

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

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**Введение в экономику:
основы экономического анализа**

УЧЕБНО – МЕТОДИЧЕСКОЕ ПОСОБИЕ

Рекомендовано методической комиссией факультета управления и предпринимательства
для иностранных студентов,
обучающихся в ННГУ по направлению 010400
«Информационные технологии» (бакалавриат)

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Учебно– методическое пособие представлено в виде сжатого содержания курса лекций, практических заданий (кейсов), списка литературы по предмету «Введение в экономику: основы экономического анализа» для иностранных студентов, обучающихся в ННГУ по направлению 010400 «Информационные технологии» (бакалавриат).

MINISTRY OF EDUCATION AND SCIENCE OF THE RUSSIAN FEDERATION

Lobachevsky State University of Nizhni Novgorod

National Research University

Ilya Kuftyrev

**INTRODUCTION TO ECONOMICS:
FUNDAMENTALS OF ECONOMIC ANALYSIS**

Tutorial

Recommended by the Methodical Commission of the Faculty of Management and Business for international students, studying in the B.Sc. programme 010400 “Information Technologies”

Nizhni Novgorod
2010

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Introduction

The further integration in the international economic, educational and scientific space as well as the development of educational export are constantly among top priorities of the University of Nizhni Novgorod. In accordance with the Mission Statement, UNN participates in the formation of the integrated European Higher Education Area and preserves the traditions of international cooperation.

Today UNN is one of the leading classical universities in Russia. Being an innovative university, UNN provides highquality research-based education in a broad range of academic disciplines and programs. The combination of high educational quality and accessibility of education due to a great variety of educational program types and forms of training is a distinctive feature of the University in today's global knowledge economy.

This course is targeted at international students majoring in *Information Technologies*, an exclusive Bachelor's programme taught in English and aimed at training experts in high-level programming for national and international hi-tech companies and research institutions.

The main objective of this course is to provide students with structured knowledge of fundamental principles of Economics assuring state-of-the-art level of their professional competencies and skills. Understanding is supposed to be achieved through lectures, group discussions, elements of research activity, cases, presentations and class work.

The present course takes into consideration the substantial variations in the level of students' background knowledge in Economics preconditioned by different systems of secondary education in different countries of the world.

Предисловие

Дальнейшая интеграция в международное экономическое и образовательно-научное пространство, а также развитие деятельности в области экспорта образования относятся к числу первостепенных приоритетов Нижегородского государственного университета им. Н.И. Лобачевского. В соответствии со своей Миссией ННГУ участвует в процессах формирования интегрированного европейского образовательного пространства и сохраняет традиции международного сотрудничества.

ННГУ относится к числу лучших классических университетов России. Являясь инновационным университетом, осуществляющим основанную на научных исследованиях подготовку высококвалифицированных кадров, Нижегородский университет обеспечивает потребности личности, общества и государства в широком спектре основных и дополнительных образовательных программ, реализуемых в востребованных обучающимися формах. Сочетание высокого качества образования и доступности обучения за счет многообразия видов образовательных программ и форм подготовки - отличительная черта деятельности университета в условиях глобальной экономики знаний.

Данный курс ориентирован на иностранных студентов ННГУ, обучающихся по программе профессиональной подготовки бакалавров «Информационные технологии». Уникальность данной программы состоит в том, что преподавание курсов по данной программе осуществляется на английском языке для будущих специалистов высокотехнологичных компаний и исследовательских институтов, осуществляющих свою деятельность как в национальном, так и в международном масштабе.

Таким образом, данный курс вносит необходимый вклад в процессы интернационализации высшего образования и международного трансфера знаний в учебной сфере. Главной задачей курса является формирование базовых структурированных знаний в области экономики, способствующих обеспечению высокого уровня компетенций студентов в их будущей профессиональной сфере. Структурный подход в рамках данного курса обеспечивается за счет комплексного взаимодействия различных форм обучения: лекционных занятий, групповых обсуждений, элементов самостоятельной исследовательской деятельности, методов кейс-анализа, подготовки презентаций и индивидуальной работы студентов в аудитории.

Структура материала и методика его усвоения учитывают возможность серьезных различий в уровне базовой подготовки иностранных студентов в области экономических наук, связанных с расхождениями в стандартах и критериях образовательных систем разных стран.

SESSION 1: COURSE OVERVIEW

Course objective

To provide students with structured knowledge of fundamental principles of Economics assuring state-of-the-art level of their professional competencies and skills.

Subject of inquiry

Relations between economic actors

Aspects to be covered

- Basic principles of economic theory
- Main economic concepts
- Fundamental laws of economic theory
- Resources allocation
- Production, costs and efficiency
- Competition and competitive markets
- Economic actors' welfare
- Behavioral aspects in Economics
- State intervention into economy
- Global economic challenges and opportunities

Principles of successful studying the Course

- Attend classes
- Be active and proactive: ask questions, participate in discussion, analyze cases
- Do individual assignments (projects, presentations)

Practical assignment

Students are to prepare 10 minute self-presentations covering the following issues:

- Where are you from?
- What's your background?
- Why did you decide to study abroad? Why in Russia?
- What are your future career plans?
- Did you study any of economic disciplines before and to what extent?
- What do you want to get from this course?
- What are your professional interests besides IT?
- What is/are your favorite methods of learning (independent work, work in team, brainstorming, open discussions, etc).

SESSION 2: ECONOMICS - MAIN DEFINITIONS AND BACKGROUND

Economy - is the institutional structure through which individuals in a society coordinate their diverse wants and desires.

Economic system is the system by which the economy is organized. For example, if an economy is organized through markets, it is a market economic system.

Economics - is the study of economies, the study of how human beings coordinate their needs, given the institutional structures of the society.

Economics reveals how scarce resources are allocated among the alternative users. Here are the capstones, or the basic concepts of Economics:

1. Scarcity

- Scarcity refers to the tension between our limited resources and our unlimited wants and needs.
- For an individual, resources include time, money and skill.
- For a country, limited resources include natural resources, capital, labor force and technology.

(resources: land, labor, capital).

2. Choice

- People must choose which of their desires they will satisfy and which they will leave unsatisfied.
- Scarcity forces us to take less of something else.
- Economic activity would not exist if scarcity did not force people to make choices.

3. Costs / Benefits

One can view the cost of choosing option A as the sacrifice involved in rejecting option B, and then say that one chooses option A when the benefits of A outweigh the costs of choosing A (which are the benefits one loses when one rejects option B).

Main questions/objectives of Economics analysis:

1. What will be produced?
2. How will those things be produced, considering the resources at our disposal?
3. Who will be paid what and who will receive the goods and services produced?

Positive and Normative Economics

Economic thinking is often divided into two categories—positive and normative.

Positive economics is that branch of economic inquiry that is concerned with the world as it is rather than as it should be. It deals only with the consequences of changes in economic conditions or policies. A positive economist suspends questions of values when dealing with issues such as crime or minimum wage laws. The object is to predict the effect of changes in the criminal code or the minimum wage rate—not to evaluate the fairness of such changes.

Normative economics is that branch of economic inquiry that deals with value judgments—with what prices, production levels, incomes, and government policies *ought* to be. A normative economist does not shrink from the question of what the minimum wage rate ought

to be. To arrive at an answer, the economist weighs the results of various minimum wage rates on the groups affected by them—the unemployed, employers, taxpayers, and so on. Then, on the basis of value judgments of the relative need or merit of each group, the normative economist recommends a specific minimum wage rate. Of course, values differ from one person to the next. In the analytical jump from recognizing the alternatives to prescribing a solution, scientific thinking gives way to ethical judgment.

Microeconomics

- Microeconomics looks into similar issues, but on the level of the individual people and firms within the economy.
- It tends to be more scientific in its approach, and studies the parts that make up the whole economy.
- Analyzing certain aspects of human behavior, microeconomics shows us how individuals and firms respond to changes in price and why they demand what they do at particular price levels.

Macroeconomics

- Macroeconomics looks at the total output of a nation and the way the nation allocates its limited resources of land, labor and capital in an attempt to maximize production levels and promote trade and growth for future generations.
- After observing the society as a whole, Adam Smith noted that there was an "invisible hand" turning the wheels of the economy: a market force that keeps the economy functioning.

Background of Economics

Classical political economy

Publication of Adam Smith's *The Wealth of Nations* in 1776, has been described as the effective birth of economics as a separate discipline. The book identified land, labor, and capital as the three factors of production and the major contributors to a nation's wealth. In Smith's view, the ideal economy is a self-regulating market system that automatically satisfies the economic needs of people. He described the market mechanism as an "invisible hand" that leads all individuals, in pursuit of their own self-interests, to produce the greatest benefit for society as a whole.

Smith incorporated some of the Physiocrats' ideas, including *laissez-faire*, into his own economic theories, but rejected the idea that only agriculture was productive.

While Adam Smith emphasized the production of income, David Ricardo focused on the distribution of income among landowners, workers, and capitalists. Ricardo saw an inherent conflict between landowners on the one hand and labor and capital on the other. He posited that the growth of population and capital, pressing against a fixed supply of land, pushes up rents and holds down wages and profits.

Robert Malthus cautioned law makers on the effects of poverty reduction policies. He used the idea of diminishing returns to explain low living standards. Human population, he argued, tended to increase geometrically, outstripping the production of food, which increased arithmetically. The force of a rapidly growing population against a limited amount of land meant diminishing returns to labor. The result, he claimed, was chronically low wages, which prevented the standard of living for most of the population from rising above the subsistence level. Malthus also questioned the automatic tendency of a market economy to produce full employment. He blamed unemployment upon the economy's tendency to limit its spending by saving too much, a theme that lay forgotten until John Maynard Keynes revived it in the 1930s.

Coming at the end of the Classical tradition, John Stuart Mill parted company with the earlier classical economists on the inevitability of the distribution of income produced by the market system. Mill pointed to a distinct difference between the market's two roles: allocation of

resources and distribution of income. The market might be efficient in allocating resources but not in distributing income, he wrote, making it necessary for society to intervene.

Value theory was important in classical theory. Smith wrote that the "real price of every thing ... is the toil and trouble of acquiring it" as influenced by its scarcity. Smith maintained that, with rent and profit, other costs besides wages also enter the price of a commodity.[84] Other classical economists presented variations on Smith, termed the 'labour theory of value'. Classical economics focused on the tendency of markets to move to long-run equilibrium.

Marxism

The Marxist school of economic thought comes from the work of German economist Karl Marx. Marxist (later, Marxian) economics descends from classical economics. It derives from the work of Karl Marx. The first volume of Marx's major work, *Das Kapital*, was published in German in 1867. In it, Marx focused on the labour theory of value and what he considered to be the exploitation of labour by capital. The labour theory of value held that the value of an exchanged commodity was determined by the labor that went into its production.

Neoclassical economics

A body of theory later termed 'neoclassical economics' or 'marginalism' formed from about 1870 to 1910. The term 'economics' was popularized by such neoclassical economists as Alfred Marshall as a concise synonym for 'economic science' and a substitute for the earlier, broader term 'political economy'. This corresponded to the influence on the subject of mathematical methods used in the natural sciences.

Neoclassical economics systematized supply and demand as joint determinants of price and quantity in market equilibrium, affecting both the allocation of output and the distribution of income. It dispensed with the labour theory of value inherited from classical economics in favor of a marginal utility theory of value on the demand side and a more general theory of costs on the supply side. In the 20th century, neoclassical theorists moved away from an earlier notion suggesting that total utility for a society could be measured in favor of ordinal utility, which hypothesizes merely behavior-based relations across persons.

In microeconomics, neoclassical economics represents incentives and costs as playing a pervasive role in shaping decision making. An immediate example of this is the consumer theory of individual demand, which isolates how prices (as costs) and income affect quantity demanded. In macroeconomics it is reflected in an early and lasting neoclassical synthesis with Keynesian macroeconomics.

Neoclassical economics is occasionally referred as orthodox economics whether by its critics or sympathizers. Modern mainstream economics builds on neoclassical economics but with many refinements that either supplement or generalize earlier analysis, such as econometrics, game theory, analysis of market failure and imperfect competition, and the neoclassical model of economic growth for analyzing long-run variables affecting national income.

Keynesian economics

Keynesian economics derives from John Maynard Keynes, in particular his book *The General Theory of Employment, Interest and Money* (1936), which ushered in contemporary macroeconomics as a distinct field. The book focused on determinants of national income in the short run when prices are relatively inflexible. Keynes attempted to explain in broad theoretical detail why high labour-market unemployment might not be self-correcting due to low "effective demand" and why even price flexibility and monetary policy might be unavailing. Such terms as "revolutionary" have been applied to the book in its impact on economic analysis.

Keynesian economics has two successors. Post-Keynesian economics also concentrates on macroeconomic rigidities and adjustment processes. Research on micro foundations for their

models is represented as based on real-life practices rather than simple optimizing models. It is generally associated with the University of Cambridge and the work of Joan Robinson.

New-Keynesian economics is also associated with developments in the Keynesian fashion. Within this group researchers tend to share with other economists the emphasis on models employing micro foundations and optimizing behavior but with a narrower focus on standard Keynesian themes such as price and wage rigidity. These are usually made to be endogenous features of the models, rather than simply assumed as in older Keynesian-style ones.

Chicago School of economics

The Chicago School of economics is best known for its free market advocacy and monetarist ideas. According to Milton Friedman and monetarists, market economies are inherently stable if left to themselves and depressions result only from government intervention. Friedman, for example, argued that the Great Depression was result of a contraction of the money supply, controlled by the Federal Reserve, and not by the lack of investment as Keynes had argued. Ben Bernanke, current Chairman of the Federal Reserve, is among the economists today generally accepting Friedman's analysis of the causes of the Great Depression.

Milton Friedman effectively took many of the basic principles set forth by Adam Smith and the classical economists and modernized them. One example of this is his article in the September 1970 issue of *The New York Times Magazine*, where he claims that the social responsibility of business should be “to use its resources and engage in activities designed to increase its profits...(through) open and free competition without deception or fraud.”

SESSION 2: FUNDAMENTAL LAWS OF ECONOMIC THEORY

Law of Demand

The law of demand states that, if all other factors remain equal, the higher the price of a good, the less people will demand that good.

In other words, the higher the price, the lower the quantity demanded (figure 1).

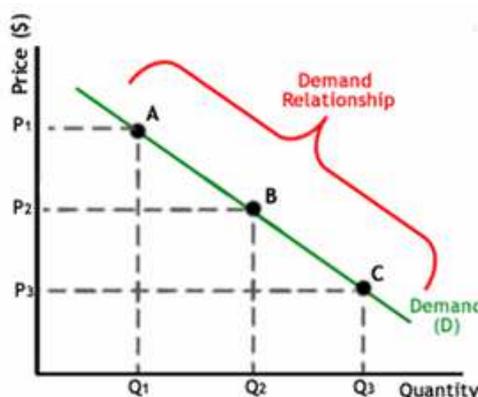


Figure 1. Market demand

Law of Supply

This law means that the higher the price is, the higher the quantity supplied. Producers supply more at a higher price because selling a higher quantity at a higher price *increases revenue* (figure 2).

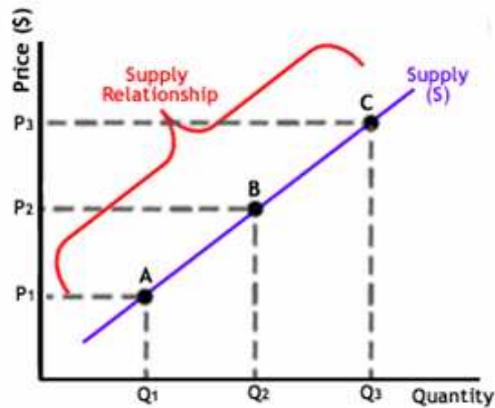


Figure 2. Market Supply

Although price is an important part of the definition of demand, it is not the only determinant of how much of a good people will want. It may not even be the most important.

