

MAKING OUR CHILDREN PAY FOR MITIGATION

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INTRODUCTION

Investments in mitigating climate change have their greatest environmental impact over the long-term. As a consequence the incentives to invest in cutting greenhouse gas emissions today appear to be weak. In response to this challenge there has been increasing attention given to the idea that current generations can be motivated to start financing mitigation at much higher levels *today* by shifting these costs to the future through national debt. Shifting costs to the future in this way benefits future generations by breaking existing patterns of delaying large-scale investment in low-carbon energy and efficiency. As we will see in this chapter, it does appear to be technically feasible to transfer the costs of investments made today to the future in such a way that people alive today do not incur any net cost (e.g. Foley, 2009; Rendall, 2011; Broome, 2012; Rezai et al., 2012; Rozenberg et al., 2013). The basic idea then is that governments can break current patterns of delaying mitigation investments by ensuring that their existing constituents do not need to make significant sacrifices.

The normative argument that we should finance mitigation by ‘borrowing from the future’ can be advanced in two general ways. The first is based on the empirical prediction that we will continue to see a pattern of very weak motivation among current generations to accept short-term mitigation costs. Thus, unless it becomes economically beneficial over the short-term to *markedly* increase investments in low-carbon energy and efficiency we should not expect to see sufficient investment to avoid dangerous levels of global warming. On this view finding a way to pass on the costs of mitigation to future generations is an imperfect solution to the problem of weak moral motivation today but much better than the status-quo (Broome, 2012, 37-48). On the second view, because we have good reason to expect that people in the future will be wealthier than

people today (at least over the next century or so) and because the benefits of mitigation largely benefit people in the future, passing on most of the costs of mitigation to the future is actually a fair way to distribute these costs (Rendall, 2011). Notice that the second view is not dependent on the empirical premise that people today will not be motivated to make sufficient short-term sacrifices, although the problem of motivating the present will give additional support to the argument for redistributing costs to the future.

In this chapter I focus on the implications of the first approach. Specifically, the aim of this chapter is to take seriously the possibility that climate change has produced an extremely intractable political problem and that we must now consider strong measures that can break existing patterns of delaying mitigation. I defend the claim that if climate change involves a stark conflict of interests between current and future generations, then borrowing from the future would be both strategically and normatively much better than the status quo.² However, I nevertheless challenge the borrowing from the future proposal on the grounds that it is not in fact the powerful tool for motivating existing agents that its proponents imagine it to be. The purpose of developing this critical argument is not, however, simply to throw doubt onto the idea of borrowing from the future.

Debt financing climate mitigation is a form of intergenerational buck-passing. In the climate ethics literature this type of buck-passing is usually viewed as deeply objectionable. As a consequence, normative theorising about climate governance tends to focus on institutional reforms that better represent the interests of future generations and inhibit buck-passing. My ultimate concern in this chapter is to argue that we cannot limit prescriptive normative theorising about climate governance to these types of reforms. If we really do find ourselves in a political context where the prospects for effective action are very poor then strategic forms of buck-passing may also make an important positive contribution to avoiding dangerous global climate change. Consequently, if debt financing is not as powerful of a motivational tool as imagined we still have strong reasons, I will argue, to identify other strategies that will change agents' incentive structures. To this end I propose an alternative form of passing on the costs of mitigation to the future that warrants consideration.

The chapter is organised into five sections. Section I accounts for why motivating existing agents to invest in climate mitigation is taken to be such a difficult challenge. Section II defends the view that borrowing from the future can be normatively justifiable. Section III explains how it is thought to be possible to dedicate significantly more resources to mitigation today without current agents experiencing this as a cost. Section IV challenges the idea that borrowing from the future is a powerful tool for motivating the present to invest in mitigation. Section V proposes that we consider the development of an alternative form of explicitly pre-committing the future to mitigation costs. I defend this type of governance instrument at a normative level, specifically against the objections that it is 1) a form of tyranny of the present over the future and 2) morally corrupt.

I - THE WICKEDNESS OF TIME IN THE ANTHROPOCENE

The capacity of the atmosphere, the oceans, and other natural sinks to safely carry GHG emissions is a global common pool resource. The mitigation of climate change is a global public good. We currently find ourselves in familiar conditions of unsustainable use of common resources and under provision of public goods. However, these cooperative challenges appear to be unusually difficult in the case of global warming. This is in part because of the large number and variety of actors that need to be coordinated and because of the scale and influence of special interests in the fossil fuel sector. In addition, there is some divergence between where the impacts of climate change will be most severe and which countries must bear the greatest mitigation costs. We are also currently lacking a leading state with strong incentives to act unilaterally and to coordinate other states. The high cost, complexity, and technological uncertainty involved in reforming our economies is another commonly highlighted obstacle. Yet, of all these impeding factors it is the role of time that appears to be the most toxic feature of this political problem.

