



PROFESSOR JOHN BROOME



PROFESSOR DUNCAN FOLEY

A World Climate Bank

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Climate change and financial institutions

No one needs to bear a burden to mitigate climate change. The benefits of mitigation will be so great that everyone can share in them, provided they are well distributed across the world's population and across generations. Distributing them will require a new financial institution, which will also mobilize financial resources to implement the investment needed for decarbonizing the world economy. In this paper we outline the rationale for a World Climate Bank, and its possible structure.

The idea of a burden has figured in international negotiations about climate change since they began. The UN Framework Convention on Climate Change, agreed at the Rio Earth Summit in 1992, introduced the term 'burden sharing'.¹ Countries were asked to take on a burden for the sake of slowing climate change, and the question was how to share the burden among them. The implicit assumption was that a burden needs to be borne in the present so as to bring benefits in the future. The bulk of the benefits will accrue to future generations and not to the people who bear the burden. This was later made explicit in the *Stern Review of the Economics of Climate Change*:

▼ **What we do now can have only a limited effect on the climate over the next 40 or 50 years. On the other hand what we do in the next 10 or 20 years can have a profound effect on the climate in the second half of this century and in the next. . . . Mitigation – taking strong action to reduce emissions – must be viewed as an investment, a cost incurred now and in the coming few decades to avoid the risks of very severe consequences in the future.**▼²



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The moral appeal

Stern recommends the present generation of people to incur costs now and in the coming few decades to avoid the risks of very severe consequences in the future. Why should we do so? The only explanation is morality; Stern is implicitly appealing to our moral responsibility. Indeed, the UNFCCC process has always been implicitly making the same moral appeal. The only reason we have to accept a burden for the sake of future people is a moral one.

Is this moral appeal justified? Do we really have a moral responsibility to make the lives of future people better? We do. First, we arguably have a general moral duty to improve the lives of others, and this will include the lives of future people. The benefits we can bring to others must be balanced against the burden on us, but if the benefit is large and the burden small, we should accept it. At least, that is one plausible view, but not everyone accepts that we have this general duty to promote other people's good. However, in the case of climate change there is an especially pressing moral consideration. Controlling climate change is a matter of correcting damage that we are already doing. Through climate change, our emissions of greenhouse gas are making future lives worse than they would otherwise have been. This is a moral wrong. We should not do it, and we have a clear moral duty to reduce the damage we do. That is the view implicit in the UNFCCC's advocacy.

The UNFCCC does not speak openly of morality, but others do. Greta Thunberg makes the same moral demand with extraordinary force and indignation. 'How dare you!' she says:

▼ **You are failing us, but the young people are starting to understand your betrayal. The eyes of all future generations are upon you and if you choose to fail us, I say: We will never forgive you.** ▼

She is right, and she is entitled to her indignation because she is a living representative of the generations that climate change is harming. Climate change is a great moral wrong perpetrated by some people on others – in particular, by the old on the young. The moral appeal for action against climate change – whether expressed implicitly or explicitly – is certainly justified.



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Political paralysis

However, the moral appeal has not proved powerful enough to bring climate change under control. After thirty years, global emissions of greenhouse gas are still rising (apart from a reduction in 2020 caused by COVID-19). The appeal has failed.

True, many individuals are moved by morality. We make sacrifices for the sake of future people. We insulate houses, eat less meat, reduce our travel and so on. However, many of us continue to act self-interestedly without weighing the consequences of our actions on future generations. Individual morality is not sufficient to solve the problem of climate change, not just because enough people will not do as morality requires, but because individual actions must be coordinated to have their intended effect. For example, to reduce our emissions substantially we need big changes in our economic infrastructure, and as individuals we cannot make those changes.

To solve the problem of climate change, governments need to act. They cannot leave the responsibility to individuals. Governments have the coercive power through regulations and taxes to make sure that everyone – not just those who are morally motivated – responds to climate change, and to coordinate individual responses to achieve real impact.

