Unit 10.
Welfare Economics

In accordance with the APT programme objectives of the lecture are to help You to:

➢examine the conditions for economic efficiency;

➢apply Lorenz curve and Gini coefficient as key measures of income distribution;

➢apply the marginal social benefit and marginal social cost principle;

➢examine the ways in which externalities, public goods and monopolies create market failures;

➢understand the arguments for and against government intervention in an otherwise competitive market;

➢study the effectiveness of government policies such as subsidies, taxes, quantity controls, transfer programs and public provision of goods and services;

➢examine government's attempt to restrain market power of monopolies by using antitrust policy and regulations.

Required reading

Begg, D., R.Dornbusch, S.Fischer. Economics. 8th edition. McGraw Hill. 2005.

Chapter 13. Risk and information.
13.2. Insurance and risk

Chapter 14. The information economy.
14.2. Consuming information
14.3. Distributors of information

Chapter 15. Welfare economics.
15.1. Equity and efficiency
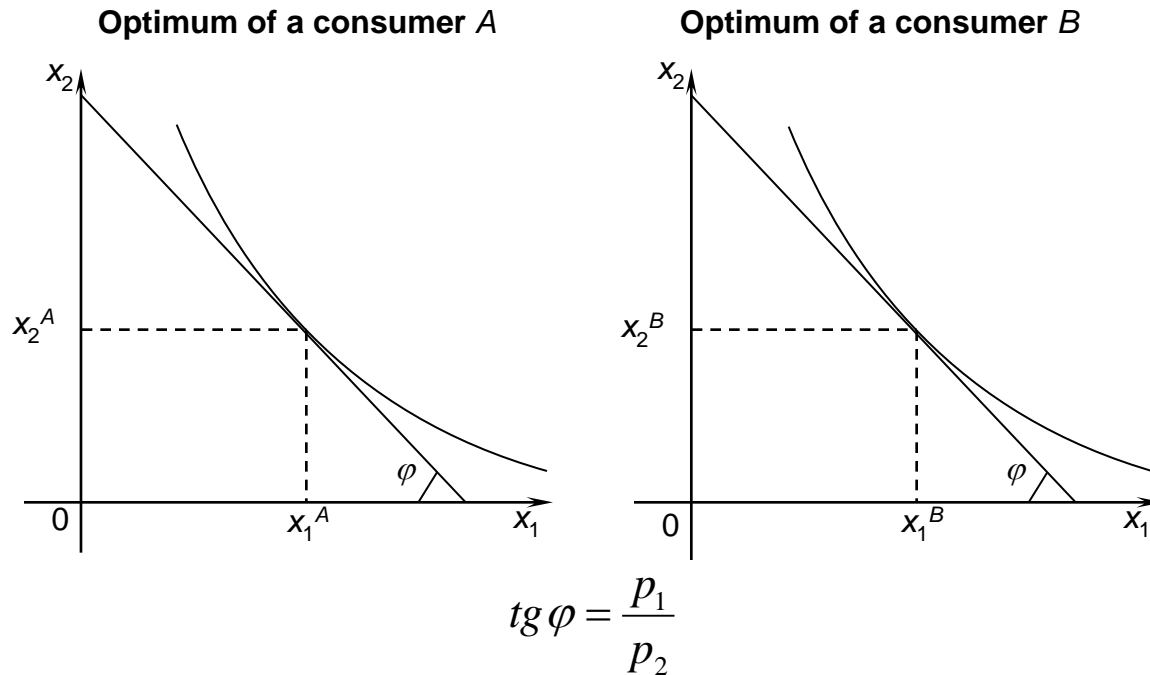15.2. Competitive equilibrium in free markets
15.4. Market failure
15.5. Externalities

