## Unit 1. Basic economic concepts

### Learning objectives

- to understand the principle of marginal analysis;
- to understand that the existence of limited resources along with unlimited wants results in the need to make choices;
- to deal with the concepts of opportunity costs and trade-offs, and to illustrate these concepts by using the production possibilities curve;
- to understand why and how specialization and exchange increase the total output of goods and services;
- to be able to differentiate between absolute and comparative advantage, to identify comparative advantage from differences in opportunity costs and to apply the concept of comparative advantage, in order to determine the basis under which mutually advantageous trade can take place between countries.

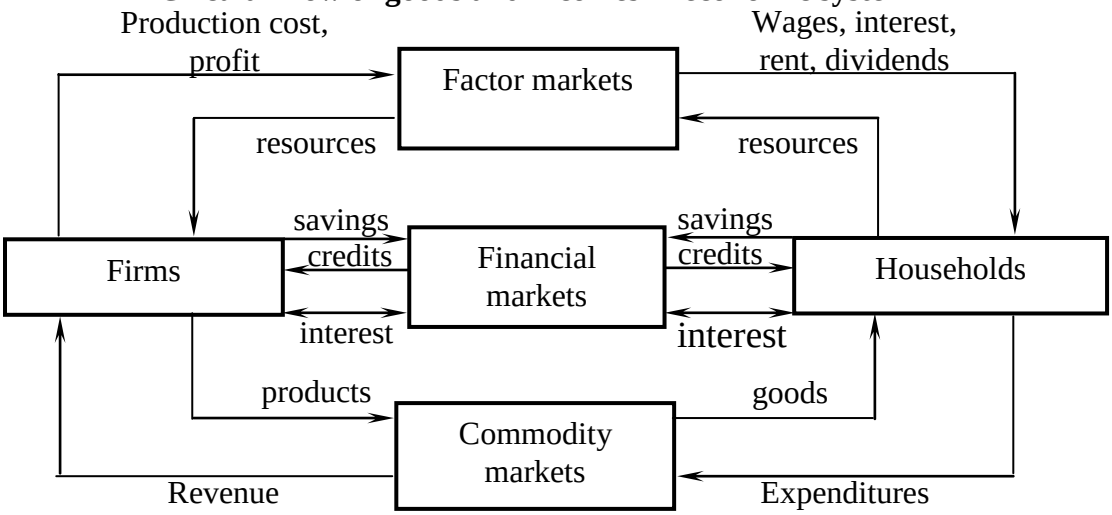
### 1.1. Scarcity and choice. Marginal analysis. Opportunity costs and trade-offs.

Microeconomics consists of four major parts:

- Theory of consumer choice that explores how consumers decide which goods/services to purchase taking into consideration limited incomes;
- Theory of firm that considers how firms decide which goods to produce and what prices to charge;
- Theory of factor markets that explains how factor prices are determined and incomes are distributed;
- Welfare economics that deals with economic system as a whole and seeks the possible ways to improve well-being of economic agents.

One can imagine an economic system as a compex relationship of these components that is presented by a circular flow diagram below.

**Circular flow of goods and incomes in economic system**




All social phenomena emerge from the choices of individuals in response to expected benefits and costs to themselves. For a choice to be made, its expected benefits should be at least as great as its costs ("cost-benefit principle").

Decisions are made on the margin. Marginal cost is an increase in total cost caused by an increment in activity. Marginal benefit is an increase in total benefit as a result of an increment in activity.

Economic surplus is a difference between total benefit and total cost. In order to maximize economic surplus, individuals (firms, society) should add units of activity as long as marginal benefit is greater than (or equal to) marginal cost.

