatic disadvantage. The key issue for the CPP is the amount of damage done and whether the emitting agent conforms to the relevant criteria for them to be held at fault for the harms caused to other states by their cumulative greenhouse gas emissions. The BPP, by contrast, holds present-day states remedially responsible for tackling climate change even if these states are not themselves plausibly held responsible, in either fault-based or non fault-based terms, for the way in which greenhouse gas emitting activities gave rise to the climate problem. This feature of the BPP comes about as a result of it being a hybrid approach to remedial responsibility containing a 'forwards-looking' element (that targets existing and future benefits so that they can be used to manage climate change) and a 'backwards-looking' element (which isolates for redistribution only those benefits that are strongly connected to climate change producing acts). This hybrid structure, as we shall see, enables the BPP to finesse a range of problems associated with holding present states morally responsible for the environmentally altering behavior of ancestral political units, as well as further problems associated with linking any particular state's cumulative greenhouse gas emissions with particular adverse outcomes arising in other states.

The BPP differs from the APP in that, for the latter, the source of differential ability to respond to climate change is not relevant to a state's remedial climatic responsibilities. The APP instead allocates remedial responsibility to states on the basis of their ability to bear climate burdens in the present and future. The argument directed at these states is 'you should pay because you are much better off than others' (Caney 2005, 758n). The BPP, by contrast, pays much greater attention to the explanation of why wealthy states should be prepared to bear a greater burden in terms of the global climate response. The argument directed at these states is essentially: 'you should pay because you are much better off than others as a result of exploiting benefits linked to the creation of climate change.' In this way, the BPP both identifies a more specific stream of benefits that should be surrendered to manage climate change and coheres with the widespread conviction, alien to purely forwards-looking articulations of remedial responsibility such as the APP, that the way in which a state came to possess its 'ability to pay' has a bearing on their 'duty to pay.' It is also worth noting that the BPP makes sense of the common normative belief in tension with the APP that bearing an appropriate share of the global

climate response burden is a matter of rectificatory justice, of ‘making amends’, rather than behaving beneficently to disadvantaged states or seeking to realize a preferred global pattern of resource distribution. This is achieved by providing an explanation of the special climatic responsibility of developed states - that their superior wealth is morally tainted through its connection to human activities known to generate significant hardships within and beyond their borders - that is not reducible to the mere fact of their superior wealth

Interpreting the beneficiary-pays principle: two alternative approaches

The above brief remarks outline the distinctiveness, and arguably attractiveness, of the BPP on the assumption that this approach to climate burden-sharing can be developed in a way that is philosophically coherent and politically relevant. But a deeper analysis of the philosophical basis and practical application of the BPP is necessary to motivate this assumption. One obvious area of normative concern is that it is not plausible to require that *all* benefits implicated in some way to the creation of climate change be surrendered by states for the sake of an effective international climate response. This would be an implausible implication since this would undermine entitlements to virtually all current holdings of resources. Instead, a principled account is needed that can discriminate between those benefits that should be surrendered to the global climate response and those that may be retained by their current holders. A second area of normative concern is that it is not obvious that the mere receipt of a benefit from a contemporaries or ancestor, whatever its origin, triggers a duty of disgorgement designed to remedy the disadvantage created by the activities from which it arose. At the very least, an account has to be given that explains why some benefits are not ‘merely received’ but rather come with further duties attached.

There appear to be two ways in which the BPP might be developed in the climatic context to address these two issues. Each possibility provides a unique answer as to which category of benefits is held to be currency of climatic remedial justice and they diverge on according to whether wrongdoing needs to be present in the acquisition and intergenerational transfer of benefits for the BPP to apply:

- (i) those states wrongfully enriched by activities that cause climate change should pay (the ‘wrongful enrichment’ principle).
- (ii) those states unjustly, but not wrongfully, enriched by activities that cause climate change should pay (the ‘unjust enrichment’ principle).

I aim to show, through a process of internal critique and refinement, that (ii) is superior to (i) before moving in the next section to argue that (ii) is also at least as plausible as, and has various advantages in theoretical and practical terms over, the CPP and APP even when it is subject to three external objections.

The wrongful enrichment BPP

According to the ‘wrongful unjust enrichment’ BPP, climate response burdens should be distributed in proportion to the *present* benefits each state enjoys as a result of activities that drive climate change and can be seen as having *wrongful* origins. The idea here is that benefiting from activities that wrongfully impose disadvantages on other states triggers a remedial duty on the part of beneficiary states to rectify climatic disadvantage. The moral predicament of such ‘climate beneficiary’ states is analogous to that of agents who receive benefits from acts of

breach of contract or profitable trespass for which they themselves cannot be held at fault but should nevertheless remedy.

The notion of ‘wrongful enrichment’ has received extensive treatment in the normative literature on international and intergenerational justice.⁹ The grounding principle is captured well by Butt who asserts that each and every moral agent is bound by ‘a duty not to benefit from the suffering of others’ and where such benefits cannot be avoided a duty arises ‘to disgorge (in compensation) the benefits one gains as a result of injustice follows from one’s duty not so to benefit’ (Butt 2009, 127). To resist this duty by refusing to disgorge the benefits one receives from the wrongdoing of others would put an agent in moral conflict, Butt thinks, since they would be simultaneously condemning the wrong from which they benefited while failing to act on this condemnation by undoing its effects by disgorging the profit that someone has accrued through another’s experience of wrongdoing. Although Butt refers here to ‘injustice’ rather than ‘injustice through wrongdoing’, it is clear that wrongdoing is an essential ingredient of his account otherwise it would not be a compelling moral failure, or a source of moral conflict, on his view for the defendant to retain the benefit rather than disgorging it to its rightful owner.¹⁰

In terms of the demandingness of the burdens that the ‘wrongfully enriched’ should be prepared to bear, it is worth noting that the benefits to be disgorged, on most accounts, are subject to tight restrictions. First, the duty to disgorge benefits is only triggered amongst beneficiaries when the perpetrators of the original wrongs are prevented themselves from bearing the associated costs. Second, the benefits must arise as ‘automatic effects’ of the wrongful behavior in question (Butt 2007: 146ff; Butt 2009: 130-2). That is, the benefits and disadvantages at the heart of a wrongful enrichment argument must be persisting effects of past or present wrongdoing rather than brute bad luck or poor life choices on the part of the sufferer. Third, proponents of the doctrine of wrongful enrichment generally embrace a ‘no worse off’ requirement in their treatment of the wrongfully enriched such that the relevant beneficiaries can only be required to surrender an amount of benefit up to the point where they would be worse off had the original wrong, or chain of wrongs, not arisen (Butt, 2009, 127). This is a further constraint designed to reflect the difference between the duties of justice in play in cases of compensation for harm (where the recovery remedy is based on damages inflicted on innocent parties) and the duties of justice in play in cases of wrongful enrichment (where the recovery remedy is based on gains realized by beneficiaries of wrongdoing).