Questions to be revised

✓Equilibrium of a competitive market;
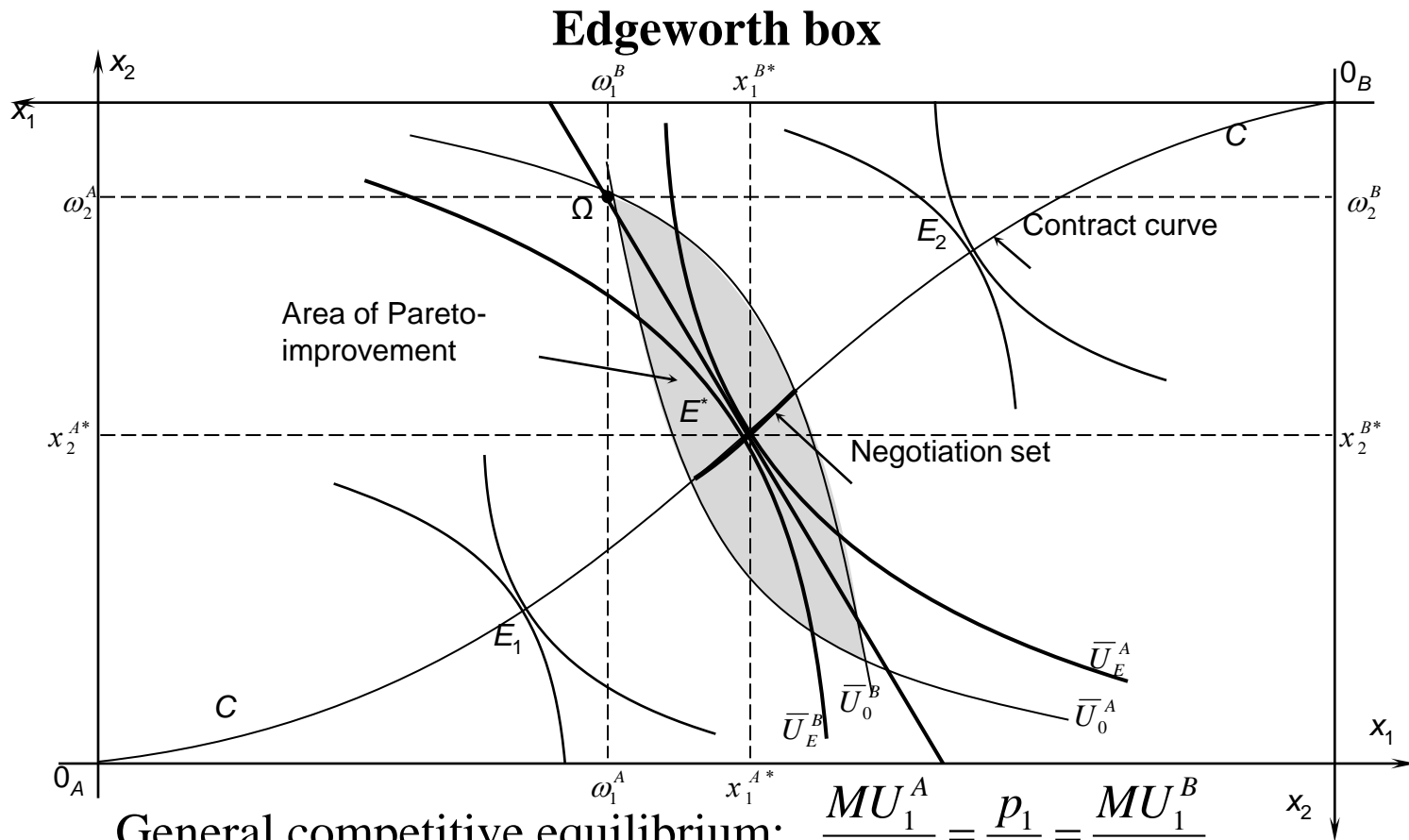✓Pareto-efficiency;
✓Government regulation of a competitive market.

Pareto-efficiency of a competitive equilibrium

Optimum of a consumer *A*

Optimum of a consumer *B*

$$tg\,\varphi = \frac{p_1}{p_2}$$

General competitive equilibrium:
- ✓ consumers are owners of resources;
- ✓ every consumer maximizes his/her utility subject to budget constraint;
- ✓ demand is equal to supply (stocks) at each market.

Pareto-efficiency of a competitive equilibrium

Edgeworth box

General competitive equilibrium: $\dfrac{MU_1^A}{MU_2^A} = \dfrac{p_1}{p_2} = \dfrac{MU_1^B}{MU_2^B}$

Contract curve: $MRS_{12}^A = MRS_{12}^B$

Pareto-efficiency means impossibility of Pareto-improvement

Pareto-efficiency of a competitive equilibrium

General competitive equilibrium:
➤ maximizing utility each consumer spends his/her total budget;
➤ improvement of individual welfare is possible only by increasing personal endowments;
➤ stocks are equal to demand for every good, that is a rise in personal endowments is possible only due to redistribution of resources. Consequently, to improve a person's welfare means to reduce welfare of someone else. Pareto-improvement is impossible. General competitive equilibrium is Pareto-efficient.