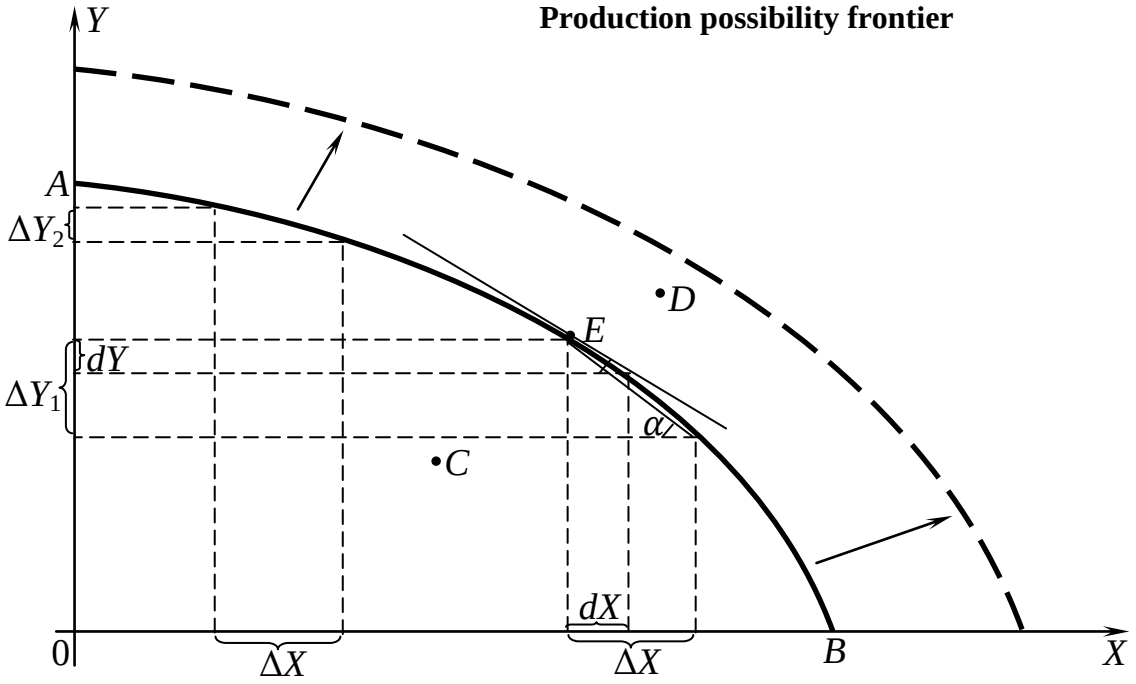
On one hand economics deals with social decisions concerning what, how and for whom to produce; and on the other hand subject of economics is allocation of scarce resources in a society.

Scarcity is an essential feature for an economic good. Scarcity of resources means tradeoffs between opportunity ways to utilize them that yields opportunity costs of economic decision-making. Opportunity cost of an activity is the value of the next best alternative that must be forgone in order to undertake that activity. Opportunity cost of a good ($X$) is the quantity of another good ($Y$) which must be sacrificed to obtain an additional unit of the former $\left(-\frac{\Delta Y}{\Delta X}\right)$. The sign "minus" points out the necessity to sacrifice a good for production of another one.

## 1.2. Production possibility frontier.

The concept of opportunity cost can be revealed via production possibilities curve of an economy. For a given amount of resources, production possibilities frontier (PPF) shows the maximum amount of a good that can be produced given any possible output of another one.

PPF is a set of various combinations of outputs of the goods (take, for instance, points *E*, *F* and *G* on the figure below) provided full utilization of scarse resources. A point below PPF (for example, *C* on the figure below) corresponds to partial utilization of resources. A point above the PPF (for example, *D*) is unattainable for the society at the given period.




Along PPF the total amount of resources is fixed. The economy reallocates them to production of one good or another. For example, the point *A* corresponds to the case when the whole stock of resources is spent for production of the good *Y*, and the society totally gives up producing the good *X*. The point *B* reflects the situation when all resources are utilized in production of the good *X*, and the good *Y* is not produced at all.

On the PPF the society makes a choise among various opportunities of production structure when output of a good can be augmented only by sacrifice of an amount of another one. Suppose that an economy is situated in the point *E* on its PPF (see the figure above). To increase output of the good *X* by $\Delta X$ the economy has to reduce output of another good *Y* by $\Delta Y_1$. Opportunity cost of an additional unit of good *X* can be measured by the

slope of the line going through initial ($E$) and the new ($F$) points on the PPF ($tg\alpha$ on the figure above). Suppose that an increment in output of $X$ tends to zero – an additional unit of the good $X$ is infiniticimal, i.e. $dX$. To produce it the economy has to give up $dY$ units of the other good. So, marginal opportunity cost of the good $X$ is $-\frac{dY}{dX}$. It is given by the slope of the tangent line to the PPF at the given point ($E$).