Returning to the climatic application of wrongful enrichment, the argument can be illustrated by its four key steps:

- (i) Many states enjoy benefits that would not have arisen had earlier generations internalized the environmental costs of industrialization rather than shifting them to later generations.
- (ii) Many states will experience disadvantages that they would not have experienced had earlier generations internalized the environmental costs of industrialization rather than shifting them to later generations.
- (iii) The disadvantage in (ii) indicates that modern day ‘beneficiary states’ have intercepted benefits that rightfully belong to ‘disadvantaged states’, namely, the capacity to exploit the assimilative capacity of the atmosphere unburdened by costs of mitigation and adaptation.
- (iv) The states identified in (i) should remedy the disadvantage experienced by those states identified in (ii) by surrendering a proportion of the benefit they enjoy that can be traced to climate change producing activities to help finance effective policies of mitigation and adaptation.

The ‘wrongful enrichment’ approach to climate change, as captured by these four steps, has three

major advantages in practical application and theoretical coherence over formulations of the APP and CPP most commonly invoked in the normative and climate policy literature. First, the account coheres with the intuition of many that wrongdoing arose at some point in the chain of causation of climate change without invoking a harm-based remedy penalizing modern states for the environmentally damaging behavior of ancestral political units. The ‘wrongdoing’, here, only arises at the historical end of the intergenerational causative chain of events that lead to climatic disadvantage. Second, the notion of wrongful enrichment pursues a deeper explanation of the core intuition motivating the APP (that rich states should take the lead in combating climate change) in terms of the superior wealth of these states having originated in the activities that generated the necessity for international climatic action.¹¹ In this way, the BPP, like the APP, identifies a potentially large stream of financial benefits that could be targeted to fund effective policies of mitigation and adaptation, but it also offers an explanation of why developed states *should* pay that does not collapse into the observation that they *could* pay (Page, 2008, 562).

Nevertheless, a significant problem remains which indicates that some additional modification is required for the BPP to be a genuinely plausible alternative to the APP or CPP. This is that the account developed up to this point is open to the challenge that wrongdoing is absent in the production and accumulation phases of the benefits associated with climate changing activities. Neither ‘wrongdoing’ nor ‘harmdoing’ are normative categories open to tidy explication, but, at the risk of simplification, an act or social policy can only be wrong if its performance can be linked to a clear violation of at least one morally relevant agent’s legitimate interests *or* if its performance can be viewed as wrong intrinsically, that is, independently, of its violation of any particular agent’s interests (Feinberg, 1990, xviii). In the former instance, it is quite possible to envisage an act or social policy wronging an agent without harming them since their interests might not be set back all things considered and yet their rights might be violated nonetheless (this would be an instance of ‘harmless wrongdoing’). In the latter instance, it is quite possible to envisage an act or social policy being wrongful without it wronging a particular agent since the wrongdoing involved might be traced to the states of mind of the wrongdoer rather than the interests, or rights, of any particular agent being thwarted (this can be termed ‘victimless wrongdoing’). However, what is required in both cases is the identification of a ‘wrongful factor’ to avoid the obvious absurdity of envisaging an act or policy being wrongful in absence of either a wronged party or wrongdoer.¹² The problem, in the climatic context, is that this ‘wrongful factor’ is surprisingly illusive regardless of whether it is pursued in terms of the conduct of agents whose activities that released greenhouse gas in the past or in terms of the conduct of agents that have received benefits as a result of greenhouse gas emitting activities.

The problem of ‘non-wrongful climate change’ demands far more space than I can give it here and in any case has been developed at length by critics of both the CPP, and versions of the BPP, that appeal to wrongdoing (see, for example, Caney 2010, 206-12; Page, 2011, 421-2). Three lines of argument illustrate the problem.

(i) Due to the way in which accumulations of greenhouse gas force climate change, there is no clearly discernible link between the annual or accumulated greenhouse emissions of any particular state and particular instances of climatic disadvantage. Two properties of the climate problem illustrate the problem. Greenhouse gases are ‘well-mixed’ in that they become evenly distributed throughout the atmosphere shortly after being emitted irrespective of the nature of the activity involved or its geographical location. Many greenhouse gases, moreover, including CO₂, are ‘stock pollutants’ in that the changes in the climate system they force are a function of their accumulation over many generations rather than during any particular year or decade. These two distinctive properties of the climate problem complicate the application of wrongful enrichment

to climate change since they undermine the specification of any particular causative event befalling one state as a result of the greenhouse gas releasing activities in another state. Consequently, the claim that any state has profited at the expense of any other state as a result of a profligate, and therefore wrongful, national emissions profile resists solution in terms of standard normative or legal treatments of wrongful enrichment that require plaintiffs to demonstrate sole or contributory causation of suffering at the hands of the defendant (Stamas, 2010, 713).

(ii) Prior to some point in the twentieth century, it is far from clear that any wrongful exploitation of the capacity of the atmosphere to store or absorb greenhouse gas could have taken place and as such any enrichments of industrialization conferred on states up to this point do not seem to have been gained wrongfully (Miller, 2009, 129-33; Gosseries, 2004, 53-4). No state's annual greenhouse gas emissions up to 1950, for example, could reasonably be considered wrongful as they could have been sustained indefinitely, even if matched by other states, without triggering a 'dangerous anthropogenic interference' in the climate system as concretized by the 2°C climate threshold endorsed by the governments of over 190 states.¹³ The benefits these emissions created for the relevant populations, many of which persists to this day, also seem 'non-wrongful' in the relevant normative sense and this immune from surrender.

