

The Economics of Climate Change: Problem Set

The problem set is provided for your individual training of the concepts discussed in class. You may decide to work on it individually or in groups. The solutions to the problem set will be discussed in the next lecture.

Optimal instrument choice

Assume that there are two identical firms A and B with polluting production plants. The two firms can reduce emissions of the pollutant at marginal costs of

$$MC_A = 18x_A$$

$$MC_B = 6x_B$$

1. What is the welfare maximizing allocation of emission reductions in this situation if the total emissions in the economy should be reduced by 20 units? Calculate the overall abatement cost for the economy.
2. What per unit emission tax needs to be imposed on the two firms to reach an overall abatement of 20 units in the economy?
3. Now assume that the aggregate marginal abatement cost function for the economy is given by

$$MC_{A+B} = 4.5X$$

and the marginal damages are given by

$$MD = 150 - 0.5X$$

4. What is the efficient level of overall abatement in the economy? Is the per unit emission tax derived above appropriate to reach the efficient level of overall abatement? If not, what per unit emission tax needs to be set to achieve the efficient level of abatement?
5. Generally, given the relative slopes of the Marginal Damages and Marginal Abatement Cost curves, is a price or a quantity regime preferable in the context of climate change?
6. Would hence a harmonized global carbon tax be preferable to a global emissions trading system? Please, consider also issues of enforcement.
7. Now let us consider a country that has implemented an emissions trading system. What arguments can support the introduction of an additional subsidy on research and development (R&D) in the field of abatement technologies?

Economics of the Clean Development Mechanism

Carbon offsets, such as generated by the Clean Development Mechanism, are often disputed as an instrument for effective climate policy.

Is Switzerland's decision to restrict the use of CDM certificates in the years to come economically sound? Discuss advantages and disadvantages from an economic perspective.