The major factors that affect market demand are called determinants of demand (figure 3).

They are:

- Consumer tastes or preferences
- The prices of other goods
- Consumer incomes
- Number of consumers
- Expectations concerning future prices and incomes¹.

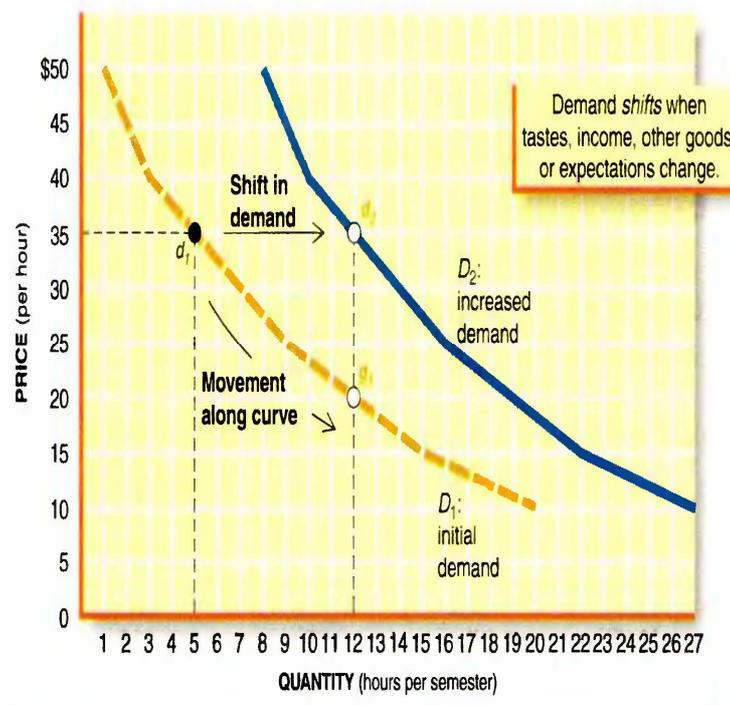


Figure 3. Shift and movement of demand curve

¹ Now proceed to Case 1.

Figure 4 (see *below*) shows the effects of shifts in demand and supply on the equilibrium price and quantity. In panel (a), an increase in demand from D_1 to D_2 raises the equilibrium price from P_1 to P_2 and quantity from Q_2 to Q_1 . Panel (b) shows the reverse effects of a decrease in demand. An increase in supply from S_1 to S_2 - panel (c) - has a different effect. The equilibrium quantity rises from Q_1 to Q_2 , but the equilibrium price falls from P_2 to P_1 . A decrease in supply: from S_1 to S_2 - panel (d) - causes the opposite effect: the equilibrium quantity falls from Q_2 to Q_1 , and the equilibrium price rises from P_1 to P_2 :

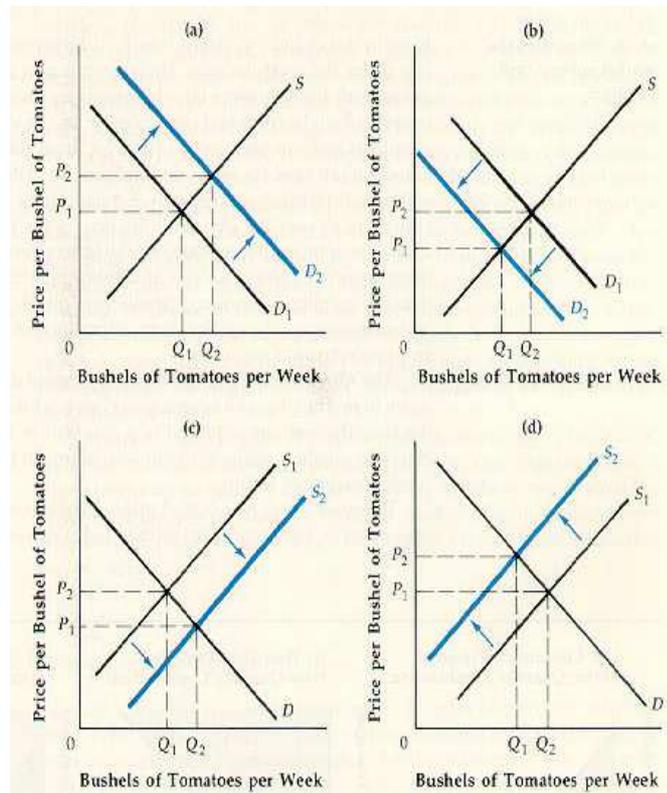


Figure 4. *Shifts and movements of Demand and Supply curves*

Market equilibrium

When supply and demand are equal the economy is said to be at equilibrium. At this point, the allocation of goods is at its most efficient because the amount of goods being supplied is exactly the same as the amount of goods being demanded (figure 5).

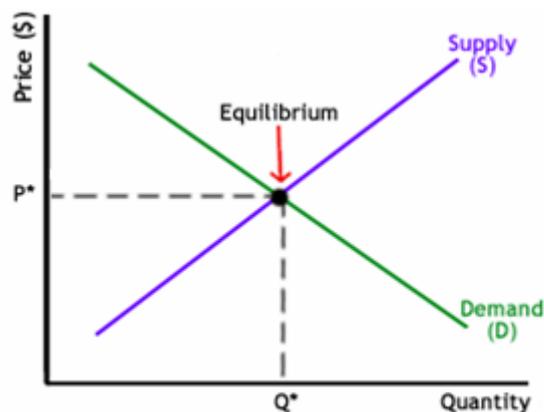


Figure 5. Market equilibrium

Short-Run and Long-Run Equilibrium

With supply and demand for calculators at D_1 and S_1 , the short-run equilibrium price and quantity will be P_1 and Q_1 . As existing firms expand production and new firms enter the industry, the supply curve shifts to S_2 . Simultaneously, an increase in consumer awareness of the product shifts the demand curve to D_2 . The resulting long-run equilibrium price and quantity are (figure 6):

- (a): P_2 and Q_2 if price increases in the long-run;
- (b): P_1 and Q_2 if price remains stable.

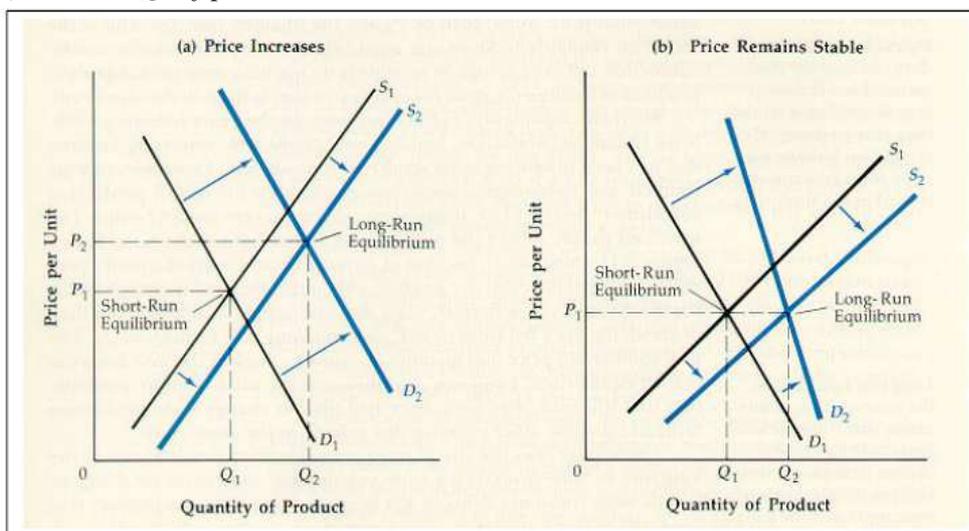


Figure 6. Short-Run and Long-Run Equilibrium

Market Efficiency

Efficiency is the maximization of output through careful allocation of resources, given the constraints of supply (producers' costs) and demand (consumers' preferences). The achievement of efficiency means that consumers' or producers' welfare will be reduced by an expansion or contraction of output (figure 7).

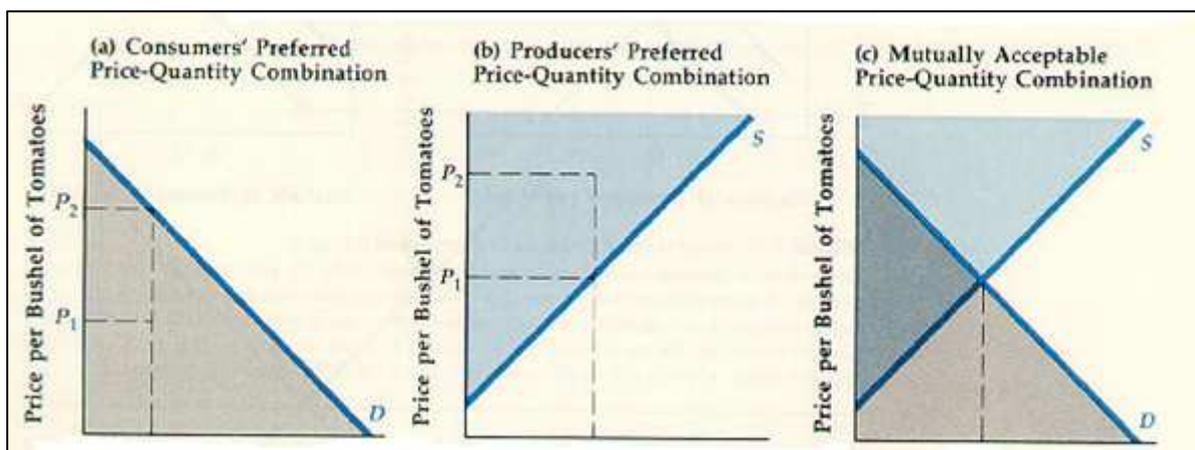


Figure 7. Combinations of market efficiency

SESSION 3: PRICES AND ELASTICITY

1. Measurement of Price

- *Nominal price.* The absolute or current dollar price of a good or service when it is sold.
- *Real price.* The price relative to an aggregate measure of prices or constant dollar price. It also measures prices relative to others, i.e. after adjustment for inflation.
- *Price floor:* is legally imposed minimum price on the market. Transactions below this price is prohibited. Policy makers set floor price above the market equilibrium price which they believed is too low. Price floors are most often placed on markets for goods that are an important source of income for the sellers, such as labor market (example: minimum wage, figure 8,b).
- *Price ceiling:* is legally imposed maximum price on the market. Transactions above this price is prohibited. Policy makers set ceiling price below the market equilibrium price which they believed is too high. Intention of price ceiling is keeping stuff affordable for poor people. Price ceiling generates shortages on the market (example: rent control, (figure 8,a).

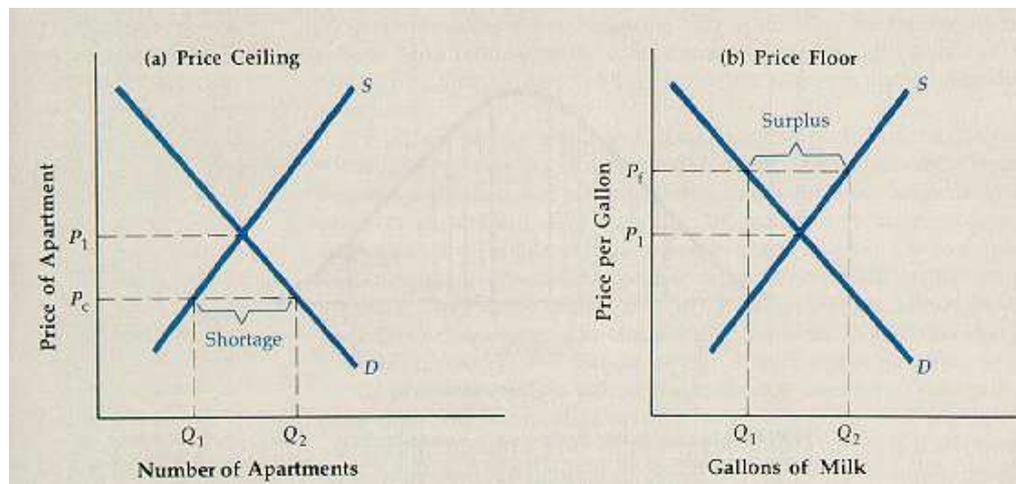


Figure 8. Price ceiling (a) and price floor (b)

When a price ceiling is set, there will be a shortage. When there is a price floor, there will be a surplus (figure 9):

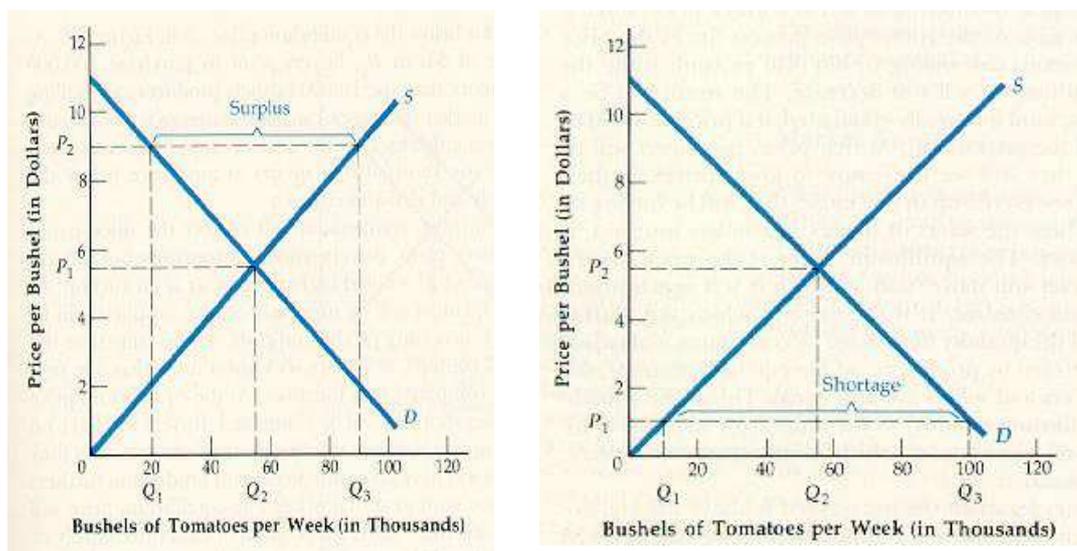


Figure 9. Market shortage and surplus

2. Elasticity

2.1. Price elasticity of Demand

Price elasticity of demand (PED or Ed) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a one percent change in price (holding constant all the other determinants of demand, such as income).

Price elasticities are almost always negative, although analysts tend to ignore the sign even though this can lead to ambiguity. Only goods which do not conform to the law of demand, such as *Veblen* and *Giffen* goods, have a positive PED. In general, the demand for a good is said to be inelastic (or relatively inelastic) when the PED is less than one (in absolute value): that is, changes in price have a relatively small effect on the quantity of the good demanded. The demand for a good is said to be elastic (or relatively elastic) when its PED is greater than one (in absolute value): that is, changes in price have a relatively large effect on the quantity of a good demanded.

Properties of Price Elasticity of Demand:

1. Price elasticity of demand is usually a negative number.
2. $|EP| > 1$ indicates that the good is price-elastic, perhaps because the good has many substitutes; $|EP| < 1$ indicates that the good is price-inelastic, perhaps because the good has few substitutes.
3. Given a linear demand curve, EP is not a constant along the curve. For example, for curve in figure 10, $EP = -\infty$ at top portion, but zero at bottom portion.