Lorenz curve and Gini coefficient

Lorenz curve

100

Percentage of income

Percentage of population

A B C D
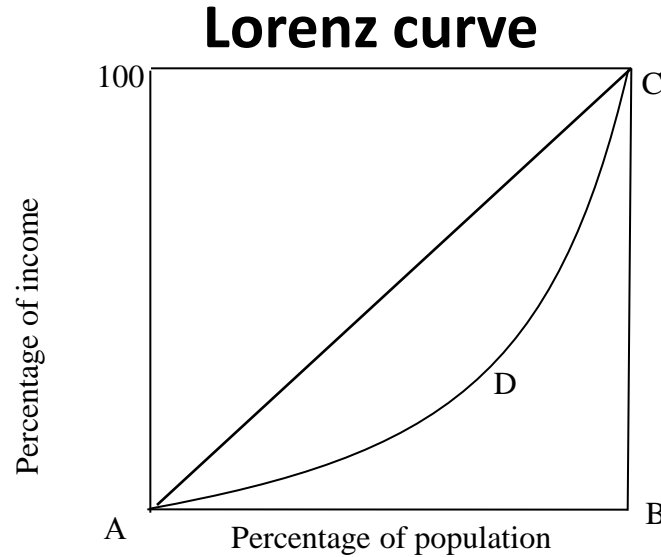
Gini coefficient:

$$G = \frac{S_{ADC}}{S_{ABC}}$$

Absolute equality: G=0.
Absolute inequality: G=1
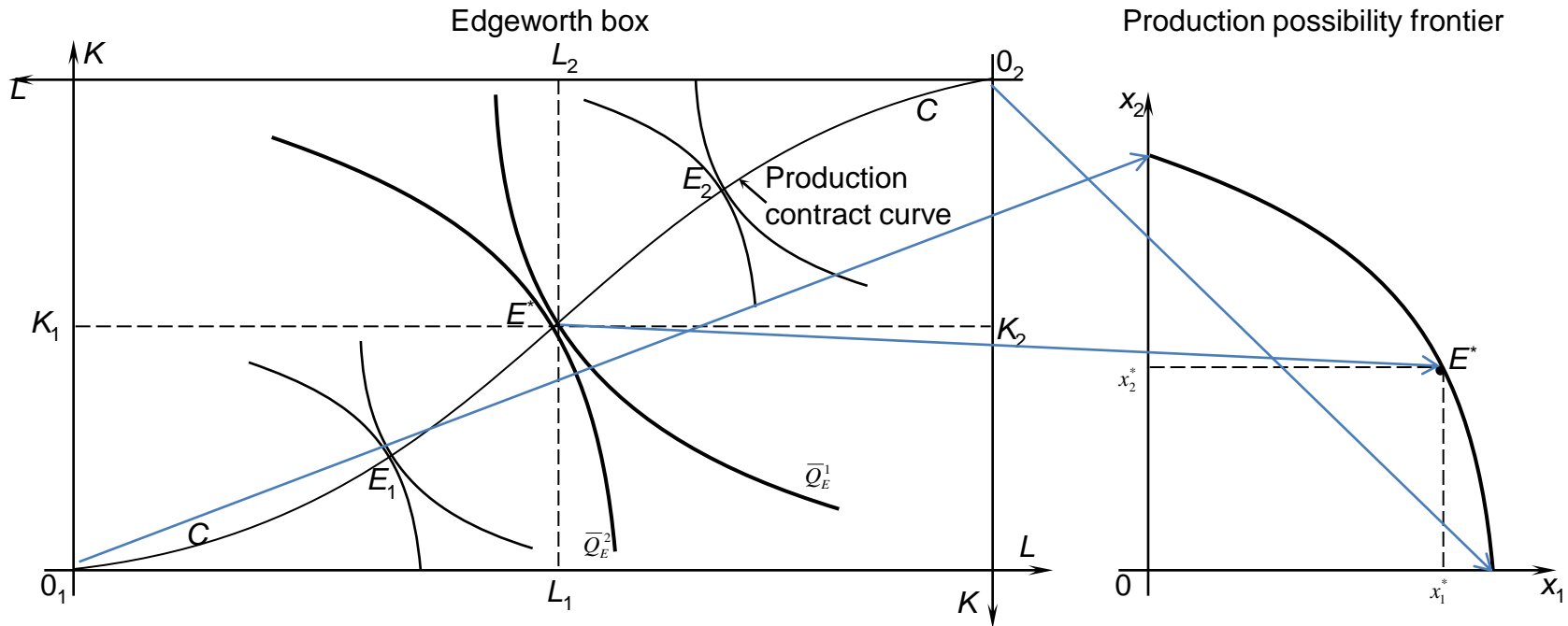
Alternative criteria of social efficiency

Pareto-efficiency: social welfare cannot be improved due to sacrifice of any individual welfare.

