Intermediate Microeconomics - Preferences and Utility (Ch3/4)

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Consumption Theory

Components Market Equilibrium

- Demand side: **Consumer Theory**
- Supply side: Producer Theory
- Equilibrium

Consumer Theory

- Simple intuition: assumes that consumers choose the best (Ch3, preference) bundle of goods they can afford (Ch2).
- Budget Constraint: describes what a consumer can afford
- Preferences: describe what a consumer thinks as “the best”

Outline

Describing Preferences

- Translating verbal statements into economic notation
- Establishing assumptions about rational preferences

Illustrating Preferences

- Using indifference curves

Utility Representation of Preferences

- Defining the utility function

Preference Refers to How Individuals Compare Options

Example: Ranking My Professors

- Each professor is a **bundle** of attributes (lecture quality, personality).
- Suppose their attributes are: **Prof. Zhao**: (9 stars, 5 stars); **Prof. Qian**: (8 stars, 4 stars); **Prof. Sun**: (7 stars, 9 stars)

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Your ranking reflects your **preference**

- The ranking comes from binary comparisons: *"I prefer Prof. Zhao over Prof. Qian, Prof. Qian over Prof. Sun, and so on."*

How do you determine the ranking?

- Based on **satisfaction**: *"Prof. Zhao gives me the most satisfaction, followed by Prof. Qian, then Prof. Sun, etc."*
- **Utility** is a way to measure satisfaction. (Thus, rating professors is possible.)

Translating Verbal Statements into Economic Notation

Strictly Preferred ($\succ$), Weakly Preferred ($\succeq$), and Indifferent ($\sim$)

1.	"I like A more than B"	$A \succ B$	A is strictly preferred to B (by me)
2.	"I like B more than A"	$B \succ A$	I strictly prefers B to A
3.	"I like A and B the same"	$A \sim B$	A is indifferent to B
(4.)	"I think A is at least as good as B"	$A \succeq B$	A is weakly preferred to B

Q: Can One Symbol Represent All (Three) Possible Comparison Outcomes?

- Use $\succeq$

How Do You Describe Your Satisfaction Level (Utility)?

- The **utility function** assigns a numerical value to each bundle to represent your satisfaction level.
- $A \succeq B \Rightarrow U(A) \geq U(B)$

Three Assumptions on Preference $(\succeq)$ as a Binary Relationship

Completeness

- Every two options can be compared, leading to a complete ranking list.
- Either $A \succeq B$ or $B \succeq A$ (or both).

Reflexivity

- Any bundle is at least as good as itself.
- $A \succeq A$.

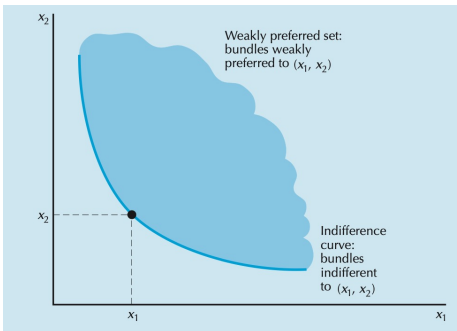
Transitivity

- Preferences are logically consistent, leading to a unique and stable ranking.
- If $A \succeq B$ and $B \succeq C$, then $A \succeq C$.

Are These Assumptions Obvious?

To Illustrate Preferences

The indifference curve represents all equally preferred bundles

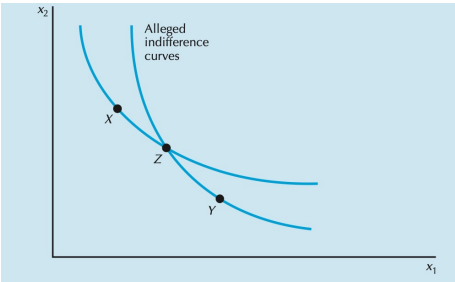


- Consider two goods only: x_1 and x_2
- x_1: what we focus on
- x_2: composite good that represents anything else other than x_1 income is m (RMB)
- Indifference Curve: $U(x_1, x_2) = u_0$

  Bundles at the same indifference curve are equally preferred

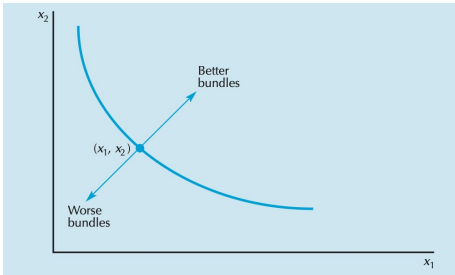
To Illustrate Preferences

Indifference curves cannot cross



- Different curves represent different sanctification levels (utilities).
- If indifference curves across X, Y, and Z would all have to be indifferent to each other
- and thus could not lie on distinct indifference curves.

