



Course: Economics I

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1. GENERAL EQUILIBRIUM ASSUMPTIONS

Economic theory is used to derive and formulate the conditions of general equilibrium model of simple economics, based on the following assumptions:

- Goal is to maximize the benefit of consumers, manufacturers objective is to maximize profit,
- perfectly competitive markets,
- economy is barter-economy where goods are easily exchanged for another,
- closed economy (no foreign trade),
- only two kinds of consumer goods - X and Y (eg. Cheese and croissant),
- consumers are spending the entire income,
- only two factors of production - L and K (labor and capital),
- only two people forming a company - A & E (eg. Adam and Eve),
- only two companies that manufacture both products.

Due to the existence of these assumptions, the model is called a 2 x 2 x 2 x 2 model. Of course, this model is very unrealistic, but on the other hand it can capture the essence of markets interconnectivity and derive conclusions that can be generalized to more realistic situations. It also can be illustrated by the graphs.

2. EFFICIENCY

Efficiency - if there is more than one activity, the situation is efficient when one of these activities can not be increased without a simultaneous decrease in other activities.

General efficiency requires the simultaneous fulfillment of the following conditions:

- efficiency in production,
- efficiency in exchange,
- producer-consumer efficiency.

2.1 Efficiency in production

Efficiency in production is a condition in which you can not redistribute a fixed amount of social resources, ie. the reallocation of available production factors can not achieve the Pareto improvement.

Efficiency in production can be illustrated:

- production-possibility frontier,
- box production scheme.

Production-possibility frontier

If the resources are deployed so that the redistribution is not possible to produce more farm X without limiting the quantity of production farm Y, then the production is located on the **production possibilities frontier (PPF)**. It is given by different combinations of output, which can be produced with a given number of inputs and production technology.

Production possibilities frontier curve can be illustrated as an alternative combinations of two products that can be efficiently manufactured with a certain fixed range of sources.

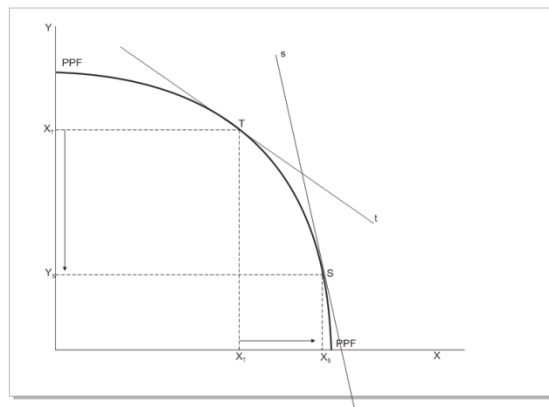
Marginal rate of product transformation

Marginal rate of product transformation (MRPT) reflects the degree to which the production of one good can be converted in the production of the other good. Of course one production can be increased by transferring resources from producing the second farm.

Marginal rate of product transformation at the same time explains why the production possibilities frontier curve is concave. With the increase of production of one good we have to give up growing number of second farm.

Formally, it is possible marginal rate of transformation product expressed as follows:

$$\text{MRPT} = \text{change in } Y / \text{change in } X = \text{MPY} / \text{MPX}$$



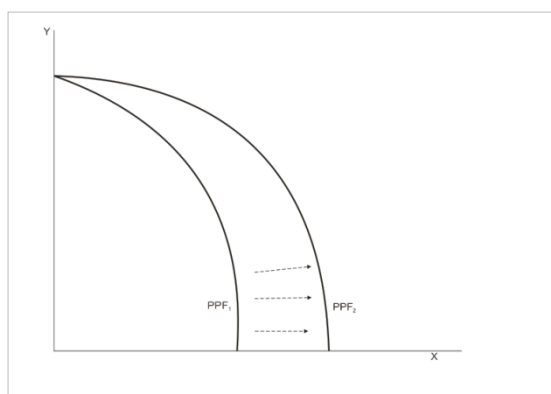
Graph n. 1: Production possibilities frontier curve slope (MRPT)

The law of increasing opportunity cost reflects the fact that with increasing production of a farm, grow alternative costs of additional produced units of this farm.

