

National and Kapodistrian University of Athens
Department of Economics

Academic year 2024-2025
Fall-Winter term

Course: Public Finance
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Date due: 14 November 2024

Assignment No 1. Answer all questions.

Multiple choice questions – Counts 2.5% each

1. A two-person utility possibilities frontier is downward-sloping because starting from a Pareto optimal allocation
 - a. you can always add to both individuals' utilities.
 - b. you can never add to either individual's utility.
 - c. you can always increase production by becoming more efficient.
 - d. **you can only increase one individual's utility by decreasing the other individual's utility.**

2. The First Fundamental Theorem of Welfare Economics states that if all technical assumptions hold
 - a. **a perfectly competitive economy generates an efficient allocation of resources.**
 - b. a centralized socialist economy generates an efficient allocation of resources.
 - c. a perfectly competitive economy cannot generate an efficient allocation of resources.
 - d. a decentralized capitalist economy generates an efficient allocation of resources.

3. The First Fundamental Theorem of Welfare Economics implies that as long as the technical assumptions hold
 - a. all economic systems do equally well in satisfying the efficiency criterion.
 - b. only centrally planned socialism can do better than perfect competition in satisfying the efficiency criterion.
 - c. **no economic system other than perfect competition can do better in satisfying the efficiency criterion.**
 - d. no economics systems do very well in satisfying the efficiency criterion.

4. The Second Fundamental Theorem of Welfare Economics states that if all technical assumptions hold,
 - a. a perfectly competitive economy cannot generate any of the feasible efficient allocations of resources with a suitable distribution of initial resources.
 - b. a perfectly competitive economy can generate several of the feasible efficient allocations of resources with a suitable distribution of initial resources.

- c. a centralized socialist economy can generate any of the feasible efficient allocations of resources with a suitable distribution of initial resources.
 - d. **a perfectly competitive economy can generate any of the feasible efficient allocations of resources with a suitable distribution of initial resources.**
5. Combined, the First and Second Fundamental Theorem of Welfare Economics suggest that
- a. all markets function exceedingly well.
 - b. **most markets function exceedingly well.**
 - c. markets cannot function exceedingly well without government intervention.
 - d. an invisible hand is needed to get markets to function exceedingly well.
6. Asymmetric information is said to exist when
- a. consumers have more information relating to the quality of a product than firms.
 - b. firms have more information relating to the quality of a product than consumers.
 - c. **one party (either consumers or firms) has more information relating to the quality of a product than the other party.**
 - d. one party has no information whatsoever relating to the quality of a product.
7. The second fundamental theorem of welfare economics implies that if the initial distribution of output is deemed unacceptable by society
- a. it can only redistribute to a point below the utility possibilities frontier.
 - b. there is nothing that can be done to increase social welfare.
 - c. **it can redistribute to a different point on the utility possibilities frontier.**
 - d. the market will make the necessary redistributions on its own.
8. To achieve an efficient allocation of resources
- a. all prices must be the same.
 - b. **all agents must face the same prices.**
 - c. all firms must have the same marginal cost curves.
 - d. all individuals must receive the same marginal utilities
9. For an economy to maximize social welfare, the
- a. marginal utilities of income must be equal for all individuals.
 - b. marginal social welfare weights must be equal for all individuals.
 - c. **social marginal utilities of income must be equal for all individuals.**
 - d. incomes must be equal for all individuals.
10. A difference between normative and positive analysis is that
- a. only normative analysis is relevant for choosing among policy options.
 - b. positive analysis deals with facts and cannot be a source of disagreement.
 - c. **positive analysis is descriptive whereas normative analysis is evaluative.**

