

Integrated course "Energy Economics" - Microeconomics: basic concepts -

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Outline

- Economics and particularities of energy sector
- Supply and demand
- Welfare effect of markets
- Tax effect deadweight loss
- Price elasticity
- Costs terminology
- Pricing in competitive markets
- Pricing in monopoly
- Cournot competition



Economics and energy sector

General economic concepts hold as a basis.

In particular: analysis of monopolistic markets.

Energy markets are governed by rules that do not correspond to perfect markets.

They require a more complex analysis.



Particularities of energy markets

- Energy is an essential factor of production.
- Energy is necessary for satisfying basic human needs.
- Long time horizons for infrastructure planning
- Public sector stake
- Energy sector causes the largest CO₂ emissions
- Risk of large-scale accidents
- Public interest in speeding up market entry of new technologies
- Natural monopolies (or oligopolies) instead of perfect competition

Market failure: state of a market where resources are not allocated efficiently (e.g. externality, market power).



Energy Policy: Magical triangle of energy policy goals





Market structures

Market is a group of sellers and a group of buyers of a particular good or service.

Perfect competition:

- Perfect competition: Sellers are price Aakers. many buyers and many sellers > cannot influence the price
- goods at exactly the same (homogeneous)
- consumers have perfect information
- no entry or exit barriers

Monopoly:

 seller is the sole producer and can influence the price of its Sellers are price setters. output

Market power is the ability to maintain a price above the price under competition.



Market structures

	one seller	few sellers	many sellers	
one buyer	Bilateral monopoly		Monopsony (buyer's monopoly)	e.g. labor mari
few buyers	Oligopolistic market structures			
many buyers	Seller's monopoly		Perfect competition	

Oligopoly: a few sellers offer a similar or identical product.

Monopolistic competition: many sellers offer products that are similar but not identical.



Demand and Supply





Demand and Supply





Bidding curves at EEX



[delivery period Monday, 6.11.2006, 8-9 h]

















Demand and Supply: Welfare effect of markets





Total surplus indicates the degree of efficiency of resource allocation.



Given are the supply and demand functions for fuel depending on the price [€/unit] in a competitive market:

Demand
$$Q_D(p) = 100 - 10p$$

Supply $Q_S(p) = 15p$

- a) What is the market clearing price (MCP) and what are the quantities being traded (MCV)?
- Find pat which $Q_D = Q_S$: 100 - 10 p = 15 p 25 p = 100 $p = 4 \pm 100$ Find $Q_D(or Q_S)$ where $p = 4 \pm 100$ for A: $Q_S(p = 4) = 45 \cdot 4 = 60$ units MCU



Given are the supply and demand functions for fuel depending on the price [€/unit] in a competitive market:

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Supply $Q_S(p) = 15p$

b) How much is the consumer surplus (CS) and how much is the producer



T(= CS + PS= 180+120= 300€



Given are the supply and demand functions for fuel depending on the price [€/unit] in a competitive market:

Demand
$$Q_D(p) = 100 - 10p$$

Supply $Q_S(p) = 15p$

c) What will be the market clearing price and what will be the quantities being traded if the price increases by 2 because of a green tax?





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c) What will be the market clearing price and what will be the quantities being traded if the price increases by 2 because of a green tax?

Qrax (p=5,2)=15.5,2= $\begin{aligned} & \mathcal{R}_{s,Tax}(p) = 15(p-2) & \forall_{Tax}(p=5/2, p) \\ & \mathcal{R}_{b}(p) = \mathcal{R}_{s,Tax}(p) \\ & 100 - 10p = 15(p-2) \\ & 100 - 10p = 15(p-2) \\ & 100 - 10p = 15p - 30 \\ & 100 - 10p = 10p - 30 \\ & 100 - 10p = 10p - 30 \\ & 100 - 10p = 10p - 30 \\ & 100 - 10p = 10p - 30 \\ & 100 - 10p = 10p - 30 \\ & 100 - 10$ = 48 mil d) How much is the tax revenue? Tax = 2 = /unif × 48 unib = 96 F





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e) How much is the consumer and the producer surplus now? How much is the welfare now?





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e) How much is the consumer and the producer surplus now? How much is the welfare now?

$$CS_{Tax} = \frac{(10-5,2)\cdot 48}{2} = 4,8\cdot 14 = 1.15,2 \notin$$

$$PS_{Tax} = \frac{(5,2-2)\cdot 48}{2} = 3,2\cdot 24 = 76,8 \notin$$

$$Tax = 96 \notin$$

$$TS = CS_{Tax} + PS_{Tax} + Tax = 1.15,2 + 76,8 + 96 = 2.88 \notin$$

$$TS_{Tax} < TS \rightarrow welfore \ low$$
Slide 24
$$FS_{Tax} < TS \rightarrow welfore \ low$$