The problem is that many governments seem impervious to morality, or at least to be insufficiently moved by it to overcome the paralysis induced by political conflicts over the impact of climate policies on particular interests. The far-seeing economist A. C. Pigou wrote in 1920:

▼ **The State should protect the interests of the future in some degree against the effects of . . . our preference for ourselves over our descendants. . . . It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and . . . defend, the exhaustible natural resources of the country from rash and reckless spoliation.**³▼

But the shoe is apparently on the other foot. It seems to be governments that do not care about unborn generations when their citizens do, or at least find themselves unable to act effectively.

Governments are more willing to promise action on climate change than to perform it. Virtually every government in the world approved the Paris Agreement of 2015, which said:

▼ **This Agreement . . . aims to strengthen the global response to the threat of climate change. . . by holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels.**⁴▼

In support of the agreement, countries made pledges to the United Nations to reduce their emissions. But even these pledges taken together are not enough to meet the 2°C target, let alone the 1.5°C target. If all pledges were fulfilled there would still be an increase of 2.4°C by 2100, according to Climate Action Tracker.⁵ Moreover, few countries are on course even to meet their pledges. Very few have policies that Climate Action Tracker reckons are compatible with 2 degrees of warming.⁶ Apart from a drop in 2020 caused by the COVID-19 pandemic, the world's greenhouse gas emissions are still growing.⁷

Why are governments so reluctant to act? A part of the explanation is the power of the fossil fuel interests. Australia provides a good example. It emits more greenhouse gas per capita than even the US, and this is without counting the contribution it makes to climate change by exporting hundreds of millions of tonnes of coal every year. Yet Australia is particularly vulnerable to climate change. Australians live on the habitable fringes of a hot dry continent, which is expected to become hotter and drier. In the summer of 2019–20 it experienced its worst ever fire season. 18.6 million hectares of Australia burnt.

It is natural to think that, when things get bad enough, our governments will eventually take action against climate change. Yet, though the Australian fires were catastrophic, the Australian government took no action. Although two-thirds of Australians favour a commitment to net zero emissions by 2050,⁸ their government still refuses to make this commitment.

Why does Australia do so little? Because of the power of the coal interests in Australia. Even while the fires burned the Prime Minister Scott Morrison said that he would not make what he called (using the word in exactly the opposite way to Pigou's) 'reckless' cuts to the coal industry.⁹ Coal is the most damaging of fossil fuels, but it is Australia's second-largest export, and it directly employs nearly 40,000 people. That is what counted with the government.



The no-sacrifice constraint

So long as there are powerful interests opposed to controlling climate change, governments will not act as they should. Morality will never be enough to motivate them. The only way we can achieve a satisfactory outcome is to make sure it is no one's interest to oppose action. This is what we should aim for now. We should not ask anyone to sacrifice their interest for moral reasons. We can then harness the strong motive of self-interest to drive action on climate change. And this can be done: climate change can be controlled in a way that requires no one to make a sacrifice – not even the owners of fossil fuel resources or workers in coal mines. None of them need to suffer.

This may come as a surprise. The moral approach has been pursued for so long that we are used to thinking the current generation has to make a sacrifice for the sake of the future. But that is not so. So much benefit can be gained by bringing climate change under control that there is enough to go round everyone. It has only to be distributed correctly. If we did make a sacrifice of our present consumption for the sake of cleaning up the air, the benefit would naturally accrue to people in the future. But we can transfer some of that benefit back in time to ourselves – enough to compensate us fully for the sacrifice we make and leave us at least as well off as before. In effect, future generations can pay for the clean-up done by the present generation, and still emerge better off. Facilitating this transfer of resources would be the central mission of a World Climate Bank.

The feasibility of controlling greenhouse gas emissions without demanding a sacrifice is a conclusion of economic theory. Greenhouse gas emissions are what economists call an 'externality'. When you burn fossil fuels that cause an emission of greenhouse gas, the gas spreads around the world and does harm everywhere over a very long stretch of time. All this harm is part of the cost of what you gained by burning the fuel. But you do not bear this cost: it is borne by all the people who suffer harm. So you do not take the full cost of your activity into account in deciding whether to do it. The consequence is a particular sort of inefficiency in the economy.

