Group Work

Econ 50 - Lecture 4

January 14, 2016

1. **Completeness and transitivity**

   Consider a group of people A, B, C and the relation "at least as tall as," as in "A is at least as tall as B." Is this relation transitive? Is it complete?

   The relationship is transitive because if A is at least as tall as B and B is at least as tall as C, then A must be at least as tall as C.

   It is complete because any two people, regardless of their height, may be compared using this relation.

2. **Drawing indifference maps**

   Draw an indifference map for each of the following pairs of goods.

   (a) Kittens and terrorist attacks (assuming kittens are good and terrorist attacks are bad)

   Suppose kittens are plotted on the horizontal axis, and terrorist attacks are plotted on the vertical axis. Let point "A" be an arbitrary point in the space (with a positive number of both kittens and terrorist attacks) and think about the monotonicity assumption. In this case, instead of the preferred area being above and to the right of point A, it's below and to the right (since "below" = "fewer terrorist attacks" and "right" = "more kittens." Similarly, the dispreferred area (i.e., the set of points dispreferred to point A) must be above and to the left of point A. The indifference curves therefore have a positive slope, with the direction of preference being down and to the right. See Varian, Figure 3.5 for a similar example.

   (b) Ebola cases and terrorist attacks (assuming both of these things are bad)

   Suppose terrorist attacks are plotted on the horizontal axis, and ebola cases are plotted on the vertical axis. In this case both "goods" are in fact "bads." So again, if we choose an arbitrary point A, the preferred area is the set of points below and to the left of A, and the dispreferred area is the area above and to the right of A. The indifference curves have a negative slope, indicating that you might very well face a policy tradeoff: that is, you might ask yourself how many ebola cases you would be willing to "trade off" for a terrorist attack. Put another way, if you think about the indifference curve passing through point A, the slope of that indifference curve would indicate the number of ebola cases you would be willing to allow to occur in order to prevent one terrorist attack.

   (c) Nickels and dimes

   Suppose nickels are plotted on the horizontal axis, and dimes are plotted on the vertical axis. No matter where you are in the space, you are willing to trade one dime for two nickels. Therefore all the indifference curves are straight lines with a slope of $-\frac{1}{2}$, with the direction of preference being up and to the right. See B&B, Figure 3.13 for a similar example.

   (d) Nickels and quarters

   This is the same question as nickels and dimes, but now the slope of each indifference curve is $-\frac{1}{5}$, indicating that you would be willing to trade one quarter (on the vertical axis) for five nickels (on the horizontal axis).

(e) Hamburgers per day and french fries per day (make each axis go to 20).

The assumption here (stated in class) was that you actually had to eat all the burgers and fries. On the assumption that nobody would prefer to eat 20 burgers in a day, the idea here is that monotonicity does not hold in this case. In this case we say that there is a "satiation point" or "bliss point" which is your most preferred bundle of burgers and fries. If you think of indifference curves as being like contour lines on a topographical map, this bliss point would represent a mountaintop, with concentric indifference curves around it. The direction of preference would be toward the mountaintop. See Varian, Figure 3.7 for a similar example.

Note that the "problem" of potential satiation goes away if you constrain yourself to the lower-left hand section of the choice space. That is, as long as you're well below and to the left of the satiation point, you can sill examine relevant tradeoffs in a region where indifference curves have a negative slope and the directions of preference are up and to the right.

(f) Kale and bacon, for a vegetarian who just throws away any bacon they get

In this case our assumption is that the consumer only cares about the amount of kale they eat; so for any amount of kale, the amount of bacon is irrelevant. In this case we call bacon a "neutral" good. If kale is plotted on the horizontal axis and bacon is plotted on the vertical axis, the indifference curves would be vertical, indicating that the vegetarian would be willing to give up any amount of bacon for an additional bit of kale. See Varian, Figure 3.6 for a similar example.

3. **Indifference curve facts**

(a) Can two indifference curves cross? Why or why not?

No; this would violate transitivity. See B&B, Figure 3.7 and the accompanying discussion.

(b) Can indifference curves be "thick"? That is, can a whole region be considered indifferent? Why or why not?

No; this would violate monotonicity. See B&B, Figure 3.8 and the accompanying discussion.

4. **Marginal Rate of Substitution**

(a) What is the MRS of the indifference curves in question 2(c) and 2(d)?

We write the MRS as a positive number, even though the slope is negative; that is, the MRS is the "amount of good Y a consumer would be willing to give up for another unit of good X." Therefore, since the slope of the indifference curves is $-\frac{1}{2}$ and $-\frac{1}{5}$ for questions 2(c) and 2(d), respectively, the MRS in those cases is $\frac{1}{2}$ and $\frac{1}{5}$.

(b) Suppose that "good Y" is "money spent on all other goods except good X." In this interpretation, what is the value of the MRS?

In this case, the "amount of good Y" is equivalent to "the amount of money spent on other things." So in this interpretation, the value of the MRS is "the amount of money the consumer would be willing to not spend on other things in order to get an additional unit of good X." Put more simply, it's the consumer's (marginal) willingness to pay for an additional unit of good X.