- d. normative analysis is ignored by economists because they have no expertise in making value judgments.
11. Pareto efficiency is achieved when
- the gain from an exchange outweighs the loss.
 - all parties are made better off by an exchange.
 - at least one party is made better off by an exchange.
 - no party can be made better off by an exchange without at least one other party being made worse off.**
12. The set of Pareto efficient allocations in an Edgeworth-Bowley box diagram is
- found along the flattest indifference curve of the individual in the upper right of the box.
 - the set of points on a straight line running from the lower left corner to the upper right corner of the box.
 - the most equitable allocation of resources among the individuals.
 - known as a contract curve**

A. Essay type questions (Explain briefly) – counts 5% each

1. Obesity is perceived to be a national health problem in the United States. One suggestion to deal with this problem is a “fat tax.” The idea is to levy a tax on foods containing more than a government prescribed percentage of the daily minimal fat intake. Is such a tax consistent with a mechanistic view of government?

Answer

The mechanistic view of government says that the government is a contrivance created by individuals to better achieve their individual goals. Within the mechanistic tradition, people could disagree on the obesity tax. Libertarians would say that people can decide what is best for themselves - whether to consume high calorie food - and do not need prodding from the government. In contrast, social democrats might argue that people are too short sighted to know what is good for them, so that government-provided inducements are appropriate.

2. Explain how you would expect a libertarian, a social democrat, and someone with an organic conception of the state to react to the following laws:

- a. A law prohibiting gambling
- b. A law mandating seat belt use
- c. A law mandating child safety seats
- d. A law prohibiting prostitution
- e. A law prohibiting polygamy
- f. A law requiring all commercial signs be written in the country's native language.

Answer

Libertarians believe in a very limited government and are skeptical about the ability of government to improve social welfare. Social democrats believe that substantial government intervention is required for the good of individuals. Someone with an organic conception of the state believes that the goals of society are set by the state and individuals are valued only by their contribution to the realization of social goals.

a. A law prohibiting gambling would probably be opposed by a libertarian and advocated by a social democrat. Someone with an organic conception of the state would first decide whether gambling would help to achieve the state's goals before taking a position on this issue. If the view is that gambling keeps individuals from being productive, then someone with an organic view would probably be in favor of prohibiting it, but if gambling is considered a good way to raise more revenue for the state, then they might oppose the prohibition.

b. Libertarians oppose the law mandating seat belt use, arguing that individuals can best decide whether or not to use seat belts without government coercion. Social democrats take the position that the mandate saves lives and ultimately benefits individuals. The organic view would probably lead to favoring the mandate on the grounds that reduced health care costs caused by fewer accidents benefit society.

c. Libertarians oppose the law mandating child safety seats, arguing that individuals can best decide whether or not to use child safety seats without government coercion. Social democrats take the position that the mandate saves lives and ultimately benefits individuals. The organic view would probably lead to favoring the mandate on the grounds that reduced health care costs caused by fewer accidents benefit society.

d. Libertarians would probably oppose a law prohibiting prostitution, while social democrats would likely favor such a law. The organic view depends on the type of society policymakers are attempting to achieve. The law would probably be favored on moral grounds.

e. Libertarians would probably oppose a law prohibiting polygamy, while social democrats would likely favor such a law. The organic view depends on the type of society policymakers are attempting to achieve. The law would probably be favored on moral grounds.

f. Libertarians would likely oppose the law, believing that individual business owners should make the decision about which language is used for their signs. Social

democrats would also probably oppose the law in order to foster a more inclusive society. Those with an organic view would probably favor the law if they hold the view that every member of the society should speak the native language.

3. For each of the following policy changes, explain why the change is likely or not likely to be a Pareto improvement. In each case, state who the losers and winners are likely to be.

- a. Building a park, financed by an increase in the local property tax rate.
- b. Building a park, financed by the donation of a rich philanthropist.
- c. Increasing medical care facilities for lung cancer, financed from tax revenues collected from the personal income tax.
- d. Increasing medical care facilities for lung cancer, financed out of an increase in the cigarette tax.

