Topic 1
Consumer Preferences

Consumer Preferences

- Consumer Preferences tell us how the consumer would rank any two baskets of goods, assuming these basket were available to the consumer at no cost.

Consumer Preferences Continued

Three Standard Assumptions of Preferences

1. Completeness
2. Transitivity
3. Monotonicity

Consumer Preferences Continued

Completeness

Consumer Preferences Continued

Transitivity

Consumer Preferences Continued

Monotonicity

Types of Ranking

Example:

- An ordinal ranking
- A cardinal ranking

The Utility Function

- These three assumptions about preferences allow us to represent preferences with **a utility function**.
- A utility function…
  - measures the level of satisfaction a consumer receives from any basket of goods and services.
  - assigns a number to each basket so that more preferred baskets get a higher number than less preferred baskets.

Implications of Utility Function

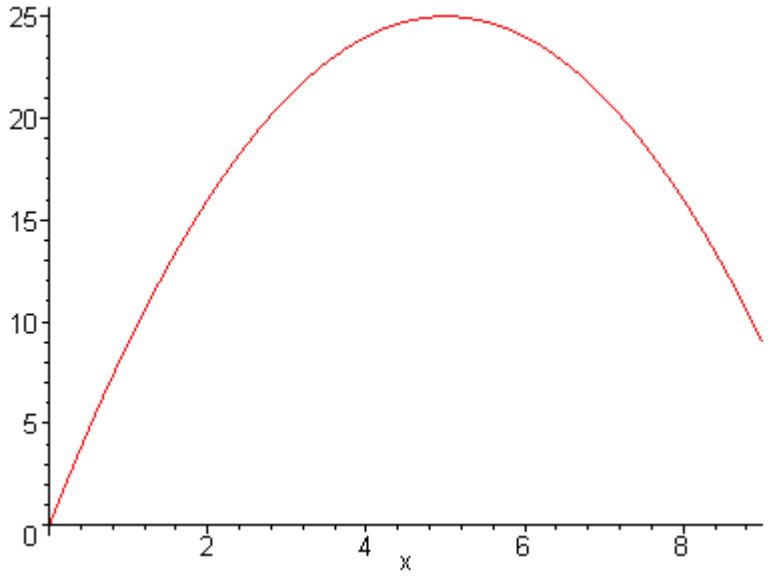
- It is an ordinal concept.
  - The number that the function assigns has no significance.

- Utility is not comparable across individuals.

Implications of Utility Function Continued

- Any transformation of a utility function that preserves the original ranking of bundles is an equally good representation of preferences.

Preferences with a Single Good



Consider a simple scenario where a consumer purchases only one good, hamburger (H).

Let the utility function be

$$U(H) = 10H - H^2$$

Marginal Utility – a Single Good

- Marginal Utility of a good y is the additional utility that the consumer gets from consuming a little more of y
  - In other words, the rate at which total utility changes as the level of consumption of good y rises
- $MU_y = \frac{\Delta U}{\Delta y}$
- It is the slope of the utility function with respect to y

