Sensorveiledning – ECON4910 – Environmental Economics, våren 2004

1. Discuss the need for governmental intervention when the production of a good causes pollution.

2. Consider a situation where domestic production causes transboundary pollution. The government has in an international agreement, made a commitment to limit the annual emissions from domestic sources to a specific target. To comply with its commitments, the government decides to use a tradable permits system, where the total number of tradable permits issued each year equals the annual target for emissions. All emitters are obliged to hold permits corresponding to their emissions. Discuss the effects of the following three systems for distributing permits across enterprises:

   a) Auction tradable emission permits each year.

   b) Allocate tradable emission permits free of charge each year. The permit allocation is based on historic emissions and given independently of current activity or emission levels. New enterprises must purchase permits on the market.

   c) Allocate tradable emission permits free of charge each year. The permit allocation is based on historic emissions (as in b)), but in this case the enterprises lose the right to receive permits free of charge if they close down production. New enterprises must purchase permits on the market.

You must answer both problems, and they are given equal weight in the evaluation.

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"Examiner's guidance":

Problem 1.

Discussion of why the market mechanism does not solve the problem (Chapter 5 in Kolstad);

There is a market failure / externality in production. The cost of pollution does not enter the producers cost function. If pollution is a nonexcludable bad, there is no market for pollution reduction. Private costs do not correspond to the social cost of production. The production level is not socially efficient.

Even if excludability is possible and a market for pollution reduction exists, the demand for a non-rival good, as pollution reduction, will be to low because the other consumer's benefit of pollution reduction is not included in each consumer's utility function (eg. Figure 5.3 in Kolstad)

The Coase theorem. (chapter 6 in Kolstad;

Under certain conditions establishment of well-defined property rights is sufficient to solve the problem. Property rights make goods excludable and thus allow a market system to operate.

Coase. – without transaction cost (and full information), well defined property rights solve the problem, initial distribution does not matter.

Coase. – with transaction cost (and full information), initial distribution of property rights matters. The government must distribute property rights efficiently and /or reduce transaction cost associated with trading.

With non-rival pollution there is the problem of free-riding and truthful revelation of demand.

Problem 2.

Both a) and b) ensure that marginal abatement costs are equalized across all firms (and target is met).
System a), opposed to b), gives revenue to the government. Hence, a) gives a possibility for double dividend effect.
The free distribution of permits under b) does not influence the firms' abatement decisions, or their decisions to shut down production. The free permits count as fixed income independent of production.

With system c) the enterprises which received free permits loose them if they shut down. The free permits count as variable income, which is lost if they shut down. Given that the firms stay in business, their marginal cost of emission reductions equals the permit price. However, system c) leads to higher incentives for the firms that receive free permits, to stay in business. (this corresponds to the effect of subsidies vs. taxes)
The total cost of the emission target is higher under c) than a) and b) if enterprises stay in business only because of the free permits. This is not socially efficient use of the limited resource, "emission target", if some firms receive a "subsidy" for staying in the business. (see discussion about fees vs subsidies in Kolstad p.124-128)