Answer

- a. Those local residents who will not enjoy the park much will be worse off when their taxes increase; the change is not likely to be Pareto improving.
- b. Since the land was donated the opportunity cost is zero. The move is likely to be Pareto improving.

c. Revenues from the individual income tax have alternative uses to cancer treatment; those people who would have benefited more from the relevant alternatives are worse off. The move is not Pareto improving.

d. If some smokers don't believe that cigarettes cause cancer and also happen not to get cancer, they will not benefit from the cancer facilities and will be worse off under the tax. The move is not Pareto improving.

4. There are three people (A, B, and C) and five possible states of their economy summarized in the table below by the resultant utilities of each of the three people. Which of the states are Pareto optimal?

State	U_A	U_B	U_C
1	10	10	10
2	12	9	7
3	12	10	7
4	11	13	10
5	9	14	14

Answer

- 1 not Pareto optimal (4 is better for all)
- 2 not Pareto optimal (3 is better for B and no worse for A and C)
- 3 Pareto optimal (The only movement that doesn't make A worse off is to 2 which makes B worse off)
- 4 Pareto optimal (The only movements that don't make A worse off are to 2 and 3. Both of these make both B and C worse off.)
- 5 Pareto optimal (Any movement makes both B and C worse off.)

C. Problems. Answer all problems (counts 10% each)

1. Consider two firms A and B are producing lamps using input x and y, with no externality. A has the production function $F_A = x_A + y_A$ and B has the production function $F_B = x_B^{1/2} y_B^{1/2}$. The resource constraint is $x_A + x_B = 10$ and $y_A + y_B = 10$. Suppose the inputs are allocated so that $x_A = 6, y_A = 8$ and $x_B = 4, y_B = 2$. Is this allocation Pareto Efficient? If you say no, please give a way to make Pareto improvement.

Answer:

$$MRTS_{x,y}^A = MP_x^A / MP_y^A = 1$$

$$MRTS_{x,y}^B = MP_x^B / MP_y^B = y_B / x_B = 1/2$$

So, $MRTS_{x,y}^A > MRTS_{x,y}^B$. It is not Pareto optimal.

$x_A = 7, y_A = 7, x_B = 3, y_B = 3$ is a Pareto improvement.

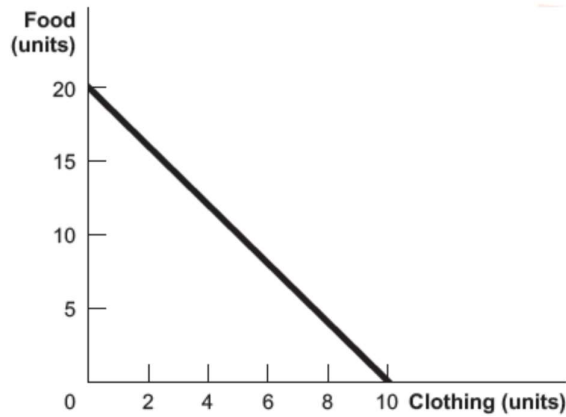
The outputs under the original allocation are $F_A(6,8)=14$; $F_B(4,2)=2\sqrt{2}$.

The outputs under the new allocation are $F_A(7,7)=14$; $F_B(3,3)=3$. Therefore, A has the same output under the new allocation, while B has higher output under the new allocation. So the new allocation is a Pareto improvement.

2. You have €100 to spend on food and clothing. The price of food is €5 and the price of clothing is €10.

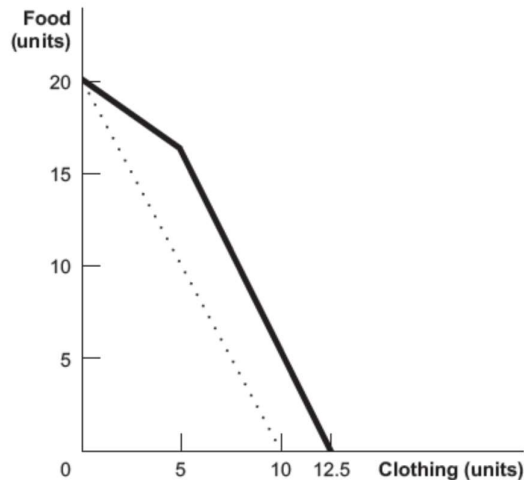
a. Graph your budget constraint.