(iii) It is not at all clear that even, even if the causative problems outlined above could be solved, that wrongdoing arose in the production of climate change, or its associated benefits, until the very recent past. For an agent to engage in wrongful action, it is often held that she must have control over their alleged wrongful behaviour and this requires the ability 'to choose and to control [her] conduct in accordance with [her] choice' (Honoré, 1999, 32). Agents (whether individuals, firms, or states) that impose disadvantages on others through the performance of activities whose bad effects could not have reasonably been foreseen seem to lack this ability; and states, even if they can in principle behave wrongly in the way they exploit the atmosphere, seemed to lack this crucial ability for most of history due to very widespread ignorance amongst citizens and policymakers of the science of climate change until the late twentieth century. The implication is that the 'wrongful enrichment' BPP, as the CPP before it, could only require disgorgement of climatic benefits from any particular state subsequently to a moment in history at which point political elites could no longer resist a charge of climatic wrongdoing through the defence that they were reasonably ignorant of, and hence had no effective control over, the consequences of their climate changing activities (Page, 2008: 560).

The 'unjust enrichment' BPP

The problem of wrongless climate change indicates that, even if the adverse impacts of anthropogenic climate change are not in doubt, the normative problems it raises cannot be fully captured by historical responsibility or *wrongful* enrichment. Acknowledging this problem, the 'unjust enrichment' BPP holds that states should bear climate response burdens in line with the climate change-linked benefits they have accumulated even if no wrongdoing can be identified in their production or intergenerational transfer. Profiting from activities that impose climatic disadvantages on other states, here, triggers a remedial duty on the part of beneficiary states to rectify climatic disadvantage arising in other states solely because the disadvantages and benefits share common origins. The moral predicament of states who are climate beneficiaries in this sense is taken to be analogous to that of agents who receive benefits from flawed, but not necessarily wrongful, transfers and acquisitions of benefits. The remedy for this chain of non-wrongful benefit creation and transfer is for the current recipient to restore justice between states

by ‘giving up’, rather than ‘paying back’, the unjust benefits they have gained through industrialization to fund mitigation, adaptation, and other measures designed to limit the climatic damage accruing in poorer states or prevent richer states from inheriting burdens associated with climate changing activities. Here, wrongdoing only characterizes dealings between states when they refuse to surrender the benefits necessary for the effective management of climate change.¹⁴

The restitutionary response the BPP demands of present-day developed states rests on the claim that they been enriched by activities characterized by an ‘unjust factor.’¹⁵ Within the general account outlined above, at least three ways of specifying the ‘unjust factor’ at the heart of unjust climatic enrichment are possible, each of which specify *who* has been enriched, *by whom*, and *to what degree*. Here, I do not attempt to defend any particular specification, but rather to show that the unjust enrichment account can be reconciled with several popular explanations of the injustice at the heart of the global climate change.

(i) the production of adverse effects on those moral agents unconnected to the vast emissions of greenhouse gas between 1750 and 2011 explains why the recipients of climatic benefits are not entitled to retain these benefits before reasonable attempts have been made to remedy these adverse effects. Not to disgorge their fair share of climatic benefits for the sake of the global climate response would put states in the position of condoning the setbacks of interest to which their affluence can be historically linked. They would, following Feinberg’s useful terminology, be condoning widespread ‘wrongless harming’ even if they could not be accused of profiting from ‘harmful wrongdoing.’ We might call this the ‘harm-based’ account.¹⁶

(ii) benefits have been created by activities that emitted so much greenhouse gas into the atmosphere that later generations of moral agent, particularly states located in the developing world, face a tragic dilemma between using less greenhouse gas than they planned (in order to increase the probability of meeting the 2°C objective discussed above) or using the same amount of greenhouse gas as they planned (in order to achieve something approaching the economic progress enjoyed by developed states before the climate problem was discovered). Benefits have been created at the expense of states facing this dilemma since the states that enjoyed the benefits of industrializing in a period where the climate problem was not understood have effectively deprived them of the legitimate expectation of economic development untainted by the knowledge that this goal is no longer compatible with the avoidance of dangerous climate change. We might call this the ‘constrained development’ account.

(iii) the generation of significant benefits which became concentrated in the developed states, both in the form of accumulated wealth and national income, can be traced to the exploitation of the storage and sink capacity of the climate system, which itself should be viewed as commonly, or jointly, owned by all states. Although each states is currently conceived as possessing sovereignty over the sinks and sources located within its territory, the bulk of the assimilative capacity of the atmosphere, despite being modified by the way each state exploits the greenhouse sinks and sources within its control, can only be subject to a collective claim of sovereignty in given its quality as a non-rivalrous and non-excludable good. Here, the behavior of developed states since 1750 can be conceived as an instance of accidental, but nevertheless profitable, trespass on the atmospheric commons the value of which should be spread across all states more evenly than is presently the case. We might call this the ‘common ownership account.’¹⁷

The ‘unjust enrichment’ BPP, on any of the above specifications of the ‘unjust factor’ at the heart of the climate change problem, has various advantages over the rival burden sharing views. First, this approach identifies a substantial revenue stream for climate policy without implying disgorgement of all present-day benefits since the strict liability at play only applies to the ‘automatic’ benefits generated by activities that cause climate change. This revenue stream, in

being detached from considerations of wrongdoing, is potentially far greater than that targeted by the wrongful enrichment BPP. Second, a deeper explanation is provided than the APP or ‘wrongful enrichment’ BPP permits of the intuitive principle that the rich states should shoulder the primary burden of initiating a robust climate policy response. Since these states enjoy benefits that are not rightfully theirs in the sense that they have not been justly produced and transferred through the generations, a principle of strict liability arises for the disgorgement of the benefits. The relevant benefits have accrued at the expense of several generations of less advantaged states, as well as less advantaged populations residing in richer states, but in practice the remedy proposed here is for the benefits to be ‘paid forward’ to future generations by way of an enhanced climate mitigation and adaptation response. Third, the approach does not rely on a controversial cosmopolitan ethic – that is, one where national or generational boundaries are assumed to have no normative relevance – and therefore may be more politically feasible than many formulations of the APP. The enhanced feasibility of the BPP comes as a result of it finessing any direct appeal to positive duties to assist other states cope with climatic disadvantages based on considerations of beneficence or global distributive justice (see, for example, Posner and Weisbach, 2010, 191-2). Fourth, a similar political feasibility advantage arises in relation to the CPP and ‘wrongful enrichment’ BPP since the duties of unjust enrichment to surrender benefits to fund mitigation and adaptation do not presuppose philosophical accounts of national historical responsibility or wrongdoing that have so far failed to secure a consensus amongst the Parties to the UNFCCC on principles of burden sharing.

