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Mövzu 1: What Is Environmental Economics?

1. Describe the sources of point and non-point water pollutants

2. Why would a tax on gasoline provide a larger incentive to reduce air emissions from motor vehicles than an annual tax on owning a vehicle?

3. Suppose there is a technological change that allows firms to produce goods and services with less energy and hence fewer GHG emissions. Show graphically and explain how this will alter the PPF and a society's potential choice of where to locate on the PPF.

4. What is the difference between permanent and degradable water pollutants? Bring an example for one each of them.

5. What are the major differences between production cost and external cost?

Mövzu 2: Natural Capital, Linkages between the Economy and the Environment, and Pollution

1. Explain the terms: buffering capacity, acidic precipitation, emission and effluent

2. Why are long-lived, cumulative pollutants so much harder to manage than short -lived, non-accumulative pollutants?

3 A given quantity of a residual discharged at one time and place can be a pollutant; if it is dis charged at another time or place it may not constitute a pollutant. Why is this true?

4. What is meant by carbon sink, adaptation, mitigation and precautionary priniciple?

5. Suppose we observe that emissions of a pollutant have decreased, but that environmental quality has not increased. What might be the explanation?

Mövzu 3: Benefits and Costs, Supply and Demand1. What sorts of factors will influence the shape of marginal cost curves? Will they differ substantially within industries?

2. Explain to a non-economist why marginal values are so important in economic analysis. How would you counter the argument of a non-economist that he or she never makes decisions based on a marginal valuation?

3. What happens to aggregate demand curves when consumers expect the price of the good to rise (or fall) in the future? Would this situation undermine the theory developed in the chapter?

4. The logic of equating benefits with willingness to pay could lead us to the conclusion that cleaning the air to which low-income people are exposed would probably create fewer benefits than if it were done for high-income people. Does this undermine the idea of defining benefits as equal to willingness to pay? How should economists deal with this potential dilemma?

5. Explain the concept of MWTP. Draw and label the graph. Bring a real life example about MWTP.

Mövzu 4: Economic Efficiency and Markets

1. James brothers are producing polyester materials with heavy carbon footprint in Sumgait Industrial Park. Their total production function is $Y = 5x^2 + 10x$. Marginal demand for James products is expressed with $y = -5x+15$. Find the equilibrium quantity and price of the product.

2. Little Chemical's are producing organic materials with heavy Sulphur content and footprint in Balakhani Industrial Park. Their total production function is $Y = 5x + 7$. Marginal demand for their product is expressed with $y = -7x+7$. Find the old equilibrium.

3. James brother's produce organic-chemical materials with heavy environmental footprint. Total Production function equals $y = 5x^2 + 7x$. Marginal demand curve for their goods is demonstrated using $y = -5x + 37$. Find the equilibrium quantity and price of the product.

4 James brothers are producing polyester materials with heavy carbon footprint in Sumgait Industrial Park. Their total production function is $Y = 2x^2 + 10x$. Marginal demand for James products is expressed with $y = -5x+28$. Find the equilibrium quantity and price of the product.

5 Little Chemical's are producing organic materials with heavy Sulphur content and footprint in Balakhani Industrial Park. Their total production function is $Y = 10x + 9$. Marginal demand for their product is expressed with $y = -5x+9$. Find the old equilibrium.

Mövzu 5: The Economics of Environmental Quality

1. Let $MAC1 = 200 - 15E$ and $MAC2 = 50 - 10E$. Graph each function and compute the aggregate MAC curve. Let $MD = 30E$, compute the socially efficient equilibrium. For the equations given above, suppose the government sets the pollution level at four units. What are the net social costs of this policy?

2. . Let $MAC1 = 100 - 10E$ and $MAC2 = 50 - 10E$. Graph each function and compute the aggregate MAC curve. Let $MD = 20E$, compute the socially efficient equilibrium. For the equations given above, suppose the government sets the pollution level at four units. What are the net social costs of this policy?