According to standard economic theory, it is what is called 'Pareto inefficiency'. A situation is defined to be Pareto inefficient if it is possible in principle to change things within the economy so that at least one person ends up better off without anyone ending up worse off. According to standard theory, an externality such as greenhouse gas normally makes our situation Pareto inefficient. So it is possible to respond to climate change in a way that makes at least one person better off without making anyone worse off.



This standard analysis from economic theory applies only to a fixed population of people. To address the problem of climate change, which will affect the world's population, it needs to be adjusted. Fortunately, it can be.¹⁰ We need to adopt a modified notion of efficiency, not based on the wellbeing of future people but on the resources that are available to them. The modified notion says that a situation is inefficient if it is possible to change things in the economy so that some existing people are better off, no existing people are worse off, and the resources that are left to future people are at least as good as they were before. Economic theory shows that externalities, including intergenerational externalities such as greenhouse gas emissions, cause inefficiency in this sense.

This analysis implies that climate change can in principle be controlled in a way that makes no presently living person worse off, and leaves future generations with just as good resources as they would have had. In this sense, responding to climate change requires no sacrifice on anyone's part. We explain below how a World Climate Bank can facilitate a no-sacrifice response in practice.



Climate-change policy should no longer ask people to make a sacrifice for the sake of the future, but should instead be constrained by the condition that it requires no sacrifice. Since controlling climate change will generate a lot of benefit, accepting this constraint still leaves a wide choice over the distribution of the surplus benefit. It can be used to make present people better off, or to give better resources to future people, or both.

We recommend adopting policies that respect the no-sacrifice constraint as the most practical path to controlling climate change despite two strong objections that can be made to the constraint. The objections are, first, that it will leave the world with economic maldistribution, and, second, that it will perpetuate injustice in the world.

Maldistribution first. It is natural to think that our policy on climate change should aim at the best possible result. This implies achieving the best distribution of wealth and income within generations and between generations. But the no-sacrifice constraint will prevent us from achieving the very best result; without the constraint we could do better. The constraint implies some maldistribution, therefore.

To respond, we start with intergenerational maldistribution. Several economists¹¹ have argued that the best intergenerational distribution implies some transfer of wellbeing from the present generation to the future in addition to the part of world income presently devoted to investment and technical change.



This is where we started. For almost thirty years the present generation has been urged to make a sacrifice for the future by taking practical steps to limit greenhouse gas emissions and avert climate damage. Economic models have been used to reinforce this appeal, by showing that a sacrifice would lead to the best result. But this moral appeal has failed even to overcome the inertial and political obstacles to measures targeted specifically at climate change.

What about intragenerational maldistribution? The world distribution of income is grossly unequal, which is plainly a very bad thing. So if we choose our climate change policy with the aim of producing the best result, it will be one that involves some redistribution from better-off to worse-off people within the present generation. However, imposing the no-sacrifice constraint prevents this redistribution. So the world distribution of income under a no-sacrifice constraint will end up worse than it would have been without one.

But again, this cannot be helped, since governments representing the present better-off people will not accept a sacrifice. The world is beset by many problems. Climate change is one; inequality another. These problems do not all have to be solved together. We should not saddle our response to climate change with the additional task of correcting inequality. If we do, we shall end up with no successful response to either. If climate change were an important cause of inequality, it might be right to tackle the two problems together. But it is not. The world's inequality results from centuries of unequal development, and from colonialism. Climate change is too recent to have made much difference to global inequality. The real choice is not between an effective climate change policy that respects the no-sacrifice constraint and one that violates the constraint to improve the world distribution of income, but between a no-sacrifice policy and no effective climate change policy at all.

In sum, the problem of maldistribution is serious, but the no-sacrifice constraint is forced on us by political reality and the failure of the appeal to morality.

Next, injustice. When you harm another person, you do them an injustice unless there is some exculpatory circumstance – unless you do it in self-defence or with their consent, for example. Our emissions of greenhouse gas harm other people, and there are no exculpatory circumstances, so they are unjust. If we adopt a no-sacrifice response to climate change, we do nothing to overcome this injustice. That is the objection.

Those who emit greenhouse gas unjustly advantage themselves by their emissions, inflicting harm on others. Under a no-sacrifice policy, they are paid enough to make it worth their while to stop their emissions. Their unjust advantage is perpetuated.