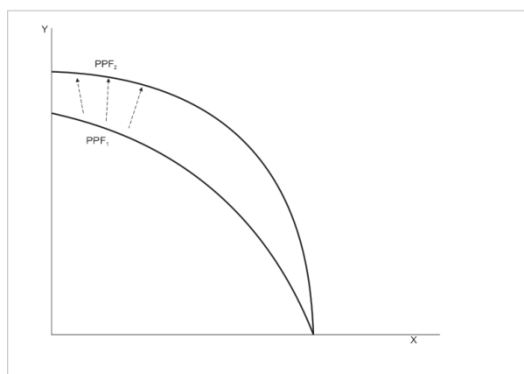
PPF and technology changing or inputs availability

Technological progress in the production of product X or Y, or increase or decrease the available inputs is reflected by moving the PPF curve.

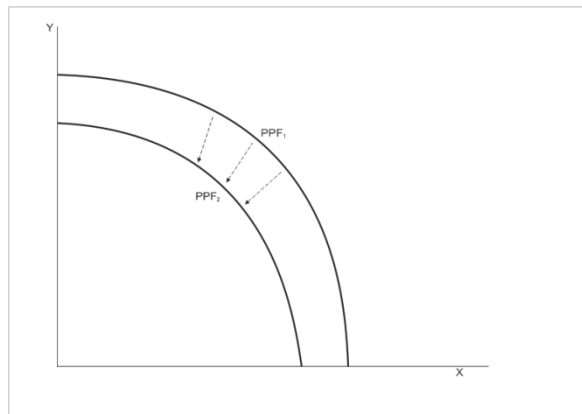
Production-possibility frontier shows the various combinations efficiently manufactured product.



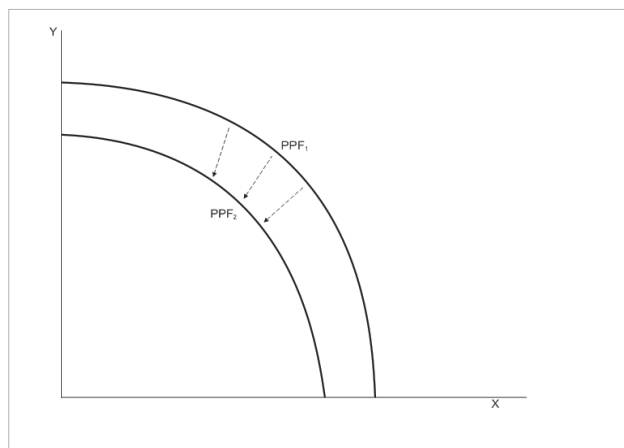
Graph n. 2: PPF shift in the case of technological progress in the production of goods X



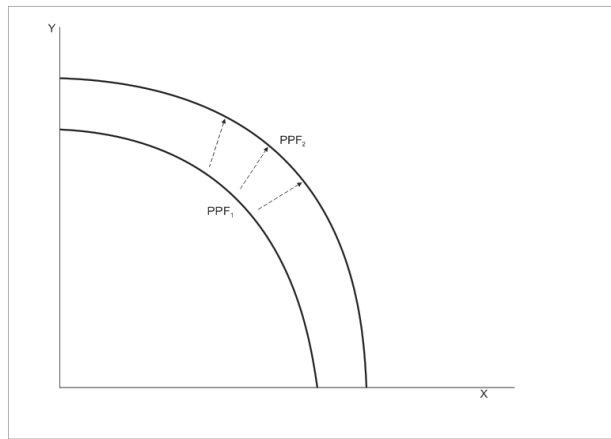
Graph n. 3: PPF shift in the case of technological progress in the production of goods Y



Graph n. 4: PPF shift in the case of technological progress in the production of goods Y



Graph n. 5: PPF shift in the case of decline in available inputs



Graph n. 6: PPF shift in the case of increase in available inputs (technological progress X,Y)

The box production scheme

Box production scheme is the second way is to graphically explain efficiency in production, illustrates all the possible ways of allocating capital and labor between the production of two goods.

More detailed explanation student obtains in the textbook:
 HOLMAN, R. Microeconomics - Intermediate Course. 1st ed. Praha: CH Beck, 2001. ISBN 80-7179-737-5. pp. 480-485.