3. When pollution regulations are imposed, governments incur enforcement costs that are part of social costs. Assume that enforcement costs are a constant amount, independent of the amount of pollution reduced. How would this change the location of the socially efficient equilibrium? Show graphically and explain

4. . Let $MAC1 = 100 - 10E$ and $MAC2 = 150 - 15E$. Graph each function and compute the aggregate MAC curve. Let $MD = 20E$, compute the socially efficient equilibrium. For the

equations given above, suppose the government sets the pollution level at four units. What are the net social costs of this policy?

5. Let MAC1 = 75 – 5E and MAC2 = 75 – 15E. Graph each function and compute the aggregate MAC curve. Let MD = 30E, compute the socially efficient equilibrium. For the equations given above, suppose the government sets the pollution level at four units. What are the net social costs of this policy?

Mövzu 6: Framework of Analysis

1) Write two critical differences between social benefit–cost analysis and private investment decisions. Be comprehensive
2) Distinguish between horizontal and vertical equity. Which is more important a goal for benefit–cost analysis? Defend your answer.
3) Using the numbers from below Table for the three different options to upgrade municipal sewage treatment to illustrate the impact of choosing different interest rates to discount the net benefits, compute the present value of each project if the interest rate is 5 percent. What would happen to these present values if the benefits from each project did not begin until year 2 instead of year 1? (That is, shift the benefit stream to the right by one year.).

Project Cost	0	1	2	3	4	5
Enhanced Tertiary	100	50	20	20	20	20
Tertiary	50	25	15	15	15	15
Secondary	25	15	10	10	10	10

Project Benefit	0	1	2	3	4	5
Enhanced Tertiary	0	50	50	70	80	80
Tertiary	0	50	50	50	50	50
Secondary	10	20	20	20	20	20

4) What is uncertainty and expected value? And calculate total expected value of the number oil spills from 0 to 5 years, using probability for each year respectively, 0.67, 0.15, 0.08, 0.05, 0.03 and 0.02.

5) Using below figure proof that E* is the socially efficient scale of a public project.
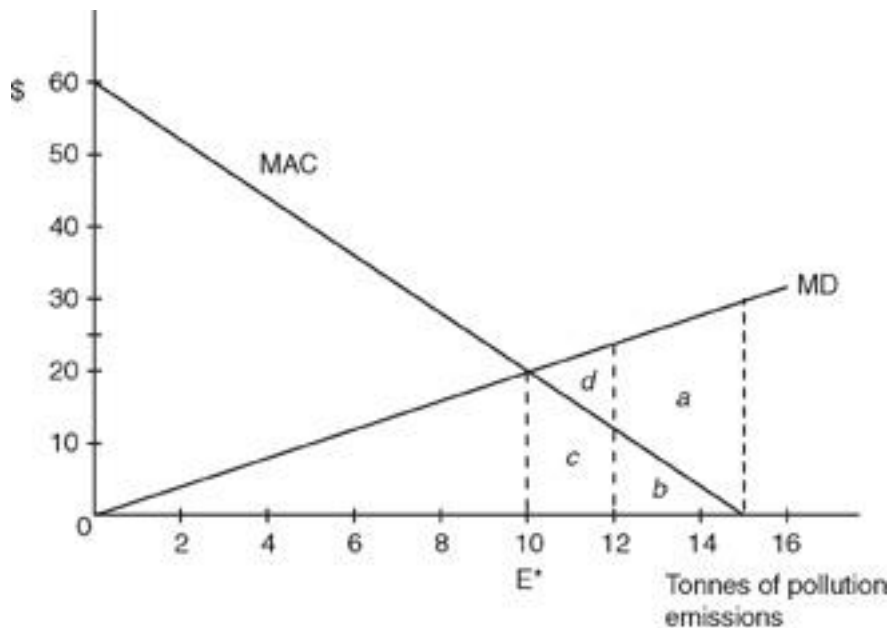
Mövzu 7: Benefit–Cost Analysis: Benefits