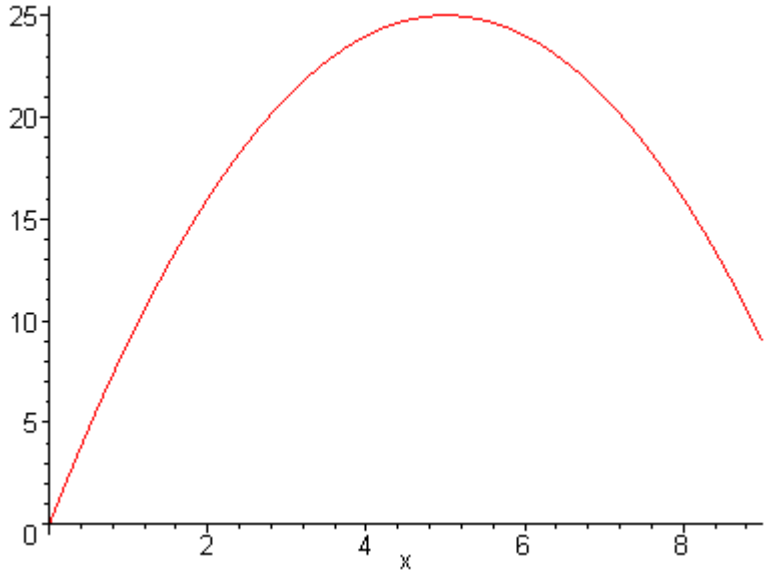
Marginal Utility Example

Example of $U(H)$ and MU_H

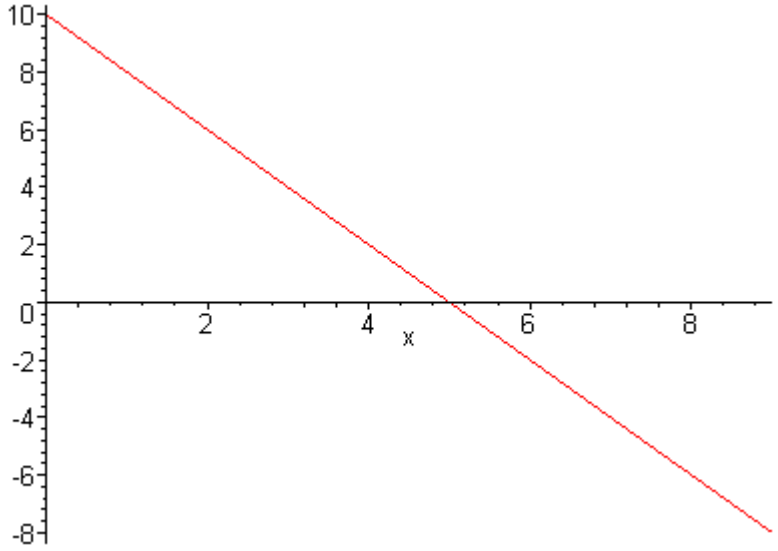
$$U(H) = 10H - H^2$$
$$MU_H = 10 - 2H$$

H	H^2	U(H)	MU_H
2	4	16	6
4	16	24	2
6	36	24	-2
8	64	16	-6
10	100	0	-10

Marginal Utility Example Continued



$U(H) = 10H - H^2$



$MU_H = 10 - 2H$

Marginal Utility Example Continued

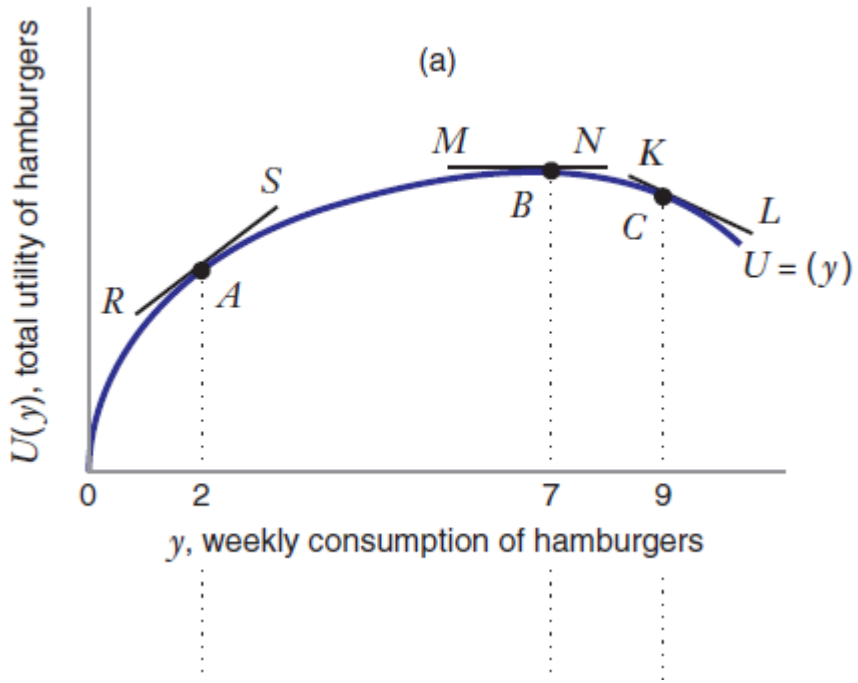
- When MU > 0,
- When MU = 0,
- When MU < 0,

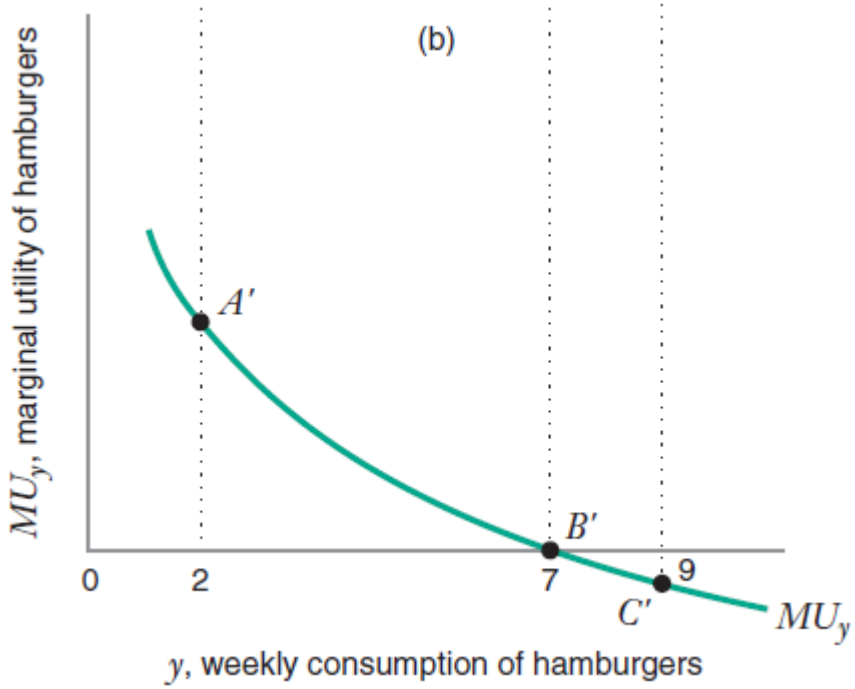
Principle of Diminishing Marginal Utility

- The DMU principle states that the marginal utility falls as the consumer consumes more of a good.

- Mathematically,

Principle of Diminishing Marginal Utility





Preferences with Multiple Goods

Consider the consumer choosing to buy goods x and y.
The consumer's utility function is $\mathrm{U}(\mathrm{x},\mathrm{y}) = \sqrt{xy}$.

