

## ECN 275/375: Exercise session 1 – Reimbursing environmental taxes

Two models for reimbursing environmental taxes

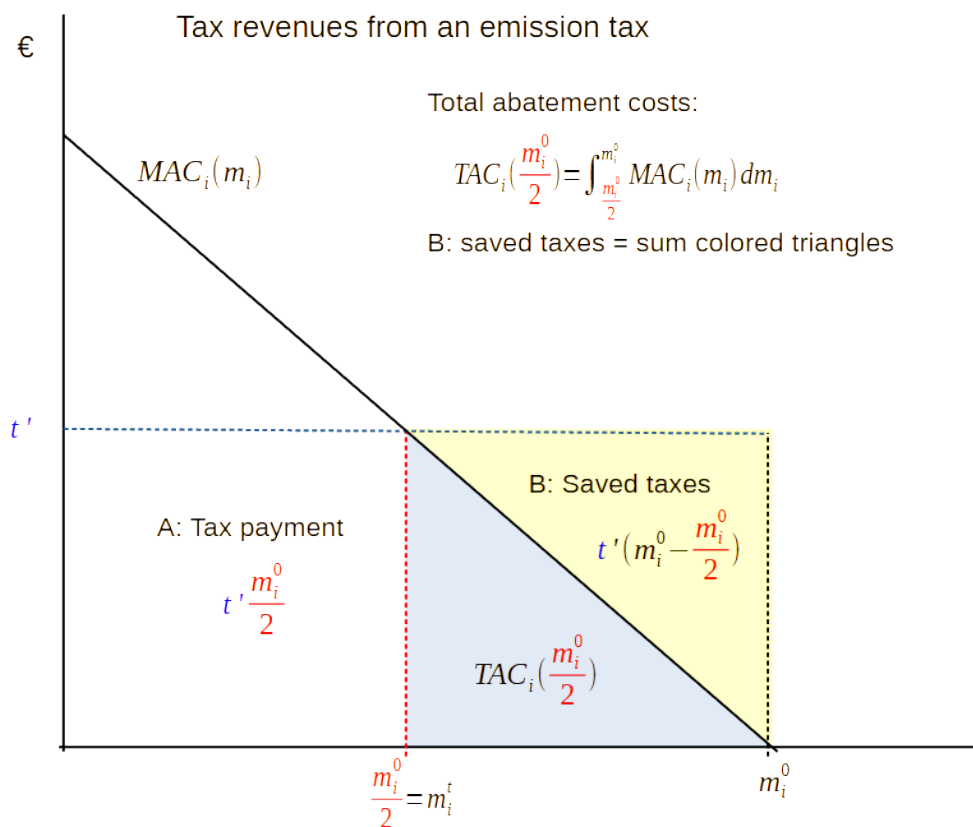
1. “Reverse cop tax”: All citizens (or a sub-sample like all adults) gets the same refund
2. All citizens (or a sub-sample) are refunded what they paid in environmental taxes

Which of the two models are most desirable from an economics perspective:

Main answer: Model 1 “Reverse cop tax” as model 2 taken into its extreme reduces or even removes the incentives for changing behavior.

To fully address the question, we need to figure out what are the environmental taxes paid. The figure below illustrates this for a typical polluter (agent) indexed  $i$ , where the rectangle A is the total taxes paid for agent  $i$ .

Under alternative 2 this agent would receive the area  $A = t' m_i^t$ . Suppose the reimbursement comes once a year. This agent would expect the interest on the paid emission taxes until reimbursement is made, have no incentives to change behavior.



Now consider the 1: the “reverse cop tax”. Using the above figure but dropping the subscripts, we can interpret the graph as an aggregate picture. Let  $N$  denote the total number of persons eligible for a refund.

In that case, each person would receive the reimbursement  $\frac{A}{N} = \frac{t' m^t}{N}$ . which in practice is decoupled from the taxes paid by agent  $i$ : the total reimbursement is in practice decoupled from this persons individual tax payment  $t' m_i^t$ . Hence, incentives for responding to the emission tax  $t'$  are preserved.

Note 1: The double dividend hypothesis: Using the revenues from an environmental tax to fund the reduction of other taxes with unwanted distortions. For info. On the double dividend see Wikipedia (for a quick reference): [https://en.wikipedia.org/wiki/Pigouvian\\_tax](https://en.wikipedia.org/wiki/Pigouvian_tax) (scroll down to the double dividend). Remember: Wikipedia is not an authorized reference, but it often provides a useful intro to a topic and formal references.

(1) The “reverse cop tax” reimbursement may not be what provides the best benefits to society. In stead of this reimbursement, we could use the tax revenues to reduce other taxes with unwanted distortions. In Norway that would for example be by reducing the taxes on labor income as labor is a scare resource.

(2) Responses to lower taxes on labor income. Remember from the discussion of labor markets that an individual worker’s supply curve for labor represents the opportunity cost of leisure (i.e., other uses of time than work). People with higher income therefore has a higher value of their free time than someone with lower income. Reducing the labor income tax rate would therefore have a stronger effect for those with low-paying jobs or those who have chosen to not be part of the labor market.

Note 2: Declining tax revenues from an emission tax. The presence of an emission tax (or any other policy instrument that entails economic incentives to reduce emissions, would lead to changes in the MAC-function over time. This could be due to technological innovations (see lecture 6 on dynamics). This would result in a counter clockwise rotation of the MAC-curve (where the hatched area represents the reduced tax revenues (see figure below)).

