

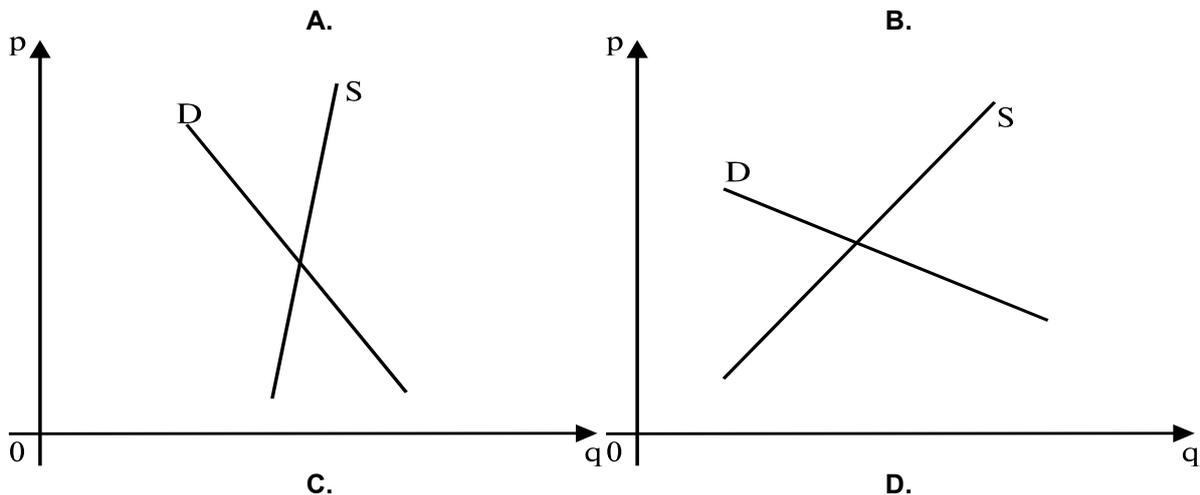
Seminar 1. Supply and Demand. Market Equilibrium.

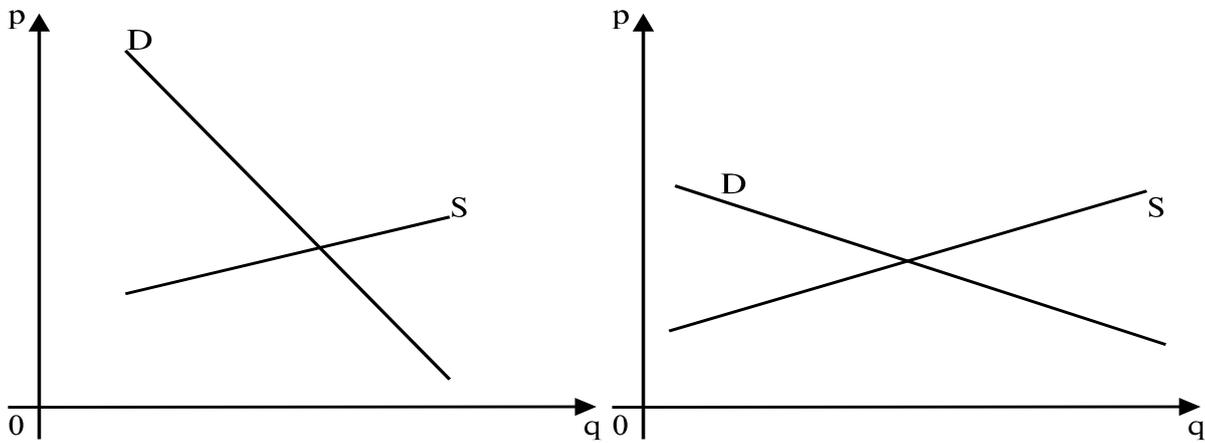
Questions for Discussion

1. True/False Questions.
 - 1.1. A person who could obtain work at a wage of either \$5 or \$10 per hour would have an opportunity cost for an hour's worth of leisure of \$10.
 - 1.2. The Law of Demand states that when the price of a good rises the quantity demanded of the good also rises.
 - 1.3. An equilibrium situation is one which continues as it is until one of the ceteris paribus assumptions changes.
2. "Technological advance benefits producers but not consumers." Do you agree or disagree with this statement? Justify your position.