Most of the people who cause harm by emitting greenhouse gas are ordinary consumers of energy. But there are also some who knowingly cause harm on a very large scale, and do everything they can to continue the injustice. These include some leaders of the fossil fuel industry who tell lies about climate change, and pay others to tell lies, in order to preserve their unjust advantage. They have lavishly funded climate denial and relentlessly lobbied governments. Justice requires people like this to be punished, but under a no-sacrifice policy they will be rewarded.

This is perhaps the least palatable feature of a no-sacrifice policy. It sticks in the gullet, but we have to swallow it. These people have the power to prevent us from controlling climate change. They hold us to ransom, and we have to pay. We have to buy out fossil fuel interests.

What more exactly does this buying out involve? Economic theory tells us that the externality of climate change can be corrected without anyone making a sacrifice. Any losses that would result from correcting the externality can be fully compensated for by a transfer of money to the loser from those who gain. For instance, suppose the correction is made by imposing a world carbon tax. The tax will reduce the value of fossil fuel reserves, perhaps to zero. The theory tells us that owners of shares in the reserves can be paid monetary compensation that is equal to the value lost. However, the value of reserves that is relevant for compensation is their true value, which is to say the value of the income that could be derived from using the fuel in the future. This is not the same as the market value of the shares. The market at present overvalues shares in fossil fuels. It apparently values them as though all the reserves will in due course be used. But the world's known reserves of fossil fuel are many times greater than can be used without causing catastrophic climate change, which will destroy the economy that gives them value in the first place.

Economic theory tells us owners of fossil fuel shares can be compensated for the true value of their shares, not for the present market value. They cannot and need not be compensated for having made a bad investment.



The need for public borrowing

The theory tells us that a no-sacrifice policy is possible, but you might reasonably wonder how. Since the benefits of controlling climate change naturally accrue to future generations, a no-sacrifice policy must include a transfer of these benefits back to presently living people. How can benefits be transferred backwards in time? This is the economic role of financial transactions and instruments.

Benefits can be transferred backwards by not transferring benefits forwards. We of the present generation control the resources that will be available to future people. We consume some of the resources, and pass the rest along to our successors in the form of investment. If we choose, we can hold back more for ourselves.

How can this be managed? First, the economy will have to be reasonably efficient. When we are dealing with an externality we cannot hope for efficiency unless the externality is 'internalized' as economists say. An emission of greenhouse gas has an external cost. If the emitter is to take the cost into account in the way efficiency demands, she must herself bear a cost for emitting that is equal to its external cost. That is to say, there must be a carbon price equal to the external cost, or some equivalent in the form of regulation and subsidies.

There is more than one way to set a price on carbon, but the simplest is to impose a carbon tax. This provides an incentive for consumers to consume less carbon-intensive goods. If the tax rate is right, it will move us towards efficiency. However, this does not mean making everyone better off. The tax will hurt those who emit a lot of carbon dioxide, who are predominantly presently living people, while it benefits future people by making their air cleaner. So if no one is to make a sacrifice, there will need to be a transfer of resources from future people to present people sufficient to compensate present people for the cost of paying the carbon tax.

A sort of redistributive taxation will be required. Governments will need to tax future people and use the revenue to subsidize present people. How can they tax future people? By borrowing. Government debt is in effect a commitment to raise taxes from future people in order to repay the debt. The government can sell this commitment in the form of bonds, and use the revenue it raises to compensate present people to the extent of making them no worse off than before. For this purpose, remember that the government will already have available the revenue it raises from the carbon tax itself; government borrowing will constitute additional revenue.

How can a government actually compensate people by means of this revenue? Reducing other taxes such as income tax will do for most people. Owners of fossil fuel resources will have to be bought out, and workers in the fossil fuel industry will also need special compensation for the costs of early retirement or retraining.



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Borrowing takes place among contemporaries, and repayment also takes place among contemporaries, so it may still seem puzzling how borrowing can move real consumption from one time to another. It does so like this. A government borrows money from capitalists and other wealth-holders (either people or capitalist institutions such as pension funds), who are planning to invest rather than consume it. When they lend money to the government, these capitalists invest less in real production. Having borrowed the money, the government distributes it among members of the present generation, who consume most of it. So we end up with more consumption and less investment in the present.

