

Chapter 3

Consumer Preferences



Preferences

- We assumed that an individual has preferences defined to over bundles of goods
- Assumptions:
 - Preferences are complete
 - Preferences are transitive
 - More is better



Utility functions

- Preferences can be represented by utility functions
 - Consumption bundles that are ranked higher according to an individual's preference ordering are assigned higher utility numbers



Cardinal and Ordinal Interpretations



- Utility functions can have Cardinal and ordinal interpretations
 - The ordinal interpretation only attaches meaning to a consumer's ranking of bundles
 - The cardinal interpretation attaches meaning to the size of differences in utility numbers associated with different bundles of goods

A Utility Function Example



- For the case of 2 goods, utility could be represented as a mathematical function:

$$U = U(x, y)$$

$$U = \sqrt{xy}$$

$$U = x^{0.25}y^{0.75}$$

Marginal Utility



- For small changes in x , the marginal utility of x is defined as:

$$MU_x = \left. \frac{\Delta U}{\Delta x} \right|_{y=\bar{y}}$$

- Similarly, the marginal utility of y is defined as:

$$MU_y = \left. \frac{\Delta U}{\Delta y} \right|_{x=\bar{x}}$$

Marginal Utility: Example



- If the utility function is:

$$U = x^{0.25} y^{0.75}$$

- Then the marginal utility of x is given by:

$$\frac{\partial U}{\partial x} = 0.25x^{-0.75} y^{0.75}$$

Utility Function



x	y	U	MU _x
1	10	5.623413	1.405853
2	10	6.687403	0.835925
3	10	7.400828	0.616736
4	10	7.952707	0.497044
5	10	8.408964	0.420448
6	10	8.801117	0.366713
7	10	9.146912	0.326675
8	10	9.457416	0.295544
9	10	9.740037	0.270557
10	10	10	0.25

Diminishing Marginal Utility



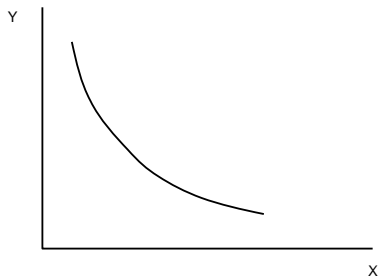
- It is sometimes argued that as x increases, holding y fixed, that the marginal utility of x will decline
- This is the principle of diminishing marginal utility – the interpretation is that as the quantity x rises, the increment to satisfaction produced by an additional unit will fall
 - This is a plausible idea, but it requires a cardinal interpretation of the utility function.

A Diagram

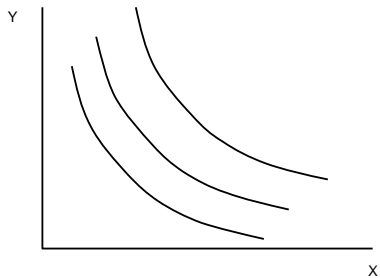


- Assume that a consumer's preferences are defined over bundles consisting of just 2 goods, and that quantities of these goods are infinitely divisible
 - For this case, there is a convenient diagram for representing preferences (and utility)
- An indifference curve plots bundles to which the consumer is indifferent; i.e., bundles that yield equal utility to an individual

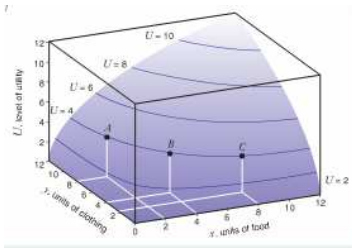
An Indifference Curve for an Individual



Indifference Curves for an Individual



Utility Function and Indifference Curves



Properties of Indifference Curves



- Properties of Indifference Curves
 - Downward sloping
 - Non-intersecting
 - One indifference curve through each point
 - Indifference curves are not “thick”

Marginal Rate of Substitution



- As we move a small interval along an indifference curve, the slope of the indifference curve ($MRS_{x,y}$) is equal to the (negative) of a ratio of marginal utilities:

$$\Delta U = MU_x (\Delta x) + MU_y (\Delta y)$$

$$0 = MU_x (\Delta x) + MU_y (\Delta y)$$

$$\frac{\Delta y}{\Delta x} = - \frac{MU_x}{MU_y}$$

Diminishing Marginal Rate of Substitution



- If indifference curves are bowed in toward the origin, then we observe a diminishing marginal rate of substitution

Utility Functions: Special Cases



- Examples:

$$U = P + 2W$$

$$U = 10 \min(R, L)$$

$$U = v(x) + by$$

The End