In a recent paper Hansen et al. (2011) estimate that it takes 100 years to see 60-90 per cent of the warming response associated with GHG emissions. Long time lags in the climate system between emissions and temperature responses, between temperature stresses and damaging environmental consequences, and between effective mitigation

policies and substantial infrastructure reform create a situation where investments in mitigation make little difference to the climate damages agents will experience over their lifetimes. It is past and probable on-going emissions that will have the greatest effects on current generations. From a game theoretic perspective this means that the relevant agents *do not* share in a preference for the collectively cooperative outcome compared to the collectively non-cooperative outcome. The consumption interests of people alive today are best promoted by *not* mitigating climate change.³ In a more typical commons problem it is the agents' preferences for the collectively cooperative outcome that can be leveraged to establish norms and institutions that allow individuals to escape prisoner's dilemma dynamics (e.g. Ostrom, 1990). In the climate case there is no prisoner's dilemma between generations. Rather the central problem is to motivate existing agents to invest in protecting the commons for future agents (Gardiner, 2001).

As time moves forward and irrespective of the climate conditions each generation is born into the same problem of weak incentives will be present (Gardiner, 2001). Overcoming the intergenerational structure of the problem requires that agents be motivated by the interests of others (i.e. future agents) to a much greater degree than is true for agents in typical collective action problems. Norms of fair reciprocity may simply not be enough. Importantly, if we can redress the intergenerational motivational obstacle we can still face a typical global public goods problem between states. Even more importantly, as time passes the costs of mitigation increase, environmental damages increase, and the amount that has to be invested into adapting to climate change increases (Vaughan et al., 2009; Luderer et al., 2012; Rogelj et al., 2013). This means that the passing of time has the real potential to create a positive feedback where delay breeds stronger and stronger incentives for further delay (Shue 2010, Gardiner, 2011, pp. 185–209). The assessment above is not, of course, an attempt to give a full account of individuals' or political communities' motivations or to depict how individuals and groups have actually responded to climate change. The account above aims only to describe key obstacles to effective climate politics that can help us understand why the world's states have yet to invest in mitigation in a way that responds to the seriousness of the threat and why the politics of climate change appear so intractable.

II - GIVING THE FUTURE A CHANCE TO PAY

If the incentives for passing on the costs of climate change to future generations are very strong, one response is to try to identify ways of passing on these costs in a way that best serves the interests of future generations. This is the core idea behind debt financing of climate change mitigation. Let us assume for now that we can pass on the costs of mitigation to the future in a way that does produce an improvement for these future agents compared to business as usual. Our terms of negotiation with the future are only possible because we are in a position of domination over them. We are free to ignore the fact that continuing to pollute the atmosphere will undermine the climatic conditions for human wellbeing far into the future. Thus, it appears to be disingenuous to claim that we are somehow helping the future by letting them pay for mitigation when it is our actions that are putting them in danger in the first place. This assessment has strong normative force, but there are also strong strategic and normative arguments for borrowing from the future.

To the extent that we expect political inertia to continue or worsen, identifying a no-cost option that could bring about immediate and significant mitigation investment while at the same time improving conditions for all the relevant agents leads to a very good outcome compared to perpetual delay (Broome, 2012, 43-48). However, this improvement on the status quo is hardly a second-best option. Finding ways to bring the interests of present people and future people into better alignment or finding ways to better mobilise the concern for future people current generations already have appear to be much more normatively attractive options. Thus we have good reason to be critical of failures to engage seriously in efforts to spread more climate friendly preferences or to make the long-term consequences of public policy more salient in political discourse. At the same time, if climate change is the most difficult cooperative challenge humanity has ever faced this difficulty must make some difference to our moral assessments of current failures to act and of strategies to address these failures.

The development of highly productive economies driven by the exploitation of cheap and abundant energy has been one of the main drivers of the amazing improvements in human welfare over the past two centuries. Individuals, companies, and governments both have had and continue to have good reasons for using fossil fuels. At the same time,

finding ways to transition to low-carbon economies is straining the capacity of our economic and political institutions. Investing in the interests of the present has traditionally and continues to pass on enormous benefits to future people. At the same time, when it becomes clear that investing in shared goods today can undermine human welfare far off into the future it also becomes clear that we are straining the ability of our systems of morality to continually improve on the human condition.

The point is not to deny that it is deeply problematic that we are failing to dedicate a small fraction of current wealth to protecting the conditions for human welfare for generations to come. However, we must also acknowledge that climate change is a system level problem similar to other system level problems in capitalist economies that are not intended and for which it is difficult to assign moral responsibility. From this perspective, taking on long-term debt to finance low-carbon infrastructure for the future is in part a moral failure but also in part a system level response to a system level problem, similar to the way in which deficit spending to redress the effects of boom-bust cycles is a system level response to the vulnerabilities capitalist economies generate.

