



ISSUE BRIEFS

Climate Injustice: Economic Division *Who pays, how much, and when*

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The following is the third in a series of Issue Briefs on Climate Injustice, written by Hunter College faculty members associated with Roosevelt House. Opinions expressed in these papers are those of the authors.

Introduction

Climate change economics focuses primarily on one of the most complex socio-scientific problems of our time: the rapid increase in average global temperature, exacerbated by excessive carbon dioxide in the atmosphere due to greenhouse gas emissions linked to human activity. Climate change is an economic problem because to reduce the damages that future generations will have to face, this generation must reduce consumption of goods and services starting today. Economists assess the impact of climate change on our future economy while at the same time inform policy-makers about the impact of current economic activities that might accelerate global warming. Equity issues, both within and across generations, are central to an economic assessment of climate change. Economists not only can address climate injustice but unless they do it in demonstrably equitable ways, the world risks impassioned arguments between haves and have-nots, even large-scale conflicts.

Does climate change economics address climate injustice?

“Justice requires that, when people suffer harms, they should be compensated for them” (Bloome 2012). From a neoclassical economic perspective, for achieving efficiency, it requires that producers should pay the full cost of producing goods including the cost borne by people who suffer because of the pollution generated from the production process. In this sense, justice and efficiency are analogous in economics. Greenhouse gas emissions lead to climate injustice because emissions by producers affect global warming and thereby impact the well-being of everyone, and yet the damage costs to everyone are not considered by the emitters. It is an inefficient scenario because the market price does not reflect the true cost of greenhouse gas emissions, if it did, the goods sold in the market would have been more expensive.

How to Place a Value on Climate Injustice

For short-run impact assessment, climate-dependent production functions are used to measure the immediate impact of climate change on food production, forestry, energy services, water utilities and coastal flooding from sea level rise (Mendelsohn and Morrison, 2005). Long-term impact analysis is performed with policy Integrated Assessment models like DICE (Dynamic Integrated Climate Economy) and RICE (Regional Integrated Climate Economy), developed by William D. Nordhaus at Yale, and PAGE, developed by Lord Nicholas Stern in the United Kingdom. These, rather than the short-term models, generate the debate around climate injustice.

The integrated assessment models assume that in the long run firms and households will respond to the price signals created by climate change impacts. Therefore, correct pricing of carbon would be the solution to climate change related problems. It would incentivize firms to innovate, leading to mitigation of and adaptation to climate change impacts. Economic theory suggests that the carbon price (the social cost of carbon) should at least equal the damage inflicted on people by each ton of human-induced carbon emitted into the atmosphere. However, based on only carbon price, the fear is that markets/firms will tend to choose only the cheapest short-term technological fixes and ignore technologies, initially more expensive, that could deliver huge cost savings in the long term (Stern, 2007).

The dilemma is, therefore, whether and how much to embark on regulation-led activities today as opposed to waiting for future developments. One wait might be for renewable energy technolo-

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gies to reach parity with fossil fuel. The other might be to find out whether fast-paced economic growth in developing countries can make them less vulnerable to climate change. The decision about now versus then is crucial to estimating the cost of mitigating climate change impact. Here rises the core question of climate injustice: who bears the burden of the cost of combatting climate change, this generation or generations in the future?

In his influential book "Stern Review," Lord Stern (2005) has placed intergenerational justice at the center of the policy debate. The Review attaches equal value to an equal unit of welfare for any member of any generation current or future and thereby proposes the use of a near-zero percent pure time discount rate in the formula to calculate project discount rates (which may vary depending on other variables in the formula). It is an approach that does not discount the well being of future generations just because those generations will appear in the future. The low pure time discount rate makes a compelling argument for investing immediately in climate mitigation policies. Yet the intergenerational justice issue adds much complexity to the debate. It centers on this question: what discount rate should we use to calculate how much should be spent for mitigation activities now?

Since greenhouse gases persist in the atmosphere, the cost and benefit of climate change mitigation has to be measured over a dramatically long time scale. Thus, the current monetary value of the damages that occur in the future can be derived on the basis of a discount rate applied to the value of damages in the future. One would have to choose one of many proposed discount rates for estimating how much to invest today in technologies and policies that mitigate the damages in the future. For example, based on discount rates of 2.5 percent, 3 percent, and 5 percent respectively, the damage value of \$1 billion in 100 years time is currently \$85 million, \$52 million, and \$8 million, (EPA, 2013). Stern, in his PAGE Integrated model, used a pure time discount rate of 0.1% or less, which makes his current estimate of future damages appear very high because he believes that society today should bear the full cost of irreversible damage that the future generation would have to bear. Whether that proposition will ever be politically tenable is a subject of intense and enduring debate especially in countries that may have to pay for it.