2.2 Efficiency in exchange

Distribution (exchange) is effective if the conditions can not be clearly improved. Situations where one can be chastened without simultaneously reduced the welfare of anyone else, is ineffective. In this case, the conditions may be clearly improved by simply redistributing goods.

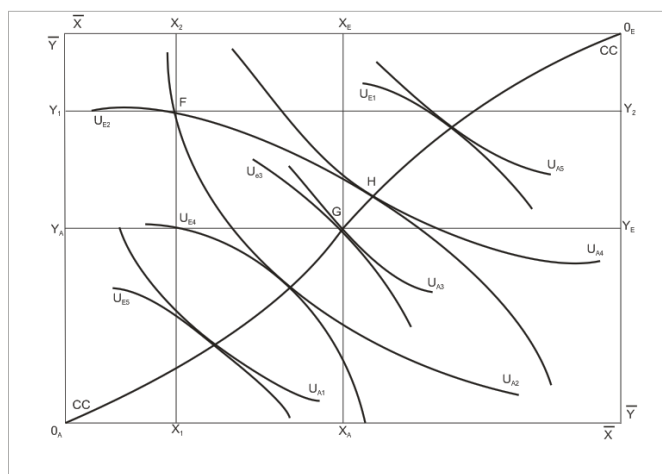
In our simplified economy is the amount of fixed goods and the task is to effectively distribute these goods to consumers. A necessary condition for such a division is that the MRS between all pairs of goods must be the same for all consumers.

$$MRS X = MRS Y$$

must be the same for both consumers:

$$MRSA = MRSE$$

For the derivation of efficiency in exchange we must take into account the preferences of consumers. They can be represented by the indifference maps two consumers (A and E) for the two types of goods (X and Y), respectively graph called an exchange box diagram. When we turn a E's indifference map to 180 degrees ('upside down'), we get a box scheme.



Graph n. 7: The box production scheme

The exchange box diagram shows all possible ways of exchanging a certain amount of the two produced goods between two consumers.

Each point in the diagram represents the distribution of the total supply of both goods among both consumers and at the same level of utility, which correspond to a combination of both goods that provides both consumers (see corresponding indifference curve). Each point is a possible point of allocation of the goods among both consumers, but may not be expressing the effective point exchange.

For example, suppose point F in the graph. At this point, the consumer A consumes X_1 and Y_1 units and consumer E consumes X_2 and Y_2 units. Point F represents an inefficient allocation of goods, because there is another possible division that:

- Brings greater benefits to both, represented by point G, which means that both consumers move to higher indifference curve: from UA_2 to UA_3 and from UE_2 to UE_3 .
- Or at least one profits and the second does not harm, at point H consumer E retains the same utility, respectively the same indifference curve UE_2 , but consumer A shifts to a higher indifference curve from UA_2 to UA_4 .

We already know that the slope of the indifference curve reflects the marginal rate of substitution of one good for another. It follows that for effective exchange must be that the marginal rate of substitution both consumers must be equal to each other:

$$MRSA = MRSE$$

If this condition is not met, it is possible to reallocate both products among both consumers so that at least one profits from them without a second being harmed.

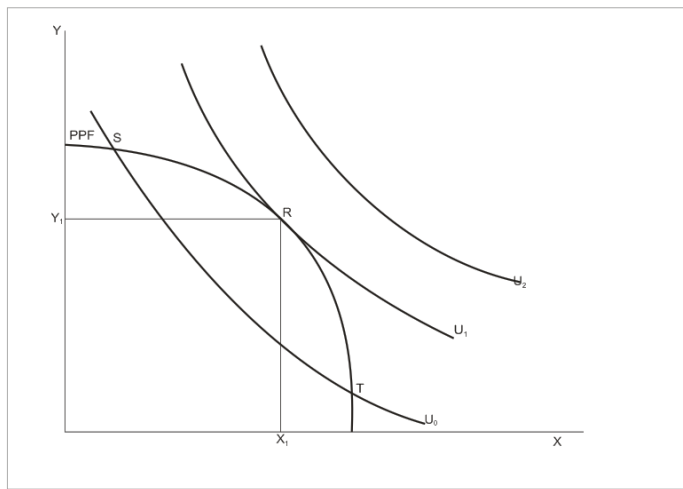
2.3 General efficiency

The goal of the economic system is to satisfy human needs - efficiency in production may not be desirable at all, if it is made a bad combination of goods in terms of consumer requirements.