We really do find ourselves in conditions of political delay with no sense of how or when these patterns might be broken. As a result, there is a strategic and normative case for at least some significant borrowing from the future. In fact the proposal raises the following question, if we can solve the largest environmental threat to human welfare without anybody having to give up anything then why don't we? Is it plausible to think that it is because we have simply failed to notice the options available to us? In the following section I explain how borrowing from the future to finance climate mitigation is technically possible. However, in section IV I argue that it is not surprising that we have not yet used debt financing to pay for mitigation. This is because the borrowing from the future proposal does not adequately address how costly it would be to compensate the current generation to the no-sacrifice level.

III - WHAT DOES THE FUTURE HAVE TO BARGAIN WITH?

If we only have access to resources in the present how can we direct these resources towards mitigation without this being perceived as a cost today? To achieve this the basic idea is that we can 1) change the *composition* of the savings we make for the future

and 2) change the *composition* of the consumption bundles we will enjoy over our lifetimes (Broome, 2012, 37-48). These changes in how we save and what we consume can, it is argued, free up resources for mitigation investments but at the same time involve no net cost. To see how this is expected to work we can first look at changes in the way we save.

Each generation passes on savings to the next generation by leaving natural resources and by investing in things like infrastructure, technology, and knowledge that pass on productive capacity to future generations. However, because the true social costs of GHG intensive consumption and investment choices are not internalised it is argued that the current generation is actually saving for future generations in a very inefficient way. We could save for the future in a much more efficient way by shifting some current investment away from conventional capital and into mitigation capital, i.e. low-carbon energy, low-carbon infrastructures, and efficiency. By investing the resources necessary to avoid dangerous levels of global warming much more welfare is 'passed on' to future generations in the form of avoided climate damages than would be passed on to them in the form of conventional productive capacity. The idea is that a shift in the *composition* of the current generation's future oriented investments can leave consumption levels constant. This brings us to the second issue, changes in the composition of our consumption.

The aim is to bring about an intergenerationally optimal level of investment in mitigation capital and an intergenerationally optimal shift away from GHG intensive consumption without affecting (too much) the value of lifetime consumption bundles for present people. In economic theory this is ideally achieved by the imposition of an optimal cost for GHG emissions. Compensating the present for making the consumption of GHG intensive goods more expensive can be achieved, it is argued, by consuming more goods that are not GHG intensive. Eating meat and other animal based foods can be compensated with eating less expensive and higher quality vegetable based foods. Travel by car can be compensated with increased investment in public transportation. Buying less carbon intensive consumer products and going on few overseas vacations can be compensated by consuming more services and working less.

Of course the substitutions noted above are all already available to us and are not currently chosen to nearly a sufficient extent. The mitigation without sacrifice proposal cannot simply be that current agents should change their preferences. This is not because there are necessarily few opportunities for existing agents to change their preferences. Instead the borrowing from the future proposal aims to show that even if we depart from the pessimistic premises that i) existing agents are only willing to make modest sacrifices for the future and ii) that we can only expect existing agents to alter their preferences marginally, it is still possible to compensate these agents for investing in avoiding future climate damage. As a consequence, the argument has to be that there is some increase in alternative consumption patterns that the current generation prefers more than or at least as strongly as its current emissions intensive economy.

If we impose an intergenerationally optimal carbon tax the costs of consuming emissions intensive goods are increased and the returns on emissions intensive investments are decreased. The results are reductions in lifetime consumption as a direct response to cost increases and reductions in consumption as consequence of reductions in the rate of economic growth *over existing agents' lifetimes* compared to a business as usual (BAU) investment scenario. We can in part compensate for these losses by redistributing emissions taxes back to citizens and in part by taking on national debt (Foley, 2009). The aim of this borrowing is to give the current generation enough of an alternative lifetime consumption bundle to make it worth its while to accept the effects of the carbon tax. To illustrate how this debt financing is expected to amount to borrowing from the future we can set up this borrowing via a pay-as-you go pension system.

Let us say that in the current pension system workers pay for retirees' pensions by transferring 5% of their earnings (i.e. productivity) into the scheme. Workers are motivated to make such transfers because they expect their children to pay for their pensions when they themselves retire. This allows workers to spread out their consumption between their productive and non-productive years and to save in a way that gives them access to some of the gains of economic growth in the economy. This same reasoning will hold for the worker's children and so on. This system of saving is a form of indirect reciprocity where the working generation confers a benefit on the

retired generation in exchange for a future benefit from the young generation. This system of reciprocity does not rely on altruism, does not have a determinate endpoint, and users expect it to reach far out into the future (Heath, 2013). To borrow from the future workers are asked to dedicate an additional 1% of their productivity to investment in mitigation capital. As compensation the workers' children will increase the size of the transfers they make to retirees when they themselves become workers. Our children will in turn be compensated when they retire by their children. When the benefits of avoided climate change begin to arrive workers can begin to reduce the amount of compensation they give to retirees.