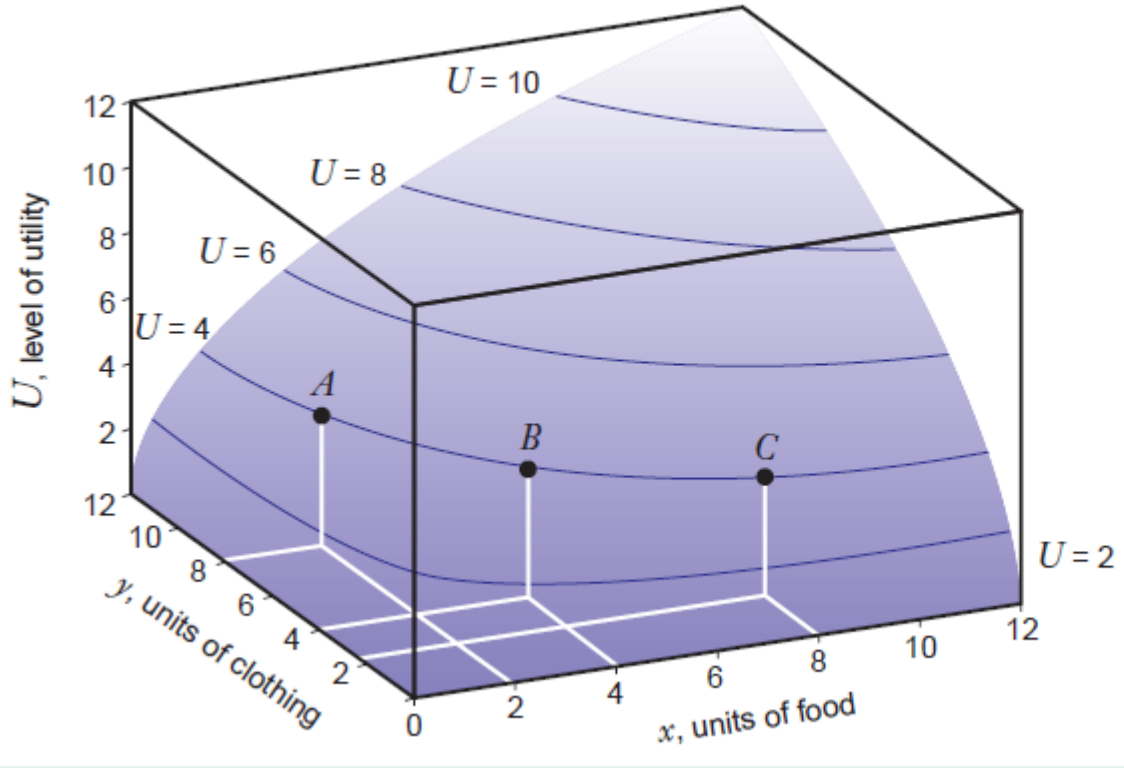


FIGURE 3.4 Graph of the Utility Function $U = \sqrt{xy}$
The level of utility is shown on the vertical axis, and the amounts of food (x) and clothing (y) are shown, respectively, on the right and left axes. Contours representing lines of constant utility are also shown. For example, the consumer is indifferent between baskets A, B, and C because they all yield the same level of utility ($U = 4$).

Marginal Utility – Multiple Goods

$U = \sqrt{xy}$

- MU_x =

- MU_y =

- Is more better for X and Y?

- Do X and Y have DMU?

Marginal Utility – Multiple Goods

LEARNING-BY-DOING EXERCISE 3.2

Marginal Utility That Is Not Diminishing

Some utility functions satisfy the assumption that more is better, but with a marginal utility that is not diminishing. Suppose a consumer's preferences for hamburgers and root beer can be represented by the utility function $U = \sqrt{H} + R$, where H measures the number of hamburgers consumed and R the number of root beers. The marginal utilities are

$$MU_H = \frac{1}{2\sqrt{H}}$$

$$MU_R = 1$$

Problem

(a) Does the consumer believe that more is better for each good?

(b) Does the consumer have a diminishing marginal utility of hamburgers? Is the marginal utility of root beer diminishing?

