Preferences

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Outline

1. Preferences
2. Indifference Curves
3. Well-Behaved Preferences
4. Marginal Rate of Substitution
5. Summary
6. References

Topic

1 Preferences

2 Indifference Curves

3 Well-Behaved Preferences

4 Marginal Rate of Substitution

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Subtopic

1. Preferences
   - Consumer Preferences
   - Assumptions

Consumer Preferences

So far, the discussion has focused on *what the consumer can afford*. Now, the focus of the discussion will shift towards *what the consumer wants*.

In order to do this, consumer preferences need to be studied.

The end goal of consumer theory and optimisation is to find how to derive maximum satisfaction, given the consumer's constraints.

The topic of 'Budget Constraint' focuses on the 'consumer's constraints' part. Now, the discussion will move towards 'how to derive maximum satisfaction'.

Consumer Preferences

Suppose two goods exist in an economy; good 1 and good 2.

We create two bundles $X = (x_1, x_2)$ and $Y = (y_1, y_2)$.

- We say the consumer **strictly prefers** bundle X to Y and write:

$$(x_1, x_2) \succ (y_1, y_2)$$

- We say the consumer **weakly prefers** bundle X to Y and write:

$$(x_1, x_2) \succeq (y_1, y_2)$$

- We say the consumer is **indifferent** between bundles X & Y and write:

$$(x_1, x_2) \sim (y_1, y_2)$$

Subtopic

1. Preferences
   - Consumer Preferences
   - Assumptions

Assumptions (Axioms)

- We assume that preferences are **complete**. This means that given any two bundles in the budget set, the consumer has a preference.
  - For any two bundles either $(x_1, x_2) \succ (y_1, y_2)$ or $(x_1, x_2) \succeq (y_1, y_2)$ or both i.e. $(x_1, x_2) \sim (y_1, y_2)$.
- We assume that preferences are **reflexive**. This means that any bundle is at least as good as itself.
  - For any bundle $(x_1, x_2) \succeq (y_1, y_2)$.
- We assume that preferences are **transitive**. This means that if bundle A is preferred to B, and B is preferred to C, then A is preferred to C.
  - For any three bundles X, Y, and Z: $(x_1, x_2) \succeq (y_1, y_2)$ and $(y_1, y_2) \succeq (z_1, z_2)$ implies $(x_1, x_2) \succeq (z_1, z_2)$.

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Subtopic

2. Indifference Curves
   - Indifference Curves
   - Perfect Substitutes
   - Perfect Complements
   - Bads, Neutral Goods, and Satiation

Indifference Curves

Suppose we pick an arbitrary bundle X (x_1, x_2).

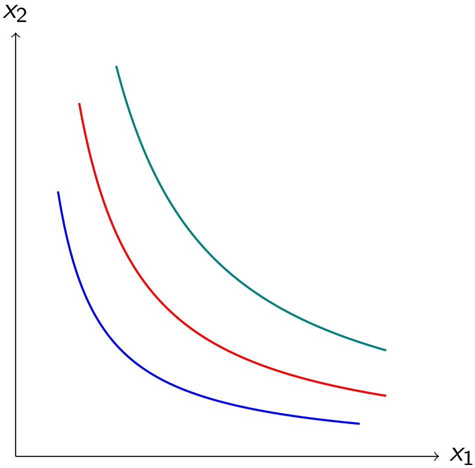
Definition

Indifference curve is the set of all bundles that the consumer is indifferent between. In essence, the bundles that the consumer likes as much as (x_1, x_2) make up the indifference curve.

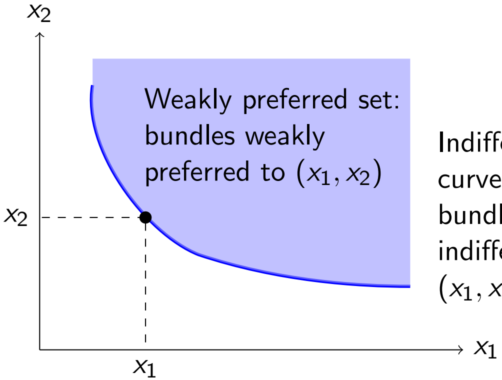
An indifference curve is the representation of a consumer's preferences. Therefore, it must obey completeness, reflexivity, and transitivity.

Then, all bundles that are weakly preferred to (x_1, x_2) form the **weakly preferred set**. We can then say that the indifference curve forms the boundary to the weakly preferred set of a bundle.

