

EPFL

ECOLOGICAL ECONOMICS

Env-610

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Exercises

WTP AND DEMAND

Demand derived from WTP

This table shows Paul's willingness to pay to spend a day in a natural park over the course of a month:

Visits per month	Total willingness to pay
1	100
2	180
3	250
4	300
5	330
6	350

1. Suppose that Paul is rational and the only cost of visiting the park is the entry ticket costing 60. How often will Paul visit the park?
2. Suppose that the entry ticket is lowered to 40. How many days will Paul spend in the park?
3. Suppose that Paul already enjoyed 3 free days in the park. For how many more days will he accept to pay 40?

Impact of price change on demand

Please complete this sentence:

When the price of a good increases, the demand of a single consumer for this good

It does so for two reasons:

- 1)
- 2)

Exercise

MARKET EQUILIBRIUM

Calculating market equilibria

Consider a perfectly competitive market for a normal good where the demand for the good at each price is equal to $Q^D = 66 - p$ and the supply is equal to $Q^S = p/2$

Explain why the slope of the demand curve is negative

Explain why the slope of the supply curve is positive

For each of the following prices: 40, 45, 50, what is the market outcome?

Find the equilibrium quantity and price for the following cases:

- i. free market
- ii. an upper price limit of 36
- iii. an upper price limit of 48
- iv. a lower price limit of 56
- v. an increase in demand to $Q^D = 78 - p$

Exercises

ABATEMENT

Reducing emissions in the face of a tax (1)

The owner of a building had an energy consultant evaluate the costs of reducing his heating oil consumption. The consultant delivered the following table:

Measures	Annual oil consumption (m ³)	Cost of measures (CHF)
None	10	0
A	9	6,000
A + B	8	16,000
A + B + C	7	30,000
A + B + C + D	6	48,000
A + B + C + D + E	5	70,000
A + B + C + D + E + F	4	95,000

This table means, for example, that oil consumption could be reduced from 10 m³ to 7 m³ per year by implementing the package of measures A, B and C, which would cost a total of CHF 30,000

Suppose that fuel oil costs CHF 800/m³ and that the owner makes his calculations over 20 years without interest and assuming a constant oil price.

- 1) What is the package of measures chosen by the owner to maximize his profit? Justify your answer

Reducing emissions in the face of a tax (2)

The owner of a building had an energy consultant evaluate the costs of reducing his heating oil consumption. The consultant delivered the following table:

Measures	Annual oil consumption (m ³)	Cost of measures (CHF)
None	10	0
A	9	6,000
A + B	8	16,000
A + B + C	7	30,000
A + B + C + D	6	48,000
A + B + C + D + E	5	70,000
A + B + C + D + E + F	4	95,000

This table means, for example, that oil consumption could be reduced from 10 m³ to 7 m³ per year by implementing the package of measures A, B and C, which would cost a total of CHF 30,000

Suppose now that a constant CO₂ tax of CHF 200/m³ is added on top of the price. We assume that this does not modify the pre-tax price of heating oil, as it depends essentially on the price of crude oil on world markets.

2) What is the package of measures chosen by the owner to maximize his profit under these new conditions?