Public Economics

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Office Hours: Tuesday afternoon (15h30 – 16h50) – or simply e-mail me

NOVA SCHOOL OF BUSINESS & ECONOMICS

2- Redistribution and Fairness

2.1) Preference-based fairness criteria (Thomson)

Preference-based Fairness Criteria

How to define what is a fair distribution of goods?

Preference-based:

1. **No-Domination:** No agent should receive (weakly) more of both goods than the other;

   Example - $(x_a, x_b; y_a, y_b) = (1,1; 1,1)$ respects No-Domination, $(x_a, x_b; y_a, y_b) = (1.01,1; 1,1)$ does not!

2. **No-Envy:** No agent should prefer another agent's allocation to their own;

   $$U_a(x_a, y_q) \geq U_a(x_b, y_b) \text{ and } U_b(x_b, y_b) \geq U_b(x_a, y_a)$$

3. **Equal Treatment of Equals:** Identical agents should be indifferent between their allocations;

4. **Equal Division Lower Bound:** No agent should be worse-off than equal division of all goods;

   $$U_a(x_a, y_a) \geq U_a(\frac{X}{2}, \frac{Y}{2}) \text{ and } U_b(x_b, y_b) \geq U_b(\frac{X}{2}, \frac{Y}{2})$$

5. **Egalitarian Equivalence:** There should exist a bundle (even if unfeasible) such that both agents are indifferent between this bundle and their own allocation.

3- Externalities and Public Goods

3.1) Externalities (Chapter 5-6 Gruber)

How to correct externalities?

Quantity Regulation

- Imposing maximum (or minimum) quantities

Pigouvian Tax

- Tax agent's actions so that they internalize the externality – for a socially optimal decision, the unit value of the tax (or subsidy) must be equal to the size of external damage, evaluated at the optimum

Property Rights (Coase Theorem)

- By assigning property rights and allowing agents to trade, a market for the externality is created.

Under complete information, negligible transaction costs and costless bargaining: the socially optimal outcome is attained

Merger

- If (all) involved parties join efforts, the socially optimal outcome is chosen

PS 3: Externalities

Ex.4) The marginal damage averted from pollution cleanup is MD = 200 – 5Q. The marginal cost associated with pollution cleanup is MC = 10 +Q.

- What is the **optimal level** of pollution reduction?

- Show that this level of pollution reduction could be accomplished through taxation. What **tax per unit would generate the optimal** amount of pollution reduction?

PS 4: Externalities

i) Why do governments sometimes impose ***quantity* regulations** that limit the level of negative-externality-inducing production?

ii) And sometimes impose ***price* regulations** by taxing this production?

If the government has **perfect information**, it can achieve the socially **optimal level** of production either:

1) by a tax on production (price regulation),

2) or by regulating the total amount of production (quantity regulation).

What if the government does not have perfect information, but rather there is **uncertainty**?

Depends on how steep is the MD curve:

Steeper curve – Better off (lower DWL) with **quantity regulations**

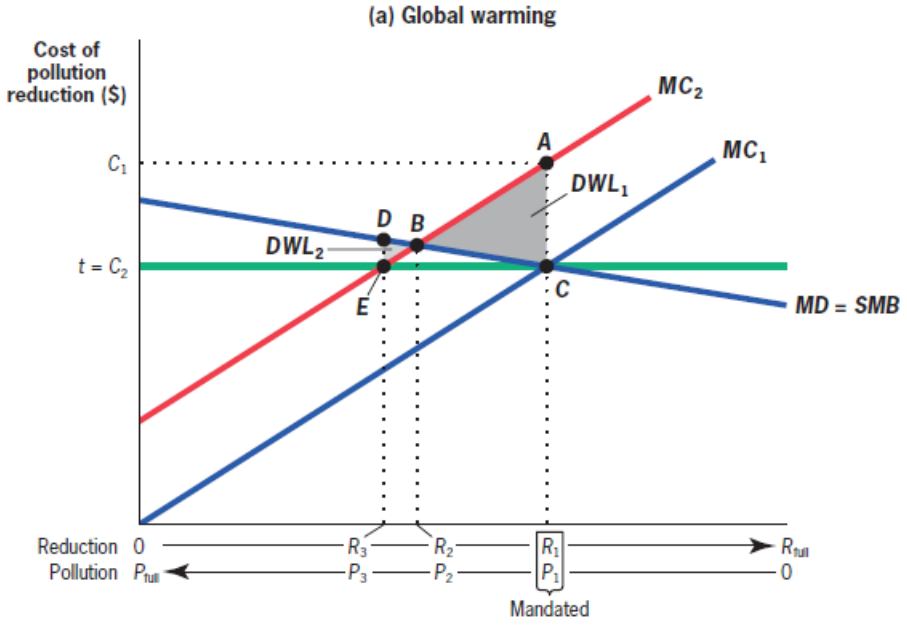
Flatter curve – Better off (lower DWL) with **taxes**