Three objections to the ‘unjust enrichment’ BPP

I hope the above has clarified, and restated in its strongest form, the ‘unjust enrichment’ BPP (hereafter, BPP). Developed states and their citizens have profited from the production of a vast range of benefits that were created, improved, and transferred through generations on the mistaken inference that the associated greenhouse gas emissions were unharmed. The BPP, grounded in the deeper principle that agents should not profit from injustice, requires that states disgorge a proportion of the accumulated ‘climatic benefit’ they have received so that it can be used to remediate the suffering with climate change accruing in other states that have not shared in the profits of industrialization to the same extent and who also now face the prospect of constraints on their use of the assimilative capacity of the atmosphere to prevent further climate change. The relevant remedial action required to restore justice between states in respect of their shared use of the climate system involves a combination of direct investment in climate adaptation measures in developing and developed states; concrete action to transform international institutions so that they are capable of coordinating and enforcing a robust climate response; and undertaking the structural adjustments attitudinal changes associated with holding increases in global temperature to 2°C above their pre-industrial level. I now respond to three objections to the account proposed above and argue that none of these objections is decisive.

Chronological unfairness

It might be thought overly demanding, and hence unfair to, later generations to require them to surrender benefits in order to discharge their BPP duties when earlier generations have enjoyed similar benefits and not surrendered benefits. The BPP seems to require the present generation of states, for example, to pay the debts of all previous generations as well as their own since many beneficiaries are now dead (taking an individualist view) or only linked to past political units to a

limited extent (taking a collectivist view). The problem arises, as Caney observes, because the whole ethos of the BPP is ‘to ensure that each of the beneficiaries pays for their benefits – not that some of the beneficiaries should pay for everyone’s benefits’ (Caney 2006, 473). Caney, in developing this objection, argues that the inability to target the benefits enjoyed by many past beneficiaries magnifies the responsibility of existing beneficiaries to the point of absurdity. The chronological unfairness objection is further strengthened where some states have consumed or despoiled the benefits they inherited courtesy of industrialization (or in some cases, as a result of war or secessions, have actually ceased to exist) since the result will mean not only fewer beneficiaries amongst which to share the climatic response burden but also fewer benefits to be surrendered. The only response to the rectificatory duties associated with these benefits seems to be to ‘write them off’ and widespread knowledge of this response would seemingly provide an unwelcome incentive for successive generations to consume benefits as fast as they are created or, worse still, refrain from generating the benefits at all. The objection seems all the stronger if that the cost of a robust climate response in terms of mitigation, adaptation and compensation is actually greater than the value of the benefits targeted by the BPP (Caney, 2006, 476).

Two points are worth making in response to the chronological unfairness objection. First, as noted above, the unjust enrichment BPP is naturally interpreted to embrace a ‘net benefit’ proviso: states can only be asked to surrender benefits that remain over we subtract costs they experience as a result of climate change. A very large component of present-day wealth arose from the positive contribution to state wealth of past and present exploitations of global trade and other structural features of industrialization. Much of the wealth created by industrialization (such as urban land, human capital, and critical infrastructure) has not been exhausted by earlier generations. This intergenerational accumulation of resources is evidenced by the rapid increase in global income (and wealth) since the beginning of the industrial revolution which reached \$70 trillion (and \$700 trillion) respectively in 2005 according to the World Bank (2011, 7).

Second, the unjust enrichment BPP is naturally interpreted to embrace a ‘no debilitating cost’ proviso: states can only be asked to surrender benefits that they actually possess and can be surrendered without significant harm to their citizens or to the survival of just institutions (Gosseries, 2004: 47). A robust set of climate policies may result in 1 or more percentage points of forgone world product relative to what it would have been in absence of either climate change or the expense of an effective response to it. But such a response would not be unaffordable in the sense outlined in the ‘no debilitating cost’ proviso so long as the burden was borne predominantly by developed states. In fact, if the costs of a robust climate response are as high as Caney suggests then *all* remedial principles would be similarly undermined and it is notable in this regard that no proponent of the APP or CPP has claimed that any state should shoulder burdens to the point that they are unable to satisfy the basic needs of their own citizens. In this sense, the chronological unfairness objection is premised on an implausibly high standard of justification on the part of the BPP relative to rival burden-sharing solutions.

Identifying the unjustly enriched party: the non-identity problem

Some commentators have argued that the BPP is vulnerable to a subtle, but devastating, metaphysical objection to the claim that states whose populations have benefited from industrialization should cover the costs of the global climate response. This is that the activities that contributed to the emergence of climate change also played a minor, but necessary role, in the coming into existence of the current citizens of all states such that none of these citizens would have been born in the absence of industrialization.¹⁸ This ‘non-identity problem’ raises

two troubling issues for proponents of the BPP. One issue is that it seems to undermine the BPP as a comprehensive solution to climate burden-sharing by cutting down substantially the range of plausible unjust enrichments that have been generated by climate change producing activities. The other issue is that particular future persons do not appear to be in danger of being disadvantaged by climate change since in its absence a completely different set of persons would come into existence. In this sense, it is unclear how climate change forcing activities can generate benefits at any particular person's expense. Combining the two issues, it seems that both the 'enrichments' and 'disadvantages' posited by the BPP may be illusory (Page, 2008, 562-3).

Three lines of thought suggest that the non-identity problem is not as decisive an objection to the BPP as has sometimes been claimed (see, for example, Caney, 2006, 474-6). First, the distribution of climate burdens amongst *states* does not seem to raise the non-identity problem. States do not possess the features of agents whose existence and identities are reshuffled by historical events and decisions and it is states, rather than individual citizens that are primary units of the global climate response systematized by the UNFCCC negotiation process. So, unless we take the extreme position that states themselves cannot be said to be harmed (or benefited) over time through large losses (or gains) in wealth, the non-identity problem does not undermine the main argument of the BPP, namely, that states should bear climate burdens according in proportion to the benefits they have accumulated from activities that cause climate change.