Retirees are now being compensated for their payments into the pension system both in the form of transfers from workers and in the form of avoided climate damages. Subsequent cohorts of workers should also expect to receive less than they paid into the pension system. These decreases in the size of the transfers made from workers to retirees can continue until the point at which a cohort of workers secures a net benefit over its lifetime from any investments they make in mitigation capital. This is the point in time when there is no longer a problem of motivating these types of investments. In theory, there can be a stopping point for transferring the costs of mitigation to future generations despite the fact that the benefits of mitigation can be expected to extend very far into the future.⁴ This looks like a clear method for taking on debt to finance investment in mitigation and effectively transferring the costs into the future.

IV - THE DIFFICULTIES OF COMPENSATING THE PRESENT

Changing the way we save for future generations only appears to be able to solve the problem of motivating the current generation in the straightforward way described above if current savings actually *aim* at passing on wealth to future generations. However, to a large extent the intergenerational savings effect of investments in the conventional capital stock appears to be a by-product rather than the aim of these investments. Savers save to distribute their consumption over both the productive and unproductive years of their lives, to secure some of the gains of economic growth, and to pass on some wealth to their immediate descendants. Borrowers borrow to make productive investments that will bring them returns that are more valuable than the cost of borrowing. When the government borrows to invest in things like infrastructure,

education, and healthcare the timeframes for returns are longer than for private investors. Still, if the government borrows to build a hospital, a university, or new roads the main aims are to use these goods now and to produce economic growth that will be beneficial in some way to taxpayers and their children.

The claim is not of course that the present's investments are in no way aimed towards the interests of future people. Those who engage in basic research may in part do so because it represents a good career for them. Individuals and society may invest in such research because it is valued for its own sake. However, if there were no prospect of this research doing some good in the future we would surely invest much less. This is especially true for areas such as cancer research, but also appears to be a general feature of our interests in the future (Scheffler, 2013, p. 24). A real concern for the future must play some part in explaining why we sometimes invest in infrastructure designed to last for many generations. Taking resources away from things like cancer research or designing hundred year bridges and re-directing them towards mitigation may in fact be a more effective way of investing in the future. However, the large majority of investments in capital aim at benefiting the present even though they also often benefit the future as a bi-product. Thus, asking the current generation to shift its investments in conventional capital towards mitigation capital is for the most part not a cost-free way for the present to produce better returns far off into the future. Rather, a motivationally challenged present needs to be compensated for not making the investments they currently make for more self-interested reasons.

If we go back to our pension scheme, it should now be clear that if current workers dedicate an extra 1% of their productivity to mitigation receiving an extra 1% of our children's productivity is not enough to compensate us in a sacrifice free way. From the perspective of current workers and their children the value of their lifetime consumption bundles is greater in the BAU scenario compared to a scenario in which investments are shifted from conventional capital to mitigation capital. Resources are directed away from the types of consumption and investments that produce the best economic outcomes over the period that is relevant for current workers. When current workers become pensioners they need to be compensated for the effect this decrease in the rate of growth will have on the size of transfers into the pension system compared to

BAU. This means that our children will have to dedicate a larger percentage of their productivity into the pay-as-you-go pension system than we did. This is only the first way in which reaching the no-sacrifice level is more difficult than it may at first seem.

Think of an economy that consists of a smoker and a room filled with asthmatics. The smoker internalises the benefits of smoking and externalises the costs. The asthmatics' lives are made almost unbearable by the suffering the second-hand smoke causes them. These social costs of smoking are much greater than the personal benefits the smoker enjoys. Let us suppose that the smoker is not moved by the plight of the asthmatics and that the only available option to eliminate the negative externality in this economy is for the asthmatics to compensate the smoker for quitting. He must be compensated to an extent that at least matches the benefits he enjoys from smoking. If the smoker quits smoking the asthmatics will become amazingly 'welfare rich' compared to current conditions. However, this does not free up resources that can be used to compensate the smoker. The asthmatics become rich in the form of avoided asthma attacks. By assumption the value of this form of wealth is extremely low from the perspective of the smoker. If the asthmatics are poor in other types of goods while the smoker has a very strong preference for smoking, a transfer to compensate the smoker for quitting will not be possible.