Indifference Curves Graphically



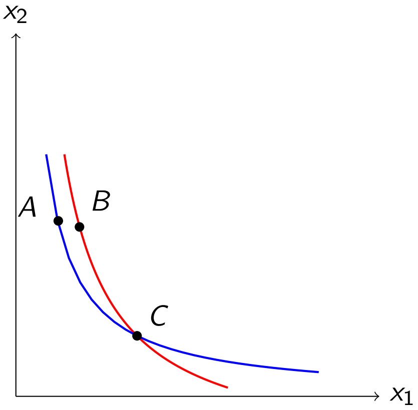
Weakly Preferred Set



Indifference curve: bundles indifferent to (x_1, x_2)

Indifference Curves Never Cross

We require that indifference curves never cross. Why?



Indifference Curves Never Cross

In the previous diagram, bundle B is in the weakly preferred set of bundle A. Therefore, the consumer (weakly) prefers bundle B to A.

Furthermore, the consumer is indifferent between bundle A and C because they lie on the same indifference curve.

However, the consumer is also indifferent between bundle C and B as they lie on the same indifference curve. By transitivity, if $A \sim C$ and $C \sim B$, it must be true that $A \sim B$.

There is a contradiction. This is why two indifference curves must not intersect.

Subtopic

2. Indifference Curves
   - Indifference Curves
   - Perfect Substitutes
   - Perfect Complements
   - Bads, Neutral Goods, and Satiation

Perfect Substitutes

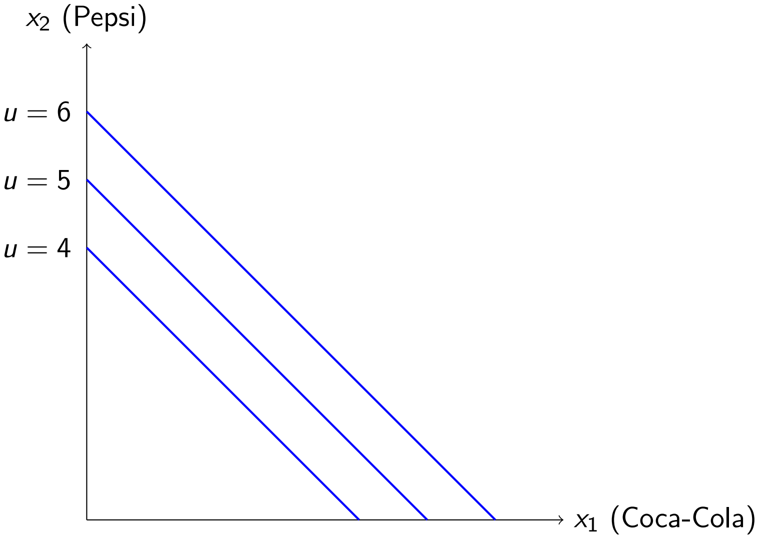
Two goods are perfect substitutes if the consumer is willing to substitute one good for the other at a *constant rate* (two-for-one or one-for-one).

Suppose that there is a choice between coca-cola and pepsi, and the consumer involved does not care about which drink they get at all.

Pick a consumption bundle, say (10,10). Then for this consumer, any other consumption bundle that has 20 drinks in it is just as good as (10,10).

Mathematically, any consumption bundle (x_1, x_2) such that $x_1 + x_2 = 20$ will be on the consumer's indifference curve. Thus, the indifference curves for this consumer are all parallel straight lines with a slope of -1.

Perfect Substitutes Graphically



Subtopic

2. Indifference Curves
   - Indifference Curves
   - Perfect Substitutes
   - Perfect Complements
   - Bads, Neutral Goods, and Satiation