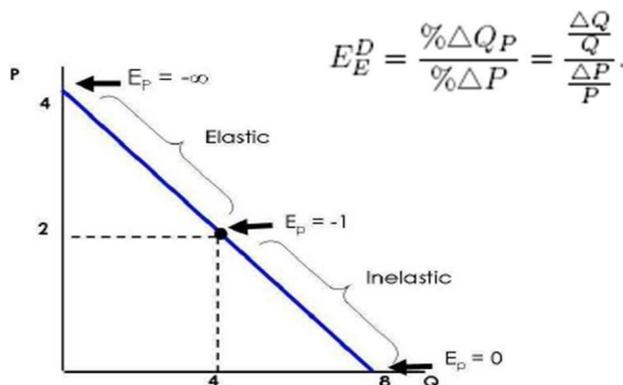
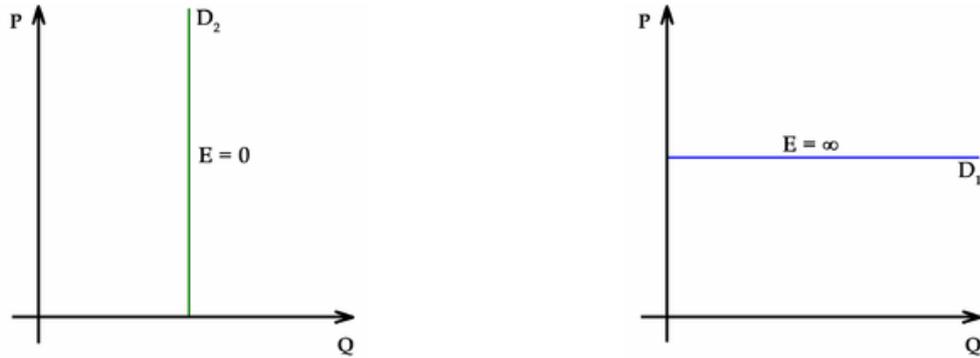


Figure 10. Price elasticity and its mathematical definition²

There could also be found two extreme situations:

- *perfectly inelastic demand* - means that quantity demanded or supplied is unaffected by any change in price. In other words, the quantity is essentially fixed. It does not matter how much price changes, quantity does not budge;
- *perfectly inelastic demand* occurs when buyers have no choice in the consumption of a good. In an analogous way, perfectly inelastic supply occurs when sellers have no choice in the production of a good (figure 11 and table 1 – see below):

² Now proceed to Case 2.



(a) Perfectly inelastic demand

(b) Perfectly elastic demand

Figure 11. Interpreting values of price elasticity coefficients

Tab.1 – Elasticity alternatives

Alternative	Coefficient (E)
Perfectly Elastic	$E = \infty$
Relatively Elastic	$1 < E < \infty$
Unit Elastic	$E = 1$
Relatively Inelastic	$0 < E < 1$
Perfectly Inelastic	$E = 0$

2.2. Income Elasticity of Demand

In economics, income elasticity of demand measures the responsiveness of the demand for a good to a change in the income (I) of the people demanding the good Q (figure 12). It is calculated as the ratio of the percentage change in demand to the percentage change in income. For example, if, in response to a 10% increase in income, the demand for a good increased by 25%, the income elasticity of demand would be $25\%/10\% = 2.5$.

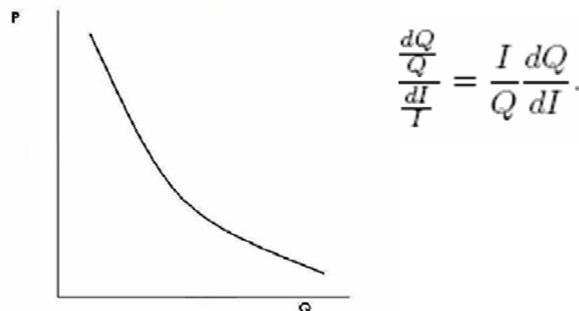


Figure 12. Income elasticity and its mathematical definition

Properties of Income Elasticity of Demand:

1. A negative income elasticity of demand is associated with *inferior* goods; an increase in income will lead to a fall in the demand and may lead to changes to more luxurious substitutes.
2. A positive income elasticity of demand is associated with *normal* goods; an increase in income will lead to a rise in demand. If income elasticity of demand of a commodity is less than

1, it is a necessity good. If the elasticity of demand is greater than 1, it is a luxury good or a superior good.

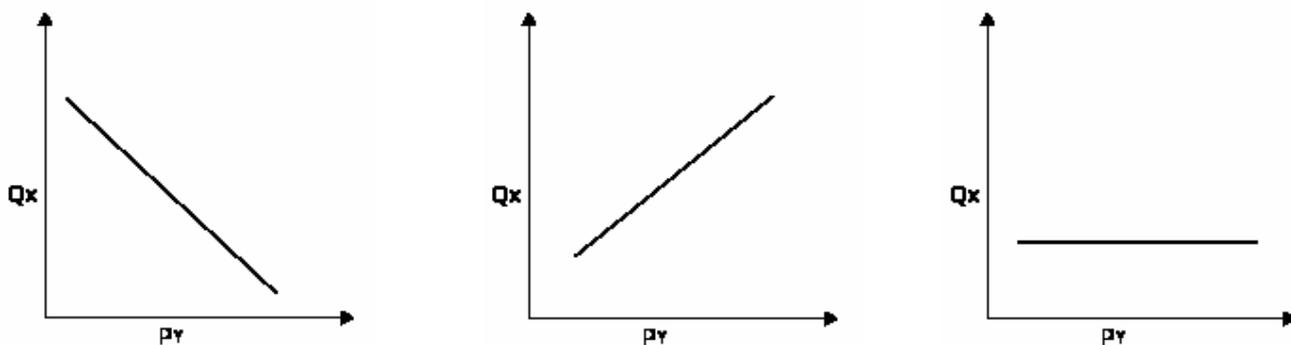
3. A zero income elasticity (or inelastic) demand occurs when an increase in income is not associated with a change in the demand of a good. These would be *sticky* goods.

Income elasticity of demand can be used as an indicator of industry health, future consumption patterns and as a guide to firms investment decisions. For example, the "selected income elasticities" below suggest that an increasing portion of consumer's budgets will be devoted to purchasing automobiles and restaurant meals and a smaller share to tobacco and margarine.

2.3. Cross-Price Elasticity of Demand

In economics, the cross elasticity of demand or cross-price elasticity of demand measures the responsiveness of the demand for a good to a change in the price of another good. It is measured as the percentage change in demand for the first good that occurs in response to a percentage change in price of the second good. For example, if, in response to a 10% increase in the price of fuel, the demand of new cars that are fuel inefficient decreased by 18%, the cross elasticity of demand would be: $18\%/10\%=1.8$.

In the example above, the two goods, fuel and cars (consists of fuel consumption), are complements; that is, one is used with the other. In these cases the cross elasticity of demand will be negative, as shown by the decrease in demand for cars when the price of fuel increased. Where the two goods are substitutes the cross elasticity of demand will be positive, so that as the price of one goes up the demand of the other will increase. For example, in response to an increase in the price of carbonated soft drinks, the demand for non-carbonated soft drinks will rise. In the case of perfect substitutes, the cross elasticity of demand is equal to positive infinity. Where the two goods are independent, or, as described in consumer theory, if a good is independent in demand then the demand of that good is independent of the quantity consumed of all other goods available to the consumer, the cross elasticity of demand will be zero: as the price of one good changes, there will be no change in demand for the other good (figure 13):



(a): Two goods that complement each other show a negative cross elasticity of demand: as the price of good Y rises, the demand for good X falls.	(b): Two goods that are substitutes have a positive cross elasticity of demand: as the price of good Y rises, the demand for good X rises.	(c): Two goods that are independent have a zero cross elasticity of demand: as the price of good Y rises, the demand for good X stays constant
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Figure 13. Cross-Price Elasticity of Demand

SESSION 4: PRODUCTION FUNCTION AND COSTS

1. Factors of production

In economics, factors of production (or productive inputs or resources) are any commodities or services used to produce goods and services. Factors of production may also refer specifically to the primary factors, which are stocks including *land*, *labor* (the ability to work), and *capital* goods applied to production. The primary factors facilitate production but neither become part of the product (as with raw materials) nor become significantly transformed by the production process (as with fuel used to power machinery).

The term factors of production relates to the key factors that go into making goods. It is common practice to break these down under a number of headings:

Land

Refers to physical land and other natural resources, e.g. the land that a building is constructed on, oil that is extracted from under the sea, under the land, forests, and fish reserves. Providers of land receive rent.

Labour

Refers to physical and mental effort - e.g. stacking shelves in a supermarket, or calculating the final accounts of a company. Providers of labour receive wages.

Capital

Exists at two levels. First of all we have financial capital. But more importantly, this is used to purchase physical capital that goes into making other things. Physical capital consists of machinery, equipment, tools, etc. Providers of capital receive interest.

Enterprise (entrepreneurship, business skills)

These are skills of combining the other factors of production. Entrepreneurs are the risk takers that set up and run business enterprises. Entrepreneurs receive profit.

2. Production function

The process of production (from the both points of view – micro- as well as macroeconomic) can be analyzed in terms of the *production function*, an abstract way of discussing how the firm gets output from its inputs (or factors). It describes, in mathematical terms, the technology available to the firm.

A production function is represented below in table 2 (see below). In this table five units of labor and five of capital can produce 71 units of output. It is, of course, always possible to waste resources and to produce fewer than 71 units with five units of labor and two of capital, but the table indicates that no more than 71 can be produced with the technology available. The production function thus contains the limitations that technology places on the firm.

The production function can also be illustrated in a graph such as that below (figure 14). Each of the curved lines in the graph shows all the combinations of inputs that can produce a particular quantity of output. These lines are called *isoquants*. As one moves to the right, one reaches higher levels of production. The factors of production are labor and capital. The price of labor (W) is \$20. The price of capital (R) is \$10. Each *isoquant* line shows a constant level of output from Q=1 to Q=7.5. Each isocost line shows a constant cost of production. The isocost lines are tangent to the isoquants along the expansion path. The *expansion path* shows the capital and labor combination that has minimum cost as production increases, given these factor prices³:

³ Examples and exercises on the production function for a firm with two variable inputs are presented in cases 3,4,5,6. Now proceed to these cases.

Table 2. Production Function

Labor/ Capital	1	2	3	4	5
1	10	17	25	29	35
2	17	25	29	35	43
3	25	29	35	44	52
4	29	35	43	53	63
5	35	43	51	62	71

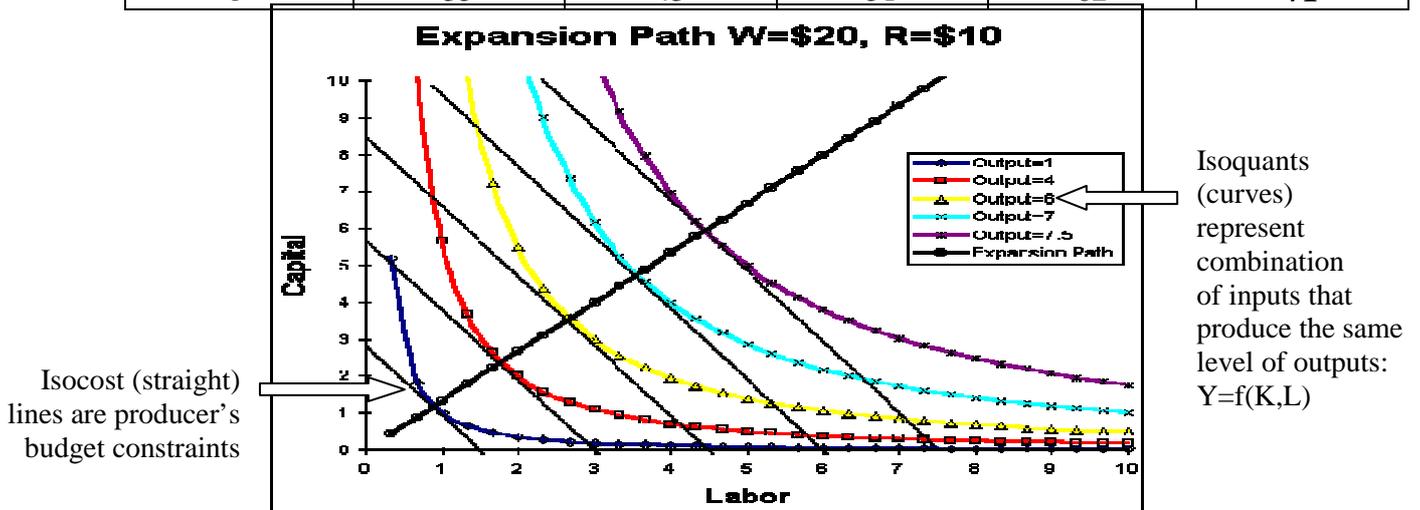


Figure 14. Isoquants, isocosts and expansion path.

Properties of Isoquants

- There is a different isoquant for every output rate the firm could possibly produce with isoquants farther from the origin indicating higher rates of output.
- As along a given isoquant the quantity of labor employed is inversely related to the quantity of capital employed, the isoquants have negative slopes.
- Isoquants do not intersect. Since each isoquant refers to a specific rate of output, an intersection would indicate that the same combination of resources could, with equal efficiency, produce two different amounts of output.
- Isoquants are usually convex to the origin so that any isoquant gets flatter as we move down along the curve.

Marginal Rate of Technical Substitution

The absolute value of the slope of the isoquant is the marginal rate of technical substitution, MRTS, between two resources. Thus, *the MRTS is the rate at which labor substitutes for capital without affecting output.* When much capital and little labor are used, the marginal productivity of labor is relatively great and the marginal productivity of capital relatively small one unit of labor will substitute for a relatively large amount of capital.

Isocosts and conditions for cost minimization

Finding the efficient way of producing any output requires finding the least-cost input combination. To do this when both inputs are variable, prices of inputs need to be known. For given factor prices, the parallel isocost lines reflect alternative levels of spending on inputs (see figure 14). The higher the spending, the further from the origin is the isocost line. Note that the

isocost line is similar to the budget line which shows all the combinations of two goods that can be bought with a given income⁴.

If the isoquant cuts the isocost line (point D - figure 15), it is possible to move along the isoquant and reach a lower level of cost. Where the isoquant is tangent to the isocost line, however, a movement in either direction along the isoquant is a movement to a higher level of cost. The least-cost method of producing any given output is shown graphically by the point E of tangency between the relevant isoquant and an isocost line (see both figures 15 and 16):

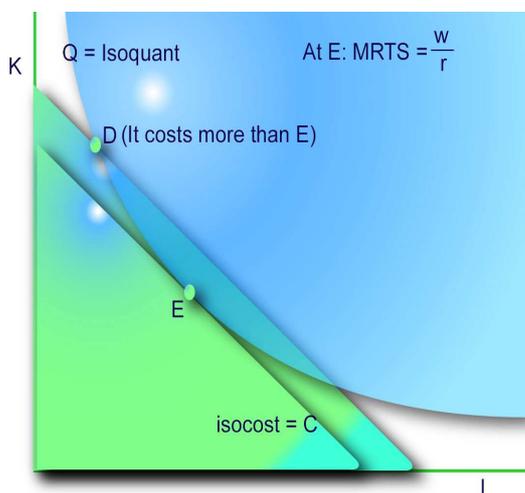


Figure 15. Isoquant – isocost relation

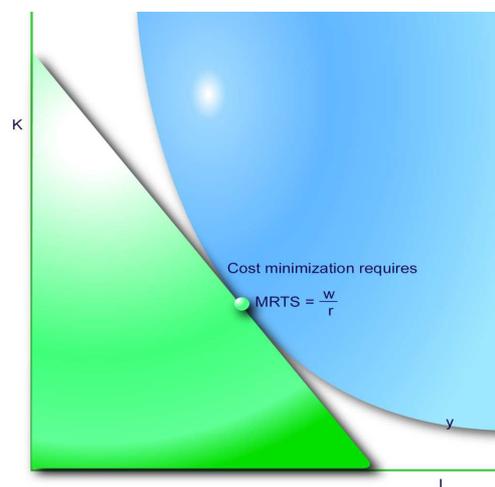


Figure 16. Cost optimization benchmark

Average and marginal products

The quantity of total output produced per unit of a variable input, holding all other inputs fixed, is called *average product*. It is found by dividing total product by the quantity of the variable input. The extent to which one input substitutes for another is directly linked to the marginal productivity of each input.