Multiple Choice Questions.

3. Which of the following is an example of economic model?
 - (a) unemployment growth decelerates inflation;
 - (b) during the economic reform savings of Russian population were evaporated;
 - (c) in 1996 we do not expect a fall in Russian industrial output;
 - (d) it is not desirable to get momentum, once being sunk;
 - (e) ruble is a currency unit in Russia.
4. The opportunity cost of getting a college education does not include
 - (a) wages you could have earned had you not gone to school;
 - (b) money spent on textbooks;
 - (c) money spent on food;
 - (d) tuition.
5. The current equilibrium price of imported shoes averages \$40 a pair. A tariff on imported shoes is likely to
 - (a) increase the price of imported shoes;
 - (b) increase the price of domestically produced shoes;
 - (c) decrease the quantity of shoes demanded;
 - (d) all of the above.
6. If we use the standard set of assumptions of the cobweb model, we may suppose that the following market is the most unstable:





Problems for homework (to be checked in classes)

7. At a certain moment society has the following options in production

Production plans	Output	
	Refrigerators (th.)	Tanks (th.)
A	0	30
B	200	27
C	400	21
D	600	12
E	800	0

- 7.1. Plot data on the graph.
- 7.2. Illustrate with the graph the situation where there is an improvement in the technology of producing refrigerators with technology of production of tanks unchanged. Show the opposite situation where there is an improvement in production of tanks only.
- 7.3. At point B calculate opportunity costs of producing one additional thousand tanks. One thousand refrigerators. Check how opportunity costs change in switching production from A to B etc. to D? What conclusion can be drawn from this observation?

8. Consider the following data describing the demand for beef.

Price (R/kg)	Quantity Demanded per Month, t.
500	1000
600	900
700	800
800	700
900	600
1000	500

- 8.1. Draw the demand curve for beef. What is the slope of this curve? What will happen if the market price of beef increases from 700 to 800 R.?
- 8.2. Suppose that the quantity demanded has increased by 100 t. at each price. How this change will affect demand curve? What factors could be the cause of such an increase? What is the difference compared to 8.1?

9. Consider the following data on the supply of beef.

Price, R/kg	Quantity Supplied per Month, t.
500	400
600	600
700	800
800	1000
900	1200
1000	1400

- 9.1. Draw the supply curve. Explain the economic meaning of its slope. What could be the explanation of the change in quantity supplied from 1000 to 800 t.?
- 9.2. Suppose that city government starts to levy a tax on sellers equal to 100R per kg sold. What will happen to the supply curve? Which factors could contribute to such a change? What is the difference between that change and changes described in 9.1 and 8.2.?

10. Data on quantity demanded at different prices on some particular market are as follows:

Price	600	800	1000	1200
Quantity	900	700	500	300

- 10.1. Define type of the demand function, its exact form and draw a demand curve.
- 10.2. What is the reservation price? (price at which consumers would prefer not to buy this good?)
- 10.3. What would be the quantity demanded if this good would be distributed for free?

11. (a) At the foreign exchange market daily demand for dollars is given by $P=5250-1.5Q$, daily supply by commercial banks: $P=5050+2.5Q$, where P - price of dollr in Rubls, Q - mln. doll. sold. What is the equilibrium exchange rate and how much is sold?

(b) What should be the intervention of the Central bank willing to maintain the exchange rate at 5160 rubles per dollar? Show it on a graph.

12. Fill the following table using the example. Notice in each case when you can make a definite forecast on prices or/and quantity and when it is impossible.

	Demand decreases	Demand is constant	Demand increases
Supply decreases			
Supply is constant			
Supply is increasing			

Self - test for Seminar 1

- 13. Suppose the demand for pairs of shoes sold per month in a small town can be described by the following algebraic equation: $Q_d=300-3P$, where Q_d is the monthly quantity demanded. The monthly supply can be expressed as: $Q_s=2P$, where Q_s is the monthly quantity supplied, also measured in thousands of pairs. P is the average price per pair.
 - 13.1. Solve the above equations for the equilibrium price and quantity sold per month (Hint: In equilibrium $Q_s = Q_d$).
 - 13.2. Suppose a tax of \$5 per pair is levied on the sale of shoes and collected from retailers. What will happened with shoes' price?
 - 13.3. The supply schedule for shoes now becomes $Q_s = 2P - 10$. Calculate the new equilibrium price and quantity sold per month on the basis of the new supply equation.