The debate turns mainly on the ethics of discount rates. For example, Nordhaus examines a model with a 3 percent discount rate that slowly declines to 1 percent in 300 years. This gives a significantly lower estimate of climate investment required today than Stern's. In other words, the Nordhaus school of thought proposes postponing abatement efforts and tolerating higher potential climate risks in the belief that future generation will inherit better technologies, higher productivity and higher growth rates and will therefore be better positioned to bear most of the damage cost. In economics, the assumption is that future generations will be richer due to their

higher productivity than the current generation. Therefore, from a justice perspective, the current generation, which is poorer, should not bear the full cost of damages. The burden should be shared between generations.

Environmental economist, Sir Partha Dasgupta, points out that the large cost of combatting climate change estimated by Stern must be shared by the current global community too, the rich as well as the poor. This implies that there is urgent need to transfer funds from rich nations to the poorer nations to mitigate climate impacts. Moreover, green measures to achieve a low carbon economy, if not based on a just principle, could exacerbate poverty rather than solve it. For example, growing energy crops (biomass), may lead to food crop shortages in vulnerable regions (Chatterjee: Policy Brief for DFID and UK Government, 2011). Amartya Sen, the Nobel laureate Professor of Economics and Philosophy at Harvard, warns that our linear focus on emissions reduction without including justice issues ignores "the growing danger from the rapidly increasing use of nuclear energy—in China and India especially" (Sen 2014).

There is no consensus in the published literature about what discount rates reflect the true value that economics attaches to climate injustice. Also, low carbon development does not automatically address injustice issues. In fact, investment in renewable energy or sustainable agriculture will have to pay special attention to poor households' share in the outcome.

Do Emissions Reduction Policies Consider Climate Injustice?

The next question is how economic activities can be pursued in a way that slows or stops rapid progression of climate change. Numerous different cost estimates have been proposed. Here are Nordhaus's estimates, prominent in the United States:

- Do nothing. (Estimated cost: \$4 trillion damage).
- Stabilize global temperature: Set policies to limit temperature rise to 2.5°C or 4.5°F (Estimated cost \$3.5 trillion).
- Stabilize global emissions: Limit carbon dioxide concentrations to a doubling of preindustrial levels. (Estimated cost \$1.4 trillion).
- Stabilize emissions from high-income regions, as adopted in the 1990 Kyoto Protocol. This option requires developed countries (listed as Annex I countries) to make binding commitments to reduce emissions below 1990 levels. The United Nations is encouraging governments to speed up their acceptance of such commitments under the Kyoto Protocol in time

for the Conference of Parties in Paris, next December. (Estimated cost: around \$5.8 trillion if Kyoto Protocol is strengthened and reformed).

- Geo-engineering: Invest in low-cost backstop technologies to offset greenhouse warming. These have not yet been discovered.

Taxes, restrictions (i.e. quotas or bans) and tradable permits (e.g. international cap and trade) are the main policy options used for stabilizing global emissions. The optimal policy according to Nordhaus is a carbon tax, which would lower the increase in global temperature to 2.1°C (3.8°F) by 2200 with an estimated abatement cost of \$2.2 trillion in contrast to Stern's estimate: between \$17 trillion and \$22 trillion.

Nordhaus estimates that without U.S participation, the Kyoto Protocol is an inefficient policy that can achieve at best 1.6% reduction in emissions from 1992 levels. However, many countries in Europe and elsewhere have opted for the International Cap and Trade policy under the Kyoto Protocol and organizations like the Environmental Defense Fund in the U.S. and several other independent think-tanks have assessed the program to be cost effective. Under this system, the developed nations are allocated a quota for greenhouse gas emissions. A country can use its permits to emit greenhouse gases or sell the permits to other countries. Currently, developed countries have signed up to receive permits but developing countries do not have any cap on their emissions. However, the developing countries also receive emissions reduction certificates if they voluntarily reduce emissions (Clean Development Mechanism or CDM). Developed nations are allowed to buy those emissions reduction certificates from the developing nations and use the certificates to emit more than their cap on the premise that they have paid for emissions reduction (offset emissions) in some other part of the world. Currently 7,300 CDM projects in 89 developing countries have delivered more than 1.38 billion tons of emission reductions. It has leveraged an estimated \$315 billion in capital investment in developing countries (UNFCCC 2013). From 2005 to 2009, the developed countries, under this system, reduced more than 480 million tons emissions at home (Environmental Defense Fund 2012). By 2011, emissions of 15 EU countries were estimated to be 14.1% lower than in 1990.