For a social planner trying to maximize welfare it is clear that that permitting smoking in this economy is very inefficient. However, this is not how economists conceive of the way a negative externality can create inefficiency in a *market* that can be eliminated by a transfer that leaves no party worse off. Instead we have to see the value of smoking in terms of the smoker's willingness to be compensated for not smoking. In other words, the social benefit of smoking a cigarette is determined by how much we would have to pay the smoker so that he would be at least indifferent between the options of smoking the cigarette or taking the payment. The social cost of smoking is a function of the asthmatics willingness to pay to prevent smoking. When some agents' willingness to pay to avoid a negative externality is greater than the amount necessary to pay some other agents to refrain from creating this externality there is inefficiency in the market. A transfer from the negative externality takers to the externality producers generates a more efficient market outcome (Kelleher 2015, 71-73). In the smoking case I have

described we can assume that the asthmatics' willingness to pay is greater than the smoker's willingness to be compensated. However, the point to notice is that even if we have a large negative externality that is massively inefficient with respect to welfare outcomes it can also be true that there is no possible transfer between agents that could diminish the externality while each agent remains, at the very least, on their Pareto indifference curve. The extent to which an externality reducing transfer will be possible is dependent on the pollutees having access to goods that are candidates for transfer because they satisfy the polluters' willingness to be compensated.

Once we focus on the question of what the present appears to be willing to be compensated with to stop consuming GHG intensive goods it becomes clearer how large this alternative bundle of resources may have to be. What is at issue is the core of the current generation's consumption preferences and productive capacity. For example, effective climate mitigation may require moving largely to a vegetarian diet. The resources necessary to make such a transition are negative. Production of plant-based foods requires fewer resources than the production of meat. Small reductions in meat consumption are surely easy to compensate, but if we are aiming to compensate without having to wait for people to change their preferences (which is what the borrowing from the future proposal aims for) at some point the marginal willingness to be compensated for not being able to eat meat will become very low. Likewise, it may only take an annual investment of 1% of gross world product to mitigate climate change. However, getting to the no-sacrifice level may require a very large bundle of alternative resources to compensate the current generation for not being able to exploit emission intensive goods they have strong demonstrated preferences for.

The upshot is that in addition to compensating for differences in economic growth compared to BAU our children will also have to dedicate even more of their productive capacity to the pay-as-you-go pension scheme to make it worth the present's while to change the composition of its consumption bundles. Also note that the system calls for us to shift more of our consumption from our productive years to our non-productive years than we would normally choose to do. This is an opportunity cost and has to be compensated by more consumption in our non-productive years than we forewent in our productive years. This is a third additional cost that results in still greater shares of our

children's productivity going into the pension system. Our children's children will in their turn have to dedicate even larger portions of their productivity to their parents than they did for us.

The point is not to suggest that it is more expensive than we think to mitigate climate change. Nor is the concern that there must necessarily be a very low elasticity of demand for GHG intensive goods that will make GHG emissions prices less effective than expected. The point is that even if emissions taxes effectively bring about desired shifts in consumption and investments it looks like it is more expensive than we think to compensate the current generation to the extent that they do not view these taxes as generating important sacrifices. It looks more difficult than expected to solve the problem of motivating agents to adopt effective carbon taxes in the first place. This is important because of limits to the amount of debt financing countries can engage in.

The typical story about limits to deficit spending is that the more debt a country has the more tax revenue they have to dedicate to servicing the debt, which raises the risk of default, which raises the interests rates at which governments can borrow, which in turn increases the revenue necessary to service the debt, which eventually makes further borrowing too costly. Given limits to how much debt governments can take on, whatever the mechanisms, it seems to follow that a generation that is unwilling to take on significant sacrifices to mitigate climate change is also going to have a strong preference for using debt financing for the sake of more present oriented goods rather than more future oriented goods. In other words, there is an opportunity cost here that looks like it is very difficult to compensate. Given that the present needs to be compensated for shifting its investment patterns, changing its consumption bundles, changing its consumption timing, and for the opportunity cost of dedicating scarce access to debt financing to future oriented investments it should no longer be surprising that the current generation does not use debt financing to a substantial extent to invest in climate change mitigation. This is especially true given the magnitude of mitigation investments needed in comparison to existing deficit levels.

Net government deficits for the OECD countries in 2013 were 2.1 trillion US \$.⁵ In order to get onto a 2°C trajectory the International Energy Agency is calling for investment in

addition to those needed simply to meet future energy demand of on average 1 trillion US \$ per year to 2035 (International Energy Agency, 2014: 44). Rogelj *et al.* (2013) estimate that an immediate global price on GHG emissions of US\$40 tCO₂e, rising thereafter, would give us a 66% chance of keeping warming to 2°C. Global GHG emissions in 2011 were over 43 000 MtCO₂e.⁶ This gives us over 1.7 trillion US\$ in new costs. The co-benefits from such mitigation investments may be very large over the longer-term, while cost estimates may also be overly optimistic due to assumptions of full global cooperation and perfect policy implementation. There is obviously a lot of uncertainty about costs, but what is clear is that meeting these costs through debt financing involves extremely large shifts in how resources are being used compared to current patterns.