Second, even if causing an individual to exist cannot thereby benefit that person, and the focus on state benefits leaves some residual problems of non-identity, a different response rests on rejecting the 'narrow person-affecting' principle the non-identity problem exploits to limit the scope of intergenerational harm and benefit.¹⁹ Thus, whereas it may not be possible to benefit a particular member of a later generation by bringing them into existence in a high income state, it still could be said that climatic benefits have been produced and transferred over generations that are now concentrated in the hands of individuals, firms and states located in the developed world. Similarly, persons belonging to existing and future generations will experience adverse states of well-being which originate in past behavior that also created a set of positive opportunities for persons more fortunately located. Those experiencing the relevant disadvantages will be able to say to their more fortunate contemporaries: 'you would not have gained these benefits if it was not for the greenhouse gas emissions that caused the climatic disadvantages which agents such as myself are now experiencing, so you should surrender these benefits so that they can be used to remedy the associated disadvantages.' The 'unjust enrichment' BPP can be conceived as a way of restoring distributive inequity between these populations untroubled by the person-affecting requirement that acts and social policies should only be evaluated according to how they improve or worsen the lives of particular persons.

Third, many of the current benefits associated with CO₂ emitting activities have accrued in the lifetimes of existing individuals and at least some of the associated damages will impact on persons who already exist (Gosseries, 2004, 44-5; Page, 2006, 132ff). For illustration, roughly half of all the CO₂ hitherto released into the atmosphere (over 600 billion tonnes) was emitted between 1980 and 2008 (Boden, Marland and Andres, 2011) and during the same period global world output rose from \$12 trillion to \$72 trillion.²⁰ Retention of a significant portion of the difference between these figures could fairly straightforwardly be conceived as a benefit to the relevant states and many of their individual citizens in that they were made better off than they would have been had the activities that produced these benefits not occurred. Given the huge benefits involved in activities that rely on fossil fuel energy sources, the resulting benefit stream could fund a climate response of a far greater magnitude than that proposed by the international community at present even if narrow person-affecting principle was adopted.

Identifying the benefits: the disaggregation problem

The BPP appears to share the weaknesses of broader treatments of unjust enrichment that moral responsibilities on the part of beneficiaries are generated only if (i) a conceptually stable, and practically useful, conception of benefit can be identified that permits (ii) non-arbitrary differentiations amongst elements of national wealth with origins in past pollution and elements of national wealth connected to non-polluting activities. It could be argued that both conditions are unmet in the climatic context since virtually all benefits enjoyed by present-day states and their inhabitants can be linked to past activities that released unsafe levels of greenhouse gas into the atmosphere either *directly* (the creation of these benefits involved greenhouse gas emissions) or *indirectly* (the present market value of these benefits is shaped by the demand and supply of goods whose creation involved greenhouse gas emissions). Drawing on Butt (2009, 130-2)'s useful terminology, the problem here is that the BPP presupposes a distinction between 'automatic benefits and costs' (outcomes uniquely created by fossil fuel driven industrialization) and 'non-automatic benefits and costs' (outcomes that would have occurred anyway or had multi-faceted origins including those unrelated to climate change producing activities). If no clear distinction can be made between automatic and non-automatic benefits, then it will not be possible to distinguish between benefits that states should be prepared to sacrifice to combat climatic disadvantage and benefits that states should be permitted to retain as the outcome of activities that are to all intents and purposes *independent* of background activities that produce climate change. Since neither the CPP nor APP links just climatic burden-sharing to an account of climatic benefit, they do not face problems of benefit identification and isolation.

The benefit disaggregation problems suggests that the BPP, although potentially relevant for ideal-theoretic accounts of climate justice, may be less plausible than might have first seemed as an approach to the non-ideal circumstances characterizing negotiations amongst Parties to the UNFCCC. The CPP, in this regard, seems to enjoy an apparent practical advantage over the BPP in that well-established protocols exist to estimate the annual or cumulative greenhouse gas emissions of UNFCCC parties and consequently the rough share of the climate policy response for which each can be held remedially responsible (Den Elzen, Schaeffer and Lucas, 2005). The APP, moreover, can be operationalized by assigning burdens to states relative to well established data on per capita or aggregate national income.²¹ In both cases, burden-sharing frameworks based on the APP and CPP have generated provisional calculations of the percentage share of the global climate response that each state should finance on grounds of justice; dollar values reflecting the share of the global climate effort that each state should surrender; and proposals as to which policy mechanisms could be used to generate and disperse the associated revenue streams (see Baer *et al*, 2008; Dellink, *et al* 2009; Oxfam International, 2009). The BPP, by contrast, faces the problem that there are no established protocols for establishing how much the UNFCCC states have been unjustly enriched in financial terms from the activities that cause climate change. Until such an account is provided, the BPP should be seen as normatively relevant only if prior obligations defined by the CPP and APP have been exhausted and climate disadvantage remains since it is only at this point that the theoretical and practical challenges associated with benefit identification or disaggregation are worth tolerating.²²

Operationalizing unjust climatic enrichment

The key challenge of operationalization faced by the BPP is to calculate the economic value of national and global wealth that can be uniquely linked to activities that cause climate change. The

approach I suggest here has two core elements: a focus on *national wealth* that is *blind to the categorization of this wealth* in terms of natural, produced, or intangible capital.

Research on national wealth (which is generally viewed as an aggregation of ‘natural capital’, ‘produced capital’, ‘intangible’ capital, and net foreign currency reserves) currently lags behind research on national, household, and individual income.²³ This may explain the traditional focus of climate burden sharing policy,²⁴ and a number of contributions to the normative literature on climate justice,²⁵ on the total (or per capita) income of states when determining the upper boundary of what can reasonably be asked of a state in terms of support for the global climate response. However, recent international assessments have advanced the understanding household and national wealth (Kunte *et al*, 1998; World Bank, 2011) and the claim here is that the wealth of states (a function of a state’s total stock of resources) is a more suitable indicator for the purposes of the BPP than the income of states (a function of the annual flow of resources) for two main reasons. First, national income does not fully capture the benefits each state has derived from climate altering activities dating from the beginning of the industrial revolution due to its sensitivity to short-term fluctuations in the functioning of the global economy. Second, national wealth is connected in a deeper way to the determinants of climate change (the total stock, rather than annual flow, of atmospheric greenhouse emissions since 1750) than national income.

Although a number of theoretical and practical difficulties²⁶ remain in using relative national wealth as the metric of international burden sharing approach based on unjust climatic enrichment, it is possible to undertake a provisional analysis of how the BPP could be operationalized in terms of national wealth as a proxy for accumulated unjust climatic benefit. Table 1, for example, which draws on World Bank data for national wealth in 2005, provides an overview of global wealth distribution and indicates that the world’s 200 states enjoyed a combined wealth of roughly \$700 trillion in 200, eighty per cent of which (\$568 trillion) had accrued to High Income States in the Organization for Economic Co-operation and Development (OECD) (World Bank, 2011: 182-3).