The food intercept (y in the accompanying figure) is 20 units. If you spend the entire €100 on food, at €5 per unit you can afford to purchase $100/5 = 20$ units. Similarly, the clothing intercept (x) is $100/10 = 10$. The slope, when food is graphed on the vertical axis, will be -2 .



b. Suppose that the government subsidizes clothing such that each unit of clothing is half-price, up to the first 5 units of clothing. Graph your budget constraint in this circumstance.

This budget constraint will have two different slopes. At quantities of clothing less than or equal to 5, the slope will be -1 because 1 unit of food costs the same as 1 unit of clothing (€5). At quantities of clothing greater than 5, the slope will be -2 (if graphed with food on the y-axis), parallel to the budget constraint in a. The point where the line kinks, $(5, 15)$, is now feasible. The new x-intercept (clothing intercept) is 12.5: if you purchase 5 units at €5 per unit, you are left with €75 to spend. If you spend it all on clothing at €10 per unit, you can purchase 7.5 units, for a total of 12.5 units. New budget constraint (bold) and original (dashed):



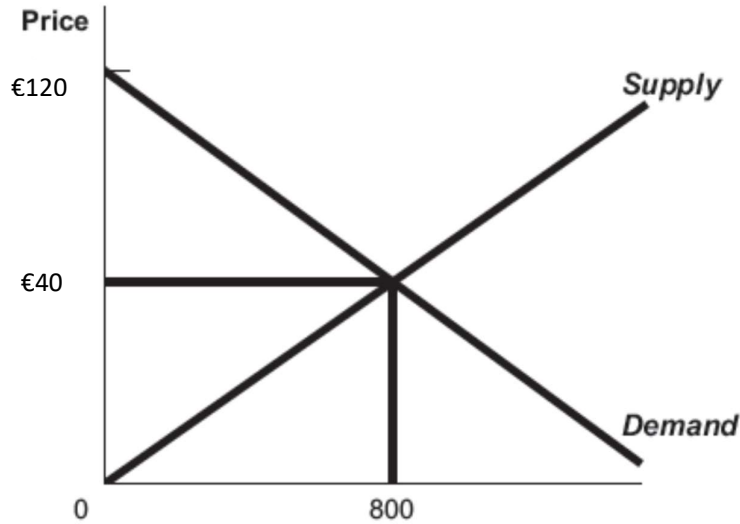
3. Consider a free market with demand equal to $Q = 1,200 - 10P$ and supply equal to $Q = 20P$.

What is the value of consumer surplus? What is the value of producer surplus?

The first step is to find the equilibrium price and quantity by setting quantity demanded equal to quantity supplied. Recall that the condition for equilibrium is that it is the price at which these quantities are equal. From $Q = 1,200 - 10P$ and $Q = 20P$, substitute: $1,200 - 10P = 20P$. Adding $10P$ to each side of the equation yields $1,200 = 30P$.

Dividing both sides by 30 yields $P = 40$. If $Q = 20P$, then in equilibrium $Q = 20(40) = 800$.

Consumer and producer surplus are determined by finding the areas of triangles; area is equal to $\frac{1}{2}$ the base times the height. So $CS = 32,000$ and $PS = 16,000$



4. Consider a two person (I and II), two good (x and y) Exchange Economy. Assuming a total fixed supply of 1 for each of the two goods, and for the utility functions do the following:
- Sketch the shape of the typical indifference curve;
 - In an Edgeworth Box, draw the "Contract Curve" (set of all the Pareto efficient points) for this Economy.