14.1 Fill-in questions.

The line showing the relationship between price per unit and the maximum quantity buyers would be willing to buy is called a (1) _____ and is assumed to have a (2) _____ slope. A (3) _____, on the other hand, shows the maximum quantity sellers would be willing to offer at each price and is assumed to be (4) _____ sloped. In general, the single price at which both sellers and buyers are satisfied is called the (5) _____ price, and it will tend to change if either the supply or the demand curve (6) _____.

14.2. Demand is a _____ between the _____ and the _____.

14.3. A change in demand is represented by a movement of _____ caused by a change in _____.

14.4. Other things being equal, an increase in demand will result in an increase in _____ and an increase in _____.

14.5. A change in quantity demanded is a _____ caused by a change in _____.

14.6. When a market equilibrium is attained, the price of a good is such that _____.

14.7. If the current equilibrium quantity of cigarettes sold is 1 million packs per month, then a \$1 per pack tax will collect _____ than \$1 million in revenue per month.

14.8. If a price floor is set above the equilibrium price per bushel of wheat, the result will be an annual _____ of wheat.

14.9. The current equilibrium rent for a one bedroom apartment in Washington, D.C. is \$1000 per month, if a rent control law sets rents for one bedroom apartments at a maximum of \$500 per month there will be a _____ of one bedroom apartments in Washington, D.C.

Seminar 2. Elasticity.

Questions for discussion

1. True/False questions.
 - 1.1. The higher in the value of derivative at a certain point, the quicker this function increases at this point.
 - 1.2. All elasticity measures are independent of the units of measure used to measure prices, incomes or quantities.
 - 1.3. If the number of tires sold per month decreases when the price of gasoline increases, all other things held constant, an economist would say that tires and gasoline are substitutes.
 - 1.4. The number and closeness of substitutes is a major factor in determining a commodity's price elasticity of demand.
2. **Problem.** At the price \$1 per pound daily quantity demanded of chicken legs was 800 pounds; after price has decreased to \$0.8, it has increased to 1000 pounds per day. What is the point price elasticity of demand? Compare it to arc elasticity. If the price returns to \$1 per pound and the quantity demanded goes back to 800 pounds, what will happen to the coefficients of arc and point elasticities?
3. **Problem.** Demand function for a good X is given by $q=150-2p$ (q - quantity demanded, p -price). At which price the demand will have the elasticity equal to -1? Give a geometrical explanation to your answer.

Multiple choice questions

4. The price elasticity of demand for a good measures the responsiveness of quantity demanded to changes in
 - (a) the prices of other goods;
 - (b) tastes and preferences;
 - (c) the price of the good;
 - (d) the consumer income.
5. It was reported in the chapter that the cross price elasticity of demand between rice and fuel in Indonesia was 0.14. What would you predict would happen if the price of rice in Indonesia rises by 10 percent?
 - (a) Rice demand would decline by 1.4 percent.
 - (b) Rice demand would increase by 1.4 percent.
 - (c) Fuel demand would decline by 1.4 percent.
 - (d) Fuel demand would increase by 1.4 percent.
6. The demand for bread in a town N is characterized by the following function $P=10000-0.5Q_d$, where P is the price of bread (R per kg), Q_d - quantity of bread sold, kg per day. The only bakery in a town has the capacity to produce 15 t of bread per day. At what price this bakery will maximize its revenue?
 - (a) 5000
 - (b) 10000
 - (c) 15000
 - (d) impossible to say.
7. Along a straight-line demand curve, demand is
 - (a) inelastic below the midpoint and elastic above it;
 - (b) elastic below the midpoint and inelastic above it;
 - (c) only inelastic below the midpoint for luxury goods;
 - (d) inelastic at the midpoint.
8. If the demand function is given by $Q = c/P^r$ where $c>0$, $1<r$ - constants, along the demand curve:
 - (a) demand is inelastic everywhere;
 - (b) demand is elastic in all points;
 - (c) demand is unit elastic in all points;
 - (d) there are points where demand is elastic, inelastic or unitary elastic.
9. As a result of the shift in the supply curve, the quantity supplied falls and incomes of suppliers are increasing. Which of the following is true?
 - (a) supply is inelastic with respect to price;
 - (b) demand is inelastic with respect to price;
 - (c) price elasticity of supply is greater than 1;
 - (d) demand is price elastic;
10. An oil embargo introduced by OPEC members in the 70s contributed to the increasing revenue from sales of oil exporting countries. It could be explained by
 - (a) high elasticity of market demand for oil;
 - (b) low elasticity of market demand for oil;
 - (c) the coefficient of elasticity of market supply for oil exceeding 1;
 - (d) elasticity of demand higher than the elasticity of supply;