When the loan is repaid in the future, the government will take money by taxation from people who would have consumed most of it, and pay it to capitalists who do not consume it. So future consumption is reduced. This is fortunate because there will be fewer goods available for future people to consume, since the capitalists will have done less investment in the present. Fewer goods are passed through from the present to the future, but the future will be compensated by inheriting a smaller and more manageable concentration of greenhouse gases in the atmosphere.

The upshot is that we shall not in practice be able to implement a no-sacrifice policy financially except by means of borrowing. This poses a new problem. The no-sacrifice approach to climate change will require a new era of increasing public debt. But many governments are not sufficiently creditworthy to be able to borrow any more money than they do already. They are effectively liquidity-constrained.

Even some governments that are well able to borrow are disinclined to do so. Public debt has a bad name in many countries; in the last decade many European countries have been imposing austerity on their people even though they could instead have borrowed at ludicrously low interest rates. They could have borrowed and invested massively in reducing climate change, but they refused to do so on grounds of fiscal probity. Their reluctance has to be overcome particularly in the specific case of financing investments in the decarbonization of the world economy, including compensation of those who stand to lose from decarbonization.

The conventional arguments against public borrowing do not apply to borrowing aimed at financing decarbonization. For example, one argument against public borrowing is that in the long run it can “crowd out” private borrowing to finance investment that enriches future generations. But the aim of decarbonization policy is exactly to crowd out investments in conventional fossil fuel technology in order to provide future generations with a better mix of clean energy infrastructure and lower atmospheric concentration of greenhouse gases.

But even if attitudes to debt-financed decarbonization change among the rich countries, many poorer countries will still be unable to raise any further loans. How is that problem to be overcome? It would be outrageous if the world’s financial system could not rise to the challenge of saving us from climate change by making the no-sacrifice policy possible financially.

A World Climate Bank

Climate change unfolds over hundreds of years because carbon dioxide and other greenhouse gases sink out of the atmosphere very slowly. Investment to control climate change will bring its benefits over an equally long period, and borrowing to finance this investment will have to have a comparable term. Few national governments could borrow for such a long term. We need a new international financial institution to underwrite this sort of debt. Let us call it a 'World Climate Bank' (WCB). How could this bank operate, how can it be governed, and how could it maintain its solvency, solidity, and credibility over the required long horizon?

It could be structured as a mutual bank following the model of the International Monetary Fund and the World Bank. National governments would contribute capital to the WCB and they would be able to borrow from it. In order to pay the interest on its debt, the WCB would have to command regular revenues. One possibility is to give it first claim on the proceeds of a global carbon tax or, in the case of national governments that fail to enact a carbon tax, it could be given the right to claim a share of national government revenues. By either of these means, the WCB's source of revenue would be spread across many national governments, thereby increasing the credibility of the guaranteed return on the bank's bonds.

The ability of the WCB to borrow at long maturities and low rates of interest would depend both on the credibility of its promises to pay and on the creation of a market for its liabilities. Its bonds should be situated at the very highest level of world debt obligations, as close as possible to the position now occupied by US Treasury bills, which are regarded as almost risk-free by international financial markets. One means of achieving this aim would be to make WCB bonds eligible to serve as international reserve assets.

The low risk that markets ascribe to U.S. Treasury bills rests on the confidence they place in the continued existence of the United States and in its commitment and ability to pay interest and principal on its obligations. It is also supported by the short maturities of Treasury bills, which renders them relatively free of inflation risk. On the other hand, WCB bonds would have very long maturity, so inflation risk would be a problem. To negate it, the WCB could index interest payments and the value of the bonds to the purchasing power of a broad basket of widely held world currencies. If the WCB bonds were index-linked and widely accepted as international reserves, they could be expected to become a vehicle for private reserves seeking very low-risk assets. This would enhance their marketability.