1) How to value reductions in traffic noise using following three aproaches?
      Approach 1: Preventive or mitigating expenditures
      Approach 2: Hedonic estimation
      Approach 3: CVM

2)   Using Air quality index eplain and drove derivation of a hedonic demand curve on house price and WTP for air quality. Be specific

3)   The government introduces new pollution regulations that reduce the pollution threatening lobster stocks on the East Coast. Let MC = 8Q represent the costs of harvest for a lobster harvester before the policy. The regulation reduces harvesting costs by 50 percent. What are the net benefits to the lobster harvester from the regulation?

4)   Suppose the people of Quba buy no air purifiers. Can data on defensive expenditure in Baku still provide information about a Baku residents' WTP for cleaner air? Explain and illustrate graphically.

5)   Compute the change in consumer surplus using Q=20 – 4P. If the demand curve shifts to P = 20 – Q. Ilustrate graphycally

6)   How would you use wage-rate differences among cities to measure the value of reducing health risks from pollution?

7)   Would the travel-cost approach be a good technique to use in valuing a policy to increase wildlife corridors in the Hirkan national park? Defend your answer.

Mövzu 8: Benefit–Cost Analysis: Costs

1) An environmental regulation results in the closing down of many firms in an industry, leaving just two or three dominant firms. How might this affect the long-run costs of the regulation?

2) A wastewater treatment plant is built for a city, thereby improving the water quality in a nearby river. The city has two sites it is considering for the plant. The first is a site (site A) that has been owned by the city for five years. The city initially paid $150,000 for the site. The current market value of the site is $300,000. Site B is land the city would have to purchase for $225,000. Which site should they choose?

3) Prove graphically that a technological change that lowers marginal abatement costs can lead to higher levels of environmental quality.

Mövzu 9: Criteria for Evaluating Environmental Policies

1) "Efficiency implies cost-effectiveness, but cost-effectiveness does not imply efficiency." Explain this statement.

2) Should "political feasibility" be a criterion in designing environmental policies?

3) Prove graphically that a technological change that lowers marginal abatement costs can lead to higher levels of environmental quality.

4) Should efficiency be sacrificed for equity? Defend your answer.

Mövzu 10: Liability Laws, Property Rights, Moral Suasion, Green Goods

1) Explain and illustrate graphically how the degree of substitution between green goods and pollution-intensive goods affects the level of environmental quality.

2) Accidents with trucks carrying hazardous wastes have become fairly common. Suppose the perpetrators of any accident of this type are held liable for a sum equal to the average damages done in all such accidents. Would this lead trucking companies to take the efficient amount of precautions against such accidents?

3) For the example illustrated in below figure, prove that the socially efficient equilibrium minimizes the chemical factory's total payments (compensation to the salmon fishery plus total abatement costs) compared to any other emission level.
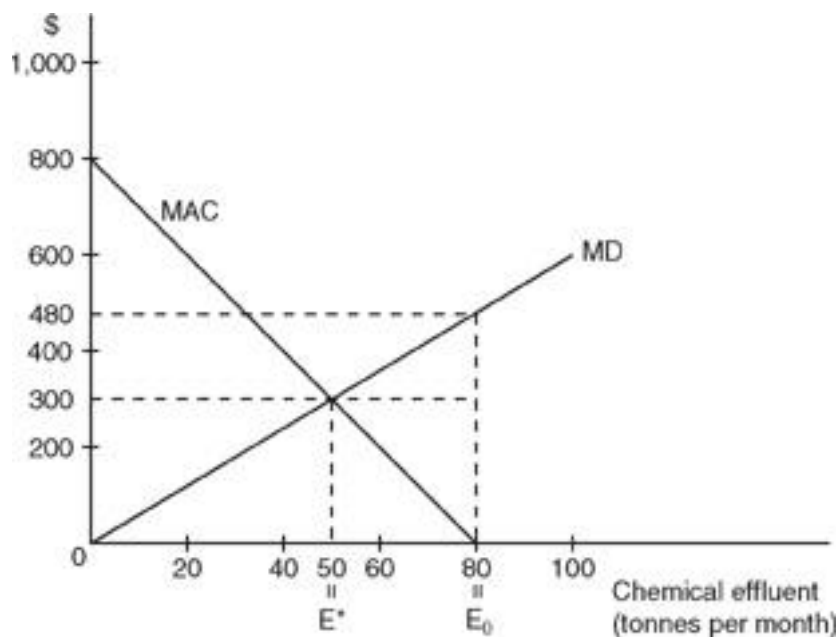
4) Assigning liability for pollution damages and assigning property rights to environmental resources can both lead to a socially efficient equilibrium (assuming no transactions costs). Are the net gains to each party also identical? Prove graphically or algebraically.