Indifference Curves

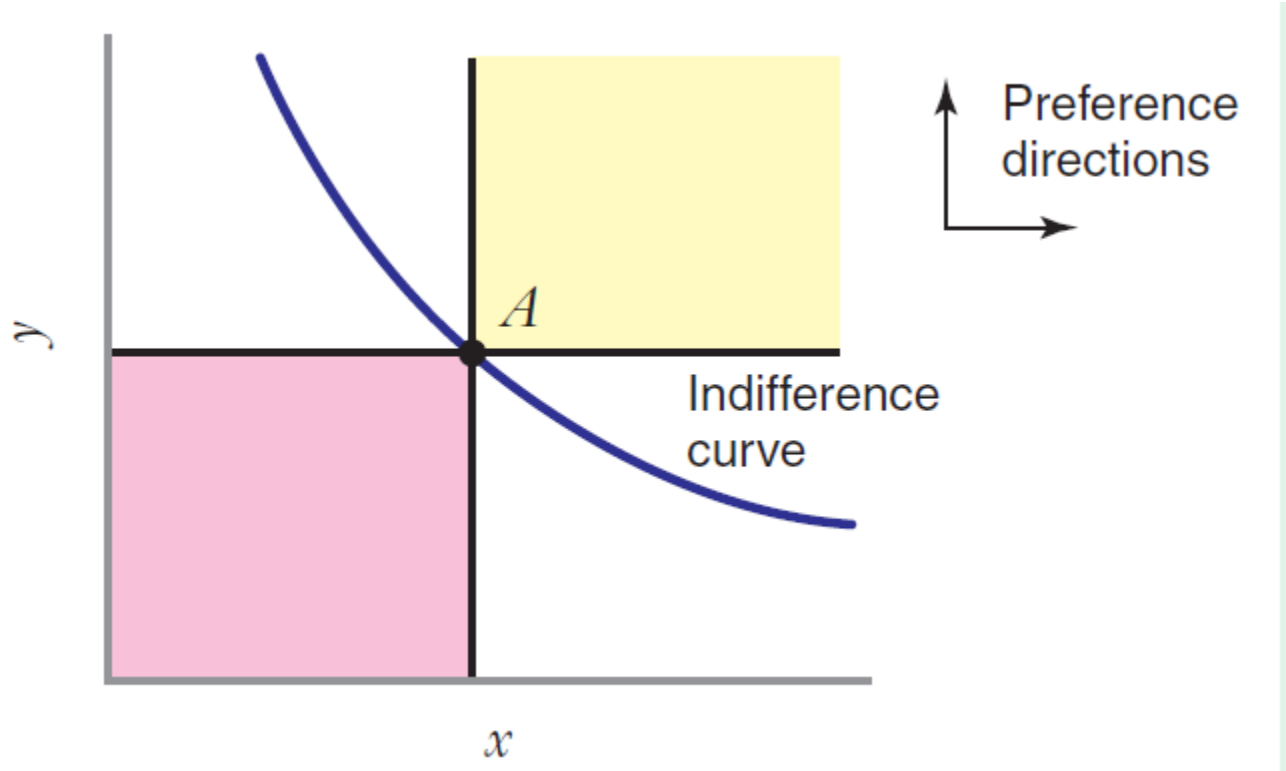
- An indifference curve or indifference set: The set of all baskets for which the consumer is indifferent

- An indifference map : Illustrates a set of indifference curves for a consumer

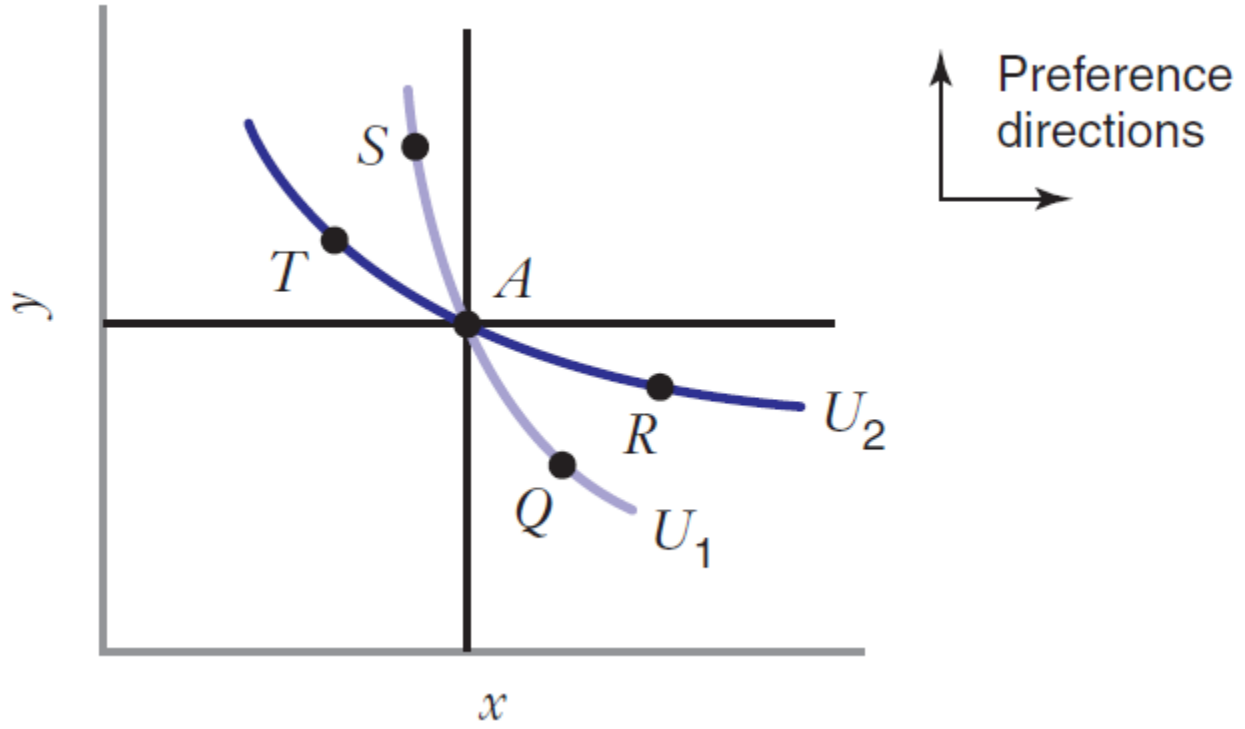
Indifference Curves: Key Properties

1. Monotonicity
   - Indifference curves have negative slope
2. Transitivity
   - Indifference curves do not intersect
3. Completeness
   - Each basket lies on only one indifference curve
4. Indifference curves are not “thick”