Table 1: National wealth by type of capital and global income group (2005)

Global income group	Natural capital (US\$ billion)	Produced capital (US\$ billion)	Intangible capital (US\$ billion)	Net foreign assets (US\$ billion)	Total wealth in US\$ billions	Global share of wealth in 2005
Low Income	1658	677	2484	-148	4607	<1%
Lower middle income	15335	14536	30533	-176	60228	9%
Upper middle income	12415	12595	50856	-1,186	74681	11%
High Income	14219	96776	457631	-479	568148	80%
World	43627	124584	54,504	-1989	707664	100%

Source: raw data from World Bank, 2011: 182-3 (data in table includes high income oil exporting states).

Using a rough estimate of current global wealth of \$700 trillion as the theoretical limit of the resources available to tackle climate change, the task remains of responding to the disaggregation problem outlined above in order to apply the BPP in a consistent and policy relevant manner. The approach suggested deals with the problem through a combination of three premises: (i) *all* existing wealth is to some extent tainted by the activities in the past and present that produce

climate change, (ii) the normative problems associated with this ‘useful fiction’ are greatly reduced once it is understood that the total cost of a robust response to global climate change will amount to a small proportion of total global wealth, and hence (iii) the BPP need not, in practice, impinge on national stocks of national that cannot be linked clearly with the past and present activities that cause climate change. One reason for preferring this ‘aggregative approach’ over a more complex application of unjust enrichment that targets a specific range of benefits implicated in the processes driving climate change is that accumulations, and the current value of, the holdings of each state in terms of all three of the main categories of wealth are intimately connected to processes of industrialization and globalization and hence by implication to human activities that have released greenhouse gas into the atmosphere since 1750. The current market value of intangible capital, for example, is connected to demand and supply of global labor which is in turn shaped by features of the global economy that would not exist but for industrialization; the market or notional value of natural capital is connected to activity on the global commodities and energy markets which is, in turn, linked to global demand for goods and services; and the value of produced capital is similarly linked to global prices in intangible and natural capital.

The BPP as developed above has four further stages in its practical application as illustrated in Table 2’s analysis of climatic remedial responsibilities of 10 key states.

Stage 1 involves the calculation of each state’s maximal remedial burden under the BPP as measured in by its total national wealth in US dollars in a given base year (in this case, 2005). Total national wealth, as noted above, is taken to be the sum of a state’s natural, produced, and intangible capital adjusted for its holdings of net foreign assets.

Stage 2 involves the calculation of the share of the global climate effort that each state should be apportioned according to its share of global wealth in the base year (the United States, for example, would be assigned a climate effort share on this basis of 30.7 per cent for the base year of 2005). To get an even more striking idea of each state’s financial liability under the BPP, these percentages can then be used to calculate how much each state should pay for each trillion dollars spent on tackling climate change (\$307 billion in the case of the US, for example).

Stage 3 involves the calculation of the total cost of a robust response to global climate change as specified by a response that would predictably avoid ‘dangerous anthropogenic interference’ in the climate system (UNFCCC, 1992, Article 2). This cost is then multiplied by the percentage effort share apportioned to each state as calculated in *Stage 2* to generate the total climate response obligation for each state. Since the cost of avoiding dangerous climate change, as specified by a high probability of limiting post-1750 global warming to 2°C or less, is known to be a very large but as yet uncertain figure, an initial benefit surrender, modeled on a 1 per cent ‘climate beneficiary dividend’, could be levied in advance of a calculation of the final cost of climate change policy over the next century. The climate beneficiary dividend is here conceived as a small ‘down-payment’ that each state has a duty to surrender as part of the longer-term process through which each state agrees to bear its full climatic remedial climate responsibility. Given that 1 per cent of global wealth in 2005 amounted to over \$7 trillion, an even more limited dividend could be restricted to High Income States (see table 1) or some combination of the top 10 states in the current global wealth league (see table 2) and still generate up to \$5.5 trillion. In either case, the consequent benefit surrenders would greatly exceed the current pledges of developed states in terms of adaptation and mitigation (UNFCCC, 2011; 2012) and therefore bridge the gap between present political commitments of UNFCCC states and the projected costs of climate mitigation and adaptation measures over the next century.

The idea behind the ‘climate beneficiary dividend’ is that the difficulties concerning a final determination of the amount of benefit that should be disgorged by each state can be finessed by

selecting a comparatively modest levy calculated on each state's total wealth rather than a larger percentage levy targeting a particular component of national wealth. Such a levy, as shown in Table 2, would finance a significant step towards a robust initial set of climate policy response measures without which climatic catastrophe will prove much harder to avoid. The final amount to be surrendered according to the BPP, though potentially far greater, will amount to a fraction of the amount of benefit that has accumulated in developed states through activities that generated the climate problem. So long as we have good reason to hold that the total cost of tackling global climate change will be far more than 1 per cent of global wealth in the relevant base year, no state could raise a general objection, eg one prior to a consideration of their individual circumstances, to a burden-sharing rule that required it to surrender this amount of its national wealth to the global climate response.

Stage 4, which is not depicted in the table, would involve each state meeting their assigned burdens under the BPP through a flexible range of activities including direct investment in mitigation and adaptation technologies within and beyond their borders; investment in effective institutions of global climate justice; and investment in other activities that reduce the costs of mitigation and adaptation such as energy efficiency measures or investments in technologies that increase the efficiency of greenhouse sinks that could be 'offset' against the value of their 'climate beneficiary dividend.' It is important to note that the BPP does not itself specify any particular favoured method of revenue generation, or climate policy mix, but rather is limited to the specification of the equitable share of global climate response activities that each state must 'pay back' to the international community as a consequence of profiting from the causes of climate change. In this sense it seeks to exploit the practical and democratic advantages of assigning the primary financial burdens of remedial justice to individual states while leaving the method through which these burdens are shared domestically to the interactions between domestic policymakers, citizens and other stakeholders.