Kaldor-Hicks compensation principle: social welfare will be improved if those who gain can compensate losses for those who are hurt.

Pareto-efficiency in production

Economic system: two producers, each produces single good which is different from output of the other one.

Production contract curve and production possibility frontier

K

L

L_2

0_2

C

E_2 Production
contract curve

K_1

E^*

K_2

E_1

$\overline{Q}_E^1$

C

$\overline{Q}_E^2$

0_1

L_1

L

K

x_2

x_2^*

E^*

0

x_1^*

x_1

Social choice: Condorcet voting paradox

Individual preference orderings of three alternatives (α, β, γ)

Individual	Structure of preferences		
A	α	β	γ
B	β	γ	α
C	γ	α	β

Two persons prefer α for β.

Two persons prefer β for γ.

According to majority rule with pair comparisons, α should be preferred for γ.

But in fact, vice versa, majority prefers γ for α.

Social choice

According to K. Arrow, social choice mechanism should:

➢Satisfy two rationality axioms (completeness and transitivity) for any three opportunities

➢Be appropriate with Pareto principle

➢Be independent of a third opportunity

➢Not be imposed

➢Not be dictatorial

Social choice

Arrow possibility theorem: majority rule is an appropriate social choice mechanism in the case of two alternatives.

This is a logical foundation of British and American two-party political system.

Arrow impossibility (of democracy) **theorem**: in the case of more than two alternatives every social choice mechanism that satisfies rationality, Pareto principle and independency conditions is either imposed or dictatorial.

Market failures

There are several reasons for the price adjustment mechanism to fail:

- Several firms can use market power to influence prices,

- Externalities: production or consumption decision of an economic agent affects others bypassing market prices,

- Public goods.

Distortions and theory of second best

Externalities, public goods, monopolies and taxation at least at a single market distort Pareto efficiency of economic system as a whole.

These phenomena distort:
✓Price structure;
✓Structure of output as compared with competitive equilibrium;
✓Allocation of resources because factors displaced from the given industry will be employed at other industries.

Consequently, in case when distortions cannot be eliminated at the given market it should be better to give up with efficiency at other markets in order to improve situation in economy as a whole.

Public goods: criteria

		Appropriability (excludability)	
		Yes	No
Competitiveness	Yes	Food, clothes, apartments	Pastures, fish in a sea, fresh air
	No	Bridges, roads (except rush-hours)	City lighting, national defence, fundamental science

Public goods: market equilibrium
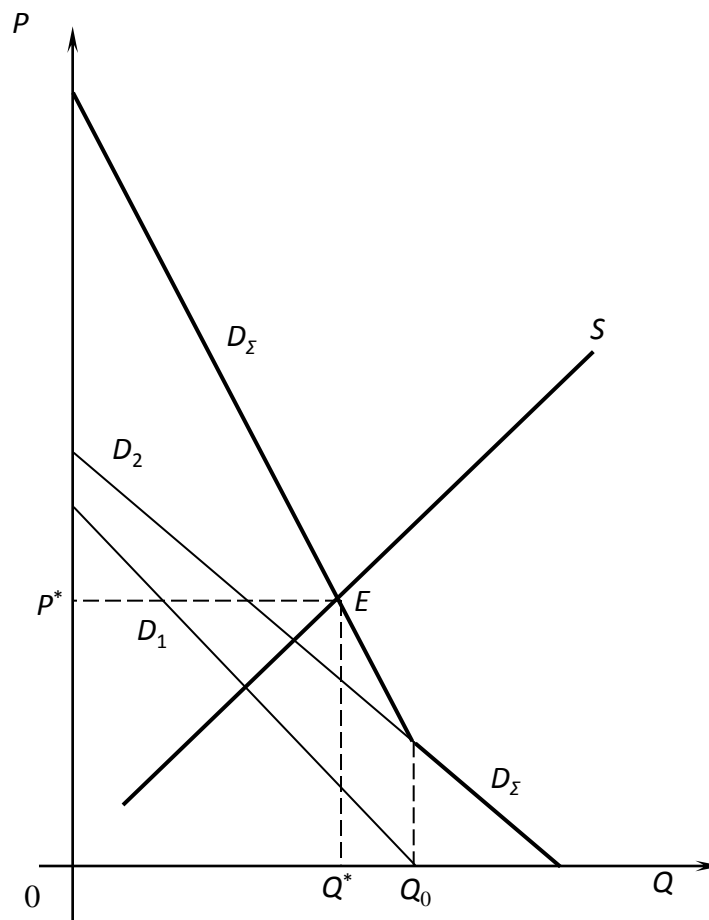
Public goods: free-rider problem