5) What is Coase theorem? explain and ilusrate it graphycally.

6) What are problems with property rights as a technique to internalize externalities

Mövzu 11: Standards

1. Solve for the two socially efficient equilibria for the two MD functions in Figure 11-3. Suppose the regulatory authority imposes a uniform standard at the emission level mid-way between the two socially efficient emission levels. What are the excess damages from under-control in the urban area and over-control of damages in the rural area?

2. Using Figure 11-5, would area c ever be larger than area a? In other words, can you prove that a technological change that reduces compliance costs (lowers a polluter's MAC) could actually make the polluter worse off than without the technological change? Explain your result.

3. List and explain, using graphs to assist your answer, three problems with technology-based standards.

4. What kind of standard would you recommend for a nonpoint pollution source (e.g., runoff of pesticides from agricultural and home use) where emissions per polluter cannot be measured? Explain why.

5. Suppose a regulatory agency has a limited budget for enforcement. Is it better from society's viewpoint to use its limited resources to monitor sources that emit large amounts of pollution and prosecute them vigorously if they violate the standard, or to monitor all polluters? Defend your viewpoint.

Mövzu 12: Emission Taxes and Subsidies

1. For Figure 12-4 and the equations MAC1 = 200 – 5E and MAC2 = 160 – 4E, compute the cost savings to the polluter if it adopts the new technology (MAC2) after the introduction of an emission tax of $100 per tonne. Compute the cost savings under a standard that is set at 20 tonnes. Explain why the tax provides a larger incentive to innovate than does the standard.

2. Suppose a regulator wants to introduce an emission tax on discharges of mercury into waterways. Illustrate the impact of the tax on two industries that discharge mercury: gold mining (as part of its processing), and dentistry (flushing mercury from fillings down the drain). Discuss the following questions: (a) How would the regulator measure mercury discharges from both sources? (b) Would the tax be uniform? (c) What is the likely impact of the tax on the prices of gold and dental services? (You will need to make some specific assumptions here about the nature of demand for these products.) (d) What are some incentives to alter production technologies? (e) What are the distributional impacts of the tax? Use graphs to support your arguments.

3.Using the numbers given in Table 12-1, or knowing that MAC = 200 – 4E for a polluter, illustrate graphically the impact of a subsidy of $100 per tonne on the polluter's emissions. Contrast the subsidy with an emissions tax of the same amount and discuss differences in (a) incentives created, (b) ease of implementation, (c) distributional impacts, and (d) effects on polluting industries.

4.Suppose that we institute an emission charge on a particular pollutant, and we use the proceeds of the tax to help subsidize the short-term capital costs by firms in the same industry of installing emission-reduction equipment. Will this approach upset the incentive effects of the emission tax?

5.Suppose the federal government proposes a tax on SO2 emissions. The tax is to be levied on the sulphur content of the fuel used by utilities and other industries because emissions from these sources are difficult to measure. But in cases where firms have ways of measuring the SO2 content of exhaust gases, the tax will be levied on the SO2 content of the gases. Will this system lead to a socially efficient equilibrium? (You will need to make some specific assumptions to answer the question.)

