ECON 1101-58 Fall 2004
ADDITIONAL NOTES #1

SCARCITY AND OPPORTUNITY COST

In the world with scarce resources in order to have something we have to forgo something else. Therefore, any activity we pursue has a cost, which is a cost of lost opportunities (Opportunity Cost, OP). In order to figure out what is the OP of some economic activity (call it A), either you as consumer or some firm is pursuing, we should do the following:

1. Consider *all* resources available to the consumer or firm (all time, all money, all possessions). Consider the set of all alternatives that the consumer or the firm have. Namely, all possible ways to spend *all* of the resources. Each alternative activity has a value (in terms of utility for consumers and it terms of profit for firms).
2. Exclude the activity A from this set and find the alternative with the biggest value (so it is the alternative activity with the biggest value and it is not A). *This value is your Opportunity Cost*.

In the set of all alternatives there is the activity with the biggest value (call it B) and the alternative with the second biggest value (call it S). Therefore, we can have only two possible levels of Opportunity Costs: 1) if you are pursuing the best activity: *your opportunity cost is the value of the second best alternative S*; 2) if you are *not* pursuing the best activity: *your opportunity cost is the value of the best alternative B.*

(University Example): Suppose there only two types of resources: time and money. The set of alternatives consists of the following things: Alternative1) spend all time on studying and all money on paying tuition; Alternative2) spend all time on working and all money on buying SUV; Alternative3) spend all time on sleeping and throw all money out of the window; etc…. Suppose that you attach the biggest utility out of all alternatives to the Alternative1 and second best utility to the Alternative2. Then your OP of going to school is the utility of Alternative2 and your OP of sleeping and throwing money away is the utility of Alternative1.

So why are we so interested in this stuff? Because this tells us if the resources are spent efficiently or not. When you pursue the alternative with the biggest possible utility (profit) you forgo the smallest possible amount of utility (profit): your OP in this case is the smallest! Notice that *any* activity has positive OP, since we are living in the world with limited resources.

FIRM

DEF **Bundle**. Bundle of goods (outputs) or bundle of resources (inputs) is just the row of numbers which specifies the amount of each single input (output). For example: (5 apples; 1 hour of time; 3 bananas) is a bundle.

DEF **Firm**. Firm is a transformation process. It takes in an input bundle of resources and spits out the output bundle of goods according to the rule of the process.

So in order to define a firm we should specify: 1) what are the inputs; 2) what are the outputs; 3) for each bundle of inputs, what are the bundles of outputs that can be produced from these inputs.

DEF **Production Possibility Frontier (PPF)**. This is the set of all output bundles that can be produced given some fixed input bundle.

So according to our definitions the firm is completely defined by all pairs (input bundle; PPF corresponding to this input bundle).

DEF **Efficiency of Production**. A firm is producing efficiently if it uses all available resources and produces maximum amount of output possible.

DEF2 **Efficiency of Production**. A firm is producing efficiently (or the output bundle A of the firm is efficient) if there is no other output bundle B which can be produced by the firm such that the amount of all single outputs in B is as big as in A and the amount of one output in B is strictly bigger than in A.

Notice that efficient output bundles always lie on the boundary of PPF (why?).

COMPARATIVE ADVANTAGE

DEF **Absolute advantage (AA).** Firm A has AA in producing good G over the firm B if A can produce one unit of the good G using less amount of all resources needed for that than firm B.

DEF **Comparative advantage (CA).** Firm A has CA in producing good G relative to firm B if A has smaller Opportunity Cost of producing one unit of good G.

CONSUMER BEHAVIOR

DEF **Consumer**. Consumer is preferences.

DEF **Preferences**. Preferences are the ranking over all possible bundles of goods.

Suppose we have only two goods in our model. Then the preferences are fully defined if given *any* two bundles (say (1 banana; 2 apples) and (2 bananas; 1 apple)) you can say if first bundle is preferred to the second or vice versa.

DEF **Utility**. Utility of the consumer is the number attached to every possible bundle of goods.

So utility corresponds to some preferences if given any two bundles A and B we have u(A) > u(B) whenever A is preferred to B (by u(x) I mean the number attached to the bundle x).

To make the analysis more interesting let's add more structure to our preferences. Suppose that the preferences of the consumer are such that:

1. Given all other goods fixed, he always prefers more of any one good to less (the bundle (*x* bananas; *y* apples) is always preferred to (*x* bananas; *y+1* apples) for any *x*, *y*).
2. When the consumer has a very little amount of some good – he is willing to sacrifice a lot of other goods to get more of that (water and diamonds in the desert: if you're dying of thirst you're willing to sacrifice diamonds for water).
3. When the consumer has too much of one good, adding more of it does not increase his utility significantly. (notice that here adding more stuff cannot decrease the utility since it would contradict the first assumption)

DEF **Indifference Curve (IC)**. Is the set of bundles which have the same utility.

So we have one indifference curve for each *utility level* (say, for utility equal to one we have IC1, for utility equal to 2 we have IC2 etc…).

Notice that given assumptions 1,2,3 above we get additional properties of the preferences which satisfy them: The bundles with more or less equal amount of all goods are preferred to the bundles where there is a lot of one good and very small amount of all other goods.

