

Burden-sharing Rules for Stabilizing Greenhouse Gas Concentrations: A First Assessment of Their Equity and Cost Implications

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Assuming that the stabilization of greenhouse gas concentrations becomes a global effort, rules on how to share global burden of emission reduction will have to be agreed upon in international negotiations. During such negotiations, equity and fairness play important roles. Although it is obvious that equity principles alone cannot be used to unambiguously craft an agreement text to which everyone will agree, appeals to equity and fairness will carry a lot of weight, and parties to the UNFCCC can be expected to be convinced by such appeals, provided the economic costs of doing so are considered acceptable.

An important "factual basis" for future negotiations on global burden sharing is therefore a framework, in which the interrelation between equity principles, emission entitlements, and economic cost can be analyzed in a coherent and consistent way.

First, we surveyed equity principles that are relevant in the climate negotiation context and analyzed the degree of their realization in 11 burden-sharing rules proposed by various authors. Of these 11 rules, we selected three, the equal-emission per capita approach, the efficiency index approach, and the triptych approach, for which we quantified emission entitlements for 67 countries. We then aggregated these 67 countries into 8 world regions (USA, Western Europe, Japan, Canada plus Oceania, Eastern Europe and the former Soviet Union, China, India, Mexico plus OPEC) and added a "Rest of the World" to make the analysis global.

All emission entitlements were calculated assuming a global carbon emission profile that reaches 10 GtC in the year 2050. That profile was determined in a way to lead to a stabilization of GHG concentration at 550 ppmv.

The quantitative results of our analysis confirm that the equal-emission per capita approach tends to favor developing regions whereas the other two favor industrialized regions. To introduce flexibility in international negotiations, what is therefore needed is a means to generate in-between emission entitlements while maintaining reference to the same equity principles. We do this by introducing parameters that leave the principles intact, but still lead to different emission entitlements for countries and regions.

The calculation of economic costs, for world regions, of different emission entitlements is not subject of this paper, but described in Klaassen, Miketa, and Zhu (2003).

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