(e) none of the above.

11. Cream complements coffee for a consumer, tea is a substitute. After the price for coffee has increased, which of the following could happen?
- (a) prices of cream and tea will increase;
 - (b) price of cream will rise, price of coffee will fall;
 - (c) cream will become cheaper, tea - more expensive;
 - (d) both prices will fall;
 - (e) nothing definite can be said.

Problems for home work (to be checked in classes)

12. **Problem.** We have the following indicators on the oil market in 1973:
Price: 4 USD/barrel
Total quantity sold: 18 bln. bar. (of which 12 bln.-by OPEC members)
Price elasticity of demand: - 0.05 (estimation, short-run)
Price elasticity of supply: 0.1 (non-OPEC members, short-run)¹
- 12.1. If all oil producers were joined the OPEC, what they should do to increase their revenues? Prove your answer using data.
12.2. Find supply and demand function corresponding to data given, assuming that they have linear form.

13. **Problem.** Since a great deal of information can easily be summarized in an equation, market demand curves are often expressed as equations rather than as curves or tables.
Suppose, for example, an economist has been studying the demand for bottled water bought in supermarkets. she has found that the following formula accurately models the relationship of P_x, P_y, P_z and I to the quantity demanded of bottled water, X :

$$X = 400 - 200P_x + 10P_y - 0.2P_z + 0.01I,$$

where X - quantity demanded of supermarket bottle water in gallons per year,
 P_x - price in dollars per gallon for water purchased in supermarkets;
 P_y - price in dollars per gallon for water delivered to a customer's home by a water delivery service;
 P_z - price of paper cups in cents per cup; I - income per year in dollars.

- 13.1. Are water bought in supermarkets and water delivered to homes substitutes or complements? Explain.
13.2. Are water bought in supermarkets and paper cups substitutes or complements? Explain.
13.3. Is water bought in supermarkets a normal good or an inferior good? Explain.
Use a calculator or a computer spreadsheet program to calculate the answers to the next questions.
13.4. How many gallons of supermarket water are demanded per year when $P_x = \$1.75, P_y = \$2.50, P_z = 3\text{cents}$ and $I = \$20000$?
13.5. How many gallons of supermarket water are demanded per year when prices P_x falls to \$1.50 and the other prices and income stay at the present level?
13.6. Compute the ratio on change in quantity demanded to change in price using data of (E). What is the exact value of derivative at a point $P_x = \$1.75$? How you would interpret this value?
13.7. At what price per gallon the revenue from selling water in supermarkets would be maximized? Does it depends on the income and other prices?

Self-test for seminar 2

14. **Problem.** We have the following information on gas production and consumption:
Price: 2 USD/thous. cub. feet
Consumption: 20 trln. cub. feet
Price elasticity of demand: -0.5 (short-run)
Price elasticity of supply: 0.2 (short-run)
Government decides to fix the price ceiling equals to 1 USD per Thous. cub. feet . How big will be the shortage of gas?
15. **Problem.** A publishing house discovered that at the price 1200 R per book it could sell 1000 copies per week, after increasing price to 1600 R - 900 copies. Point elasticity is equal to:
(a) -0.3; (b) -0.37; (c) -0.5; (d) -1; (e) 0.5.
16. **Problem.** At the price 3200 R/kg a store sells 500 kg of sausage per day, after increasing price to 4000 R/kg - 400 kg. Arc price elasticity of demand for sausage is equal to:
(a) -0.5; (b) -0.8; (c) -1; (d) -1.25; (e) -2.