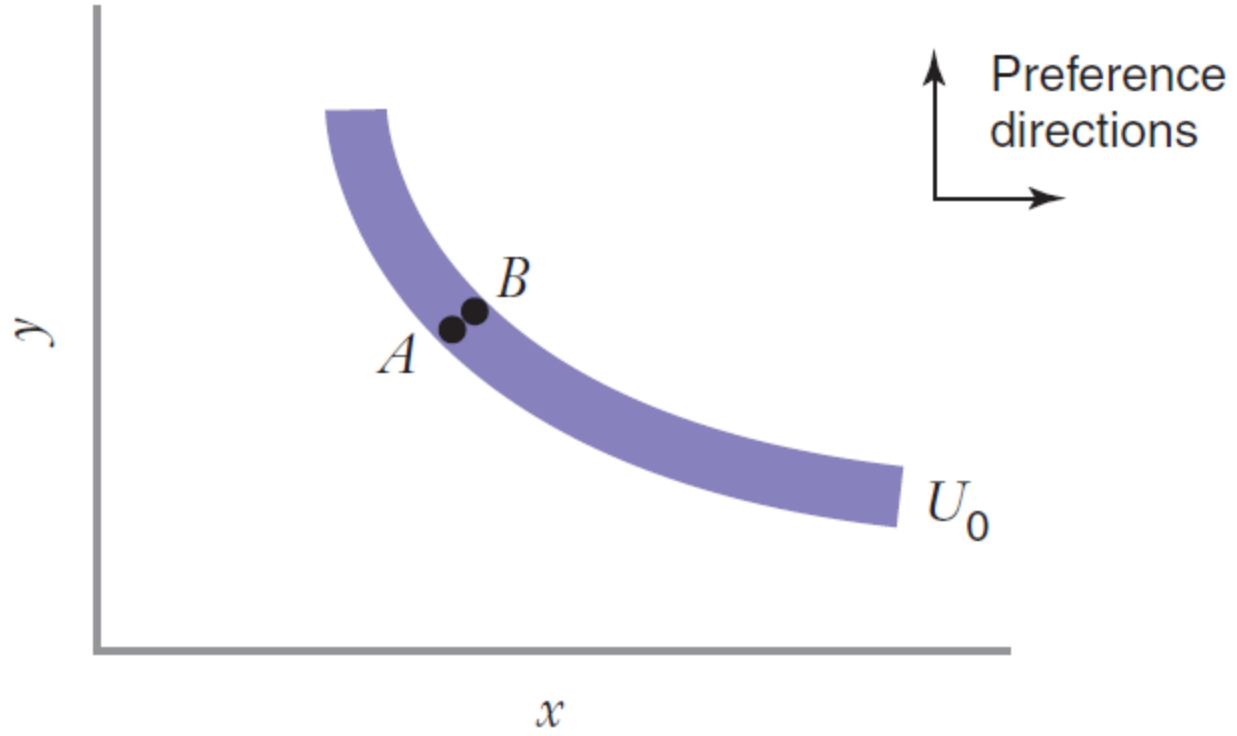
Indifference Curves have Monotonicity



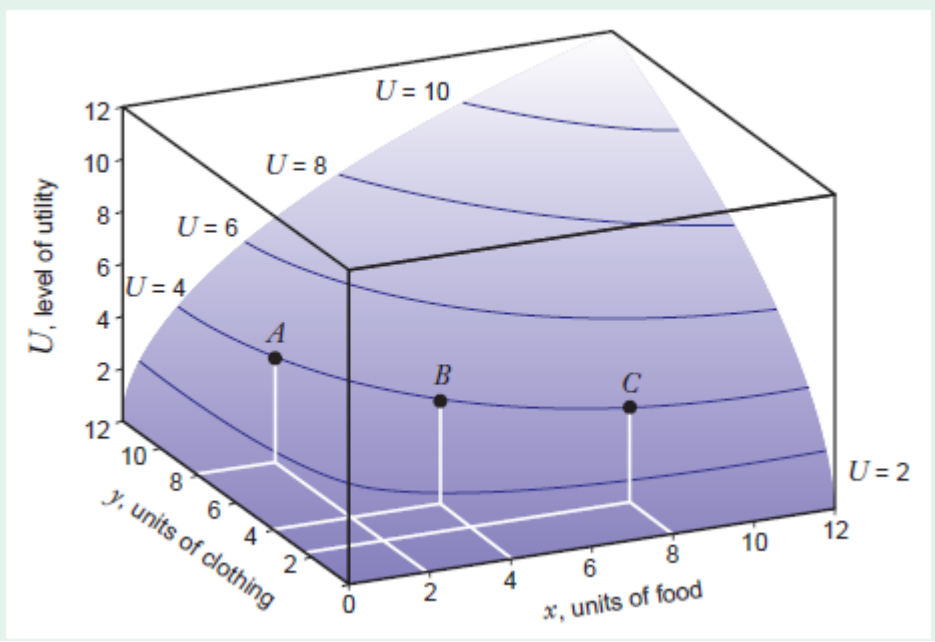
Indifference Curves Cannot Intersect

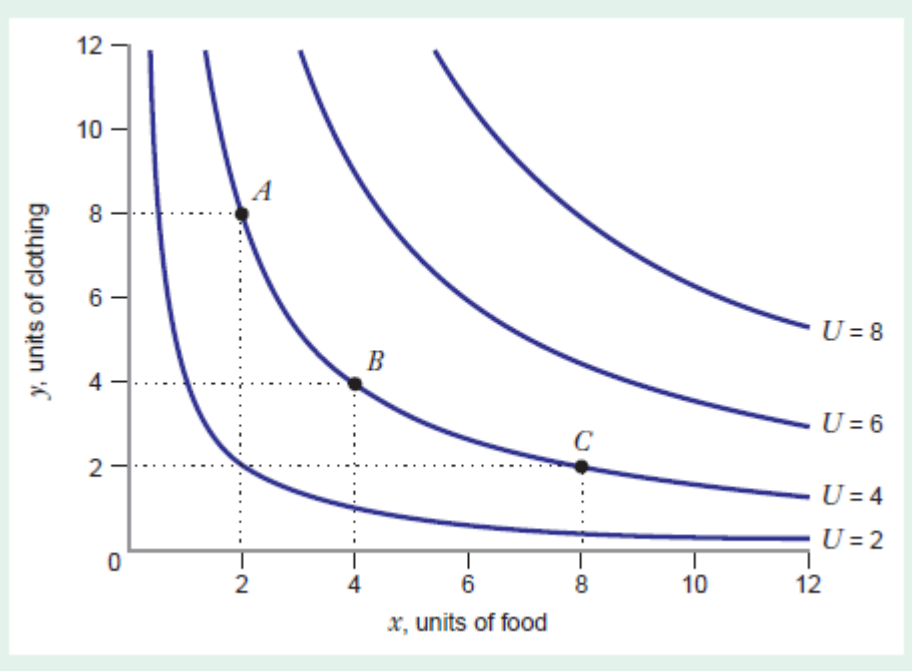


Indifference Curves are not “Thick”