To achieve the general efficiency must be satisfied the conditions of achieving efficiency in production and efficiency in exchange.

In case of inefficient production, there is a product whose production could be increased, without decreased production of any other products. This additional product could increase consumers without worsening the situation of another consumer. The initial situation therefore was not effective.

Fulfillment of the efficiency conditions in production and exchange is not a sufficient condition of general efficiency, because at the same time must be made consumers desired combination of products. Condition MRS of two goods coincides with MRPT of these goods: **MRS = MRPT**. The degree of substitutability of the two goods in consumption must match the rate at which goods are substitutable in production.



Graph n. 8: General equilibrium (one consumer)

3. GENERAL EQUILIBRIUM ACHIEVING

General equilibrium conditions:

- **MRTSX = MRTSY**
- **MRSA = MRSE**
- **MRS = MRPT**
- MRTS of each production factor for any other factor of production should be the same for all goods,
- MRS of any goods for any other goods should be the same for all consumers,
- Common MRS should equal the common MRPT for all pairs of goods.

The price system and production efficiency:

- Under conditions of perfect competition, the work moves between sectors until we reach the same wage rates in all sectors.

Therefore, the equilibrium situation is true:

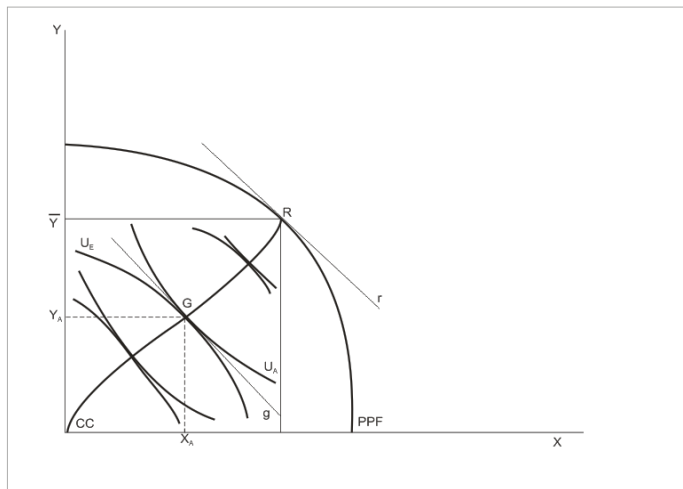
$$MPPLX.PX = \text{wage rate} = MPPLY.PY$$

This equation can be modified to the form:

$$MPPLY / MPPLX = PX / PY$$

- consumer chooses the option which corresponds to the point at which the budget line touches the highest possible indifference curve
- slope of the budget line and the slope of indifference curve are at this point the same.

- General equilibrium occurs when consumers and producers face the same prices and they receive them. Firms balance the the relative prices with the ratio of marginal products. Consumers balance relative prices with relative marginal utility of both products. In the equilibrium point, therefore, the following applies:

$$\text{MRPT} = P_X / P_Y = \text{MRS}$$


Graph n. 9: Production-consumption efficiency

4. EFFICIENCY AND JUSTICE

In order to determine which situation is for society preferable, it is necessary to make certain comparisons among consumers.

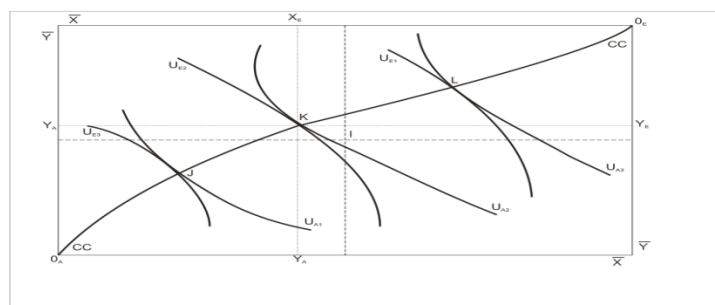
The given allocation can be identified as:

- economically efficient - if there is no possible redistribution where someone would profit without harming anyone else,
- justice - it is associated with socially desirable distribution of income and wealth.