¹We assume that the supply of OPEC members is fixed (zero elasticity).

17. Problem. Demand function is given by $Q_d = 5I/p$ (Q_d - quantity demanded, I - income, p - price). Income elasticity of demand is equal to:

- (a) -1 (b) 0; (c) 1; (d) 5; (e) depends on the price and income.

18. Completion Questions.

The price elasticity of demand measures the (1) _____ resulting from (2) _____.

The price elasticity of demand along a linear demand curve will be highly (3) _____ at low prices but very (4) _____ at high prices.

If price elasticity of demand is equal to -1 then a change on the price of the good will result in (5) _____ in consumer expenditures on it.

If the cross elasticity of demand of one good with respect to the price of the other is positive, the two goods are (6) _____.

The income elasticity of demand for potatoes is -0.81. It follows that consumers regard potatoes as a (n) (7) _____ good.

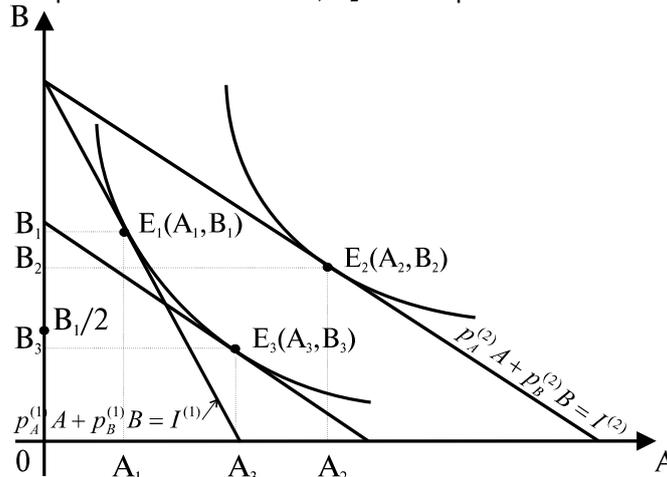
A study shows that the demand for bicycles is inelastic. A bicycle company lowers its price by 25 % that month only. Total revenue taken in by the company will (8) _____.

Seminar 3. Consumer Choice and Market Demand.

Questions for discussion

1. True/False questions.
 - 1.1. When your incomes increases, your budget constraint shifts out parallel to the original budget constraint.
 - 1.2. A good that obeys the law of demand is called a Giffen good.
 - 1.3. At the elastic point a demand curve, a decrease in price increases consumer surplus even though it causes consumers to increase their spending on the product.
 - 1.4. An inferior good is a good whose demand decreases when income increases, all other things held constant.
2. **Problem.** In 1991 the average per capita consumption of beer in Kursk was 80 litres per year, in Astrakhan - 90. The monthly average per capita income was 700 R in Kursk and 750 R in Astrakhan. Basing on this information, could you conclude that beer is a normal good? Why?

3. **Problem.** Let E_1 be an initial equilibrium of consumer, E_2 - new optimal bundle.



- 3.1. What changes in prices of A, B or income could bring about such a change?
 - 3.2. Indicate substitution and income effects.
 - 3.3. Is the demand for A and B elastic?
 - 3.4. Are these goods complements or substitutes?
4. **Problem.** As a result of trade embargo, gas supplies to your country were suspended. Government experts in your country have estimated the total losses at the real value of expenditures on gas before the sanctions. Do you agree with this statement?

Multiple choice questions

5. If the marginal rate of substitution between two goods is 4, regardless of the level of consumption, you would conclude that
 - (a) the two goods are perfect substitutes;
 - (b) the two goods are perfect complements;
 - (c) the indifference curve between two goods is characterized by diminishing marginal rate of substitution;
 - (d) indifference curves between the two goods bow outward from the origin.
6. The slope curve of the budget line has an economic interpretation. It is
 - (a) the amount of one good a consumer is willing to give up when compensated by enough of the other good to keep her on the same indifference curve;
 - (b) the boundary of the feasible;
 - (c) that the marginal rate of substitution diminishes;
 - (d) the opportunity cost of one good in terms of the other.
7. The price of pears and apples is the same, 75 cents per kg. Jill is trying to maximize her utility when consuming pears and apples. As a good economist, you recommend that she
 - (a) buy the same number of apples and pears since their prices are the same;
 - (b) spend all of the income she has allocated to apples and pear consumption;
 - (c) choose apples and pears so that her $MRS=1$;
 - (d) do both b and c simultaneously.