Marginal product is the change in the quantity of total product resulting from a unit change in a variable input, keeping all other inputs unchanged. Marginal product, usually abbreviated MP, is found by dividing the change in total product by the change in the variable input. Marginal product lies at the very foundation of the analysis of short-run production and the subsequent explanation of the law of supply and the upward-sloping supply curve, using the law of diminishing marginal returns.

There is one rule that seems to hold for all production functions - *the law of diminishing returns* saying that adding more of one input while holding other inputs constant results eventually in smaller and smaller increases in added output⁵.

3. Costs of production

In Economics the costs are referred to be a burden sustained by a company/ household/ economy in order to perform a certain activity, to carry out a certain production, to achieve certain goals. In a balance sheet, costs raise commercial liabilities to be settled. *They should not be confused with money outflows.*

Actual costs refer to real transactions, whereas *opportunity costs* refer to the alternative taken into consideration by decision makers who might want to choose the line of activity which minimise the costs.

⁴ This aspect will be analyzed in Session 6 – *Consumer behavior*.

⁵ Now proceed to Case 7 – Interaction between average and marginal products.

Discretionary costs are not strictly necessary for current production but correspond to strategic goals (e.g. improving the firm's image through an advertising institutional campaigning).

Given a specific product version, production costs are usually classified according to their responsiveness to different levels of production attained.

Fixed costs are simply not responsive to production levels. If there are only fixed costs, the total costs follow this rule (figure 17):

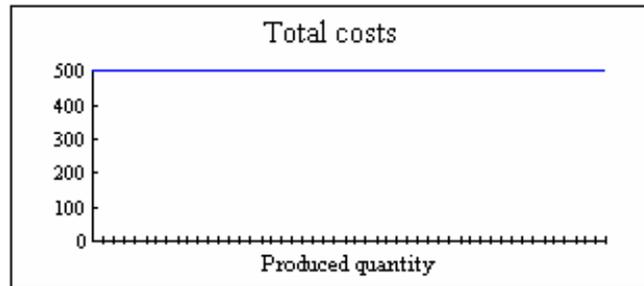


Figure17. *Fixed costs*

Variable costs grow with higher levels of production (proportionally or not). If there are only variable costs, at zero production the total costs will be zero. Total costs will follow for instance this rule (figure 18):

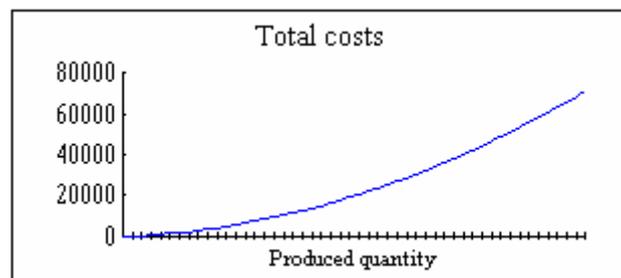


Figure 18. *Variable costs*

Total costs are the sum of all costs. By dividing the total costs by the quantity produces, one gets the *average costs*: how much a unit of production costs ("unit cost"). Average costs can be directly compared with price to compute profitability: if the price is higher than average cost, the production is profitable⁶.

Marginal costs indicate by how much the total costs changes because of modification in the production level by one unit. When there are only fixed costs, marginal cost will be zero: any increase of production does not change costs. If there are only proportionally-growing variable costs, marginal costs will be equal to variable costs⁷.

SESSION 5: CONSUMER BEHAVIOR

Consumer behavior involves the psychological processes that consumers go through in recognizing needs, finding ways to solve these needs, making purchase decisions (e.g., whether or not to purchase a product and, if so, which brand and where), interpret information, make plans, and implement these plans (e.g., by engaging in comparison shopping or actually purchasing a product).

On the one hand, the consumer faces numerous sources of influence (figure 19):

⁶ Now proceed to Case 8 - *Average and total costs* and Case 9 – *Economies of scale*.

⁷ Now proceed to Case 10 - *Production costs' scheme*.

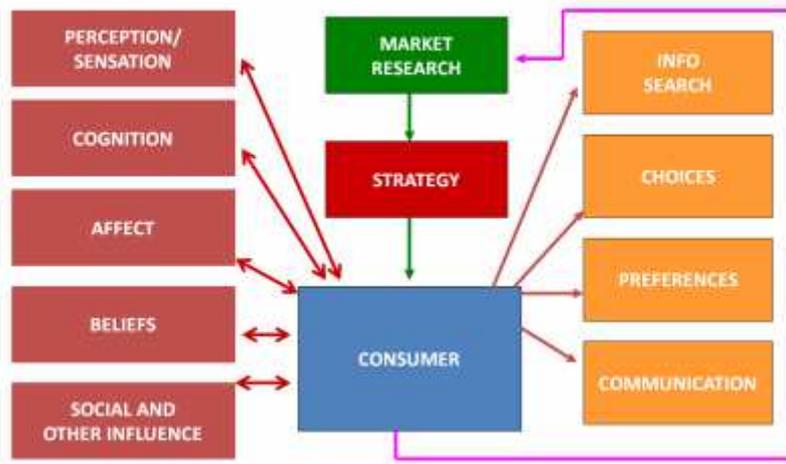


Figure 19. Influence on and of consumer behavior

Here are some *basic assumptions* about consumer's preferences:

- Preferences are complete, which means that a consumer can rank all market baskets. E.g. for any two market baskets A and B, the consumer can prefer A to B or B to A, or can be indifferent.
- Preferences are transitive. It means, that if a consumer prefers basket A to B and prefers B to C, then he should also prefer A to C.
- Preferences are reflexive (desirable). So that leaving costs aside, consumer always prefer more of any good to less (this applies to economical goods, and not applies to bad goods such as pollution).

Indifference curves can serve as graphical presentation of consumer preferences. An indifference curve represents all combinations of market baskets that provide the same level of satisfaction or utility to a person or consumer (figure 20):

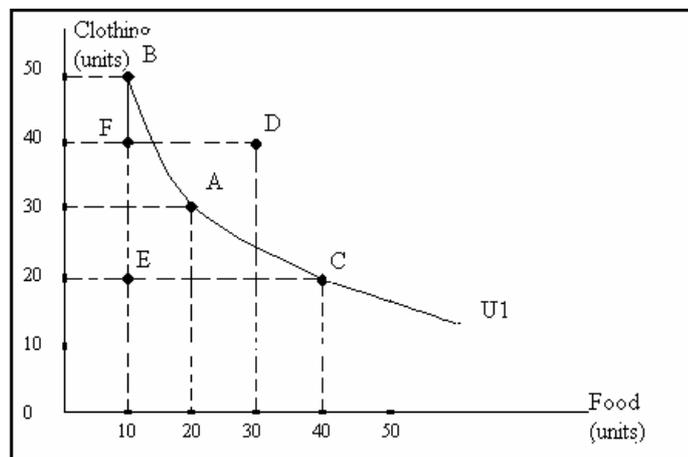


Figure 20. Indifference curves

Figure 20 highlights that the shape of the indifference curve is not a straight line. It is conventional to draw the curve as bowed. This is due to the concept of the diminishing *marginal rate of substitution* between the two goods (which has the same sense as marginal rate of technical substitution – see previous Session 4). The marginal rate of substitution is the amount of one good (i.e. work) that has to be given up if the consumer is to obtain one extra unit of the other good (ex., leisure):

$$\text{The marginal rate of substitution (MRS)} = \text{change in good X} / \text{change in good Y}$$

The reason why the marginal rate of substitution diminishes is due to the principle of *diminishing marginal utility*. Where this principle states that the more units of a good are consumed, then additional units will provide less additional satisfaction than the previous units. Therefore, as a person consumes more of one good (i.e. work) then they will receive diminishing utility for that extra unit (satisfaction), hence, they will be willing to give up less of their leisure to obtain one more unit of work.

The relationship between marginal utility and the marginal rate of substitution is often summarised with the following equation:

$$MRS = Mu_x / Mu_y$$

It is possible to draw more than one indifference curve on the same diagram. If this occurs then it is termed an *indifference curve map* (Figure 21):

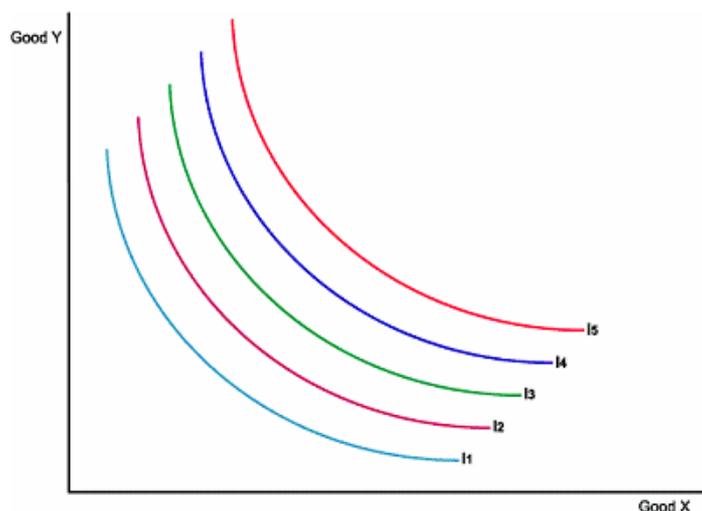


Figure 21. *Indifference map*

This map represents an ordinal ranking. An ordinal ranking arrays market baskets in a certain order, such as most preferred, second most preferred, third most preferred, etc.

The assumptions made about the consumer preferences for economic goods imply that indifference maps have the followings:

- Market baskets on indifference curves further from the origin are preferred.
- Indifference curves cannot intercept. If the market basket represented by point A (see figure 22) is on both indifference curves U_1 and U_2 where $U_1 > U_2$ this implies that the consumer is indifferent between B and C. So $A < C$ & $A < B$. But market basket B has less of both goods (Food and clothing) than C has. It must therefore follow that he prefer C to B. This is a contradiction because the consumer cannot simultaneously prefer one basket to another:

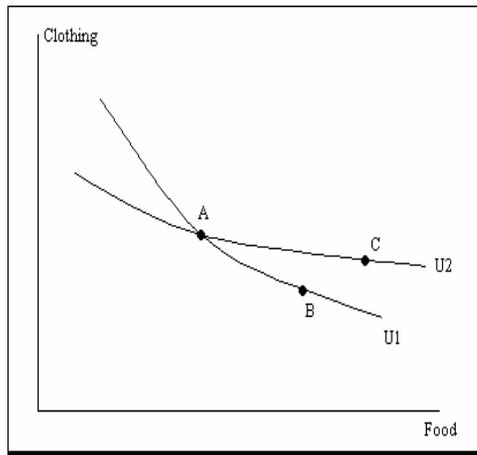


Figure 22. *Interception of indifference curves (contradiction)*

Along with his/her preferences, the consumer faces the budget constraints because he/she has limited income (I) to allocate among consumption items X and Y at corresponding prices P_x and P_y :

$$P_x X + P_y Y = I$$

Budget constraints are an important component when analysing consumer behaviour. *The budget line* illustrates all the possible combinations of two goods that can be purchased at given prices and for a given consumer budget. Thus, *Indifference analysis* combines two concepts: indifference curves and budget lines (constraints). The first stage is to impose the indifference curve and the budget line to identify the consumption point between two goods that a rational consumer with a given budget would purchase. The optimum consumption point is illustrated on figure 23:

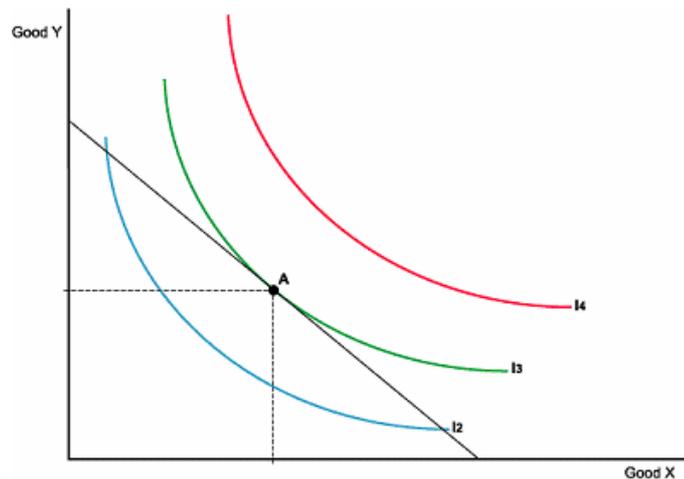


Figure 23. *The optimum consumption point*

Income and substitution effects of a change in price

If we assume that the good is normal, then the increase in price will result in a fall in the quantity demanded. This is for two reasons: the income effect (have a limited budget, therefore can purchase lower quantities of the good) and the substitution effect (swap with alternative goods that are cheaper, see Figure 24):

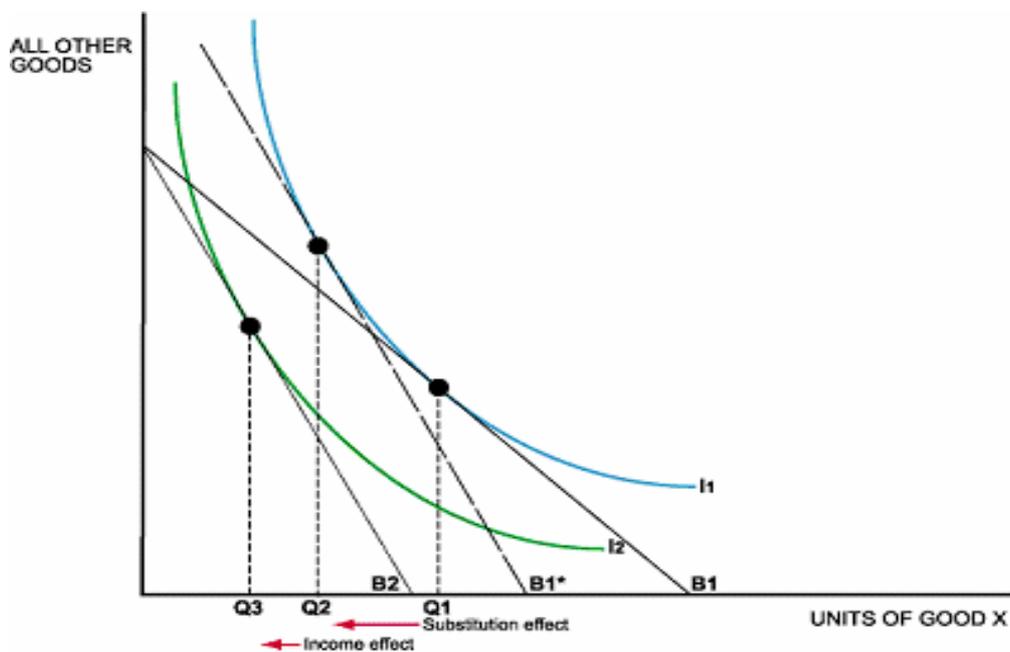


Figure 24. *Income and substitution effects*

The substitution effect: takes place when the consumer switches consumption patterns due to the price change alone but remains on the same indifference curve. To identify the substitution effect a new budget line needs to be constructed. The budget line $B1^*$ is added, this budget line needs to be parallel with the budget line $B2$ and tangential to $I1$. Therefore, the movement from $Q1$ to $Q2$ is purely due to the substitution effect.