V - EXPLOITING TYRANNY OVER THE FUTURE FOR THE GOOD

The combination of limits to the ability of governments to take on debt, incentives to use debt for present oriented goods, preferences for GHG intensive goods over alternative packages of goods, and a system of investment in capital that largely aims at producing returns over the nearer term should make us question how big of a role borrowing from the future can play in addressing *motivational* obstacles to investing in mitigation capital. If this assessment is plausible we are back where we started. We see strong incentives for delaying mitigation investments and as a result it may be strategically important to identify ways of shifting the costs of mitigation to avoid dangerous levels of global warming.

In one sense ‘passing the buck’ to the future has been a key strategy in climate politics for several decades. The 1997 Kyoto Protocol is regularly derided as having had far too weak commitments, covering far too little of global emissions, and as having been ineffective in bringing about emissions reductions that would not have occurred for other reasons. However, it is also widely understood that the protocol was weakly demanding in order to secure broad international participation and to make it possible to set up the institutional mechanisms for carbon trading and other flexibility mechanisms. The aim was to extend the regime in subsequent commitment periods with deeper reduction targets and more effective institutional mechanisms. This did not occur as envisioned, but the push within the UNFCCC process for more ambitious emissions commitments and expanded coverage continues. In the EU Emissions Trading System’s (ETS) initial

trading period between 2005-2007 the market was characterised by weak emissions targets, an over-allocation of free emissions allowances, and significant national flexibility in meeting targets (Parker, 2011). Increased ambition and harmonisation of rules across EU member states, especially for the third trading period 2013-2020, has followed. However “temporary exemptions, compensations and procrastination of decisions” still create delays between decisions and the arrival of costs with these delays designed to help secure agreement (Muller & Slominski, 2013: 1437). For example, the full shift in the third trading period to auctioning of emission credits will not be in place until 2027, while sectors deemed to be exposed to significant carbon leakage will have access to free allowances and the possibility of compensation.⁷

Creating temporal space between when policy makers adopt a decision and when the costs arrive, working with shorter-term flexibility and longer-term pre-commitments, and setting in motion path dependencies are all highlighted in the political science literature as important strategies for dealing with so-called ‘super wicked’ cooperation problems (e.g. Lazurus, 2009, Ismer & Neuhoff, 2009, Levin *et al.*, 2012, Urpelainen, 2012, Brunner *et al.*, 2012, Jordan & Matt, 2014). To the extent that these types of policies involve weak initial demands they do not respond to the urgency of the environmental threat. This is regularly and rightly criticised, but it should also be clear that such policies are often genuine strategic responses to real political obstacles. The borrowing from the future proposal aims to offer a better strategy than incrementalism by shifting costs to the future while at the same time eliminating procrastination. I have raised doubts that this approach is a powerful tool for mediating the politics of delay. The structure of the problem suggests that we need to identify ways to set in motion serious mitigation efforts but at the same time not require large changes in behaviour right now.

For example, those in political power now could commit the young to significant investments in mitigation. Designing these commitments so that they create a future financial liability for failures to make promised investments would exploit future decision makers’ commitments to property rights regimes and the global financial system. Potential financial liabilities for failing to invest in mitigation would be a means to entrench mitigation commitments imposed by present governments onto future

governments.⁸ The only proposal along these lines I have been able to identify is the idea of governments issuing index-linked policy performance bonds where interest payments on the bonds are linked to GHG emission targets or financing targets for low-carbon energy. If the government fails to meet its mitigation targets there is a penalty in the form of higher interest rates to be paid to bond holders (Ekins et al., 2014, 168-170). However, governments have to already be committed to increasing the resources dedicated to cutting GHG emissions to pre-commit *themselves* in this way. What I am imagining is a policy that largely pre-commits future governments and thus places some temporal space between when the pre-commitment is made and when governments have to start making the mitigation investments. I have not been able to identify thinking in the economics literature that would specifically meet the criteria outlined above. As a result I am only able to briefly suggest a *type* of proposal that attempts to enforce commitments made today on future governments by creating a financial liability today that will materialise tomorrow if governments fail to mitigate.