DEF **Perfect Compliments (PC)**. Perfect Compliments are the goods which cannot be used one without the other. For example left, right shoes – you cannot use just right shoe without the left shoe etc.

The indifference curves of perfect compliments look like right angles (L-shaped). Notice that PC partially violate assumption 1 (adding just one good and keeping all others fixed doesn't change the utility), violate assumption 2 (you get the same additional utility from adding more of one good wherever you are) and doesn't violate assumption 3.

DEF **Perfect Substitutes (PS)**. These are the goods with the property that any amount A of one good brings the same utility as some amount B of the other good. For example: Pepsi and Coke – they give you the same utility.

The indifference curves of perfect substitutes look like straight lines with negative slope. Notice that PS are in line with assumption 1, but violate assumptions 2 and 3.

Notice that PC and PS are the properties of the *preferences alone and nothing else* (compare with normal/inferior goods below).

BUDGET CONSTRAINT

Now, after we described what consumer is, let's see how he can deal with the problem of making decisions under constraints. What are they? Consumer's *Income* is limited.

In the two-goods economy budget constraint looks like a straight line with negative slope.

DEF **Normal good**. The consumption of the normal good grows when the income grows.

DEF **Inferior good**. The consumption of the inferior good falls when the income grows and *there are normal goods which substitute the inferior good under consideration*.

Notice that Normality/Inferiority are the properties of the *consumer's denamand* (which depends on preferences, budget constraint and the availability of substitutes).

For example, consider the economy with only one good, namely SPAM. So all the consumer can do is to spend money on it. When the income grows, the consumer will buy *more* SPAM (so that his preferences are consistent with assumption 1 above). Therefore in this economy SPAM is normal good. Now consider the economy with two goods: SPAM and Decent Food. When the income grows the consumer starts to buy *more* Decent Food and *less* SPAM. Therefore, in the second economy SPAM is inferior and Decent Food is normal good. Notice that in this example SPAM became inferior because the substitute became available (not because the preferences changed).

EFFICIENCY OF ALLOCATION OF GOODS

In order to talk about the efficiency of the economies we need to think about all possible outcomes and be able to compare them. To do this we introduce the following concept. Suppose I am the *Benevolent Social Planner (SP)*. I can do anything: 1) I can make firms produce whatever amount of outputs I prefer (but still according to the firms' internal transformation processes which I cannot change!); 2) I can allocate the goods among consumers in the way I want (again, consumers have their own preferences over the bundles of goods, which I cannot change). I am Omniscient: I know the firms' transformation processes (see definition above); I know the preferences of all consumers.

Suppose I am to allocate certain amount of goods among people (given that I know their preferences and utilities). What are the efficient ways to do it?

DEF **Allocation**. Allocation of the goods among consumers is just the bundle of the goods specified for each of them.

DEF **Pareto Efficiency**. The allocation of the goods in the economy is Pareto Efficient if there is no other allocation (of the same amount of goods) in which everybody gets at least as much utility and one person gets strictly more utility.

This basically says the same thing as the definition of firms' production efficiency: *do not waste stuff*. However it does not tell us how exactly we should allocate the goods among consumers. For example, if we have *n* people in the economy and their preferences satisfy assumption 1 above, then if I give all the goods to the consumer #1 this will be Pareto Efficient, because in any other allocation I have to take some goods from the consumer #1 in order to give them to the others consumers. This will decrease the utility of the first consumer!

DEF **Utilitarian Efficiency**. An allocation of the goods in the economy is Utilitarian Efficient if the sum of the utilities it generates is the biggest among all possible allocations.

Example. Suppose I have two people X and Y in the economy and two goods A and B. I am a benevolent social planner and I have to distribute 10 units of A and 10 units of B between two people. I know that the utility of the bundle (a,b) where a is the amount of good A and b is the amount of good B is the following:

$$\text{Person X: } u_x(a,b) = 2a + b$$
$$\text{Person Y: } u_y(a,b) = a + 2b$$

Question: Is the allocation (5,5) to X and (5,5) to Y Pareto efficient?
Answer: NO. I can find the allocation which gives every person at least the same utility and someone bigger utility. The allocation (5,5) to X, (5,5) to Y gives the following utilities to two people:

Utility of X: $u_x(5,5) = 2*5 + 5 = 15$
Utility of Y: $u_y(5,5) = 5 + 2*5 = 15$

Now consider the allocation (10,0) to X and (0,10) to Y (notice, in both cases I divide (10,10) between two guys). This allocation gives the following utility:

Utility of X: $u_x(10,0) = 2*10 + 0 = 20$
Utility of Y: $u_y(0,10) = 0 + 2*10 = 20$

So both of them are better of (they had 15 each, now they have 20 each).

Question: Is the allocation (5,5) to X and (5,5) to Y Pareto efficient?
Answer: NO. Consider the sum of the utilities:

$$u_x(5,5) + u_y(5,5) = 15 + 15 = 30$$

Now consider the allocation (10,0) to X and (0,10) to Y. The sum of the utilities is

$$u_x(10,0) + u_y(0,10) = 20 + 20 = 40$$

40 > 30. Therefore, the allocation (5,5) to X and (5,5) to Y does not maximize the sum of utilities. Thus is not utilitarian efficient.