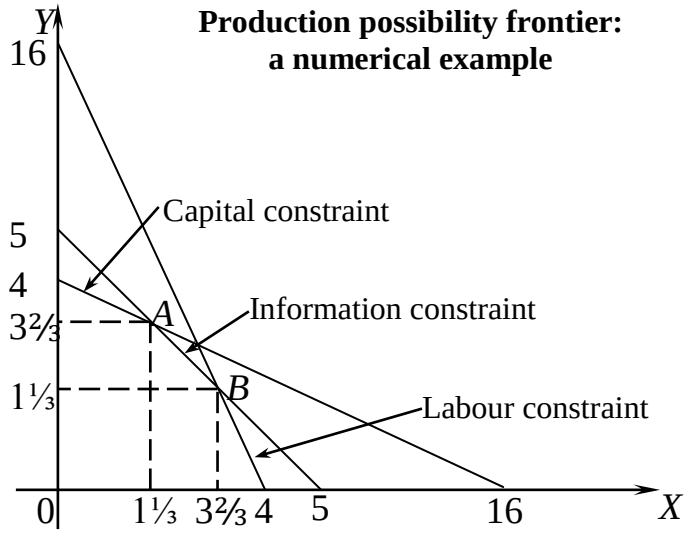
PPF for a large economy is convex from the origin (or concave). This reflects increasing opportunity costs due to diminishing returns to production factors. Increasing output of a good means growing sacrifice of output of another one. When output is small (at the point $G$ on the figure above) an additional output of a good $X$ that is equal to $\Delta X$ yields lower costs for the society ($\Delta Y_2$), as compared to the same growth ($\Delta X$), when output of $X$ is larger (at the point $E$ on the figure above), that will cost $\Delta Y_1$.

Over time, the total amount of available resources (labour force, land, capital, knowledge) or technology of production may change. This will shift PPF, and a point that has been unattainable before (for instance, $D$) can become an inner point for the set of available technological opportunities for the society. An increase in resources and productivity yields outward shift of PPF (see the figure above); a decrease – inward shift.

Let's give a numerical example of production possibility frontier. Suppose that an economy produces two types of goods $x$ and $y$ using three factors of production: labour, capital and information. There are 4 units of labour, 4 units of capital, and 1 unit of information at hand. A unit of labour produces either 1 unit of $x$ or 4 units of $y$, or any linear combination of these quantities. A unit of capital produces either 4 units of $x$ or 1 unit of $y$, or any linear combination of these quantities. A unit of information produces either 5 units of $x$ or 5 units of $y$, or any linear combination of these quantities.

Let's obtain analytically and plot on a graph production possibility frontier. Draw a straight line through the points (0,16) and (4,0) to get the labour constraint: $Y$=16-4$x$. Draw a straight line through the points (0,4) and (16,0) to get the capital constraint: $Y$=4–0,25$x$. Draw a straight line through the points (0,5) and (5,0) to get the information constraint: $Y$=5–$x$.

Production possibility frontier, if all the constraints are valid simultaneously, is the kinked line: if $X \in [0, 1\frac{1}{3}]$, $Y$=4-0,25$x$; when $X \in [1\frac{1}{3}, 3\frac{2}{3}]$, $Y$=5-$x$; and if $X \in [3\frac{2}{3},4]$, $Y$=16-4$x$. There are two kinks: point $A$ where $x=1\frac{1}{3}$, $y=3\frac{2}{3}$ (it is given by the equation: 4-¼$x$=5-$x$); and point $B$ where $x=3\frac{2}{3}$, $y=1\frac{1}{3}$ (it is given by the equation: 16-4$x$=5-$x$) (see the figure below).



**Production possibility frontier: a numerical example**

Marginal opportunity cost of production of the good $X$ is constant within three segments. If $X$ belongs to the segment [0, 1⅓], its opportunity cost is equal to 0,25. If $X$ is in the range [1⅓, 3⅔], its opportunity cost is equals 1. Finally, when $X$ belongs to the segment [3⅔,4], its opportunity cost is 4 units of $Y$.