8. A consumer is spending all income on three types of goods: bread, sausage and milk in the following proportion: 20% of income for purchases of bread, 50% - on sausage and 30% - on milk. Find an elasticity of consumer demand for milk with respect to income, if the income elasticity of demand for bread is equal to -1, and for sausage 2.
- (a) 2/3 (b) 1 (c) 3/2 (d) -1

Problems for home work (to be checked in classes)

9. **Problem.** Purchases of food is given in the table

	January	February
meat, kg	20	25
potatoes, kg	24	16

Price of meat was constant and equal to 20 000 coupons, price of potatoes was 8 000 coupons in January, and 10 000 coupons in February.

Is the demand for potatoes elastic with respect to prices? How consumer can be compensated for the increase in the cost of living? What is your assessment for the compensation equal to 48000 coupons? 32000?

10. **Problem.** Municipal government subsidizes gasoline for town's inhabitant. Subsidy decrease the price of gasoline from 100 to 50 R/liter. As a result the consumption of gasoline increases from 2 to 3 th. liters. Compute the consumer surplus and compare it to total government's expenditures.

11. **Problem.** Assume that the compensated demand is given in a table and accurately reflects the demand by consumers for crossing river on a bridge.

Price per crossing	Number of crossings in millions
\$10	0
\$ 8	1
\$ 6	2
\$ 4	3
\$ 2	4
\$ 0	5

Also, assume that at a zero price the bridge has enough capacity to allow passage to everyone who wants to cross the bridge without congestion. And finally, assume for simplicity that the demand curve shows the total number of trips that will be demanded for the entire life of the bridge.

- 11.1. What is a value to society to have the bridge in place assuming no toll is charged to cross the bridge?
- 11.2. Should the bridge be built if its annualized costs \$ 24 million to build? Why?
- 11.3. Should the bridge be built if its annualized costs \$ 26 million to build? Why?
- 11.4. Does you answer to 11.2 change if a toll of \$3 per crossing is charged?
- 11.5. Use your answers to discuss the information policy makers need to have before undertaking the construction of public projects.

12. **Problem.** The accompanying table shows the annual empirical demand curve for foreign supplied steel in the United States. In the same table the pre-tariff supply shows how much steel foreign firms would supply on the US market at each price. The post-tariff supply schedule shows how much foreign firm would supply to the US market after a tariff policy is enacted. A tariff is a tax paid by importers on each ton of steel they sell in the US.

Price per t	Quantity Demanded	Pre-tariff Quantity Supplied	Post-tariff Quantity Supplied
\$100	90	55	20
\$200	70	70	35
\$300	50	85	50
\$400	30	100	65

- 12.1. What is the pre-tariff equilibrium price and quantity?
- 12.2. Why does the tariff cause the supply curve to shift upward? Hint: in the diagram the tariff would be \$225 per ton. Figure out what price buyers must pay after the tariff to get foreign firms to supply a given quantity of steel.
- 12.3. What is the post-tariff equilibrium price and quantity? How much the government receives as tariff revenue?
- 12.4. Analyze the effect of the proposed policy. How much consumer surplus is transferred to foreign supplier in terms of higher price? What is your estimate of a deadweight loss due to the tariff policy?
- 12.5. Is it accurate to use an empirical demand curve in this case to estimate welfare implications of tariff policy?

Self-test to Seminar 3

13. Fill-in questions:

A consumer's response to a change in price can be divided into the _____ effect and the _____ effect. For a normal good, the income effect _____ the substitution effect. But for an _____ good, the two effects tend to cancel each other out. If a tax were imposed on the purchase of electricity, consumers would tend to buy _____ of it, even if an income subsidy left them no less happy than before the tax. This is because the pure _____ effect is always negative.