Perfect Complements

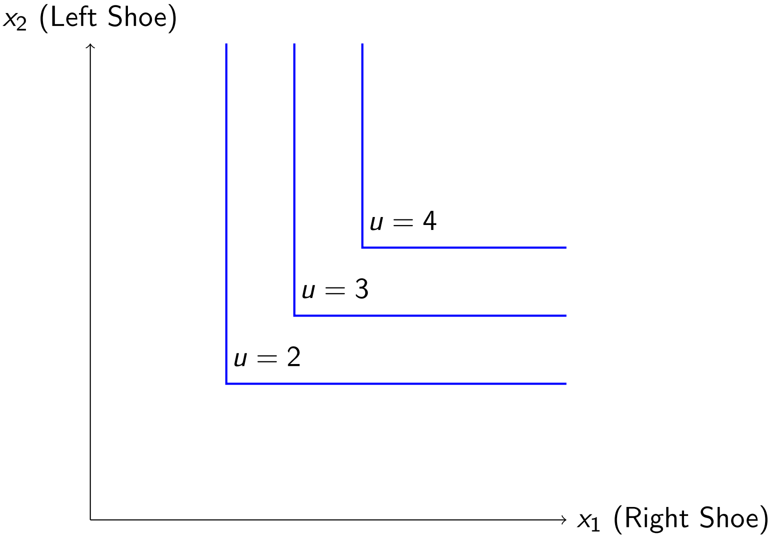
Perfect complements are goods that are always consumed together in fixed proportions. A nice example is that of right shoes and left shoes. Having only one out of a pair of shoes doesn't do the consumer a bit of good.

Suppose we pick the consumption bundle (10,10). Now add 1 more right shoe, so we have (11,10). This leaves the consumer indifferent to the original position: the extra shoe doesn't do him any good.

The same thing happens if we add one more left shoe: the consumer is also indifferent between (10,11) and (10,10).

Thus the indifference curves are L-shaped, with the optimal number of shoes being at the vertex of the L where the number of left shoes equals the number of right shoes.

Perfect Complements Graphically



Subtopic

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Bads

A bad is a commodity that the consumer doesn't like (as opposed to a good).

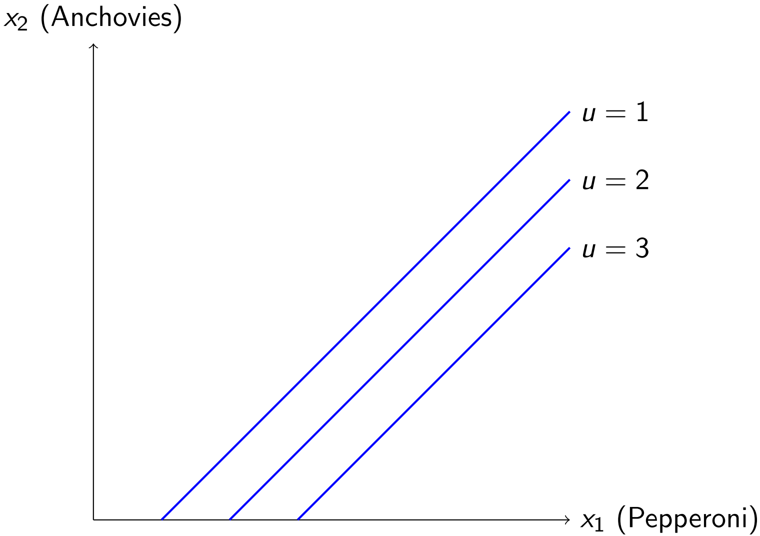
For example, suppose that the commodities in question are now pepperoni and anchovies — and the consumer loves pepperoni but dislikes anchovies.

Let us suppose there is some possible tradeoff between pepperoni and anchovies. That is, there would be some amount of pepperoni on a pizza that would compensate the consumer for having to consume a given amount of anchovies.

Pick a bundle $(x1, x2)$ consisting of some pepperoni and some anchovies. If we give the consumer more anchovies, what do we have to do with the pepperoni to keep him on the same indifference curve?

Clearly, we have to give him some extra pepperoni to compensate him for having to put up with the anchovies. Thus this consumer must have indifference curves that slope up and to the right.