The bonds issued by the WCB would finance loans to national governments to support specific expenditures tied to decarbonization, including investments in new energy, transportation and housing infrastructure, short-term measures to control the concentration of greenhouse gases in the atmosphere such as carbon capture and sequestration, and compensation at economically realistic prices for the loss of value of fossil fuel reserves. The managers of a WCB would have the responsibility of detecting and rejecting fraudulent or misleading applications for loans based on expenditures that in fact would have no impact on greenhouse gas emissions.





Credit: source: Unsplash

Governance

A properly functioning WCB will be a very large financial institution with a powerful influence on the world financial system. Its governance structure will have to be carefully designed to make the institution resilient against political and economic shocks to the world economy, to establish the credibility of its commitments over time horizons of many generations, and to enforce its mission of financing expenditures directly tied to decarbonization rigorously.

The charter of a WCB must provide for a governance structure that balances the goals of representing the interests of the whole world population in controlling climate damage, recognizing the national contributions to the capital of the bank, and providing sophisticated and experienced insight into international politics and its interaction with financial markets.

The WCB and the future of humanity

If we as a species are going to roll up our sleeves and deal practically and prudently with the problem of climate change and the damage it is wreaking and threatens to wreak, we need to attend to three broad areas of action. One is to pursue technical improvements in harvesting sustainable energy. A second is to align economic incentives with real costs and benefits of investment through a carbon tax or equivalent mechanism, which will greatly reinforce the process of technical change. The third is to address the critical question of the interfaces between politics and economics to eliminate or minimize the conflicts of interest that tend to paralyze social action. The World Climate Bank is a key part of this mission, since it can provide the sorely needed financial capability to underpin decarbonization on a world scale.

A World Climate Bank: A response

Professor Gustaf Arrhenius, Director, Institute for Futures Studies
Professor, Practical Philosophy, Stockholm University

John Broome and Duncan Foley's paper discusses several important and interesting questions regarding how we can handle the climate crisis. It is also innovative on the institutional level with its proposal of a World Climate Bank. This is indeed valuable; we need much more creative institutional thinking about the challenge of the climate crisis. All too much thinking has been focused on individual behaviour instead of collective solutions and institutional change.

It is a rich paper with many ideas so I won't be able to do justice to all of it. Let me just bring up a few issues. As the title indicates, the main idea is to describe and argue for a World Climate Bank (WCB) which would "...finance loans to national governments to support specific expenditures tied to decarbonization... and compensation at economically realistic prices for the loss of value of fossil fuel reserves". This indeed seems a good idea that is likely to be easily defended on pragmatic moral grounds as one important tool in for dealing with the climate crisis. Broome and Foley are however quite sceptical to appeals to morality. As they write, "...the moral appeal has not proved powerful enough to bring climate change under control". They correctly note that this need not be because too few people are moral but because individual actions must be coordinated. For example, as long as it costs much more to take the train to Paris than to fly, people will fly. So we need big changes in the economic infrastructure through government action.

So why don't governments act? One partial explanation, they note, is the power of the fossil fuel interests (there are of course other reasons, such as the lack of coordination on the international level). They conclude that as long as "...there are powerful interests opposed to controlling climate change, governments will not act as they should".

What is their solution? Rather surprisingly, they claim that the "...only way we can achieve a satisfactory outcome is to make sure it is [in] no one's interest to oppose action" such that we can "harness the strong motive of self-interest to drive action on climate change". Even more surprising, as they acknowledge, they think such a solution exists and is feasible since greenhouse gas emissions are an externality which yields a Pareto inefficiency. And with such an inefficiency, "...it is possible in principle to change things within the economy so that at least one person ends up better off without anyone's ending up worse off".

Here I think Broome and Foley are wrong. Firstly, and luckily, they are wrong that the only solution to some oppositional powerful interest is to find a course of action that is in no one's interest to oppose. That is indeed one solution but a rather far-fetched one: no big changes and reforms in humanity's history, such as universal suffrage, has been underpinned by such a unanimity of interests among everybody concerned. Rather, much closer at hand and in line with changes in the past, it will do with sufficiently many powerful individuals and organisations on the right side to push through necessary change. That's how politics works. Luckily, since it not feasible, we don't need everyone onboard.