14. A consumer moves to a new equilibrium position as the result of a change in market price and a change in income. In the new equilibrium, the marginal utilities of all goods consumed are lower than they were before. Two goods are consumed both before and after the change, and preferences are unchanged. This consumer
- is definitely worse off than before;
 - is definitely better off than before;
 - must have experienced a reduction of income;
 - must have experienced a rise in prices of all goods consumed;
 - may be better or worse off depending upon circumstances and information not provided in the question.
15. Consumers have budgeted a fixed money amount to buy a certain commodity. Within a certain range of prices, they will spend neither more nor less than this amount on it. Their demand in this price range would properly be designated as:
- in equilibrium;
 - perfectly income elastic;
 - perfectly price inelastic;
 - highly price inelastic but not perfectly so;
 - unit-elastic.
16. Consumer prices in Kyrgyzstan in 1994 were 3.8 higher than a year ago, average per capita income - 3 times higher. Based on the following table with average per capita consumption per year of main food items (in kg), and the fact that relative prices were stable, find an item with the highest elasticity of demand. Is there any inferior good in a list? Why?

	Bread	Potatoes	Vegetables	Meat	Milk
Consumption in 1993	135	59	50	44	193
Consumption in 1994	134	58	52	43	183

Seminar 6. General equilibrium and welfare. Application to economic policy: cases of consumer and producer subsidies.

Questions for Discussion

1. True/False Questions.

- 1.1. Jenna and Sunny have different marginal rates of substitution between ice cream and cookies. Given that they both have some ice cream and some cookies, *any* reallocation of ice cream and cookies between them will be a Pareto improvement.
- 1.2. Competitive prices lead to a Pareto-efficient allocation of resources as long as everyone is a price taker and there are no market failures.
- 1.3. The rich have plenty of money so it would be a Pareto improvement to have them provide housing for the homeless.
- 1.4. As long as all relevant markets exist, intertemporal situations and uncertainty present no special problems for achieving a Pareto-efficient resource allocation.

2. Show how taxes other than lump-sum taxes prevent an economy from achieving efficiency.

Multiple Choice Questions.

3. At the current level of output. Acme Cattle can produce another cow at a marginal cost of \$500 while Superior Sheep can produce another sheep at a marginal cost of \$300. Imagine a diagram with cattle measured on the horizontal axis and sheep on the vertical axis. Assuming that all markets are in general equilibrium, the marginal rate of transformation of sheep into cows is

- (a) 3/5.
- (b) 5/3.
- (c) 1/3.
- (d) 1/5.

4. When consumption is efficient, mutually beneficial trade between two individuals is

- (a) Always possible.
- (b) Never possible.
- (c) Sometimes possible.

5. Farmer Jones grows wheat and can borrow at the rate of 10 percent. What rule should he use to determine how much wheat to grow in each of two periods?

- (a) Plant and harvest the same in each period.
- (b) Plant and harvest more in the first period.
- (c) Plant and harvest more in the second period.
- (d) Use the equality between the marginal rate of transformation between periods and the price ratio to determine how much to plant in each period.

6. Everything is easy in Easy World. There, the marginal rate of transformation of milk into honey is constant at 3 gallons of milk for 1 pound of honey and the marginal rate of substitution of milk for honey is constant at the rate of 2 gallons of milk for 1/2 pound of honey. Furthermore, everyone in Easy World is a price taker. Consequently

- (a) Only milk will be produced and consumed.
- (b) Only honey will be produced and consumed.
- (c) Some of each will be produced and consumed.
- (d) It is impossible to determine what will be produced and consumed from the information given.

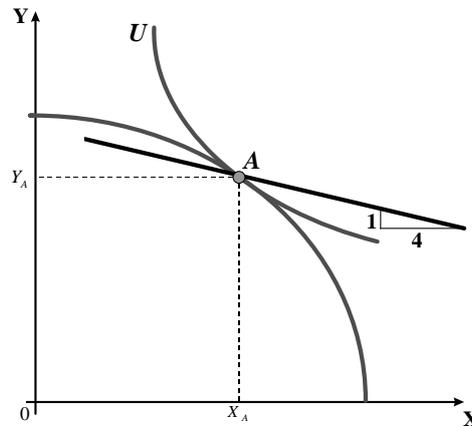
Problems for homework (to be checked in classes)

7. The allocation of resources in the fish farming industry on Cape Ann is production efficient. At Bob's Fish Farm the ratio of the marginal physical product of capital to labor is 3 to 1. At • Bonnie's Fish Acres her marginal physical product of capital is 24. What is the marginal physical product of labor at Bonnie's Fish Acres?

