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## Protecting the poor with a carbon tax and equal per capita dividend \*

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## **Standfirst**

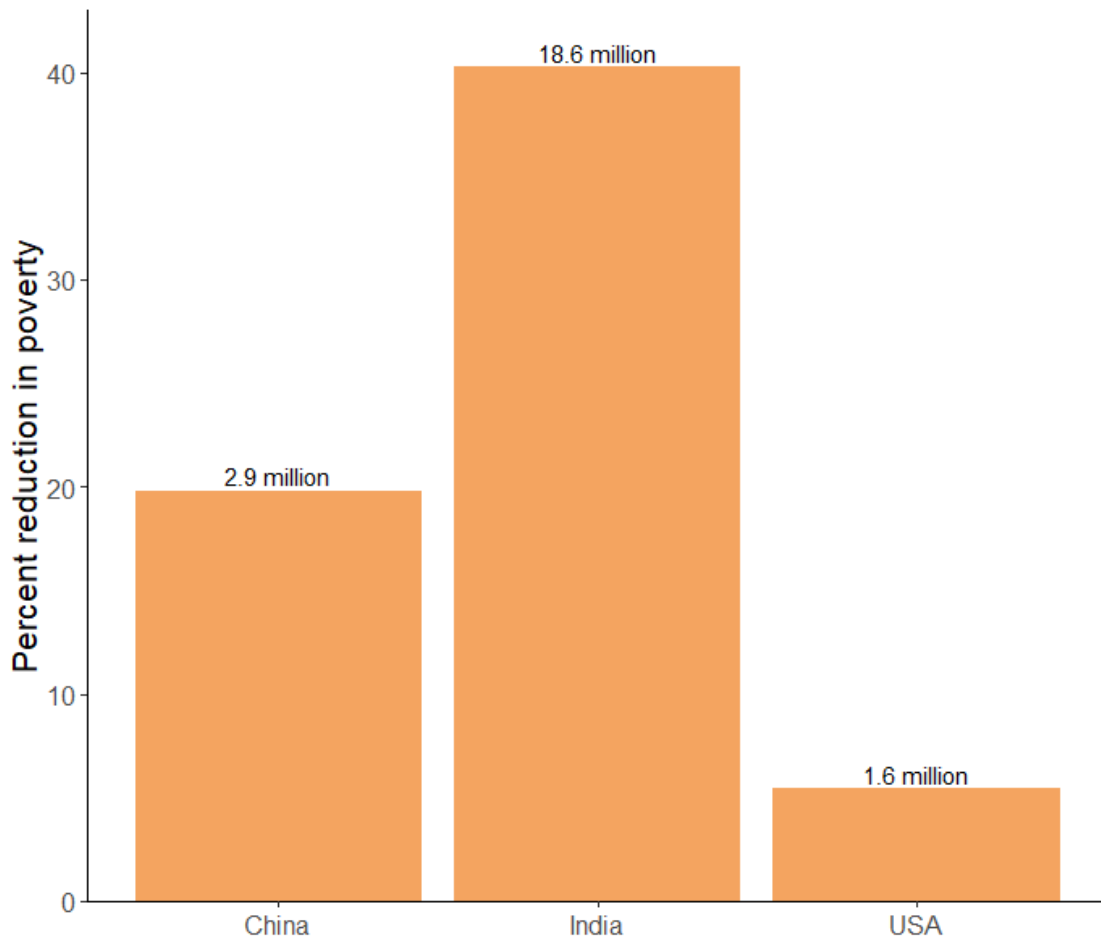
We find that if all countries adopt the required uniform global carbon tax and return the revenues to their citizens on an equal per capita basis, it is possible to meet a 2°C target while also increasing wellbeing, reducing inequality, and alleviating poverty. These results indicate that it is possible for a society to implement strong climate action without compromising goals for equity and development.

## **The policy problem**

Climate policy decisions are strongly intertwined with issues of equity. One key challenge involves identifying policies that achieve aggressive mitigation without overburdening already-disadvantaged populations, for example through increases in energy and food prices, or from job losses. Some argue that the harm imposed by these costs justify less dramatic emission-reductions than those needed to meet the Paris Agreement temperature targets. Decision makers therefore face the challenge of identifying a climate policy that prevents runaway climate change, while also supporting society's equity goals. Carbon taxes represent one salient policy option to reduce emissions. Although some express skepticism about fixing the climate problem with a market-based solution, others argue that the approach is economically efficient and – most importantly here – raises revenues that can be used to counteract the potential harms from high mitigation costs. The question of whether a carbon tax can be designed in a way that reduces global emissions while also protecting the poor and achieving equity goals has considerable relevance for how society's decarbonization efforts unfold.