The income effect highlights how consumption will change due to the consumer having a change in purchasing power as a result of the price change. The higher price means the budget line is $B2$, hence the optimum consumption point is $Q2$. This point is on a lower indifference curve ($I2$). Therefore, in the case of a normal good, the income and substitution effects work to reinforce each other⁸.

SESSION 6: BASIC MARKET STRUCTURES: COMPETITION AND MONOPOLY

1. Perfect competition

Assumptions behind a Perfectly Competitive Market

1. Many suppliers each with an insignificant share of the market – this means that each firm is too small relative to the overall market to affect price via a change in its own supply – each individual firm is assumed to be a price taker.
2. The price is beyond the control of a competitive firm. Therefore a competitive firm can influence its revenue only by varying the amount it offers for sale.
3. An identical output produced by each firm – in other words, the market supplies homogeneous or standardized products that are perfect substitutes for each other. Consumers perceive the products to be identical.

⁸ Now proceed to Cases 11 and 12.

4. Consumers have perfect information about the prices all sellers in the market charge – so if some firms decide to charge a price higher than the ruling market price, there will be a large substitution effect away from this firm.
5. All firms (industry participants and new entrants) are assumed to have equal access to resources (technology, other factor inputs) and improvements in production technologies achieved by one firm can spill-over to all the other suppliers in the market
6. There are assumed to be no barriers to entry & exit of firms in long run – which means that the market is open to competition from new suppliers – this affects the long run profits made by each firm in the industry. The long run equilibrium for a perfectly competitive market occurs when the marginal firm makes normal profit only in the long term
7. No externalities in production and consumption so that there is no divergence between private and social costs and benefits

Revenue in a Competitive Business

Businesses in competitive markets take the market price (P) as given (price takers). How much does the business receive for a typical unit is known as the “average revenue” (AR) and is equal to $TR/Q = (P \times Q)/Q = \text{Price}$. So average revenue is equal to price, and is constant. How much additional revenue does the firm get if it sells one additional unit? To answer this question, it’s necessary to take a look at “marginal revenue” (MR) which is equal to the change in TR divided by the change in quantity. Note that this too is equal to price, so the marginal revenue is constant as well, and is equal to average revenue. (Note and compare: Profit = Total Revenue (TR) - Total Cost (TC)).

Profit Maximization

To maximize profit, it’s necessary to know the revenue and costs of the business. Profit is maximized when *marginal revenue = marginal cost*, and marginal cost is rising. To see why, recall that marginal revenue is the additional revenue from 1 additional unit. Marginal cost is the additional cost from 1 additional unit (figure 25):

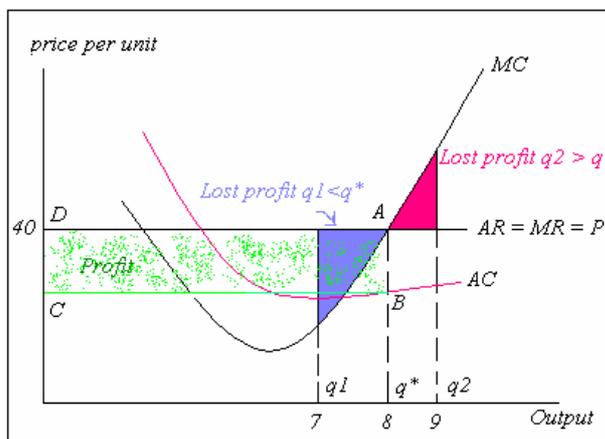


Figure 25. Profit maximization benchmark

When $MR > MC$, revenue is increasing faster than costs and the firm should increase production. When $MR < MC$, revenue from the additional unit is less than additional cost, and the firm should decrease production. As such, A firm maximizes profits when $MR = MC$. Since MC is upward sloping, as price increases, quantity produced will increase too. As price falls,

quantity produced falls. In each case, the marginal cost curve determines how much the firm is willing to produce at each price, so it translates into the supply curve⁹.

2. Monopoly

Monopoly and perfect competition represent two extremes along a continuum of market structures. At the one extreme is perfect competition, representing the ultimate of efficiency achieved by an industry that has extensive competition and no market control. Monopoly, at the other extreme, represents the ultimate of inefficiency brought about by the total lack of competition and extensive market control.

Pure monopoly exists when a single firm is the sole producer of a product for which there are no close substitutes. They are very desirable from the point of view of a company and, usually, not very desirable for consumers.

Characteristics of the pure monopoly:

1. There is only one firm which supply the entire market and many buyers & consumers
2. The firm sells a unique product, which has no close substitutes.
3. The firm has market power (that is it can control its price)
4. Entry into the market is restricted, e.g. due to high costs and some special barriers to entry. A social, political or economic impediment that prevent firms from entering a market.

Whereas the perfectly competitive firm was a price taker, the monopolistic firm is a price maker, i.e. it has control over the price. Examples of monopoly are public utilities (*natural monopolies*) such as gas, fuel, electricity, water, national airlines and railroad carriers, etc. Also, monopolies may exist at the local level because of geographic location. Barriers to entry are the main line of defense for incumbent monopolies and may be of different types.

Barriers to entry the market

Economies of scale constitute one major barrier. They occur where decreases in unit costs depend on output size. In this case, because a large firm with a large market share is most efficient, new firms cannot afford to enter the market and gain market shares. Public utilities, known as natural monopolies, possess such economies of scale.

Barriers to entry also exist in legal forms as *patents or licenses*. Patents grant the inventor the exclusive right to produce a product for a number of years (new worldwide patent period established with a 1995 GATT agreement). Licenses are granted by the government and allow only one or few firms to operate in a given market.

Finally, barriers to entry may arise from the *exclusive ownership or control of essential resources*.

Price control

Since there is only one company, the monopolist is a price maker (which means $MR=P$). The company controls output or price – though not both. Even the monopolist has to deal with its market context. Ultimately, its profits depend on its ability to sell, that is, on the market demand for its product. As for perfect competition, crucial information is summarized by the demand curve. Since there is only one firm, in the case of the monopolist, the market and the company's demand curves are identical. A monopoly demand is the industry (market) demand and is, therefore, illustrated by a downward sloping curve.

As in perfect competition, the profit maximizing solution for the monopolist is obtained when $MC = MR$. Unlike perfect competition, however, monopoly price exceeds marginal revenue because the monopolist must lower its price in order to increase sales. For each price cut, revenue increases by an amount equal to the price of the last unit sold minus the sum of the

⁹ Now proceed to Cases 13 and 14.

price cuts which must be taken on all prior units of output. Everything works in reverse if we consider a price increase. The trade-off between price and sales is the reason why the marginal revenue is always below the demand curve. Finally, since the monopolist produces where $MR = MC$ and $P > MR$, then $P > MC$ is also true. A monopolist charges a higher price and lower quantity of output than would competitive producers selling in the same market (figure 26):

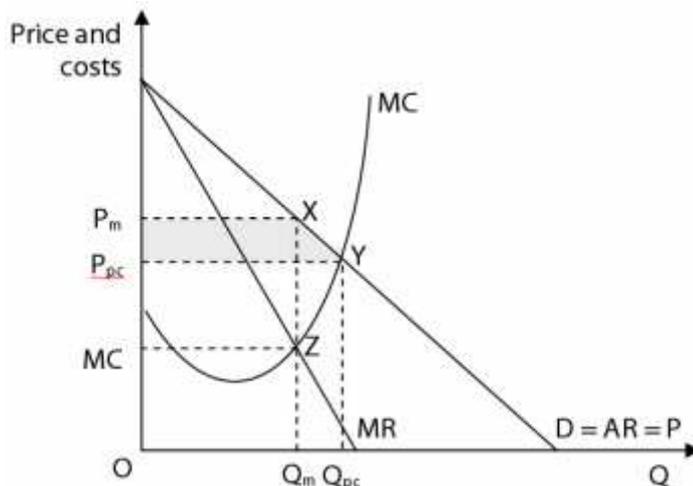


Figure 26. *Comparative efficiency of competitive market and monopoly*

A monopolist, like any other company, does not care about charging the highest price it can get, it cares about selling as close as possible to the quantity of output that maximize its profits. Finally, remember that, in monopoly, losses can occur. They are, in fact, relatively common in regulated monopoly where the government subsidizes low per unit prices (e.g. utilities)¹⁰.

Types of government intervention

Economies can be structured using the free market, allowing the government to make all the decisions or a mixture of both. Using this mix, governments intervene in the economy with the goal of helping the society as a whole. In some cases, the market might not do what is best for all citizens, at least according to the government. Government intervention may result in some inefficiencies, but they are deemed necessary in order to help those in need.

Taxes

A government can levy taxes on its citizens in order to create social programs, build infrastructure and create a military. Many of these services would not be created in a purely market-based system. The taxes collected are meant to go toward worthy programs that help the citizens of the country. While some museums or libraries might not be profitable, the government still deems them necessary because they serve a public good. In a free market system, free book rentals might not exist-with taxes they can¹¹.

Subsidies

The government gives certain sectors subsidies to produce goods. These goods might not be produced otherwise because they are not profitable on the free market. The government gives subsidies to lower prices on goods so exports increase. They might also give subsidies to keep the cost of food low so living expenses would not increase. Without subsidies, jobs could leave a particular country because costs are lower elsewhere¹².

¹⁰ Now proceed to Cases 15 and 16.

¹¹ Now proceed to Case 17.

¹² Now proceed to Cases 18 and 19.

Tariffs

Tariffs put a tax on imported goods to make domestic products more competitive. If a good from a foreign country costs one dollar while the good domestically costs two dollars, a two dollar tariff on the imported good would make it relatively more expensive for domestic consumers. This keeps demand high within the country and helps to keep people employed. It can also keep prices from lowering. With a free market system, people would buy the cheapest good, even if it came from outside of the country.

Wages

Governments can create a minimum wage for all workers. This means that no matter the job and responsibilities, a worker must be paid at least a certain wage. On the free market, the worker might be paid less. The government determines that anything lower than the minimum wage is not enough for a person to live on. The minimum wage also forbids workers from selling their labor at a lower rate, meaning people cannot out-price the competition.

SESSION 7. MAIN MACROECONOMIC INDICATORS

Gross Domestic Product (GDP)¹³

Gross Domestic Product is one of the major economic indicators that generally reflect the state of the economy of the whole country. GDP measures an economy's total expenditure on newly produced goods and services and the total income earned from the production of these goods and services. In particular, the GDP is the market value of all final goods and services produced within a country in a given period of time. The formula used to compute GDP is:

GDP= Consumption spending + Investment spending + Government spending + Imports and Exports.

GDP does not discriminate between those goods and services made by the people of that country or by foreigners. As long as the goods and services are made within that country's borders, it counts towards the GDP.

Gross National Product (GNP)

GNP is the total income earned by a nation's permanent residents. Whereas GDP is the total of all final goods and services made within an economy, GNP measures the goods and services made by a nation's residents throughout the world. If a Japanese car company opens a plant in Michigan, the value of the cars made and the money spent on investment, will count towards US GDP but also to Japanese GNP as they own the capital and profits. GNP and GDP are released every quarter, but preliminary measures come out in between those releases. The formula for GNP differs from GDP by including income that US citizens earn abroad and excluding income that foreigners earn within the US.

Industrial Production

Industrial output of the country and its changes. It is composed of mining and manufacturing industry volumes, the forest and public sectors as well as the production of electricity are also taken into consideration. The indicator reflects the level of the economy, but does not determine the direction of its development. An increase in value of this indicator leads to the growth of the national currency rate.

New Durable Goods Orders

Consumers primarily use these goods. New Durable Goods Orders measures the strength of manufacturing because durable goods are designed to last three years or more. These goods

¹³ See Annex 2.

can include airplanes, machine parts for factories, cars and buses, cranes, appliances, etc... Since this fundamental indicator measures new orders, it will be an indication of how actual production will perform in the near future. Production firms will have to make the durable goods to fill all the new orders. New orders directly affect the level of both unfilled orders and inventories that firms monitor when making production decisions. The Conference Board attempts to take into account inflation when measuring. In the US, New Durable Goods Orders data uses price indexes constructed from various sources at the industry level and a chain-weighted aggregate price index formula to try and "deflate" the results.

Retail Sales Indicator

The retail sales indicator is released on a monthly basis and is important to the foreign exchange trader because it shows the overall strength of consumer spending and the success of retail stores. Retail Sales impart information on the economy because it measures the amount of shopping consumers are doing. If the consumers have enough income to purchase goods at stores, then more merchandise will be produced or imported. Retail Sales is a "seasonal" indicator, meaning that during certain months retail sales are always expected to be up, for example September (when kids are going back to school) and December (the holiday season).

Consumer Credit

The volume of all types of public credit. The volume of consumer credit varies seasonally and achieves significant growth over major holidays (New Year's Day, Christmas). The increase has a positive impact on the country's economy and leads to an increase in the national currency rate. Consumer credit data is published on the 7th day of every month at 20:00 GMT in the United States and at the end of each month at 9:30 in the UK.

Producer Price Index (PPI)

The indicator of the average level of price change for raw materials and finished products, the cost of which also includes the cost of labor. A more accurate figure is obtained by exclusion of food and energy industries (PPI excluding food and energy). The index does not take into account the price of imported goods and services. The growth of this indicator leads to the growth of cost inflation: the cost of production increases, while the prices do not change, which leads to an imbalance in production. Monthly figures issued one week after "Nonfarm payrolls" at 13:30 GMT.

Consumer Price Index (CPI)

Indicator showing the change of value of the consumer basket of goods and services. The index was first calculated in the US. It is calculated using average items chosen by residents. The index has a greater impact on the calculation of the cost of living of citizens and is also an inflation indicator. According to the index rising interest rates begin to rise. Core CPI is the Consumer Price Index excluding food and energy. It serves as an addition to the Consumer Price Index.

Current Account Balance

The ratio of payments from foreign countries and payments abroad. If the incoming funds exceed the outgoing, the balance is active (surplus), otherwise it is passive (shortfall). An active balance has a positive effect on the growth rate of the national currency.

Export

The value of export goods and services for a specific period of time. Monthly changes of this indicator are generally tracked in percentages and compared with the similar import data.

Import

The cost of the volume of imported goods and services for a specific period of time. Monthly changes in the indicator are generally tracked in percentage and are compared with similar export data.

Trade Balance

The ratio of imported and exported goods. The balance is active if the export goods costs exceed the import goods' costs (surplus), otherwise the balance is passive (shortfall). An active balance has a positive effect on the growth rate of the national currency.

Gold and Foreign Currency Reserves

Country gold and currency reserves held by the Central Bank or Financial bodies. Large reserves of foreign currency and gold represent the level of security and the benefits of investing in the economy of the country.

Unemployment Rate¹⁴

The average number of unemployed citizens over 18 years of age relative to the total labor force. Only persons who are registered as unemployed are taken into account. This indicator first appeared in the 1930s in the United States during the Great Depression. A low unemployment rate indicates a large number of citizens employed in the production of goods and services. An increase in unemployment results in lower GDP: employment in the production of goods is lower, hence, production declines.