The conflict between efficiency and justice:

- **Social welfare** is determined by a number of factors that determine satisfaction of society members. Includes both the total amount of products and services and the way in which they are distributed, but also such factors as the health of society, amount of leisure time, environmental pollution, etc.

- To achieve a certain level of social welfare we can accept some inefficiency. In some cases the optimal allocation is unreachable. Then we can accept an inefficient inputs allocation because of the social interest. In this case, sacrificed effectiveness is compensated (in terms of social welfare) by increased justice.



Graph n. 10: The box production scheme and equitable allocation

5. MARKET FAILURE - CAUSES

The situation where the market does not work or works badly - failing in its activity, there is an inefficient allocation of resources. Market failure leads to inefficient production or consumption, and the government can play a role in the treatment of this disease.

At the same time, we must pay attention to the "government failure" - the government is trying to solve problems, but the problem may worsen or cause another. Market failures when the price gives incorrect information.

Monopoly power

Imperfectly competitive firm may affect the price of the firm. An extreme case of imperfect competition is a monopolist - the only one offering, which itself determines the price of a good. However, this does not mean that the company can dictate the price and still be profitable; must also take into account the potential demand. The company produces such a profit-maximizing scale of production at which marginal revenue equals marginal cost.

$$MR = MC \text{ where } P > MC$$

Overhang prices above marginal costs is referred to as monopoly profit. Monopoly power is measured by the **Lerner index**.

Externalities

Externalities or spillover effects. They occur when companies or people transfer benefits (or costs) to other entities without adequately pay for benefits (or costs).

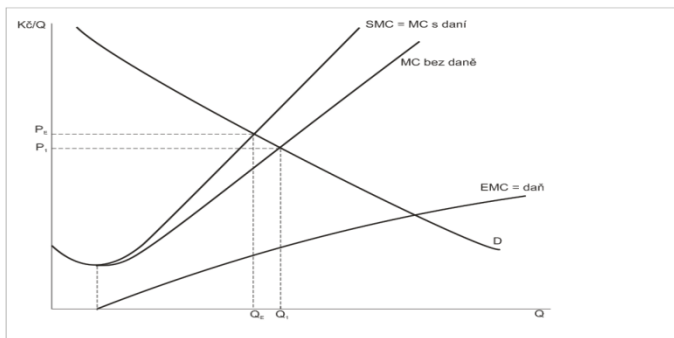
Positive externalities Recipient draws a **social benefit**, which is the sum of positive externalities and benefits paid (is higher than the paid benefit).

Negative externalities Recipient draws social costs, which are the sum of negative externalities and costs actually paid (are higher than the paid costs).

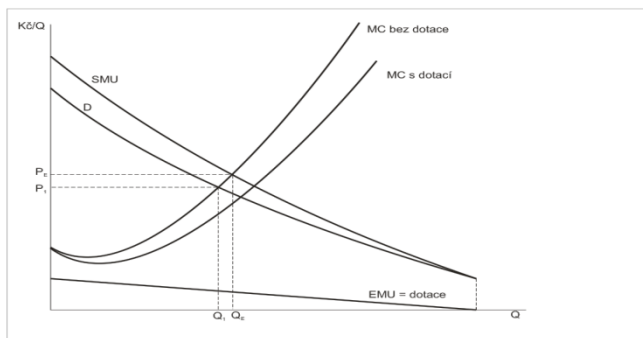
It is an activity whose impact is not included in the price.

We distinguish externalities:

- positive in production,
- negative in production,
- positive in consumption,
- negative in consumption.



Graph n. 11: Negative externality in production (imposed tax)



Graph n. 12: Positive externality in consumption

Public goods

Are another example of inefficient allocation of public goods. Important examples are the production of public goods: maintaining national defense, law and order in the country, the construction of the motorway network, support for basic research and public health. The private providing of these public goods is not realistic, because their benefits are so scattered among the population that no single company or the consumer has no economic incentive to produce them.