Example: Utility and indifference curves





Example: Utility and indifference curves

Exercise: Given U = X + Y, draw IC's for U = 2 and U = 4.

Marginal Rate of Substitution

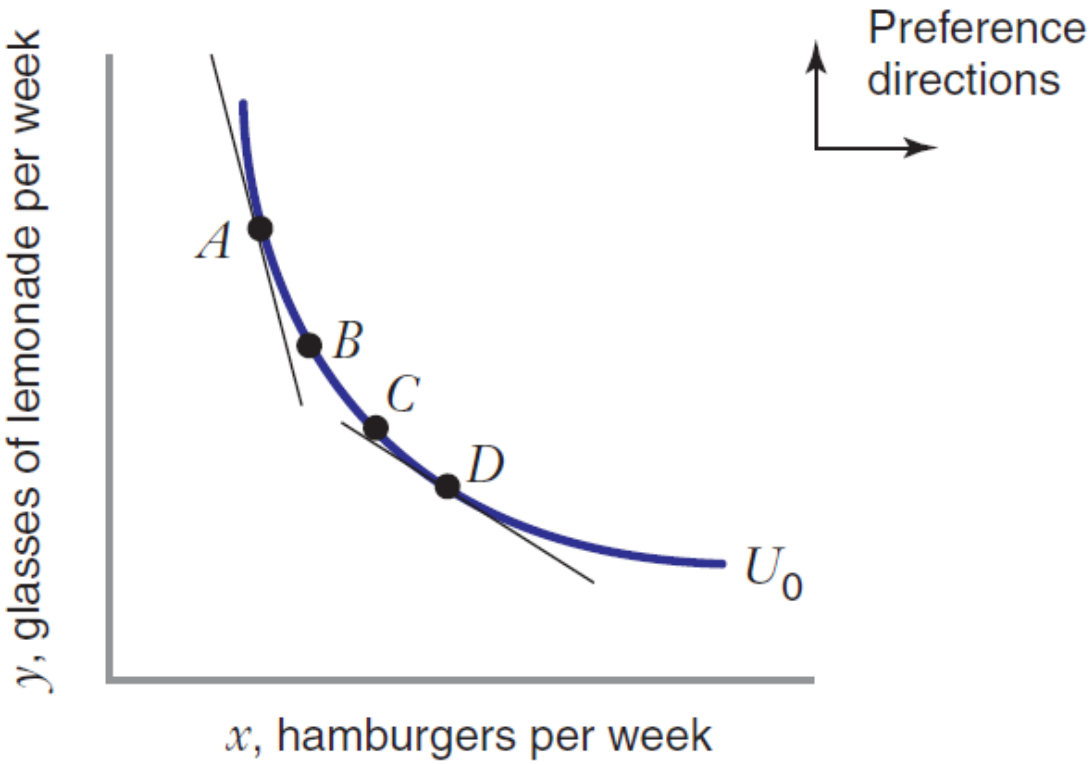
- The marginal rate of substitution (MRS):