8. Romeo and Juliet live for wine, bread, and each other. Juliet has 20 jugs of wine and 5 loaves of bread. Romeo has 30 jugs of wine and 10 loaves of bread. Juliet views wine and bread as perfect substitutes at a rate of one loaf per one jug. On the other hand, Romeo's tastes exhibit normal diminishing marginal utility between wine and bread and at the initial quantities, he is willing to trade two jugs of wine for one loaf of bread.

- 8.1. Draw an Edgeworth Box and explain what happens to Romeo and Juliet.
- 8.2. Is the trade between Romeo and Juliet a Pareto improvement?

9. Rent control is a common governmental intervention in the housing market. It is often motivated by the desire to provide renters with "affordable" housing. Before rent control general equilibrium in the housing (X) and all other goods markets (Y) was established at A (X_A, Y_A). When the city council passed the rent control ordinance, it said that the ratio of the price of all other goods to housing should be 1 to 4. A line with this slope is drawn through the original point on the production possibility curve. Assume that the city enforces rent control to the point that transactions only take place at legal, rent controlled prices.



- 9.1. On the diagram show how much housing renters want to occupy under rent control. Label it point B. Can they occupy this much housing? Are consumers achieving consumption efficiency? Explain.
- 9.2. In the short run firms must supply x amount of housing. Are firms that supply rental housing achieving production efficiency? Explain.
- 9.3. In the long run the firms supplying housing will wish to maximize their profits. How much housing will be supplied in the long run? Label it point C. (Remember that rent control is as sumed to be *perfectly* effective.) Are firms achieving production efficiency? Are consumers achieving consumption efficiency?
10. Suppose the government rationing program effectively prevents any person from consuming more than 1 pound of butter per week. Suppose at the 1-pound allowance, Judy's marginal benefit of an additional pound is \$5 and Joe's is \$1. Assuming that the market price of butter is \$1 per pound, use an Edgeworth box to show the impact of rationing on these two consumers. Show how Judy can be made better off without banning Joe if the two are allowed to exchange butter for cash between themselves.
11. Suppose the market for widgets can be described by the following equations:
Demand: $P = 10 - Q$, *Supply:* $P = Q - 4$
 where P is the price in dollars per unit, and Q is the quantity in thousands of units.
- 11.1. What is the equilibrium price and quantity?
- 11.2. Suppose the government imposes a tax of \$1 per unit to reduce widget consumption and raise government revenues. What will the new equilibrium quantity be? What price will the buyer pay? What amount per unit will the seller receive?
- 11.3. Suppose the government has a change of heart about the importance of widgets to the happiness of the public. The tax is removed, and a subsidy of \$1 per unit is granted to widget producers. What will the equilibrium quantity be? What price will the buyer pay? What amount per unit (including the subsidy) will the seller receive? What will be the total cost to the government?
12. The benefit of a subsidy falls partly on the consumer and partly on the producer. What determines the share of a subsidy that benefits consumer?
13. Suppose that the consumption of food is subject to a 50% subsidy, whereas no subsidy is levied on the consumption of clothing. Show the general equilibrium-distorting effects of a subsidy.

Self-test for Seminar 6

14. Fill-in questions.
- 14.1. A general equilibrium analysis of prices differs from a partial equilibrium analysis in that it considers the effect of an economic change in all _____. A general equilibrium exists when _____ equal _____ in all markets.
- 14.2. If productive efficiency has not been attained, the opportunity cost of increasing the output of at least one good will be _____.
- 14.3. The marginal product of labor is currently 5 pounds per day in the production of food and 3 outfits per day in the production of clothing. The marginal product of capital is 10 pounds per day in the production of food and 6 outfits per day in the production of clothing. _____ has therefore been attained.
- 14.4. A point on a production possibility curve gives the _____ of any one good that can be produced per year given _____, _____, and _____. All points on a production possibility curve imply that _____ has been attained.