6.Opponents of emission charges argue that polluters will simply pay the taxes and pass the cost on to consumers without reducing emissions. Is this correct? Explain.

Mövzu 13: Transferable Emission Permits

1. Using the MAC curves given in the sulphur-permit example in this chapter, calculate the total costs of each firm before any trading occurs, after the cost-effective trade of fifteen permits occurs. Who gains the most from the trade and why?

2.   Again, use the MAC equations given in the example. Compute the private versus social costs of a TEP system that initially auctions permits. Contrast this outcome with your solutions to question 1 and explain why any differences occur.

3.   Two polluting firms can control emissions of a pollutant by incurring the following marginal abatement costs: MAC1 = $300 − 10E1 and MAC2 = $90 − 5E2. Assume the target level of pollution is 30 units. We do not know if this is the socially efficient level or not.

(a)   Compute the level of emissions per firm that is cost-effective for society.

(b)   Explain how a tradeable discharge permit system could be applied to achieve the target level of emissions. Assume the regulator initially assigns 15 permits to each polluter. The government gives these permits to the firms without charge. Solve for the number of permits each firm holds after a permit market operates, the price of the permit, and total private costs of the permit system. How would the private costs to each polluter change if the government initially auctioned the permits to the polluters?3. What happens to aggregate demand curves when consumers expect the price of the good to rise (or fall) in the future? Would this situation undermine the theory developed in the chapter?

4 Which policy instrument uniform standard provides the largest incentive to invest in R&D to lower MACs: individual standard, emission tax, or TEP? Prove your answer graphically.

5. The government has set up a TEP system where it gives away the permits to polluters then lets them trade thereafter. How would this system respond to new firms that enter the industry and have positive levels of pollution? Do you foresee any problems? Explain.

6. What are the pros and cons of letting anybody (e.g., banks, private citizens, environmental groups, government agencies) buy and sell transferable discharge permits, in addition to the emission sources themselves?

Mövzu 14: Policy on Toxic and Hazardous Substances

1. Handlers of hazardous wastes—that is, firms that accept hazardous materials and transport them for disposal—sometimes dispose of the materials illegally or in unapproved landfills. How might a deposit–refund system be designed to provide incentives to dispose of hazardous materials in approved ways?

2. What are the advantages and disadvantages of using a limited liability approach to cleaning up hazardous waste sites; that is, an approach whereby firms that dumped material in a site are held liable only for their own wastes?

3. The cost of cleaning up toxic waste sites is thought to be enormous. At present there is no dedicated funding for this task. How might Canadian governments finance remediation while simultaneously providing incentives to reduce waste generation?

Mövzu 5: Local Environmental Issues: Recycling, Solid Waste Management, and Land Use

1. Suppose the demand for a product is P = 100 − 1/2Q and the supply of virgin inputs is 20 units. The marginal cost curve for recycled inputs is r = Q/4. Compute the socially efficient output level, the use of recycled inputs, and the efficient recycling ratio. Recompute all these under the following changes (take them one at a time) and compare them to the original case.

(a)   Demand falls to $80 - 1/2Q$;

(b)   The MC curve for recycling inputs becomes $r = Q/6$;

(c)   The supply curve for virgin inputs increases to 30.

2. Another way of increasing the use of recycled material by industry is to subsidize its purchase of materials taken from the waste stream. How would you analyze this in terms of Figure 19-5?

3. Many communities have been successful in collecting recyclable material, but have been unable to find buyers for the recovered materials. Analyze this situation graphically using the model of recycling covered in this chapter.

4. Suppose there is a wetlands that can be used for ecological values or drained and houses built on it. How could the socially efficient use of the wetlands be reached?

5. Many communities are instituting a "pay as you throw" system for solid waste. Discuss the equity implications of this type of system.