Marginal Rate of Substitution Continued

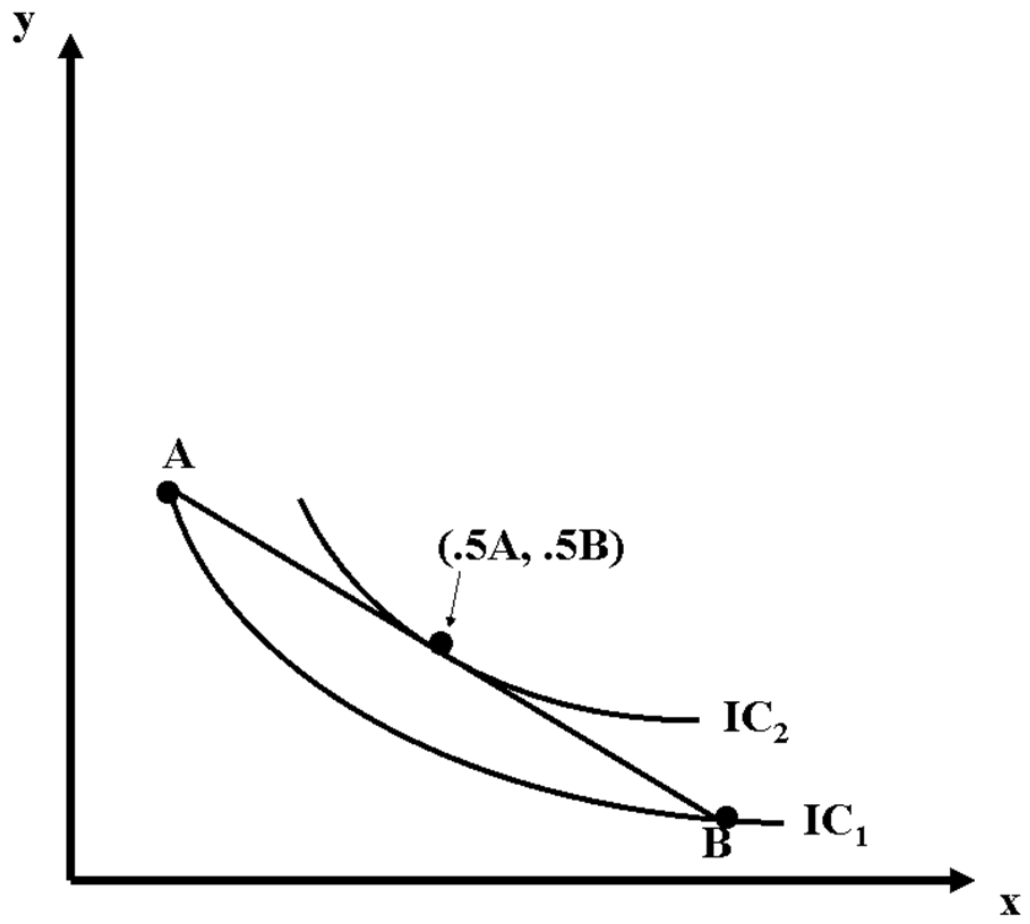
- It is the negative of the slope of the indifference curve
- $MRS_{x,y} = {}^{-\Delta y}/_{\Delta x}$ for a constant level of preference

Proof

Diminishing MRS



Diminishing MRS Continued



Increasing MRS

LEARNING-BY-DOING EXERCISE 3.4

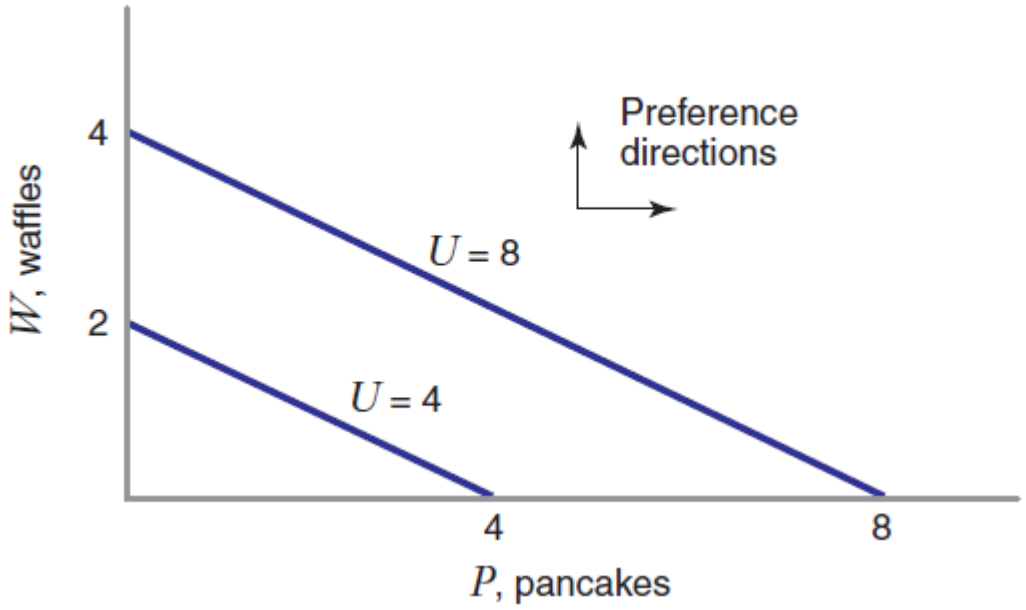
Indifference Curves with Increasing $MRS_{x,y}$

Problem Suppose a consumer's preferences between two goods (x and y) can be represented by the utility function $U = Ax^2 + By^2$, where A and B are positive constants. For this utility function $MU_x = 2Ax$ and $MU_y = 2By$. Show that $MRS_{x,y}$ is increasing.