Bads Graphically

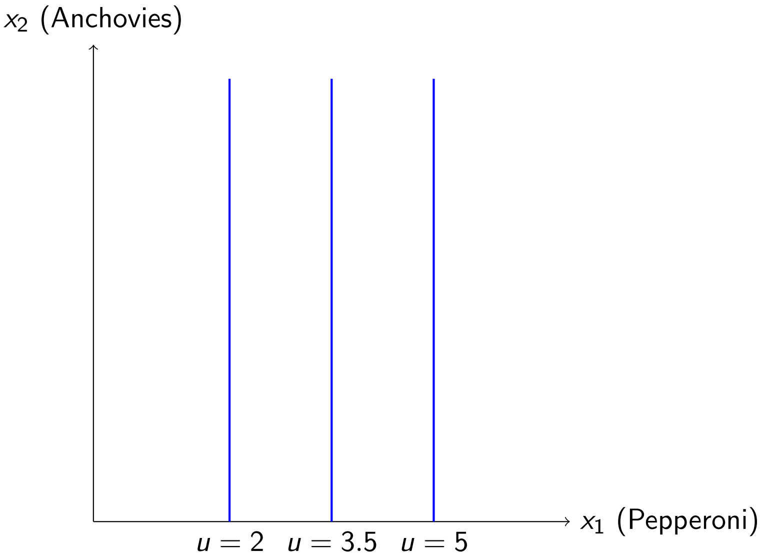


Neutral Goods

A good is a neutral good if the consumer doesn't care about it one way or the other. What if a consumer is just neutral about anchovies?

He only cares about the amount of pepperoni he has and doesn't care at all about how many anchovies he has. The more pepperoni the better, but adding more anchovies doesn't affect him one way or the other.

Neutral Goods Graphically



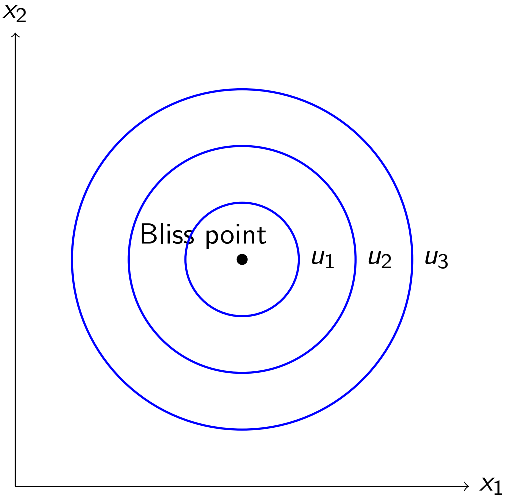
Satiation

We sometimes want to consider a situation involving satiation, where there is some overall best bundle for the consumer, and the "closer" he is to that best bundle, the better off he is in terms of his own preferences.

In this case we say that (x_1, x_2) is a satiation point, or a bliss point.

Suppose, for example, that the two goods are chocolate cake and ice cream. There might well be some optimal amount of chocolate cake and ice cream that you would want to eat per week. Any less than that amount would make you worse off, but any more than that amount would also make you worse off.

Satiation



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Subtopic

3. Well-Behaved Preferences
   - General Preferences
   - Monotonicity
   - Convexity

General Preferences

We have seen that many kinds of preferences, reasonable or unreasonable, can be described by indifference curves.

However, if we want to describe preferences in general, it will be convenient to focus on a few general shapes of indifference curves.

We will now describe some more general assumptions that we will typically make about preferences and the implications of these assumptions for the shapes of the associated indifference curves.

These assumptions are not the only possible ones; in some situations you might want to use different assumptions. But we will take them as the defining features for *well-behaved indifference curves*.

Subtopic

3 Well-Behaved Preferences

- General Preferences
- Monotonicity
- Convexity

Monotonicity

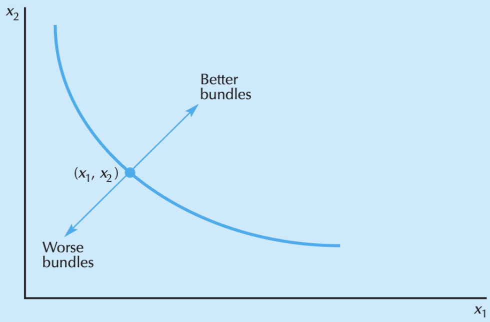
Definition

Monotonicity is the assumption that more of a good is better than less. More precisely, if (x_1, x_2) is a bundle of goods and (y_1, y_2) is a bundle of goods with at least as much of both goods and more of one, then $(y_1, y_2) \succ (x_1, x_2)$.

As suggested in the discussion of satiation, more is better probably only hold up to a certain point. Thus the assumption of monotonicity is saying that we are going to examine situations before that point is reached — before any satiation sets in — while more still is better.

What does monotonicity imply about the shape of indifference curves? It implies that they have a negative slope.

Monotonicity Graphically



Monotonic preferences. More of both goods is a better bundle for this consumer; less of both goods represents a worse bundle.

Subtopic

3 Well-Behaved Preferences

- General Preferences
- Monotonicity
- Convexity

Convexity

Definition

Preferences are said to be convex if, for any two bundles that a consumer finds equally desirable, any weighted average (or combination) of these bundles is at least as desirable as either of the original bundles. In essence, we are going to assume that averages are preferred to extremes.