Business cycle (or economic cycle) -

refers to economy-wide fluctuations in production or economic activity over several months or years. These fluctuations occur around a long-term growth trend, and typically involve shifts over time between periods of relatively rapid economic growth (expansion or boom), and periods of relative stagnation or decline (contraction or recession). These fluctuations are often measured using the growth rate of real gross domestic product. Despite being termed cycles, most of these fluctuations in economic activity do not follow a mechanical or predictable periodic pattern.

Economic Growth¹⁵

The simplest definition of economic growth is an increase in real gross domestic product (GDP) (that is, GDP adjusted for inflation¹⁶). The growth rate of real GDP is the percentage change in real GDP from one year to the next. We can express the rate of growth in, for example, the period 2004-2005, as follows:

$$\text{Growth rate of GDP} = [\text{GDP}(2005) - \text{GDP}(2004)] / \text{GDP}(2004) \times 100$$

Example: U.S. real GDP in 2004 was 10.76 trillion and in 2005 it was 11.13 trillion.

Thus the growth rate of real U.S. GDP from 2004 to 2005 was

$$(11.13 - 10.76) / 10.76 = (0.37) / 10.76 = 0.034 \text{ or } 3.4\%$$

For purposes of evaluating how economic growth can feed into economic development it is often helpful to focus on the growth rate of GDP per capita—that is, output per person—rather than simply on overall output. Mathematically, GDP per capita is expressed as:

¹⁴ See Annex 3.

¹⁵ Now proceed to Cases 20 and 21.

¹⁶ See Annex 4.

GDP per capita = GDP / Population

The growth rates of GDP, population, and GDP per capita are related in the following way:

Growth Rate of GDP = Growth Rate of Population + Growth Rate of GDP per capita

or:

Growth Rate of GDP per capita = Growth Rate of GDP – Growth Rate of Population¹⁷

¹⁷ See Annex 1.

CASES

CASE 1

Supply and its determinants

1. According to the content of the Session 2 define the determinants of Supply. Try to find out some examples from a real business practice.
2. Then compare your results with those presented in *Nota Bene* section.

NB:

That's important to divide price and non-price determinants (or factors) of Supply. Thus, *changes in input prices and/or in costs of production* cause only shifts along the curve of supply. Any other of the the following determinants cause movements, i.e. shifts in the entire supply curve:

- change in technology;
- change in taxes and subsidies;
- change in the prices of other goods;
- change in producer expectations;
- change in the number of suppliers.

Any factor that increases the cost of production decreases supply.

Any factor that decreases the cost of production increases supply.

CASE 2

Comparison between elasticity over short run and long run

1. Give your own examples and make graphs on short-run and long-run elasticity for consumption goods and durable goods.
2. Note that it's necessary to point out both – demand elasticity and supply elasticity - while answering the first question.

NB:

Price elasticity of supply is a measure of the sensitivity of the quantity of a good supplied in a market to changes in the market price for that good, *ceteris paribus*. [2]

Per the law of supply, it is posited that at a given price and corresponding quantity supplied in a market, a price increase will also increase the quantity supplied. [2][3] PES is a numerical measure (coefficient) of by how much that supply is affected. [1] Mathematically: [2][4]

In other words, PES is the percentage change in quantity supplied one that would occur would expect after a 1% change in price. [2] For example, if, in response to a 10% rise in the price of a good, the quantity supplied increases by 20%, the price elasticity of supply would be $20\%/10\% = 2$. [

Consumption goods.

For consumption goods, the demand is more elastic in the long run. Because people need goods for daily life and buy them constantly, the short run demand is inelastic. Faced with high prices in the long run, they may change habits or find more substitutes.

Durable goods.

For durable goods, the demand is more elastic in the short run. Consider cars. If price of cars increase, in the short run people might use their current cars longer. In the long run, though, people have to replace their cars.

CASE 3

Production function with fixed proportions

Consider the fixed proportions production function $F(z_1, z_2) = \min\{z_1, z_2\}$ (one worker and one machine produce one unit of output). An isoquant and possible isocost line are shown in the following figures:

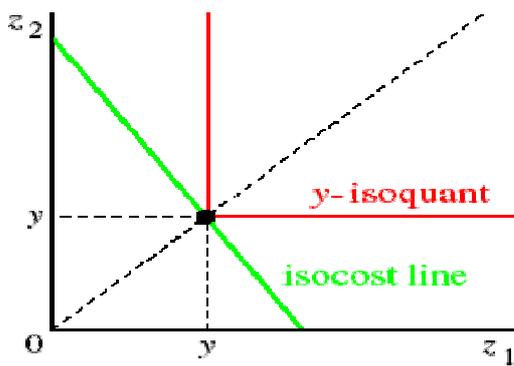


Fig.1

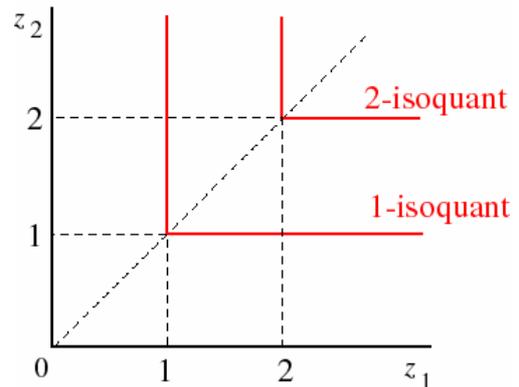


Fig.2

Give your own examples on this case.

CASE 4

Isoquants for a technology in which there are two possible techniques

Consider a technology in which there are two possible techniques. In each technique there is no possibility of substituting one input for another, but various mixes of the two techniques may be used by the firm. For example, perhaps machines can be operated at two possible speeds, fast and slow. If they run fast, then a relatively small amount of labor is used together with a relatively large amount of raw material (since some is wasted). If they run slowly, then a relatively large amount of labor is used together with a relatively small amount of raw material. The firm can run some of its machines fast, and some slowly. An isoquant for such a technology has the form shown in the following figure. (I am considering only raw material and labor as inputs, ignoring the machine.):

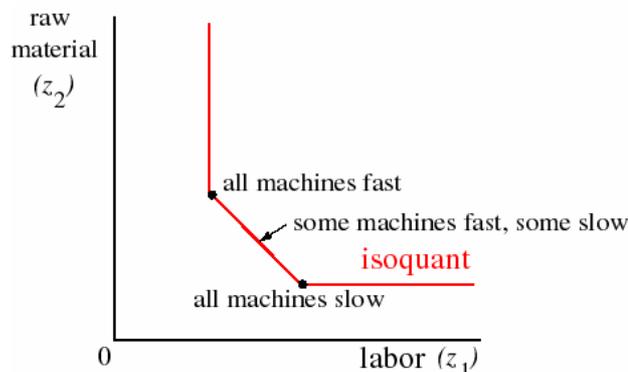


Fig.3

Give your own examples on this case.

CASE 5

Isoquants for a production function in which the inputs are perfect substitutes

If the production function models a technology in which the inputs are perfect substitutes, then it takes the form as follows:

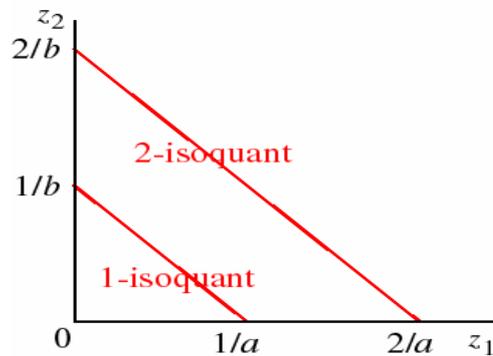


Fig.4

Give your own examples on this case.

CASE 6

Isoquants for a production function in which the inputs are not perfect substitutes, i.e. MRTS is not constant (ex.: Cobb-Douglas production function)

Consider the production function $F(z_1, z_2) = z_1^{1/2} * z_2^{1/2}$.

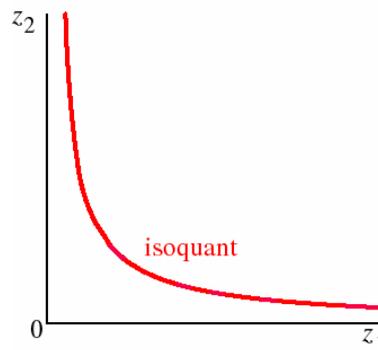


Fig.5

The y -isoquant is the set of all pairs (z_1, z_2) such that: $y^2 = z_1 * z_2$. Thus the y -isoquant is a rectangular hyperbola for every value of y :

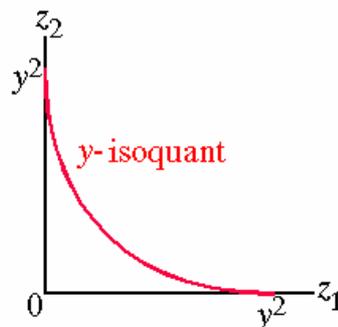


Fig.6

Give your own examples on this case.

CASE 7

Relation between average product and marginal product

The relation between average product and marginal product is one of several that reflect the general relation between a marginal and the corresponding average. The general relation is this:

- If the marginal is less than the average, then the average declines.
- If the marginal is greater than the average, then the average rises.
- If the marginal is equal to the average, then the average does not change.

The graph below illustrates the relation between average product and marginal product:

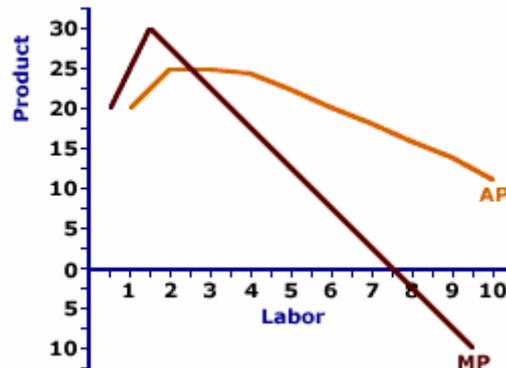


Fig. 7.

Make analysis of the following phases:

Marginal greater than average: for the first few quantities of variable input (workers), marginal product is rising and lies above average product. This is consistent with an increasing average product. If a company hires an additional worker in this early stage of production, then the marginal product (that is the extra contribution) of this worker is greater than that of the existing workers. This, as such, increases the average for all workers. Even after the law of diminishing marginal returns starts working, and marginal product declines, average product continues to increase because the marginal exceeds the average.

Marginal equal to average: the point of intersection between the marginal product and average product curves is also the peak of the average product curve. If the productivity of the marginal worker is equal to the average productivity of the existing workers, then the average does not change.

Marginal less than average: once the marginal product curve moves below the average product curve, then the average product curve declines. As a company hires an additional worker in the middle of this range, the marginal product of this worker is less than that of the existing workers, which pulls down the overall average.

Present your own examples on this interaction: calculate AP, MP and make conclusions on productivity and efficiency of your case.

CASE 8

Average and total costs

In the simplified situation of a production process characterized by a fixed cost (F) plus a proportionally-growing variable cost (VC), total costs (TC) are described by the easy formulas below:

$$TC = F + VC \times q$$

where q is the quantity of good.

Average costs (AC) are thus the following:

$$AC = TC/q = F/q + VC$$

The first term of the right side (F/q) decreases systematically the higher the production level (q). At low production levels, this reduction is quantitatively relevant whereas for a high q it is not.

In fact, for high q, the average cost is practically equal to variable cost VC.

A numerical example of fixed, variable and total costs:

$$F = 100$$

$$VC = 5$$

First case: q = 10

$$TC = 100 + 5 \times 10 = 150$$

$$AC = 150/10 = 15 = 100/10 + 5$$

Second case: q = 100

$$TC = 100 + 5 \times 100 = 600$$

$$AC = 600/100 = 6$$

For low levels of production, fixed costs are major determinants of average costs whereas for high levels of production, variable costs dominate.

Make your own examples.

CASE 9

Economies of scale

Economies of scale describe situation when the total costs rise less than proportionally to production increases:

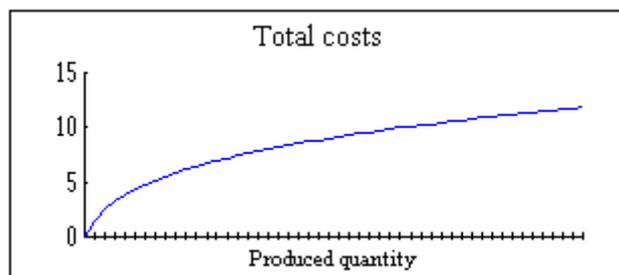


Fig. 8

Dis-economies of scale represent the opposite situation:

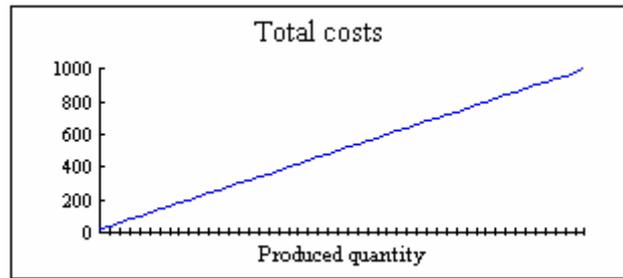


Fig. 9

Constant return to scale are the intermediate situation in which the growth in production is exactly matched by the same percentage increase in total costs:

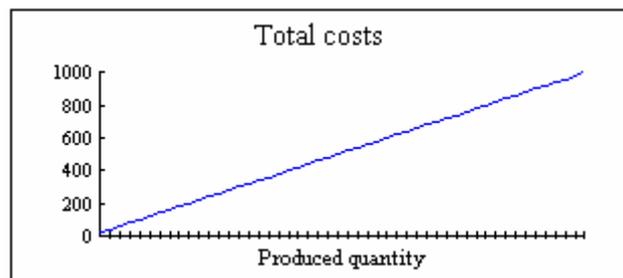


Fig. 10

To understand the sources of economies of scale is helpful to consider that total costs for production inputs depends on two components: the quantity and the price of the inputs.

Accordingly, it is often useful to distinguish two broad reasons for cost to rise: an increase of the input quantity or a soaring price for input. This allow for distinguishing different reasons for costs behaviors in reaction to changes in production levels.

In particular, economies of scale can be due:

- a) to savings in average physical quantity of input when the production is higher (e.g. electricity dispersion is lower in percentage when the electricity throughput is high);
- b) to reduction in prices paid when buying larger quantities (e.g. because of stronger power in purchase negotiation).

Present your own situations of economies of scale, describe them from quantitative and qualitative points of view and make conclusions.

CASE 10

Production costs' scheme

The main costs that a manufacturer faces can be summarized in the following table:

Tab. 1

Cost item	Cost category	Justification
Raw materials to be processed	Variable (proportionally)	Production recipe: any un-proportional change would impact the features of the product
Semi-manufactured components to be assembled	Variable (proportionally)	Production recipe
Energy	Variable (less than proportionally)	Physical properties produce economies of scale
Personnel (direct labour)	Variable (proportionally)	Constant productivity of people directly involved in production Particularly flexibility-oriented legal contracts with the labour force
Personnel (indirect labour)	Quasi-fixed	The size of necessary administrative personnel (and of other indirect labour) doesn't change so much if production incrementally changes. Discrete jump will happen when the overall scale of production drastically changes.
Plant rent	Fixed	The typical contract of rent makes no reference to effective production levels
Amortization of capital goods	Fixed	Fiscal and accountancy rules
Policy costs (advertising, R&D,...)	Fixed or quasi-fixed	Discretionary costs
Distribution cost	Variable (proportionally) plus a fixed component	Sale representatives usually are paid in percentage to success plus a fixed fee. Sometimes supermarkets would require a "listing fee" to be admitted on the shelves and require a rebate at the end of the year, based on the amount of sales done.
Shipping and transport	Variable (more or less proportionally)	Shipping is proportional to volume sent and packed. Transport would also depend on the distance to be covered (and speed of delivery). Both elements alternate randomly across orders.
Participation to trade fairs and promotion materials	Fixed	Discretionary cost, whose effectiveness depend on many elements.