The aim of the pre-commitment proposal suggested above is to reduce the level of bootstrapping involved in the more incrementalist approaches we currently have while at the same time taking seriously the possibility that governments will continue to be very wary about binding themselves to strong financial commitments over the short-term. The type of proposal under consideration is clearly flawed in that it does not respond quickly enough to the environmental threat. Thus, it should be understood chiefly as an insurance policy against the risk of an intergenerational pattern of perpetual delay.⁹ Because I cannot provide a design for the strategy proposed above, this chapter is limited to assessing the normative case for this more explicit form of pre-committing the future. The purpose of such an assessment is to give some normative permission to think about new creative ways of pre-committing future publics that can better mediate the wickedness of time in the Anthropocene.

If our parents had committed us to financial liabilities for failing to invest in mitigation could we plausibly argue that we did not deserve this type of treatment? The more unjustifiable it appears to be for us to simply fail to mitigate climate change and the longer we delay serious action, the less plausible it is to question that it would have been justifiable for past generations to bind us to mitigation investments. If we deserve

paternalistic treatment for our unwillingness and political incapacity to make meaningful investments in mitigation then so may our children. We have good reason to expect the next generation to do better than us from a moral perspective in various respects, but it is far from obvious that we should expect so much change that they will not also have very strong incentives to discount the interests of the future. Thus, the claim is not that the ways and extent to which people are motivated by moral considerations cannot change, but only that the incentives to discount the far future look particularly hard to change and that we should have some insurance against this problem.

When current publics try to pre-commit future publics the most common normative objection is that this is a form of political domination over the future by the present. This concern is usually raised against the constitutional entrenchment of some substantive public policy by the current majority with the aim of limiting the ability of future majorities to make public policy in this same area. If the present is able to democratically determine what the right substantive policy is without such obstacles why should the future be denied this same democratic power? Given reasonable disagreement about politics it is problematic for the current public to paternalistically safeguard future publics from following their own majoritarian will. On what grounds do current majorities think they have better access to answers about the policies that ought to be adopted than future majorities (Waldron, 1999, 255-282)? However the type of pre-commitment I am proposing is not an effort to protect the future against *itself*. Instead, pre-committing our children to mitigation investments is an effort to protect the *further* future from the *near* future. What we do is not to democratically adopt some measure for ourselves that we then think should be maintained in perpetuity. Rather we *fail* to adopt some measure that we think ought to be put into practice for the sake of future generations and instead pass on that commitment to the publics that will follow us. Surprisingly then, the combination of an unwillingness and inability to adopt just legislation with respect to the interests of future generations that we are currently witnessing appears to significantly improve the justifiability of present majorities paternalistically pre-committing future majorities.

The most serious objection to the idea that we should bind our children to mitigation costs is that it is a form of moral corruption. As Stephen Gardiner puts it,

if the current generation favors buck-passing, but does not want to face up to what it is doing, it is likely to welcome any rationale that appears to justify its behavior. Hence, it may be attracted to weak or deceptive arguments that appear to license buck-passing, and so give them less scrutiny than it ought.

It is the claim that the obstacles to political action are particularly severe in the case of climate change that makes buck-passing in a safer way seem reasonable. How this claim is deployed in our moral evaluations is what warrants more scrutiny.

Given the enormous amount of wealth and technological capability we currently enjoy it is not plausible to be sceptical about the prospects for action due to a sheer lack of capacity. Rather, it is a lack of the right kinds of motivations that prevents us from bringing the climate threat under effective political control. Binding our children to the costs of mitigation is presented as a way for us to live up to our obligations to protect the interests of future generations, albeit a very imperfect response. However, to make this move the present's moral failure to act is actually conceived of as an external condition that existing agents must take into account as we decide how to protect the interests of the future. It looks like I have perverted our blatant discounting of future interests into a moral justification for passing on the costs of mitigation! What can be said in response to this charge?

It is clearly moral suspicious to appeal to current political obstacles to justify cost shifting to the future. There is an incentive to exaggerate the obstacles one is complicit in creating because this provides moral cover for doing little now to address the problem. At the same time, it is also problematic to conceive of the present as a singular agent that can simply decide not to exploit some other agent, the future. Prohibitions on exploiting others agents are a basic feature of our normative theories and social institutions, and the message is that we need simply not to do what we normally expect agents not to do to each other. Yet, a generation is not a singular agent or any agent at all. Instead, what is required is to coordinate the actions of individuals, companies, communities, and governments all over the world. What we need to coordinate around is not some ubiquitous feature of common sense morality but something new. Agents must let the effects of their present actions on conditions far into the future outweigh

their interests in securing goods here and now. We may have always depended on the idea of future generations to give meaning to our projects (Scheffler, 2013), but we have not had to face the prospect of stark conflicts between many of our own unextraordinary projects and welfare in the distant future. If we look at the conditions in which agents have tended to be successful in protecting common pool resources it is clear that in the case of climate change these conditions are not satisfied (see Dietz et al., 2003). Climate change is the most difficult cooperative challenge humanity has faced to date and as a result it is reasonable to think in terms of second and third best options without being accused of blatant moral corruption.