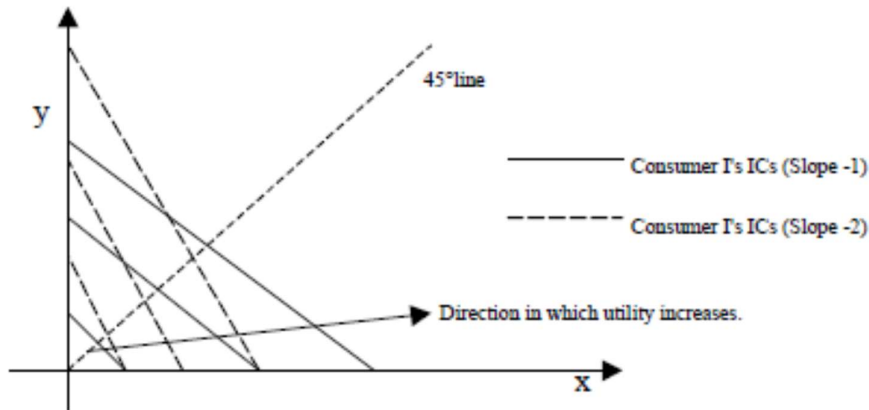
$$U_I(x,y) = x + y$$

$$U_{II}(x,y) = 2x + y$$

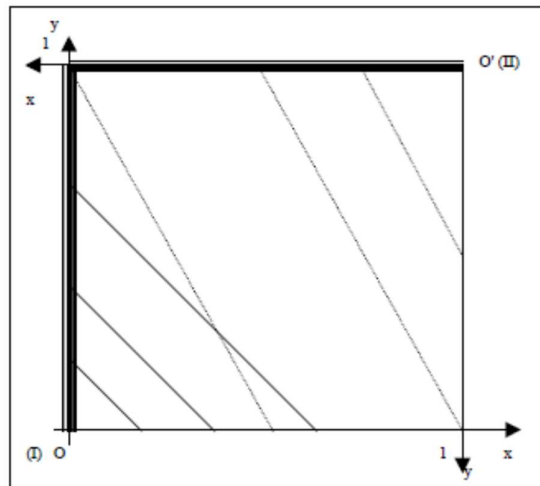
Answer

$$U_I(x,y) = x + y \text{ for a specific utility level, we have: } y = \bar{U}_I - x$$

$$U_{II}(x,y) = 2x + y \text{ for a specific utility level, we have: } y = \bar{U}_{II} - 2x$$



Case C



Contract Curve.
 Consumer I's Indifference Curves.
 Consumer II's Indifference Curves.

5. Consider a case of pure exchange, with no externalities. A has the utility function $U_A = 2X_A + 2Y_A$ and B has the utility function $U_B = X_B Y_B$. The resource constraint is $X_A + X_B = 10$ and $Y_A + Y_B = 10$. Consider the following two allocations. One is $X_A = 1, Y_A = 1$ and $X_B = 9, Y_B = 9$; the other is $X_A = 5, Y_A = 7$ and $X_B = 5, Y_B = 3$. Are these two allocations Pareto Efficient? Explain.

First allocation:

$$MRS_{XY}^A = \frac{MU_X^A}{MU_Y^A} = \frac{1}{1} = 1 \qquad MRS_{XY}^B = \frac{MU_X^B}{MU_Y^B} = \frac{Y_B}{X_B} = 1$$

So

$$MRS_{XY}^A = MRS_{XY}^B$$

It is Pareto optimal

Second Allocation:

$$MRS_{XY}^A = \frac{MU_X^A}{MU_Y^A} = \frac{1}{1} = 1$$

$$MRS_{XY}^B = \frac{MU_X^B}{MU_Y^B} = \frac{Y_B}{X_B} = \frac{3}{5}$$

So

$$MRS_{XY}^A > MRS_{XY}^B$$

It is not Pareto optimal