It is characterized by two fundamental properties:

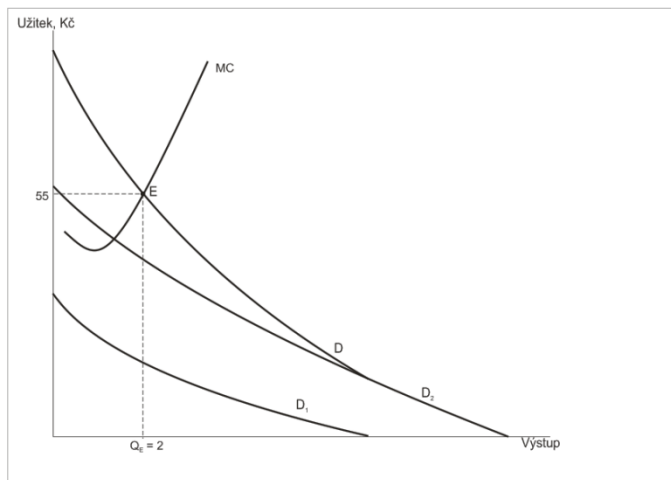
- irreducibility - consumption of another person will not reduce benefits for existing users, individual consumption does not increase the cost of providing this good - good feature of public goods,
- unexcludability from consumption – we can not control who paid for the consumption of goods and exclude non-payers - there is the problem of "free-rider" - in this situation of market failure.

The optimal amount of public good

We are comparing marginal benefits and marginal cost of production. All recipients of public goods receive the same amount of utility. Suppose two recipients of a public good, each of which he attributes to a different value.

From the picture below, it is possible to determine market demand for public goods as the sum of all values on the vertical axis x . Supply curve is derived from the development of marginal cost of production of public goods.

The equilibrium volume of public goods occurs at point E, where the sum of all the values of the marginal utility of recipients of a public good is equal to the cost of producing an additional unit.



Graph n. 13: Optimal amount of public goods

Asymmetric information

This market failure is caused when one party knows more than the other. Asymmetry of information leads to:

- **moral hazard** - where the principal can not control exactly what Agent performs.
- **adverse selection** - it is a process in which poor quality goods displace normal goods. In a world of perfect information, the buyers are able to immediately recognize good and poor quality and pay less or more.

6. STATE'S IMPACT ON THE MICROECONOMIC ENTITIES

Microeconomic policy of the state

- state (government) - one of the economic subjects,
- effort to remedy the consequences of market failure,
- state has the tools whose implementation affects the decisions of firms and households - taxes, fees, subsidies, standards, sanctions, transfers,
- microeconomic policy of the state - affects the formation of equilibrium firms, households.

Market failure and the State:

- state may regulate monopoly (price regulation, goal: eliminate DWL),
- state is trying to eliminate the negative externalities (environmental damage)
 - standards, the precise definition of property rights (Coase theorem), environmental taxes, penalties, licensing,
- state may provide subsidies to producers of positive externalities,
- problems: how to determine the amount of external marginal cost (EMC) and external marginal utility (EMU),
- state through taxation mechanism ensures the production of public goods,
- state seeks to maximum awareness of economic subjects - firms and households.

State failure:

- situations where the state produces inefficiency, benefits from the activities of the state are lower than costs,
- state may also have incomplete information, make wrong decisions, there is a problem in the timing of the implementation of various measures, the state microeconomic policy maybe unsuccessful.

List of tasks for students:

1. What does the attitude in theory of partial and general general equilibrium distinguish? What are the advantages and disadvantages of both methodological approaches and economic theory to analyze the balance?
2. Define the category efficiency and apply this definition to the area of production and exchange (resp. consumption).
3. What condition (resp. conditions) provides the status of efficiency in production?
4. What does the Edgeworth box diagram of production expresses? What expresses the contract curve and the production possibilities frontier? What information provides the slope of the curve of production possibilities frontier?
5. Characterize the concept of monopoly power, give specific examples and solutions.
6. Charakterize the externalities and give specific examples of positive externalities in production, in exchange and negative externalities in production and exchange.
7. What does the concept of asymmetric information express?
8. Give three specific examples of a public good and discuss them.

References and further reading:

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- Translated on the basis of Ing. Lenka Brizgalová, Ph.D documents.