In response to long-term threats like climate change political theorists often argue for institutional reforms that will eliminate the tyranny of the present over the future. The most common proposals are to have the interests of the future represented in some way in the democratic process or to constitutionally entrench respect for the interests of future generations. Instead of trying to address symptoms of the tyranny of the present over the future it would be better, it is argued, to address the institutional sources of this injustice. However, it remains highly uncertain if institutional reforms of this type will go far enough fast enough to bring about effective mitigation policies. The argument of this section is that because we may have a limited window of opportunity to deal with the problem of weak incentives to invest in mitigation we should also consider strategies that attempt to exploit the present's tyranny over the future for the good.

The argument above has defended the paternalism of binding the future to mitigation costs. However, once a case for paternalism is made it is appropriate to ask if other forms of paternalism are preferable. For example, one could imagine more or less paternalistic government policies that attempt to change present people's preferences so that they are more in line with the interests of future generations. The argument advanced here clearly does not demonstrate which policy responses are all things considered the best ones. Much depends on how pessimistic we think we should be about current political conditions. The type of proposal I have advanced is thought of as an insurance strategy against the risk of perpetual political inertia.

CONCLUSION

There is already some debt financing of mitigation investments and debt financing would surely be a large part of extensive government efforts to mitigate climate change. There is also a good strategic and normative case for passing on the costs of mitigation investments to the future. If the present has strong incentives to pass on the costs of climate change to the future we should at least try to identify ways of passing on those costs in ways that best protect the interests of future generations. However, I have argued that the option to debt finance mitigation does not really resolve the basic problem of motivating agents to change their consumption and investment behaviours. This raises the question of whether or not there are other ways to pass on the costs of climate change in a 'safer' way. Strategic buck-passing and efforts to pre-commit future publics to increasingly demanding mitigation efforts are also already a key part of climate governance. I have suggested that we should consider more explicit pre-commitment strategies that bind the young today to large investments in mitigation over their productive lifetimes. If we are failing to overcome the tyranny of the present over the future then we should consider how we might exploit that tyranny for the good. My argument is not a moral endorsement of the present's domination over the future and it is not in conflict with the typical institutional reforms political theorists advance to reduce the present's discounting of future interests. Yet, given the severity of the political challenges we currently face and the severity of the consequences of global warming we should also be open to the possibility that we may need stronger measures to prevent a scenario in which we perpetually put off investing in climate security for the future.

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² I remain agnostic on the question of what a fair distribution of mitigation costs between generations would be.

³ This conclusion appears to be true even where agents are narrowly altruistic in the sense of having strong preferences for securing high consumption levels for their children (Asheim, 2013).

⁴ There is a question of whether or not the one could plan to reduce pay-outs to retirees without undermining the pension scheme. Workers facing the prospect that they will put more into the pension system that they get out cannot be excluded from the avoided climate damages that are supposed to make up for this difference. As such they have an incentive to decrease their inputs into the system to what they can expect to get out of it. This in turn gives cohorts prior to them incentives to pre-emptively decrease their inputs into the system. This dynamic could undermine the credibility of the scheme. Perpetually rolling over the debt could be a better way to ensure the credibility of the scheme. Normatively assessing such a strategy would be dependent on a theory of distributive justice between generations.

⁵ By country GDP figures were taken from OECD (2014), "Gross domestic product in US dollars", *Economics: Key Tables from OECD*, No. 5. DOI: [10.1787/gdp-cusd-table-2014-5-en](https://doi.org/10.1787/gdp-cusd-table-2014-5-en). By country deficit figures were taken from OECD (2014), "Government deficit / surplus as a percentage of GDP", *Economics: Key Tables from OECD*, No. 20. DOI: [10.1787/gov-dfct-table-2014-1-en](https://doi.org/10.1787/gov-dfct-table-2014-1-en). The calculation excludes Chile, Mexico and Turkey.

⁶ WRI, CAIT 2.0. 2014. Climate Analysis Indicators Tool: WRI's Climate Data Explorer. Washington, DC: World Resources Institute. Available at: <http://cait2.wri.org>. Accessed October 1, 2014.

⁷ See http://ec.europa.eu/clima/policies/ets/cap/auctioning/index_en.htm.

⁸ Ideally, the future holders of the corresponding financial entitlements would be those in poorer countries most vulnerable to the effects of climate change. These entitlements could thus serve as some level of compensation for failures to mitigate. However, one would also want agents holding rights to payment for 'failure to perform' to be in a strong position to defend these entitlements.

⁹ Rendall (2011) also argues that borrowing from the future should be seen as an insurance policy against a pattern of political inertia.