PS 4: Externalities

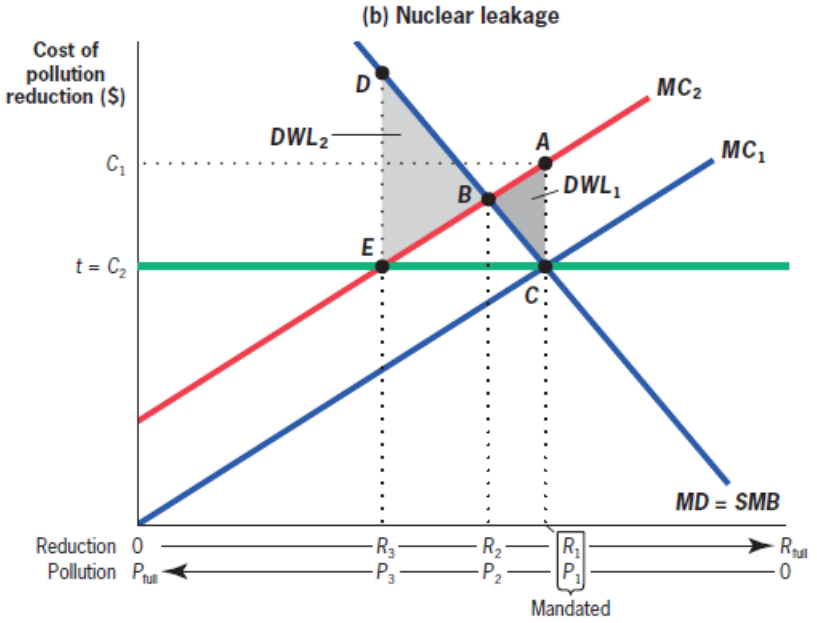
What if the government does not have perfect information, but rather there is **uncertainty**?

- Suppose the **government's best guess is** that the true MC of pollution reduction is given by $\boldsymbol{MC_1}$, **but there is a chance** it can actually be represented by the curve $\boldsymbol{MC_2}$

Flatter MD curve – Better off with taxes!



Steeper MD curve – Better off with quantity regulations!



PS 4: Externalities

Ex.2) Two firms are ordered by the federal government to reduce their pollution levels. Firm A's marginal costs associated with pollution reduction are $\boldsymbol{MC = 20 + 4Q}$. Firm B's marginal costs associated with pollution reduction are $\boldsymbol{MC = 10 + 8Q}$. The marginal benefit of pollution reduction is $\boldsymbol{MB = 400 - 4Q}$

a) What is the socially **optimal level** of **each firm's** pollution reduction?

b) Compare the social efficiency of three possible outcomes:

   i) Require **both firms to reduce** pollution by the **same amount**;
   ii) Charge a common **tax per unit** of pollution;
   iii) Require both firms to reduce pollution by the same amount but **allow pollution permits** to be bought and sold.