"Chicken game": a<b

| | | Player 1: To buy a watch dog? | |
		Yes	No
Player 2: To buy a watch dog?	Yes	→ ↓ (a,a)	(0̲,a̲)
	No	(a̲,0̲)	(b,b) ↑ ←

Multiple Nash equilibriums with free riding

Externalities

A **negative externality** results when the activity of one person or a business imposes a cost on someone else.
Positive externalities occur when the activities of a person or a firm result in benefits, the value of which the producer is unable to internalize or enjoy.

Externalities: private and social equilibrium
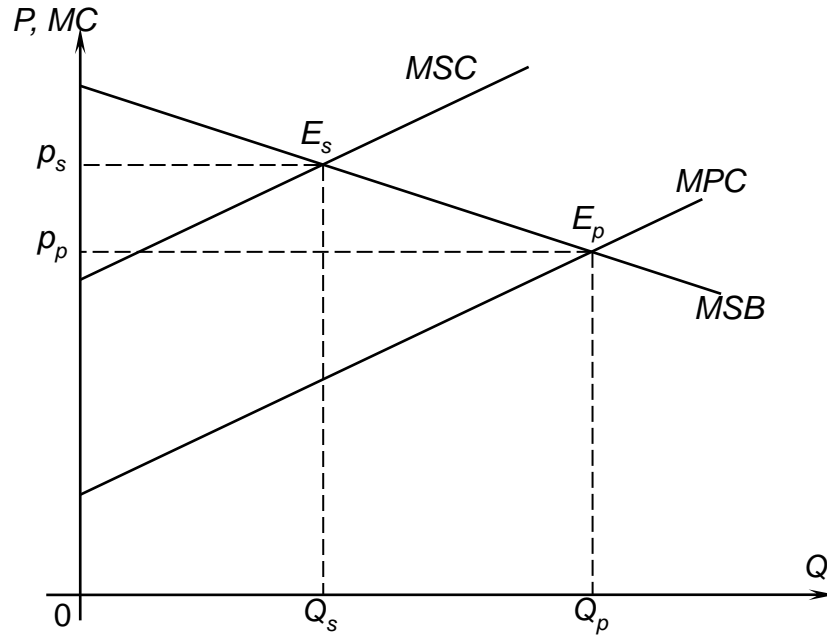
Regulation of externalities: Pigouvian tax
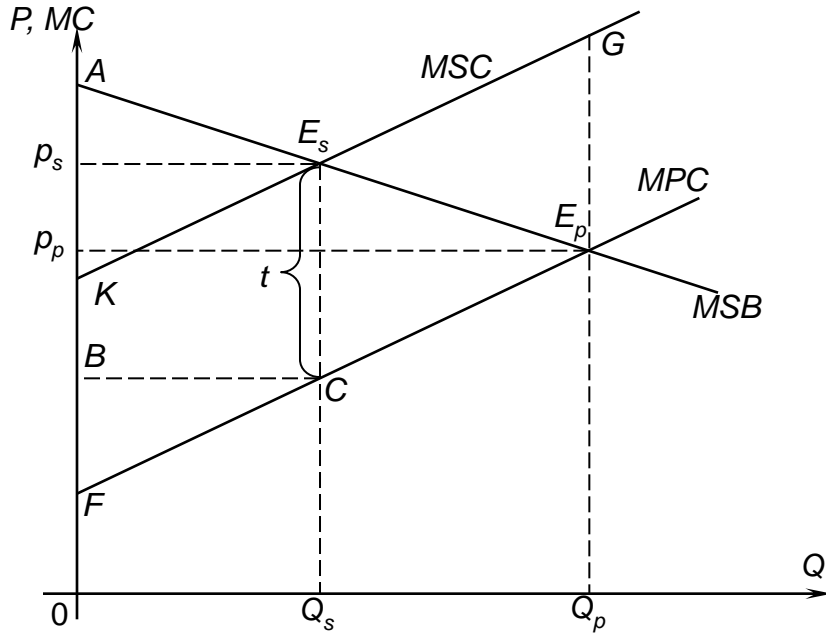
Social welfare without tax