Still, as Broome and Foley correctly note, that might mean that we must make some rather unpalatable decisions such as, in a sense, "bribing" some leaders of the fossil fuel industry to get their hands off the levers of power. That means rewarding people "who tell lies about climate change, and pay others to tell lies, in order to preserve their unjust advantage. They have lavishly funded climate denial and relentlessly lobbied governments." Albeit morally repugnant, we might have to do this to avoid the catastrophe of run-away climate change.

This buy-out of the fossil fuel interests could be done by a WCB as Broome and Foley suggest. However, one wonders why it couldn't also be done by already existing big and rich national governments, or coalitions of governments. Moreover, national governments have an advantage over a WCB since in addition to carrots (buy-out), they can provide sticks, such as a threat of nationalization or adverse legislation. This will make the price of the buy-out lower. It is not clear to me why a WCB is needed for this purpose and what advantage it would have over already existing governments.

Secondly, as Broome and Foley are aware, the standard notion of inefficiency in welfare economics only applies to populations consisting of the same people. But future alternative populations will consist of different people and different numbers of people, depending on what we do and how we tackle climate change. So the standard notion of inefficiency is not applicable. They try to remedy this by providing a new notion of inefficiency: "a situation is inefficient if it is possible to change things in the economy so that some existing people are better off, no existing people are worse off, and the resources that are left to future people are at least as good as they were before".

This is a rather strange creature that mixes considerations of welfare with considerations regarding resources. It is far away from the standard notion of inefficiency which is in terms of people's preferences. The standard notion has the advantage that no one seems to have a reason to complain if we move to the efficient outcome which Pareto dominates the other outcomes: At least one person prefers A to B and no one prefers B to A. However, whether future people will have a complaint depends on how we work out the idea of "resources that are at least as good as they were before", which is left undefined in the paper.

One way would be to spell it out in terms of total resources in some manner, which Broome has suggested in another paper.¹² However, future populations could be much bigger than the current population so that per capita resources would be dismally low although these future populations would have the same total amount of resources that the current generation enjoys. It could be so low per capita that future people would have bad lives and suffer a lot. Hence, it cannot plausibly be claimed that this notion of efficiency "...requires no one to make a sacrifice... [n]one of them need [to] suffer".

One can try to spell out "resources that are at least as good as they were before" in terms of per capita resources or in terms of what would give future generations sufficiently good lives or in some other terms. However, the choice between these different alternatives for how to aggregate resources would need a moral argument regarding what combination of resources and number of people is at least as good as another one. Hence, we cannot dispense of morality as Broome and Foley had hoped. Moreover, we would run into problems analogous to those in population ethics where a number of paradoxes and impossibility theorems shows that we are far away from a consensus on how to value populations when both the quality lives and the number of people varies.¹³

Although we cannot use the arguments from standard welfare economics to support the idea of a WCB, there are many other promising arguments for such a bank, some of them presented in Broome and Foley's paper, which I, for reasons of space, unfortunately cannot discuss here. We need more work in this area and Broome and Foley's has done us a great service by starting the discussion of this important idea.¹⁴

Biography

- **John Broome** is Professor of Moral Philosophy at the University of Oxford. He is also a visiting Professor at Stanford University and an adjunct Professor at the Australian National University.
- **Duncan Foley** is the Leo Model Professor of Economics at the New School for Social Research in New York.

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13. See G. Arrhenius, *Population Ethics* Oxford: Oxford University Press (forthcoming); G. Arrhenius, J. Ryberg, & T. Tännsjö, T., "The Repugnant Conclusion", in E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2017), pp. 1–30 <https://plato.stanford.edu/archives/spr2017/entries/repugnant-conclusion/>; and D. Parfit, *Reasons and Persons*. Oxford: Oxford University Press (1984).
14. I would like to thank John Broome, Krister Bykvist, Tim Campbell, Marc Fleurbaey, Stephane Zuber, and the audiences at the PPE-seminar, Institute for Futures Studies, March 2022 for useful questions and comments.

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We hope the conversation will continue further.

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**ADDITIONAL
CONTACT INFORMATION**

The Global Challenges Foundation
Grev Turegatan 30
114 38 Stockholm
Sweden

info@globalchallenges.org
+46 (0)73 385 02 52