Present your own examples based on this table: imagine a real business situation, give characteristics to each of the cost item, make necessary calculations and formulate conclusions.

CASE 11

Change in consumer income and the budget line

If consumer income increases then the consumer will be able to purchase higher combinations of goods. Hence an increase in consumer income will result in a shift in the budget line. This is illustrated in Fig. 11. Note that the prices of the two goods have remained the same, therefore, the increase in income will result in a parallel shift in the budget line:

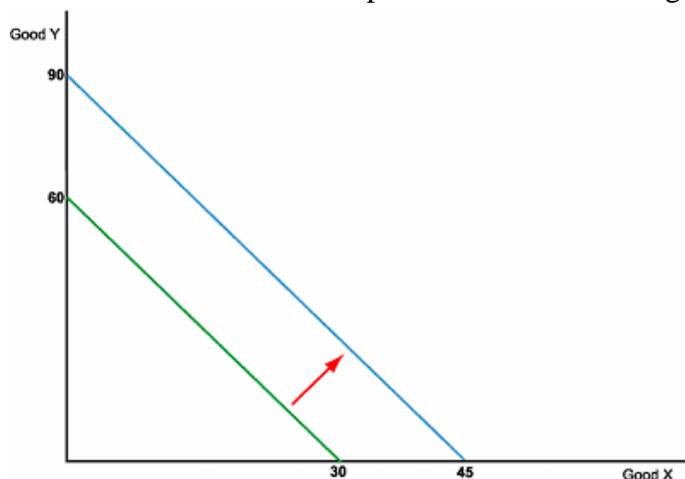


Fig. 11

Assume consumer income increased to £90. If consumer income fell then there would be a corresponding parallel shift to the left to represent a fall in the potential combinations of the two goods that can be purchased.

Present your own example on this case, make calculations and a conclusion.

CASE 12

Change in the price of a good and the budget line

If income is held constant, and the price of one of the goods changes then the slope of the curve will change. In other words, the curve will pivot. This is illustrated in Fig. 12:

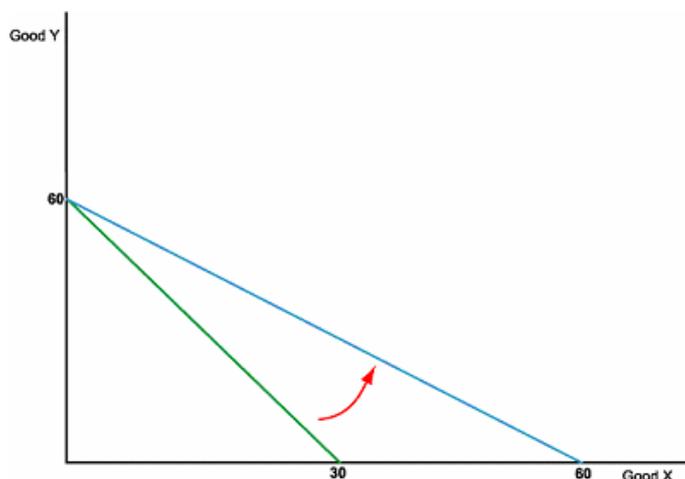


Fig. 12

The reduction of the price of good x from £2 to £1 means that on a fixed budget of £60, the consumer could purchase a maximum of 60 units, as opposed to 30. Note that the price of good y has remained fixed, hence the maximum point for good y will remain fixed.

1. Present your own example on this case, make calculations and a conclusion.
2. Based upon your example, describe income and substitution effects of a change in price. Make corresponding calculations and give a conclusion.

CASE 13

Shutting down a company (temporary) and leaving the market (permanent)

1. A company is considered to have shut down, if it temporarily ceases production but keeps fixed capital. A company has exited the industry when it has made a permanent decision to leave the industry. The decision to temporarily shut down a business depends on a few factors. Recall that $ATC = AVC + AFC$. So average fixed cost is the vertical distance between average variable cost and average total cost.

If a business shuts down, its total revenue becomes zero, and its total cost equals the fixed cost. So the company should continue producing its product, as long as it covers its variable costs. This way, total revenue is greater than total variable cost, because losses are then less than TFC. Basically, shut down when $P (AR = MR) < AVC$, to minimize the losses and so the company's short-run supply curve = MC curve above AVC. The firm therefore produces where profit equals marginal cost.

Another way to put this is that sunk costs are sunk. Fixed costs are sunk, and therefore cannot be recovered by shutting down in the short run. The decision to continue producing depends on revenues and variable costs. If average revenue is greater than average variable cost, then the business should continue to produce. It is rational to continue producing, so long as $AVC < P < ATC$.

2. A business should leave the industry when revenue is less than cost of operating in the long run. In other words, exit if total revenue is less than total cost ($P < ATC$). In competitive markets, a company will make zero economic profits in the long run. If companies are making more than zero economic profits, it will encourage other firms to enter the industry to share in these profits. In other words, enter if total revenue is greater than total cost ($P > AC$). If companies are making zero economic profits, there is no entry and no exit, which is a long run condition.

- Upon this case: present a company production's scheme with the following variables: input, costs, products and revenue (both average and marginal) and a market price.
- Present three possible market situations for your competitive firm:
 - i. The company's activity is profitable;
 - ii. The company's temporary shutting down;
 - iii. The company's leaving the market.

Make clear interpretation of this case through graphs.

CASE 14

Allocative efficiency in a perfectly competitive market

Allocative efficiency can be achieved in case of the perfectly competitive market when resources are allocated in a way that allows the maximum possible net benefit from their use. When an efficient allocation of the resources has been attained, it is impossible to increase the well-being of anyone person without harming another person.

Consumer surplus:

Is the total net benefit that all consumers purchasing the good enjoy. For consumers in the aggregate, it is the area between the demand curve and the market price.

Producer surplus:

is the difference between the market price the producer receives and the marginal cost of producing this unit. It represents the profit on the unit, plus any rents accruing to factors of production. For a market as a whole, producer surplus is the area above the supply curve up to the market price (fig. 13):

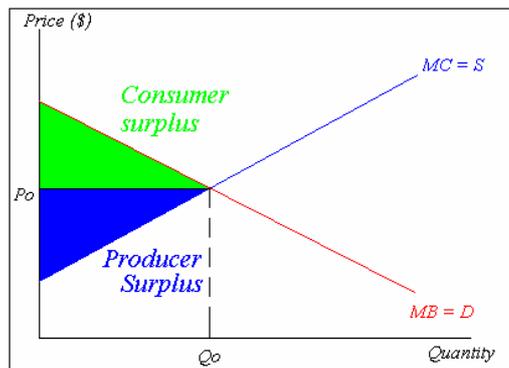


Fig. 13

Example (fig. 14, see below). Consumer A would pay \$10 for a good whose market price is \$5. And therefore enjoys the benefit of \$5 ($\$10 - \$5 = \5).

Consumer B enjoys a benefit of \$2 ($\$7 - \5).

No benefit for consumer C, who values good at a market price.

Therefore consumer surplus measures the total benefit to all consumers is shaded area between the demand curve & the market price.

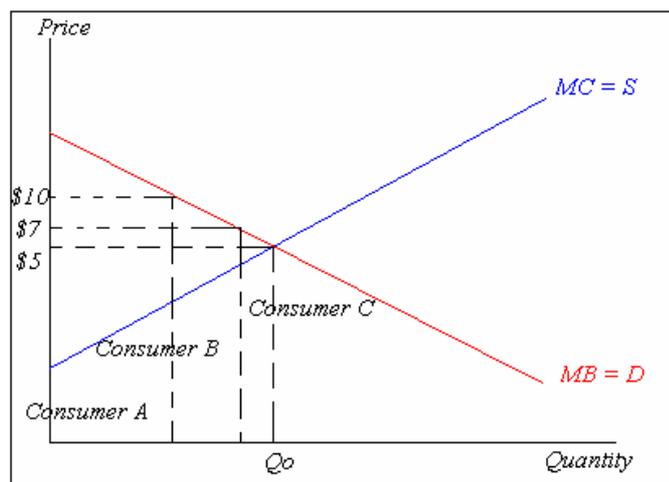


Fig.14

Make your own examples on this case, calculate consumer and producer surplus.

CASE 15

Effects of government intervention. Price control

Initially, P_0 and Q_0 are the equilibrium price and quantity (i.e. the price and output that would prevail without government regulation):

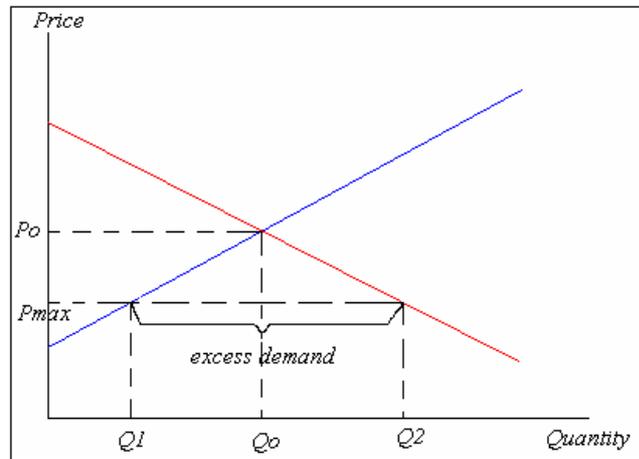


Fig. 15

However, the government decides that P_0 is too high and has mandated that the price cannot be higher than a maximum ceiling price, which is denoted by P_{max} .

Because the price is lower, producer (particularly those with higher costs) will produce less and supply will be Q_1 . Consumers will demand more at this low price and would like to purchase Q_2 and a shortage or excess demand develops which is $Q_2 - Q_1$.

Consumer surplus

With price control the price would be at P_{max} :

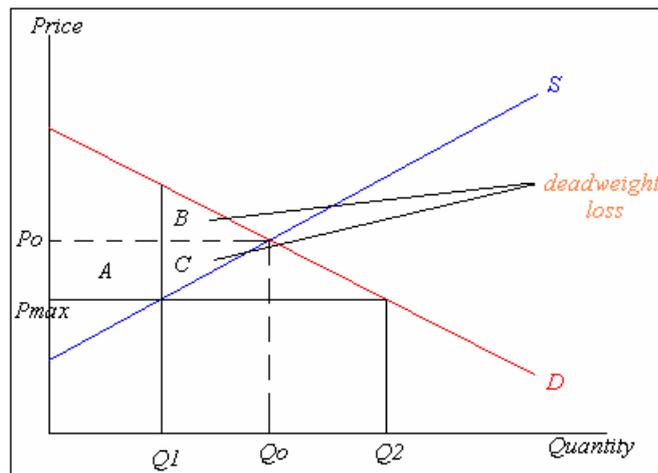


Fig.16

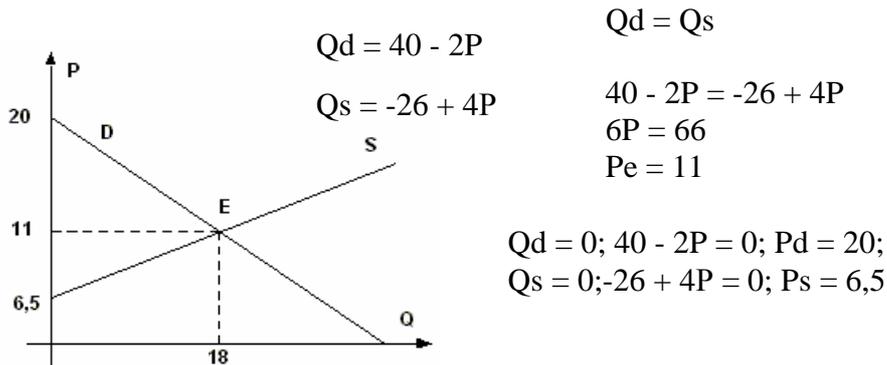
Some consumers would be rationed out of the market because of the price controls, and production and sales would fall down from Q_0 to Q_1 . Those consumers who can still purchase the good now can do so at a lower price and thus enjoy an increase in the consumer surplus shown in rectangle A . However, some consumers can no longer buy the good, their loss of consumer surplus is given by triangle B , the net change in consumer surplus is therefore $A - B$,

following an imposition of price control also linked to that rectangle A is greater than triangle B, so net change in consumer surplus is positive.

CASE 16

Effects of government intervention. Consumer & Producer Surplus

Calculate:



Consumer Surplus: $(P_d - P_e)Q_e / 2 = (20 - 11) * 18/2 = 81.$

Producer Surplus: $(P_e - P_s)Q_e / 2 = (11 - 6,5) * 18/2 = 40,5.$

Effects of government intervention: fixed prices!

If $P_e' = P_e + 1 = 11 + 1 = 12$

$Q_d \text{ fix} = 40 - 2P = 40 - 2 * 12 = 16$

$Q_s \text{ fix} = -26 + 4P = -26 + 4 * 12 = 22$

Total surplus = $2 + 4 = 6 = 22 - 16.$

If $P_e' = P_e - 1 = 11 - 1 = 10$

$Q_d \text{ fix} = 40 - 2P = 40 - 2 * 10 = 20$

$Q_s \text{ fix} = -26 + 4P = -26 + 4 * 10 = 14$

Total shortage = $2 + 4 = 6 = 20 - 14$

– The second method: *providing subsidy to customers*.

Customers get a 2 unit price refund per unit quantity bought, thus the quantity demanded changes: $QD = 10 - (P - 2) = 12 - P$. The new intersection point is $P = 7$, $QD = QS = 5$.

The revenue after using method 2 is:

$$\text{REVENUE} = P \times QD = 7 \times 5 = 35 (> 24) .$$

Conclusion: upon these examples, providing subsidies achieves the government's goal to increase seller's revenue, but setting price floor does not and even makes the revenue less.

NB:

Revenue = PRICE \times PRODUCTION.

Expenditure = PRICE \times CONSUMPTION.

CASE 19

Government intervention. Subsidies.

Calculate:

$$Qd = 40 - 2P$$

$$Qs = -26 + 4P$$

$$\text{Subsidy} = 2$$

$$Qs = -26 + 4(P + 2) = -18 + 4P$$

Subsidy always means net losses for the society.

$$Pd \text{ sub} = 40 - 2P = -18 + 4P$$

$$58 = 6P$$

$$P \text{ sub} = 9,7$$

$$Qd \text{ sub} = Qd = \text{const.}$$

$$Qd \text{ sub} = 40 - 2 \cdot 9,7 = 20,7$$

$$Qd \text{ sub} = Qs \text{ sub}$$

$$20,7 = -26 + 4 \cdot P; P = 11,7$$

$$\text{Producer's portion in P sub: } \Delta P \text{ prod} = 11,7 - 11 = 0,7$$

$$\text{Consumer's portion in P sub: } \Delta P \text{ cons} = 11 - 9,7 = 1,3$$

Total sum of money needed to subsidy:

$$V = \Delta Q \cdot \Delta P \text{ cons} = (20,7 - 18) \cdot (9,7 - 11) = 3,5$$

CASE 20

Macroeconomic indicators

Make a short report using a set of macroeconomic indicators mentioned in Session 7:

- Find these figures for any three countries you like (it could be your home country among them) and present this data in a table (see a sample below):

<i>Macroeconomic indicator</i>	<i>Country</i>		
	Country 1	Country 2	Country 3
1. Gross Domestic Product (GDP)			
2. Gross National Product (GNP)			
3. Industrial Production			

-
- Try to make a comparative cross-country analysis, use critical thinking to examine this data.
 - Make a conclusion on the main problems/achievements of every country taken for your analysis.