$S_{AP_pE_p}$ – consumers' surplus

$S_{0P_pE_pQ_p}$ – total revenue

$S_{0FE_pQ_p}$ – total private cost

$S_{FP_pE_p}$ – producers' surplus

S_{FKGE_p} – total external cost

$SW_0 = S_{KAE_s} - S_{GE_sE_p}$ – social welfare

Social welfare with tax

$S_{AP_sE_s}$ – consumers' surplus $\quad$ $S_{0P_sE_sQ_s}$ – total before-tax revenue

$S_{BP_sE_sC}$ – Pigouvian tax $\qquad$ $S_{GE_sE_p}$ – welfare gain due to Pigouvian tax

S_{FKE_sC} – total external cost

S_{0BCQ_s} – total after-tax revenue

S_{0FCQ_s} – total private cost

$S_{FBC} = S_{KP_sE_s}$ – producers' surplus

$SW_t = S_{AP_sE_s} + S_{KP_sE_s} + S_{BP_sE_sC} - S_{FKE_sC} = S_{KAE_s}$ – social welfare

Regulation of externalities: Pigouvian tax
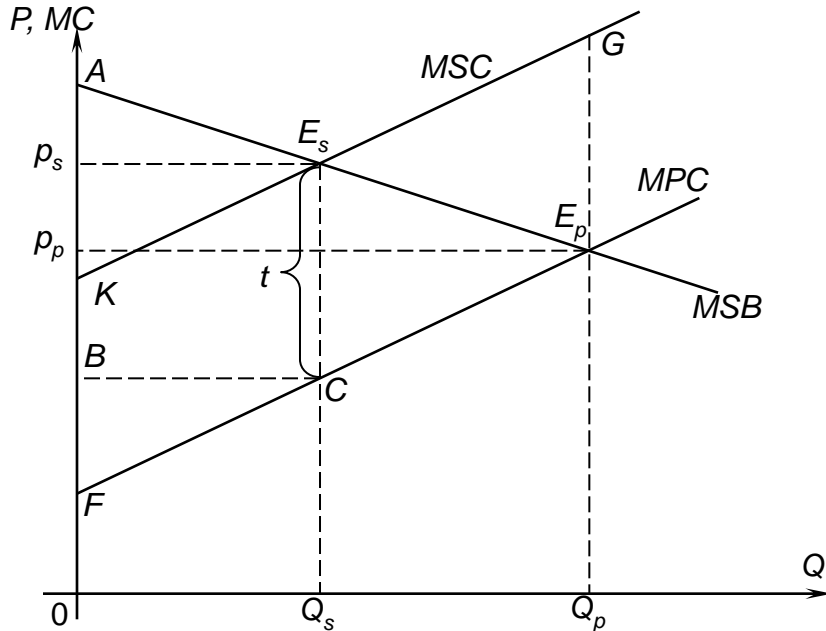
$\Delta CS = S_{P_p E_p E_s P_s}$ – change in consumers' surplus

$\Delta PS = S_{P_p E_p CB}$ – change in producers' surplus

$S_{BP_s E_s C}$ – Pigouvian tax

$S_{E_p G E_s C}$ – reduction in total external cost

Welfare gain due to Pigouvian tax:

$$\Delta SW = SW_0 - SW_t = S_{BP_s E_s C} + S_{E_p G E_s C} - S_{P_p E_p E_s P_s} - S_{P_p E_p CB} = S_{G E_s E_p}$$

Coase theorem

Provided properly specified property rights, transaction costs and wealth effect are zero, under conditions of perfect competition resulting allocation of resources will not depend on initial specification of property rights.

Wealth effect: the actual ownership of an asset affects the ability of a party to pay.

In its simpliest way the Coase theorem says that an initial assignment that is allocatively inefficient – assigned to the party who does not attribute the greatest value to the right – will be corrected by the market.

Coase theorem: consequences

- Externalities are bilateral.
- Externalities are zero under the conditions of the theorem.
- Property rights serve as the tools to internalize external costs and benefits.

Coase theorem and private regulation of external costs: example

Output	1	2	3	4	5
Marginal revenue of factor's owner	12	9	7	5	3
Marginal external damage	3	5	7	9	12