Table 2: The climate beneficiary dividend: top 10 national climate beneficiaries 1751-2005

	Stage 1: Total national wealth in US\$ billion	Stage 2a: Global climate effort share (%)	Stage 2b: Financial contribution to climate response per \$1000 spent	Stage 3: 'Climate Beneficiary dividend' (US\$ billion)
US	217623	30.7	\$307	2176
Japan	70116	9.9	\$99	701
Germany	45127	6.4	\$64	451
UK	39908	5.6	\$56	399
France	35699	5.0	\$50	357
Italy	29202	4.1	\$41	292
China	25091	3.5	\$35	251
Spain	17723	2.5	\$25	177
Canada	17399	2.5	\$25	174
Brazil	14,752	2.1	\$21	147
Other	195,114	27.6	\$276	1,951
World	707,724	100	\$1000	7,077

Source: raw data from World Bank, 2011:173-83 (world wealth data includes high income oil exporting states).

Conclusion

I have argued that the BPP, in its most plausible formulation, is not fatally undermined by any of the normative objections that have been raised against it and, in addition, that it also avoids some well known defects of the CPP (such as the problem of excusable historical ignorance and the problem of holding present states remedially responsible for the environmental damage caused by ancestral agents) and APP (such as the problem of allocating burdens to wealthy states solely on grounds that they are wealthy). In the idea of benefits that are strongly connected to the activities that cause climate change, the BPP also has a plausible account in the abstract of which parts of current global wealth should be devoted to the fight against dangerous climate change. Being in their infancy, burden sharing analyses based on the BPP have yet to provide a convincing answer to the practical problem of separating the elements of national wealth originating in climate altering activities and the elements of national wealth originating in non-climate altering activities. However, a preliminary operationalization of the BPP is nonetheless instructive if developed in terms of a levy of a small proportion of the aggregative wealth of the world's richest states designed to target just a small measure of the profits each has accrued from economic activities since the industrial revolution that have released over 1 trillion tonnes of CO₂-equivalent into the atmosphere. Limiting the application of the national remedial responsibility specified by the BPP to a disgorgement of 1 per cent of each of the world's 31 richest states in could generated a 'down payment' of over 5 trillion US dollars on the eventual costs of implementing a robust global climate response. If pooled into an international climate fund, the resulting income stream would dwarf the current pledges of developed states in terms of adaptation and mitigation and thereby bridge one of the many gaps that currently exist between existing political commitments and the magnitude of the threat posed by climate change.

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¹ The assimilative capacity of the atmosphere is a function of two processes that are easily conflated. First, the capacity of the atmosphere to store greenhouse gases as measures in terms of the total stock of such gas at any one time. In 2012, this figure surpassed 393 parts per million by volume (as compared with the pre-industrial level of 280 parts per million) as calculated in terms of its total CO₂-equivalent value (Conway and Tans, 2012). Second, the capacity of 'atmospheric sinks' - primarily through processes of photosynthesis and oceanic absorption - to remove greenhouse gas from the atmosphere so it does not play any climate forcing role.

² There are two main reasons for adopting this state-centric approach. First, states are the ontological units at the heart of existing domestic and international environmental law on climate change; and, as signatories and ratifiers of treaties and conventions, states actively claim legitimacy in the policy areas of relevance to climate change mitigation and adaptation. Second, given the intergenerational and international character of the climate problem, individual citizens do not possess the ability to coordinate and undertake the measures of mitigation and adaptation

necessary to combat climate change and are therefore not plausibly seen as the locus of a special responsibility to remedy the undeserved disadvantage caused by climate change. States, by contrast, both individually and in cooperation, are currently the only entities operating internationally that possess sufficient longevity, financial resources, and physical capacity to bear the required burdens.

³ *Climate mitigation* burdens arise from the foregone consumption of goods and services, as well as other costs, associated with undertaking measures designed to prevent avoidable climatic change. They are, that is, a function of the cost to present and future generations of ‘anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases’ (Klein and Huq, 2007: 750). The main burdens will a function of the necessary structural adjustments, technological improvements, investment decisions, foregone consumption opportunities, and attitudinal changes, required to hold increases in global temperature to 2°C above their pre-industrial level. Although the financial burdens associated with this climatic objective are uncertain, the *Stern Report* indicated that the eventual cost a robust global mitigation response will equal or exceed a permanent loss of at least 1 per cent of global world product per annum relative to what it would have been had no coordinated mitigation response been necessary (Stern 2007: 220).

Climate adaptation burdens are those associated with measures designed to manage future impacts of climate change that are no longer avoidable (given physical, technological, political or economic constraints) and the impacts that are already being felt (see Klein and Huq 2007: 750; Dellink *et al*, 2009: 411-2). Whereas mitigation responses seek to weaken the climatic processes that cause climate change and its adverse impacts, adaptation responses involve the modification of existing institutions, infrastructure, or behavior so that the *effects* of processes associated with climate change are lessened. Examples of adaptation measures include crop-switching, healthcare reform, coastal protection measures, and coastal migration. The World Bank (2010a:10) estimates the annual cost of climate adaptation for developing states of a 2°C warming over the 2010-2050 period to be between \$70 and \$100 billion per annum, however the final figure could be expected to be far higher since adaptation costs accruing in developed states and impacts not remediable through an adaptive response must also be taken into consideration (Parry, Lowe and Hanson, 2009, 1102-3).

⁴ The World Resources Institute (2012) estimate that High Income OECD states, excluding the effect of land-use changes, were responsible for 41 per cent of all greenhouse gases emitted in 2005 and 52 per cent of the CO₂ emitted in 2008.

⁵ See ‘How China and India Sabotaged the UN Climate Summit’, *Der Spiegel Online*, 5 May 2010.

⁶ ‘The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities’ (UNFCCC, 1992, Article 3).

⁷ See the World Bank Datasheet on OECD High Income States (<http://data.worldbank.org/income-level/OEC>) (estimate calculated in terms of current international dollars).

⁸ This is itself an application of a more foundational maxim, dating to the Roman era, that ‘it is by nature fair that nobody should enrich himself at the expense of another’ (Gergen, 1974, 1927n).

⁹ It is also worth noting that there exists an extensive legal literature on ‘unjust enrichment’ which has yet to be applied systematically to climate change (See Gergen, 1974; Birks, 2001; Weinrib, 1987; Klimchuk, 2007).

¹⁰ ‘Moral agents can have obligations to compensate victims of injustice if they are benefiting and the victims are suffering from the automatic effects of the act of injustice in question. It is crucial to the argument that the losses and benefits in question arise from injustice, *which is to say wrong-doing by other agents*’ (Butt 2009, 127 – my italics).