CASE 21

Human Development Index

Make your own investigation using **Statistics of the Human Development Report**: use the following link:

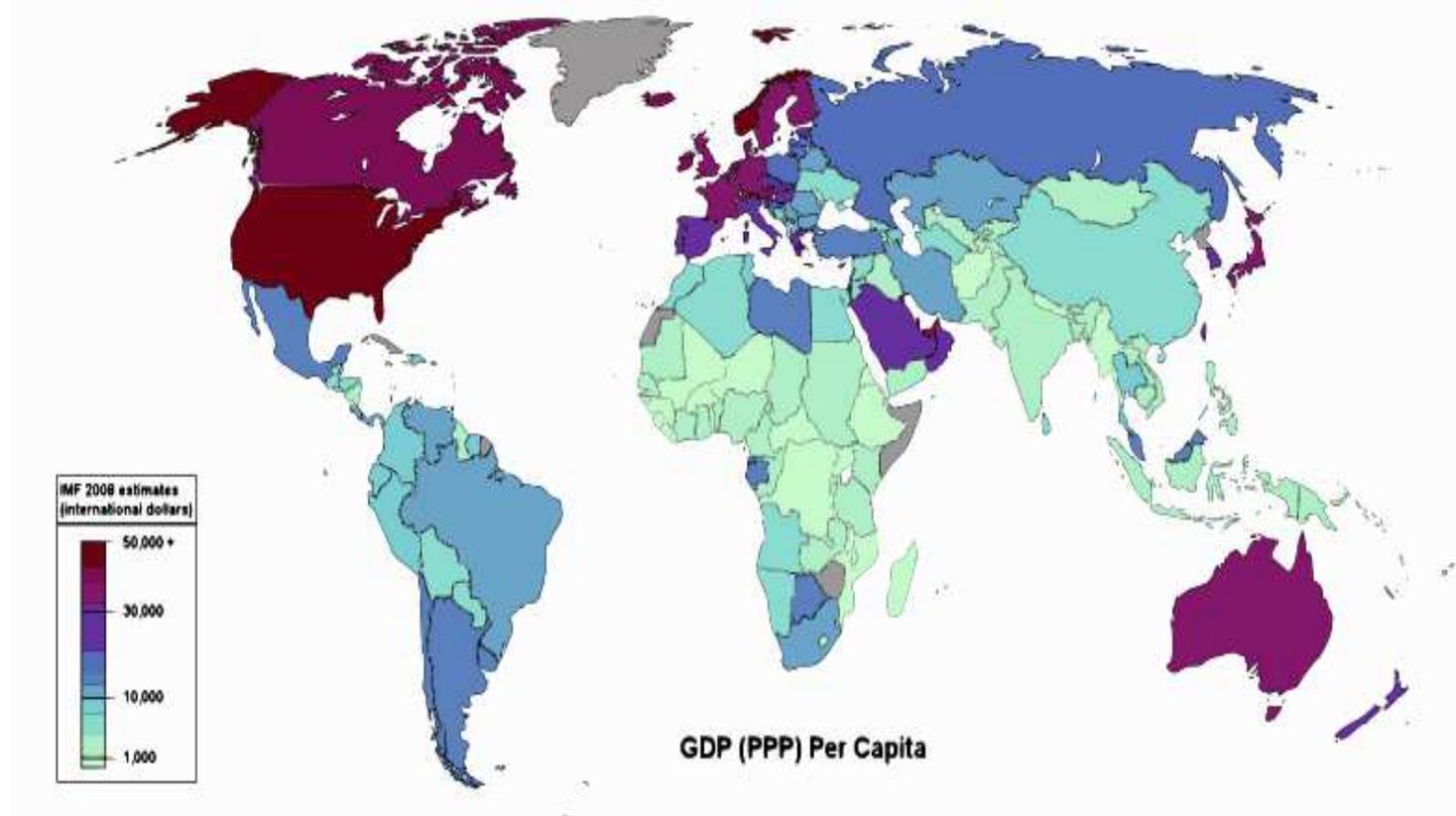
http://hdrstats.undp.org/en/countries/country_fact_sheets/cty_fs_RUS.htm

- Using this Russian case as a sample, choose any country you like.
- Present this case in a form of a short report (up to 8-10 pages) and be ready to make your comment on the data you collected.
- Use supplemental sources if needed.
- Make your conclusion on this case.

ANNEXES

ANNEX 1

Nominal GDP per capita in the World, 2008



Source: IMF Database, 2009.

ANNEX 2

Gross domestic product 2009, PPP*

Ranking / Economy / millions international dollars)

1 United States 14,256,300	2 China 9,104,181	3 Japan 4,138,481
4 India 3,783,578	5 Germany 2,984,440	6 Russian Federation 2,687,298
7 United Kingdom 2,256,830	8 France 2,172,097	9 Brazil 2,020,079
10 Italy 1,921,576	11 Mexico 1,540,207	12 Spain 1,495,683
13 Korea, Rep. 1,324,383	14 Canada 1,280,279	15 Turkey 1,040,275
16 Indonesia 966,956	17 Australia 858,168	18 Iran, Islamic Rep. 843,860
19 Poland 727,086	20 Netherlands 673,066	21 Saudi Arabia 594,886
22 Argentina 586,391	23 Thailand 542,388	24 South Africa 507,571
25 Egypt, Arab Rep. 471,475	26 Pakistan 445,549	27 Colombia 404,995
28 Belgium 388,917	29 Malaysia 384,043	30 Sweden 352,593
31 Venezuela, RB 350,276	32 Switzerland 345,707	33 Greece 334,701
34 Nigeria 332,681	35 Philippines 326,213	36 Austria 324,093

37 Hong Kong SAR, China 307,212	38 Romania 305,001	39 Ukraine 291,091
40 Algeria 285,591 a	41 Norway 268,731	42 United Arab Emirates 265,921 a
43 Czech Republic 264,683	44 Vietnam 258,096	45 Portugal 255,393
46 Singapore 252,898	47 Peru 252,184	48 Chile 243,196
49 Bangladesh 230,395	50 Israel 205,939	51 Denmark 203,265
52 Hungary 198,084	53 Finland 184,975	54 Ireland 183,707
55 Kazakhstan 183,132	56 Morocco 146,383 b	57 Kuwait 128,790
58 New Zealand 123,965	59 Belarus 121,454	60 Slovak Republic 121,130
61 Ecuador 112,810	62 Iraq 111,902	63 Angola 107,079
64 Libya 106,094 a	65 Syrian Arab Republic 99,909	66 Bulgaria 97,755
67 Sri Lanka 97,019	68 Sudan 93,042	69 Croatia 87,769
70 Tunisia 86,427	71 Dominican Republic 85,216 a	72 Serbia 84,993
73 Azerbaijan 84,755	74 Uzbekistan 79,940 a	75 Ethiopia 77,503
76 Oman 70,479	77 Guatemala 66,618 a	78 Kenya 62,579
79 Yemen, Rep. 58,317	80 Tanzania 57,692 c	81 Lithuania 55,922
82 Slovenia 55,177	83 Lebanon 54,745	84 Costa Rica 50,926 a
85 Panama 45,214 a	86 Uruguay 44,180	87 Bolivia 43,650
88 Cameroon 43,484	89 Luxembourg 41,821	90 El Salvador 41,419 a
91 Uganda 39,871	92 Turkmenistan 37,059 a	93 Ghana 36,007
94 Côte d'Ivoire 35,966	95 Latvia 34,755	96 Trinidad and Tobago 34,409 a
97 Nepal 33,916	98 Jordan 33,865	99 Bosnia and Herzegovina 32,127
100 Afghanistan 32,056 a	101 Macao SAR, China 31,345	102 Paraguay 28,757
103 Honduras 28,737 a	104 Cambodia 28,327	105 Bahrain 27,111
106 Estonia 26,072	107 Albania 26,017	108 Botswana 25,498
109 Cyprus 23,975 d	110 Senegal 22,635	111 Macedonia, FYR 22,103
112 Equatorial Guinea 21,522	113 Gabon 21,293	114 Congo, Dem. Rep. 21,100
115 Georgia 20,961 e	116 Madagascar 20,608	117 Jamaica 20,570 a
118 Mozambique 20,289	119 Brunei Darussalam 19,598	120 Burkina Faso 18,729
121 Zambia 18,505	122 Mauritius 16,398	123 Armenia 16,298
124 Congo, Rep. 15,646	125 Mali 15,446	126 Papua New Guinea 15,381 a
127 Nicaragua 15,302 a	128 Chad 15,095	129 Lao PDR 14,276
130 Namibia 14,019	131 Tajikistan 13,730	132 Benin 13,492
133 Malawi 13,117	134 Kyrgyz Republic 12,168	135 Iceland 11,995
136 Haiti 11,564 a	137 Rwanda 10,709	138 Guinea 10,565
139 Niger 10,330	140 Moldova 10,192 f	141 Malta 9,513
142 Mongolia 9,421	143 Montenegro 8,185	144 Mauritania 6,425
145 Swaziland 5,884	146 Togo 5,636	147 Sierra Leone 4,609
148 Fiji 3,873	149 Suriname 3,818 a	150 Bhutan 3,571
151 Central African Republic 3,354	152 Lesotho 3,333	153 Burundi 3,261
154 Eritrea 3,166 a	155 Gambia, The 2,416	156 Guyana 2,343 a
157 Belize 2,175 a	158 Djibouti 2,007	159 Cape Verde 1,845
160 Guinea-Bissau 1,728	161 Seychelles 1,726 a	162 Maldives 1,689
163 St. Lucia 1,655 a	164 Antigua and Barbuda 1,647 a	165 Liberia 1,568
166 Solomon Islands 1,334 a	167 Vanuatu 1,066 a	168 St. Vincent and the Grenadines 1,001 a
169 Timor-Leste 914 a	170 Grenada 870 a	171 Comoros 861
172 Samoa 789 a	173 St. Kitts and Nevis 721 a	174 Dominica 655 a
175 Tonga 465 a	176 São Tomé and Príncipe 297	177 Micronesia, Fed. Sts. 295 a
178 Kiribati 242 a		

World 72,536,974	Low income 982,238
Middle income 30,837,977	Lower middle income 18,067,414
Upper middle income 12,753,102	Low & middle income 31,824,749
East Asia & Pacific 11,805,344	Europe & Central Asia 5,230,456
Latin America & Caribbean 6,062,492	Middle East & North Africa 2,327,850
South Asia 4,632,546	Sub-Saharan Africa 1,758,382
High income 40,774,420	Euro area 11,169,960

Note: Rankings include only those economies with confirmed PPP GDP estimates. Figures in italics are for 2008 or 2007.

- a. Estimates are based on regression; other PPP figures are from the 2005 International Comparison Program benchmark estimates.
- b. Includes Former Spanish Sahara.
- c. Covers mainland Tanzania only.
- d. Data are for the area controlled by the Government of the Republic of Cyprus.
- e. Excludes Abkhazia and South Ossetia.
- f. Excludes Transnistria.

Source: World Development Indicators database, World Bank, 27 September 2010

* **Purchasing power parity (PPP)** is a theory of long-term equilibrium exchange rates based on relative price levels of two countries. The idea originated with the School of Salamanca in the 16th century and was developed in its modern form by Gustav Cassel in 1918. The concept is founded on the law of one price; the idea that in absence of transaction costs, identical goods will have the same price in different markets.

In its "absolute" version, the purchasing power of different currencies is equalized for a given basket of goods. In the "relative" version, the difference in the rate of change in prices at home and abroad—the difference in the inflation rates—is equal to the percentage depreciation or appreciation of the exchange rate.

The best-known and most-used purchasing power parity exchange rate is the Geary-Khamis dollar (the "international dollar").

PPP exchange rate (the "real exchange rate") fluctuations are mostly due to different rates of inflation between the two economies. Aside from this volatility, consistent deviations of the market and PPP exchange rates are observed, for example (market exchange rate) prices of non-traded goods and services are usually lower where incomes are lower. (A U.S. dollar exchanged and spent in India will buy more haircuts than a dollar spent in the United States). Basically, PPP deduces exchange rates between currencies by finding goods available for purchase in both currencies and comparing the total cost for those goods in each currency.

There can be marked differences between PPP and market exchange rates. For example, the World Bank's World Development Indicators 2005 estimated that in 2003, one Geary-Khamis dollar was equivalent to about 1.8 Chinese yuan by purchasing power parity—considerably different from the nominal exchange rate. This discrepancy has large implications; for instance, GDP per capita in the People's Republic of China is about US\$1,800 while on a PPP basis it is about US\$7,204. This is frequently used to assert that China is the world's second-largest economy, but such a calculation would only be valid under the PPP theory. At the other extreme, Denmark's nominal GDP per capita is around US\$62,100, but its PPP figure is only US\$37,304.

ANNEX 3

Unemployment in the World, 2007 - 2009

Global Unemployment to Increase in 2009

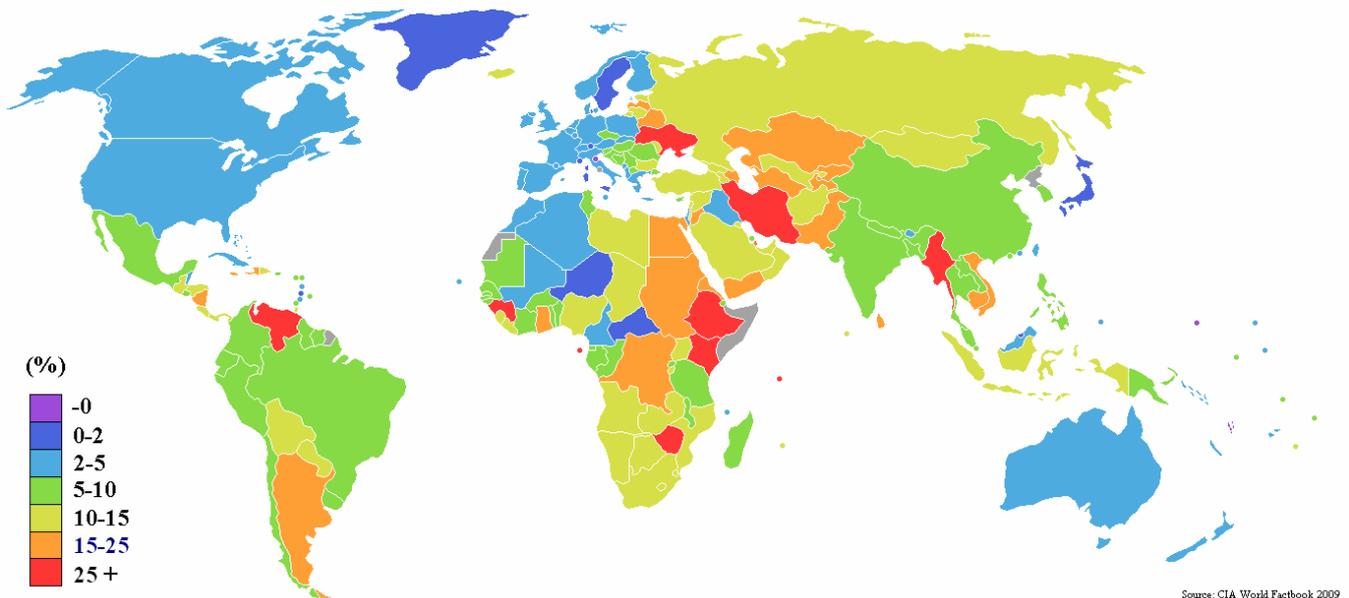
The ILO's best case projection shows a rise in unemployment across the globe
Figures show the change in unemployment between 2007 and 2009



Source: International Labor Organization, 2010.

ANNEX 4

World Inflation rate, 2008



Source: CIA World Factbook, 2009.

