

ECN 371 - Environmental Economics

09:00-12:00 - May 20, 2010

A1: No books except English dictionary, no other aiding tools.
This exam consists of 4 questions, for a total score of 100 points.
All questions are to be answered. You may answer in English or Norwegian.

Question 1 (20 points)

- List the three necessary criteria for a resource allocation mechanism (RAM) to yield predictable outcomes, and briefly explain how each criterium contributes in achieving predictable outcomes. **(10 points)**
- Why are the above criteria also important in terms of self regulatory resource regimes? **(10 points)**

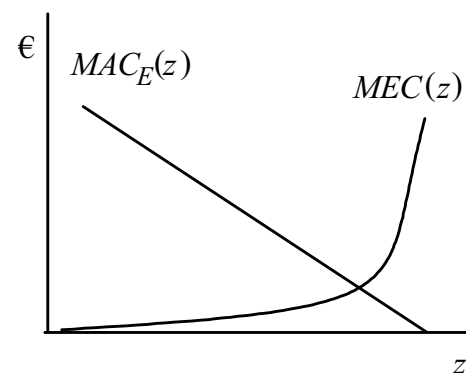
Question 2 (20 points)

- Briefly describe the *entry and exit impacts* from using taxes and subsidies. Which implications does this have for the use of taxes and subsidies when one seeks to reduce the extent of negative externalities. **(10 points)**
- Briefly discuss the main condition that must be in place for an environmental tax to yield (weak) double dividend impacts to remain over time. What are the implications of this for the design of environmental taxes and general tax policy? **(10 points)**

Question 3 (20 points)

Consider marginal abatement costs and marginal damages as functions of emissions, z , as illustrated in the graph to the right where:

- $MAC_E(z)$ are the *expected but uncertain assessment of marginal abatement costs*, and
- $MEC(z)$ are marginal economic costs (marginal damages) that are known with reasonable certainty.



- Discuss the issues you consider relevant for making policy recommendations in the situation depicted in the graph and marginal abatement costs are uncertain. **(10 points)**
- What are the informational differences between tradable emission permits and emission taxes, and what implications does this have for the choice between these two policy instruments? **(10 points)**

Question 4 (40 points)

A country has three main economic sectors, an export oriented and highly polluting industrial sector, a sector that mainly produces for the domestic market, and (as in most modern countries) a highly developed nonpolluting services sector. The industrial pollution is nontoxic, but at a level that reduces the quality of life of citizens. There is some pollution of the same kind as from the domestically oriented sector as from the industrial sector. Each of the three sectors employs about $\frac{1}{4}$ of the work force. The remaining sectors employ the last quarter of the work force. There is hardly any unemployment. The country is what economists denote "a small open economy" (like Norway).

Domestic political pressure has finally made the government propose some policies to reduce the industrial pollution. The main elements of this policy are:

- Grandfathered tradable permits to the industrial sector that will be implemented in five years' time. Initial allocation of permits will be based upon historic emission levels three years prior to the tradable permit system being put in place, i.e. emission levels two years into the future will provide the basis for permit allocations.
- An additional subsidy scheme to the industrial sector for firms adopting completely closed systems (no pollution). The cost of the subsidy program is estimated to cost 5 percent of GNP if all firms in the industrial sector utilize the subsidy scheme. The subsidy scheme will be financed by an increase in labor taxes.
- A tax on the emissions from the domestically oriented sector such that the emission tax rate will equal the price of tradable emissions in the industrial sector.

The government gives the following rationale for the proposed policy: Because the industrial sector competes on international markets it is imperative to keep the sector's costs down. Otherwise, the industrial sector risks losing market shares on the foreign markets. On the financing of the subsidy scheme the government remarks that there is nearly full employment in the economy making the damaging impacts of an increase in labor taxes small. The government further justifies the extra tax by arguing that citizens are the main beneficiaries of the resulting improvements in environmental quality.

- (a) Briefly discuss the main issues of the proposed tradable permit scheme. **(10 points)**
- (b) Briefly discuss the main issues related to the proposed subsidy scheme. **(10 points)**
- (c) Briefly discuss cost efficiency and fairness of the proposed policy package. **(10 points)**
- (d) Suggest changes in the proposed policy. Briefly justify your changes. **(10 points)**

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