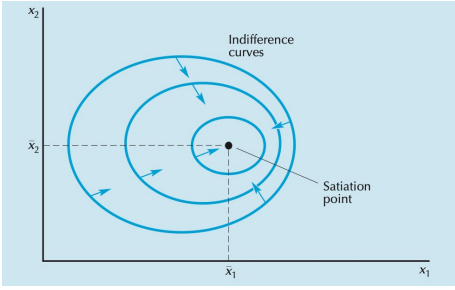
Well-behaved Preference: (Positive) Monotonicity



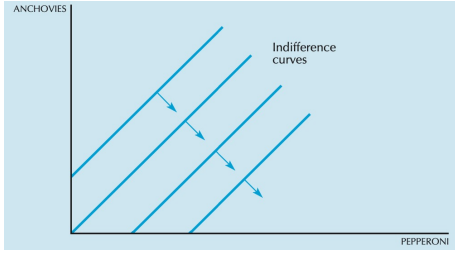
- **Monotonic Preference:** More of both goods is better,
  $B(x_1 + \Delta_{x_1}, x_2 + \Delta_{x_2}) \succ B(x_1, x_2)$
- Curve 1: $U(x_1, x_2) = u_1$; Curve 2: $U(x_1, x_2) = u_2$.
- If $u_2 > u_1$, then Curve 2 must lie above or to the right of Curve 1

- **Strict Monotonic Preference:** More of any good is better,
  $B(x_1 + \Delta_{x_1}, x_2) \succ A(x_1, x_2)$,
  $C(x_1, x_2 + \Delta_{x_2}) \succ A(x_1, x_2)$
- $\Rightarrow$ negative slope

Preference Violating Strict Monotonicity



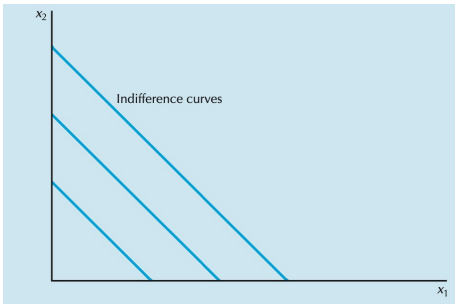
(a) Satiated Preference



(b) x_2 is a bad

Extreme Preferences

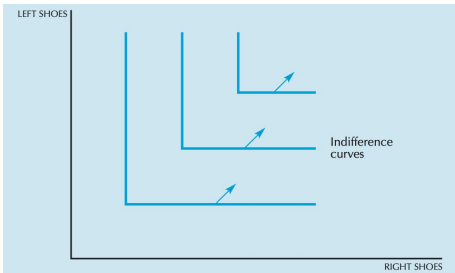
Perfect Substitutes



- Two goods are **perfect substitutes** if the consumer is willing to substitute one good for the other at a constant rate.
- Say one unit of x_1 leads to the same satisfactions level as one unit of x_2
- Then the utility function: $U(x_1, x_2) = U(x_1 + x_2)$
- Indifference curves are straight lines: $x_1 + x_2 = a_n$

Extreme Preferences

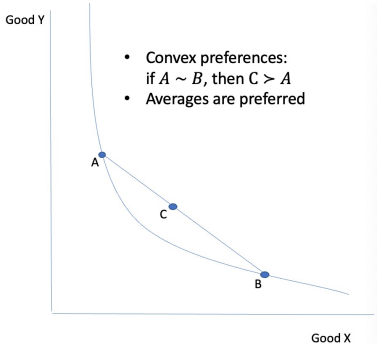
Perfect Complements



- **Perfect complements** are goods that are always consumed together in fixed proportions.
- Say one unit of x_1 must be consumed with one unit of x_2 together,
- Then the utility function: $U(x_1, x_2) = U(min\{x_1, x_2\})$

- Q: Is this a strict monotonic preference?

Well-behaved Preference: Convexity



- **Convex preference:** Weighted averaged bundles are weakly preferred to extremes.
- Bundle $A(x_1, y_1)$, Bundle $B(x_2, y_2)$
- Weighted averaged bundles: $C(tx_1+(1-t)x_2, ty_1+(1-t)y_2), t \in (0,1)$
- Convexity: $C \succeq A, C \succeq B$
- **Strict Convex preference:** Weighted averaged bundles are strictly preferred to extremes.
- $\Rightarrow$ slope of the indifferent curve becomes flatter as you move right

Summary

What We Have Learned

- Three fundamental assumptions of preference:
  Completeness, Reflexivity, and Transitivity.
- Two additional assumptions for well-behaved preferences:
  Monotonicity and Convexity.
- The typical shape of an indifference curve: negative slope, slope becomes flatter as you move right

What's Next?

- The slope of indifference curves: the Marginal Rate of Substitution (MRS).
- A typical well-behaved preference represented by the Cobb-Douglas utility function.


Thank You!