¹¹ Singer (2002, 31) captures the idea elegantly when he observes that ‘[s]ince the wealth of the developed nations is inextricably tied to their prodigious use of carbon fuels (as use that began over 200 years ago and continues unchecked today), it is a small step from here to the conclusion that the present global distribution of wealth is the result of the wrongful exploitation by a small fraction of the world’s population of a resource that belongs to all human beings in common.’

¹² This might be called the problem of ‘particularizing’ the perpetrator, the victim, and the amount gained at the expense of the victim by the perpetrator or their beneficiary (Weinrib, 1987, 415).

¹³ For illustration, roughly 6 billion tonnes of CO₂ was emitted into the atmosphere 1950 from fossil fuel burning, cement manufacture and gas flaring as compared with 32 billion tonnes of CO₂ in 2008; and accumulated anthropogenic CO₂ emissions from 1750-1950 were roughly 62 billion tonnes as compared with 1271 billion tonnes for the 1750-2008 period (Boden, Marland and Andres, 2011). A back-of-the-envelope calculation reveals that it would have taken 174 years for the actual amount of CO₂ emitted in the 1750-2008 period to have been surpassed had human emissions of CO₂ from 1950-onwards been sustained at the 1950 level.

¹⁴ An alternative way of conceptualizing the duties of unjust climatic enrichment is through the notion of

‘transgenerational free-riding’ (Gosseries, 2004, 43-46). The idea is that modern developed states are ‘free-riders’ on modern developing states in the sense that they have obtained benefits from their historical and ongoing exploitation of the assimilative capacity of the atmosphere without internalizing all of the associated costs. A principle proscribing such ‘morally free riding’ requires that developed states cease to exploit their privileged position to obtain economic benefits at below their market value both by reducing their greenhouse gas emissions and providing compensation to those agents now suffering disadvantages to which these benefits can be linked historically. Whereas the idea of ‘transgenerational free-riding’ is a useful idea to convey the injustice at the heart of the climate problem, it does not fully capture the source of the remedial duties imposed on many states by the ‘unjust enrichment’ BPP. These duties are designed to achieve a future state of justice amongst states in their use of the climate system (through the restitutive remedy of rich states ‘giving up’ climatic benefits to fund the global climate response) rather than restoring states as closely as possible to the condition they would have been in had climate change not occurred (through the restorative remedy of states ‘paying back’ benefits to those states whose atmospheric entitlements have been ‘free-ridden’ upon). I am grateful to Göran Duus-Otterström for discussion of this point.

¹⁵ The proposed can be usefully compared to the legal theory and case law of unjust enrichment. In the legal domain, there are three main types of ‘unjust factor’ to which plaintiffs in unjust enrichment might appeal to explain why a defendant must (subject to certain legal defences) surrender a benefit created at the former’s expense (see Klimchuk, 2007, 811-2). The plaintiff might claim (i) that they did not intend for their person or property to be used in the manner it was used (the ‘no intent’ argument); (ii) that a simple mistake has been made that involved their rights being violated to the benefit of another party (the ‘mistaken payment’ argument); or (iii) that an arrangement the plaintiff and defendant entered into lawfully was not executed as the plaintiff believed, and had good reason to believe, it should have been executed (the ‘qualified intent’ argument).

¹⁶ I endorse, here, Feinberg’s distinction between activities that set back the interests of an agent in way that also wrongs them (‘harmful wrongdoing’) and activities that set back the interests of an agent but in way that does not wrong them (‘wrongless harming’). It is worth noting that Feinberg’s states aim in developing this terminology is to explore ‘whether the state can rightly criminalize [conduct] on the grounds of its moral wrongfulness’ (Feinberg, 1990, xxix) and not whether wrongless harming can serve as the normative basis of an account of remedial justice suitable for application to the climatic change problem.

¹⁷ See Starkey (2011, 14ff) for a useful disambiguation of the various commons-based accounts of climatic justice.

¹⁸ Parfit (1984, 361) captures the metaphysical aspect of this ‘non-identity problem’ elegantly when he asks ‘how many of us can truly claim, ‘Even if railways and cars had never been invented, I would still have been born?’’

¹⁹ According to this principle, a person cannot be harmed (or benefited) by an act or social policy that does not make them worse (or better) off than they would otherwise have been (Parfit, 1984, 393-4).

²⁰ Figures from the World Bank Databank of historical world income calculated in terms of current international dollars (http://databank.worldbank.org/ddp/home.do?Step=2&id=4&hActiveDimensionId=WDI_Series).

²¹ According to this operationalization of the ‘ability pay’ principle, each member state is required to reduce greenhouse emissions in the economic sectors targeted (transport, agriculture, construction, and waste disposal) by an average of 10 per cent relative to their 2005 levels. The cuts required by each state are subsequently modified to reflect their comparative mitigative capacity as measured in terms of their GDP per-capita in 2005 (see European Union 2009, 137).

²² For the view that the duties generated by beneficiary-pays reasoning should be viewed subsequent, rather than prior, to those grounded in historical responsibility, see Butt (2007, 142ff) and (2010, 137-8n).

²³ According to the World Bank (2011, 4-5), a state’s ‘produced capital’ consists of the value of its stock of a complex of machinery, equipment, buildings, and urban land; a state’s ‘natural capital’ consists of the value of its stock of agricultural land, oil, coal, metals and minerals; and a state’s ‘human/intangible capital’ consists of the value of its stock of raw labour, social, and human capital.

²⁴ Current EU climate policy appeals to a modified ‘ability pay’ principle to apportion EU-wide emissions reduction commitments not targeted by the EU’s emissions trading mechanism (EU ETS). Under this policy, member states are required to reduce emissions of greenhouse gases from economic sectors (including transport, agriculture, construction, and waste disposal) by an average of 10 per cent on their 2005 levels. The emissions reductions of each state, however, are adjusted within a range of plus or minus 20 per cent according their relative national income per capita in 2005 (European Union, 2009).

²⁵ See, for example, Bear *et al* (2008, 654-6) and Oxfam International (2009, 32-7).

²⁶ Practical problems include selecting the appropriate method to harmonization of data ex post; accounting periods; definition of assets and liabilities, as well as sub-categories of these; sampling methods (data does not exist

for all states or wealth components); and substitutability amongst wealth components. Theoretical problems include selecting the unit of analysis (whether individual, household or state); the number and type of wealth variables to include; and how to include non-financial resources into assessments of national wealth (World Bank, 2011: 23-4).