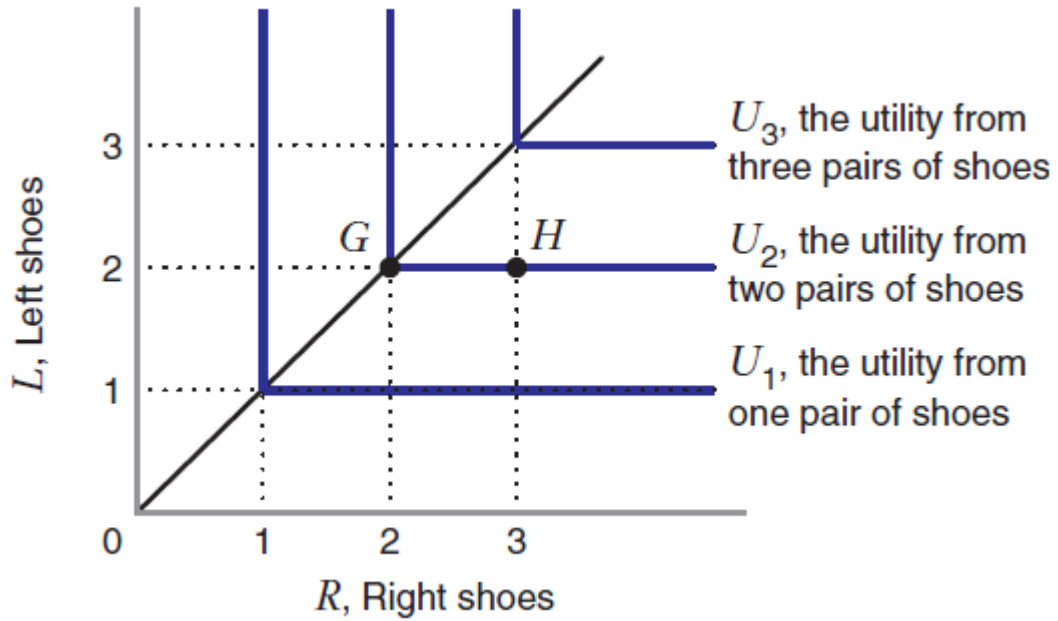
Special Functional Forms

- Perfect substitutes
- Perfect complements
- Bad Goods
- Neutral Goods
- Bliss Point
- The Cobb-Douglas utility function
- Quasilinear utility functions

Perfect Substitutes



Perfect Complements

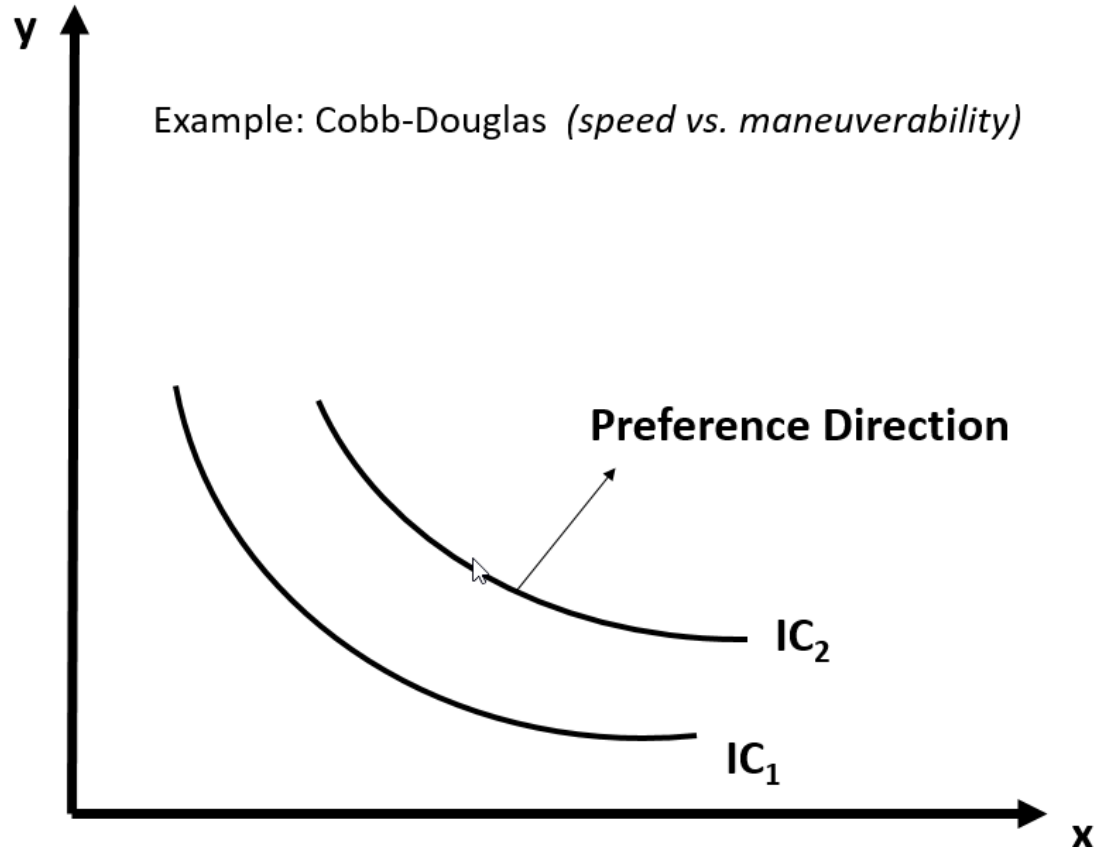


Bad Goods

Neutral Goods

Bliss Point

Cobb-Douglas Utility Function



Quasilinear Utility Function