From a fairness perspective, every person should have an equal right to emit. In that case, the permits distributed for ensuring an emissions quota/cap should be proportional to the total population of a country (Broome 2012). It would mean that countries like China with a population above a billion should receive more permits for emitting than the U.S. or the U.K. In any case, per-person emission is significantly lower in China and India than in developed countries. This is a serious bone of contention

in the international agreement over emissions caps. China, India and Brazil favor the idea that countries that have historically demonstrated high per-person emissions should receive fewer permits than countries that have emitted less. In the view of the Oxford University philosopher John Broome (2012), this is more a political debate about governments being fair rather than ensuring justice to those facing economic harm.

Does Adaptation Impact Climate Injustice?

What if none of these policies can mitigate climate change and its impacts? Broadly speaking, there are two schools of thought about adapting to climate change. One believes that development is the best form of adaptation and thereby countries should invest in physical and human capital stock, build strong institutions and achieve robust growth. The second approach is to divert significant investments into 'climate-proofing' infrastructure and all other productive capital. For example, the public sector needs to bear the cost of direct adaptation by protecting cities against extreme weather like mega-storms, severe floods and rising sea level. Governments have to invest in public health measures to prevent new mosquito-borne epidemics under the global warming conditions. A World Bank study (2010) estimates that between 2010 and 2050, a planned and policy-led adaptation of developing countries, to a level of approximately 2°C warmer (3.6°F) than now, would cost between \$75 billion and \$100 billion a year. This amount is a low percentage of the GDP of developed countries (World Bank 2011).

Adaptation-based innovation could reduce the total cost of climate change, provided that robust climate insurance is in place. Unfortunately, autonomous or planned adaptation has not gained momentum either. A report (Ceres 2014) shows that in the U.S., out of 330 insurance companies, only 9 (mainly property and casualty insurers) have made some investment towards managing climate change risks in big cities. Moreover, there is a behavioral failure where communities, corporations, and oil-exporting countries eager for immediate profit, act against their own long-term interests rather than engaging in adaptation. Some are explicitly fighting renewable energy even as the cost of solar and wind power is approaching parity with fossil fuel. "Despite evidence that extreme heat waves and other climate-related impacts will influence morbidity and mortality trends, L&A (Life & Annuity) and health insurers show widespread indifference to climate risk, both in regard to their core business lines and their investment strategies" (Ceres 2014).

New Thinking About Climate Change Economics

Climate injustice is indeed addressed in economics, but not automatically. It needs special attention especially because ignoring

climate injustice risks large-scale conflicts. They are already looming in the regions to which climate refugees are migrating from tropical countries and small islands. Such refugees are not protected by international law and do not have the same rights as those seeking asylum from war zones. Meanwhile, the new trade routes emerging from melting of the ice cap in the northern hemisphere are creating territorial conflicts among developed nations.

To align the goals of a low-carbon economy and a climate-just world, the economics of climate change needs, and needs soon, to become more than a sub-discipline of traditional neo-classical economics. Practitioners need to explore closer interactions with other contemporary disciplines including behavioral and ecological economics; risk management, especially in the insurance sector; and trans-boundary conflict resolution and law. Regulations need to be based on inter-disciplinary principles rather than only according to a traditional economic rationale. Governments have to regulate and incentivize the insurance sector to promote climate-smart products to reduce the risk for vulnerable populations. To realize significant energy efficiency and emissions reductions, decision-makers need to consider mass behavioral transformation strategies at the corporate as well as household level. Societies have forbidden slavery and child labor putting justice ahead of economic gain. Now, hopefully, they can also learn to appreciate the long-term benefits of a sustainable, climate-resilient and just economy.

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