### 1.3. Comparative advantages. Specialization and exchange

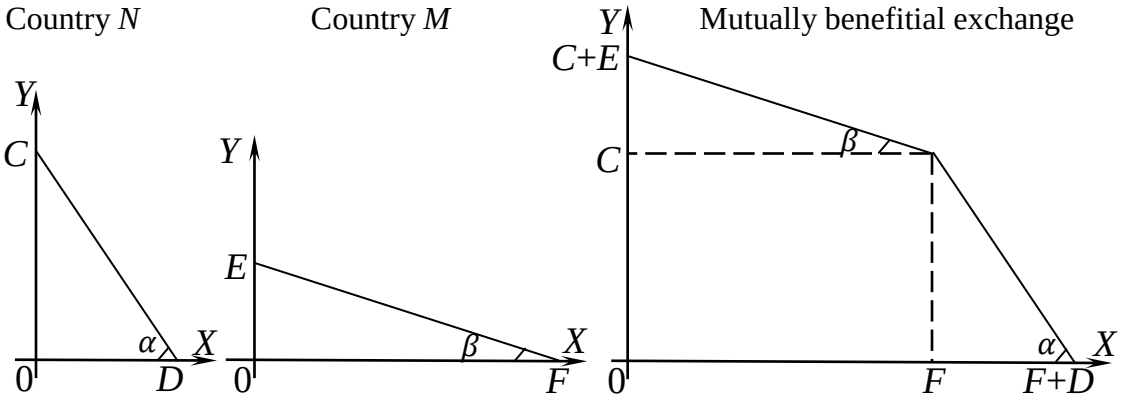
An economic agent has a comparative advantage over another if his opportunity cost of performing a task is lower than the other agent's opportunity cost. Both nations and individuals may benefit from specialization and trade due to the increase in total output. Highest total production is achieved when agents specialize in activities for which their opportunity costs are lower.

The range of opportunity costs gives the possible prices in international trade. Suppose for simplicity that production possibility curves of the countries $N$ and $M$ are linear (see the figure below). The slope of PPF for the country $N$ is $tg\alpha = A$, and the slope of PPF for the country $M$ is $tg\beta = B < A$. This is opportunity cost $\left(-\frac{dY}{dX}\right)$ of the good $X$. It means that production of the good $X$ in the country $M$ is cheaper than in $N$, so the

country *M* is going to specialize in production of *X*. Opportunity cost of the good $Y\ \frac{1}{A} = \frac{1}{tg\alpha} < \frac{1}{tg\beta} = \frac{1}{B}$ is lower in economy *N*. The latter will specialize in production of *Y*.

Mutually beneficial trade based on specialization expands production possibilities of both countries (see the figure below). The combined PPF of both countries engaged in trade relations will be concave. Suppose that initially the total stock of resourses is allocated in production of the good *Y*. In this case output of the good *Y* will be equal to the sum of production potential of the two countries: *C*+*E*. At first production of the good *X* will start in the country *M*. Additional units of the good *X* will be produced at the cost of cutting output of the good *Y*. The slope of the first segment of combined PPF will be equal to $tg\beta = B$. After the potential of the country *M* in production of the good *X* will be spent to the full extent, the country *N* will begin to produce it. The slope of the second segment of combined PPF will be equal to opportunity cost of good *X* in the country *N*: $tg\alpha = A$. When all the factors are allocated to production of the good *X*, its total output will be *F*+*D*. The same PPF results from analysis stating from the situation when initially the whole amount of resources is spent to produce the good *X*.

**Comparative advantages, specialization and gains from trade**




Let's give a numerical example of mutually beneficial exchange due to comparative advantages in production of the goods. Suppose that a person *A* can produce either 8 units of a good *y* or 4 units of a good *x* (or any linear combination of these quantities) and a person *B* can produce either 4 units of a good *y* or 8 units of a good *x* (or any linear combination of these quantities). Production possibility frontier for *A* is: *Y*=8-2*x*. Production possibility frontier for *B* is: *Y*=4-0,5*x*.

Opportunity costs are given by the slopes of the corresponding lines. Opportunity cost of a unit of $x$ for individual $A$ is $2y$ and for for individual $B$ is $0.5y$. The person $B$ has comparative advantage in production of the good $x$, so she is going to specialize on it. Opportunity cost of a unit of $y$ for individual $A$ is $0.5x$ and for for individual $B$ is $2x$. The person $A$ has comparative advantage in production of the good $y$, so she is going to specialize on it.

The corresponding ranges of opportunity costs will give the price ranges that favour mutually beneficial trade: $0.5y \leqslant p_x \leqslant 2y$; $0.5x \leqslant p_y \leqslant 2x$.

For instance, assume that the goods are going to be exchanged according to labour time spent to produce a unit of the good under full specialization. It costs 1/8 of the working time to produce the good $x$ as well as the good $y$ for the person who specializes on it. So the individuals are going to exchange one unit of good $x$ for one unit of good $y$. This exchange rate fits the price range above, so the trade will be mutually beneficial in this case.