PS 4: Externalities

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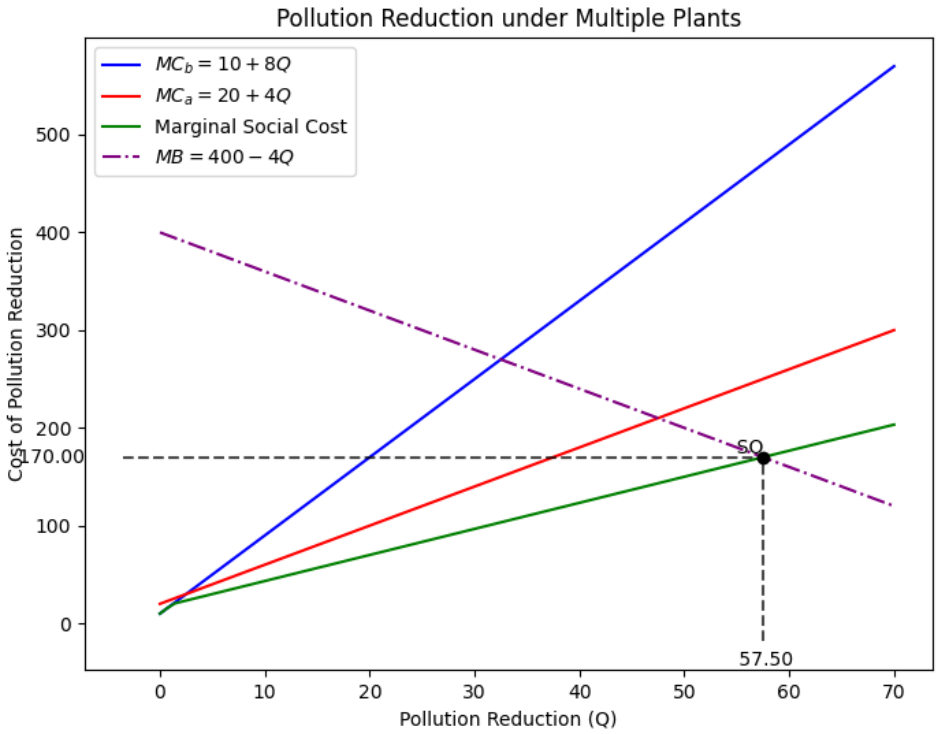


Midterm Fall '22

III (5 points)

A competitive refining industry releases one unit of waste into the atmosphere for each unit of refined product. The inverse demand function for the refined product is $p = 20 - q$, which represents the marginal benefit curve. The inverse supply curve for refining is $MPC = 2 + q$, which represents the marginal private cost curve when the industry produces q units. The marginal external cost curve is $MEC = q$, where MEC is the additional marginal cost caused to society when the industry releases q units of waste.

a. (1.5 points) How much of the chemical should the market supply in the social optimum? How much would be chosen without government intervention?

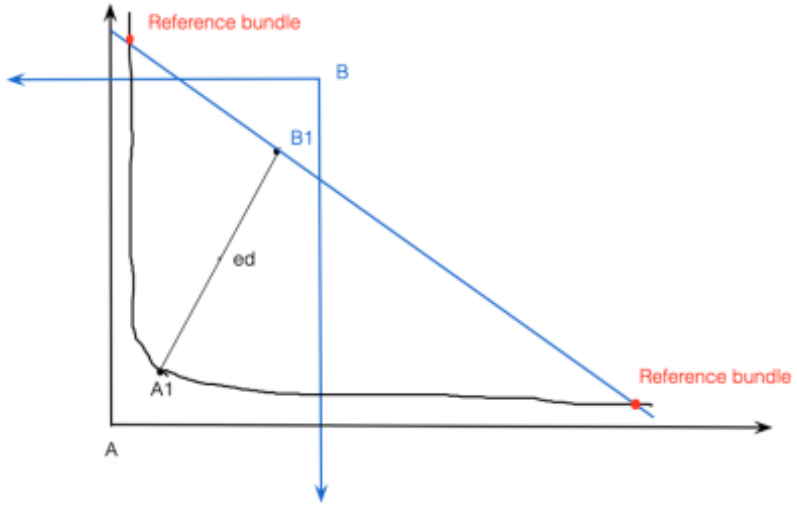
b. (1 point) Identify in a graph – and calculate – the deadweight loss associated with the externality.

c. (1.25 points) Suppose that the government imposes an emission fee of T per unit of emission. What should be the value of T if the market is to produce the efficient amount of the refined product?

d. (1.25 points) The Prime-Minister is considering the possibility of introducing tradeable emission licenses instead of the emission fee. As her advisor, what would you recommend? (without additional calculations, max 10 lines)

Midterm Fall '22

b. In an economy with two agents and two goods, an egalitarian-equivalent allocation may violate no-domination.



True: in the example we see that allocation A1 is such that A's indifference curve through A1 and B's indifference curve through B1 cross at two reference bundles. The allocation is therefore egalitarian-equivalent. However, the allocation violates no-domination: A receives less of both goods than B.

Grading: 0.5 for the conclusion, 0.5 for the definition of egalitarian-equivalence, 0.5 for the definition of no-domination, 0.5 for an example.

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