## **The findings**

We find that a 2°C target can be met while simultaneously increasing wellbeing, reducing inequality, and alleviating poverty, if each country/region imposes a substantial carbon tax and recycles the revenues to its citizens on an equal per capita basis (Figure). Furthermore, the benefits are often large, particularly to those at the lower end of the income distribution. The overall benefits to society are even greater if total carbon tax revenues are returned on an equal per capita basis globally, which directs more of the revenues towards the poorest populations in the world (rather than the poorest within each country/region). We also find that the optimal decarbonization trajectory is characterized by rapid reductions in emissions initially – which limits runaway climate change and allocates substantial revenues to the current poor – followed by a slower climb towards net zero-emissions, which preserves tax revenues for future generations. The implication is that adopting strong climate policy need not entail a tradeoff where the people of today (and the poor in particular) must sacrifice for the benefit of future generations.



**Figure.** Estimated percent reduction in poverty in 2030 in a 2 °C scenario with an equal per capita redistribution of carbon tax revenues, compared to a scenario without any climate policy (i.e. no carbon tax). The number of people that would not be in poverty is reported above the bars. Poverty rates differ by country.

### The study

Our results build on an extensive economics literature that has analyzed carbon pricing or gasoline taxes within single nations or regions. To bring this literature together into a global analysis, we begin with a global cost-benefit climate policy model known as NICE, which divides the world into 12 regions, and further divides each region into five income groups. We then add a new component to the model – calibrated to the literature – that quantifies how both the costs of a carbon tax and the benefits from an equal per capita redistribution impact different income groups in different nations. We do this for a 2 °C scenario, as well as a scenario without a temperature constraint where the model finds the mitigation trajectory that maximizes wellbeing through time via a uniform global carbon price. We evaluate the benefits of the revenue redistribution in terms of improvements in wellbeing, changes to inequality, and reductions in poverty.

## Further reading

Sterner, T. (e.d.) Fuel taxes and the poor: the distributional effects of gasoline taxation and their implications for climate policy. (Routledge, 2012).

**This volume compiles studies from around the world that together challenge the conventional wisdom that gasoline taxation, an important and much-debated instrument of climate policy, has a disproportionately detrimental effect on poor people.**

Klenert, D., Mattauch, L., Combet, E., Edenhofer, O., Hepburn, C., Rafaty, R. & Stern, N. Making carbon pricing work for citizens. *Nature Climate Change* **8**, 669-677 (2018).

**This paper synthesizes findings regarding the optimal use of carbon revenues from both traditional economic analyses and studies in behavioural and political science that are focused on public acceptability.**

Carattini, S., Kallbekken, S. & Orlov, A. How to win public support for a global carbon tax. *Nature* **565**, 289-291 (2019).

**This work describes evidence indicating that charges on emissions could be popular if revenues are given back to citizens.**

Dennig, F., Budolfson, M. B., Fleurbaey, M., Siebert, A. & Socolow, R. H. Inequality, climate impacts on the future poor, and carbon prices. *Proceedings of the National Academy of Sciences* **112**, 15827-15832 (2015).

**This paper introduces sub-regional inequality into optimal climate policy models, and finds that when future damage falls especially hard on the poor, considerably greater global mitigation effort is optimal.**

Climate Leadership Council. Economists' Statement on Carbon Dividends. Available from: <https://clcouncil.org/economists-statement/>

**This statement – signed by over 3600 economists, including 28 Nobel Laureates – describes five policy recommendations to address global climate change, including the use of a carbon tax where all the revenue is returned directly to citizens through equal lump-sum rebates.**

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## Messages for policy

- The revenues from a carbon tax capable of achieving 2 °C will be large enough to fund substantial policies that can promote equity and protect vulnerable populations.
- An equal per capita redistribution of carbon tax revenues within countries – a relatively straightforward policy to implement – can increase wellbeing, reduce inequality, and alleviate poverty.
- These benefits occur in countries at all levels of development, primarily accrue at the bottom of the income distribution, and are even greater with global equal per capita redistribution.

- Large benefits will occur even if some revenues are lost in administrative costs or are saved to fund other programs, and can make the poorest citizens net beneficiaries this decade.
  - Given an equal per capita refund, the optimal timing of global greenhouse gas mitigation is characterized by rapid initial reductions, followed by a slower climb towards net zero-emissions.
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### **Source research**

Budolfson, M., Dennig, F., Errickson, F., Feindt, S., Ferranna, M., Fleurbaey, M., Klenert, D., Kornek, U., Kuruc, K., Méjean, A., Peng, W., Scovronick, N., Spears, D., Wagner, F., Zuber, S. Climate action with revenue recycling has benefits for poverty, inequality, and wellbeing. *Nature Climate Change*. (2021).

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### **Competing Interests**

The authors have no conflicts of interest.

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