If we take two bundles of goods (x_1, x_2) and (y_1, y_2) on the same indifference curve and take a weighted average of the two bundles such as:

$$\left(\frac{1}{2}x_1 + \frac{1}{2}y_1, \frac{1}{2}x_2 + \frac{1}{2}y_2\right)$$

then the average bundle will be at least as good as or strictly preferred to each of the two extreme bundles.

Convexity

To be more precise, given two bundles such that $(x_1, x_2) \sim (y_1, y_2)$. We're going to assume that for any weight t between 0 and 1:

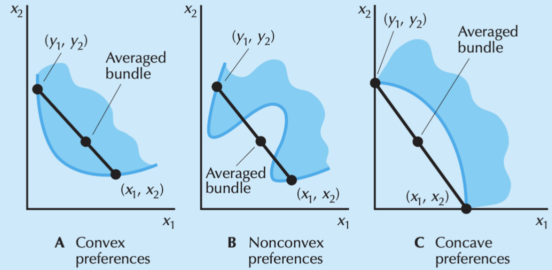
$$(tx_1 + [1-t]y_1, tx_2 + [1-t]y_2) \succeq (x_1, x_2)$$

What does this assumption about preferences mean geometrically? It means that the *weakly preferred set* of the bundle $(x1, x2)$ is a **convex set**.

Definition

A convex set has the property that if you take any two points in the set and draw the line segment connecting those two points, that line segment lies entirely in the set.

Convexity Graphically



Various kinds of preferences. Panel A depicts convex preferences, panel B depicts nonconvex preferences, and panel C depicts "concave" preferences.

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Subtopic

4. Marginal Rate of Substitution
   - Marginal Rate of Substitution
   - Diminishing Marginal Rate of Substitution

Marginal Rate of Substitution (MRS)

Definition

The slope of an indifference curve is known as the marginal rate of substitution (MRS).

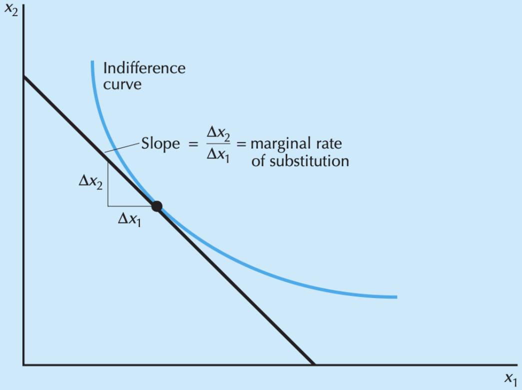
This is a measure of the rate at which the consumer is just willing to substitute one good for another.

We take a little of good 1, Δx_1, away from the consumer. Then we give him Δx_2, an amount that is just sufficient to put him back on his indifference curve.

As Δx_1 gets smaller, so does Δx_2. When these become infinitesmial, the ratio $\frac{\Delta x_2}{\Delta x_1}$ approaches the slope of the indifference curve.

Monotonic preferences imply that the indifference curves have a negative slope. Therefore, the MRS is typically a negative number.

MRS Graphically



The marginal rate of substitution (MRS). The marginal rate of substitution measures the slope of the indifference curve.

Subtopic

4 Marginal Rate of Substitution

- Marginal Rate of Substitution
- Diminishing Marginal Rate of Substitution

Diminishing MRS

From the previous figure (in slide 42), observe that the MRS varies along the indifference curve.

Think about MRS as the amount of good x_2 a consumer is willing to give up for one unit extra unit of good x_1.

the consumer to give We can think about this intuitively:

- If I have a low amount of good x_1 and high amount of good x_2, I would ideally want more of x_1 (because of convex preferences). Therefore, I will give up a lot of x_2 for some x_1.
- If I have a lot of x_1 and less of x_2, then I am willing to give up a lower amount of x_2.

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Summary

- A consumer's preferences can be represented by indifference curves.
- An indifference curve is the set of all bundles that the consumer is indifferent between.
- We assume well-behaved preferences which include monotonicity and convexity.
- The slope of an indifference curve is called the marginal rate of substitution (MRS).

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References

Varian, H. R. (2014). Intermediate Microeconomics: A Modern Approach (9th ed.). W. W. Norton & Company.