

Intermediate Microeconomics. Lecture 3

Consumer Behavior

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- 1 Consumer Preferences
 - Assumptions
 - Utility
- 2 Indifference Curves
 - Properties
- 3 MRS
- 4 Examples of Indifference Curves

Assumptions

- Demand
 - Consumption decisions
 - Utility maximization
 - Preferences
 - Budget constraint
- Supply
 - Production decisions

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Assumptions

- ① Completeness: We assume that consumers can make comparisons across all possible sets of goods (bundles)

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

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

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

- ② Transitivity: For any three bundles of goods (A, B and C), if $A \succ B$ and $B \succ C$ then $A \succ C$
- ③ Non-satiation: More is better

Utility

Economists use the concept of utility and a mathematical description called a utility function to describe preferences more simply

- Utility is a measure of how satisfied a consumer is. For practical purposes, you can think of utility as a fancy word for happiness or well-being
- A utility function mathematically describes the relationship between what consumers actually consume and their level of well-being

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Indifference Curves

- We say that a consumer is indifferent when she/he derives the same level of utility from two consumer bundles
- The combination of all the different bundles of goods that give a consumer the same utility is called an indifference curve.
- Consider the case of renting an apartment where there are two “goods” you must choose between: the size in square feet and the number of friends living in the same building

Graphical representation

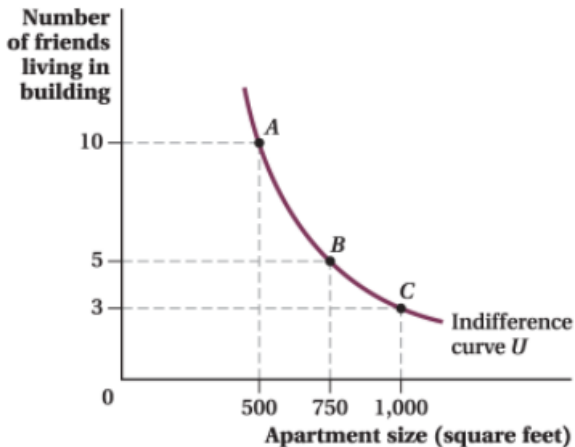


Figure: Indifference Curve

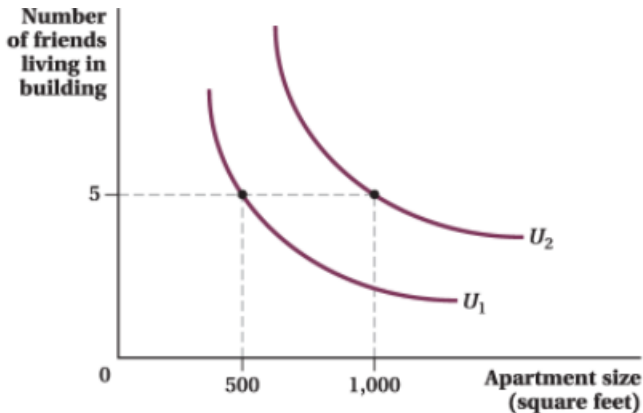
Indifference Curves: example

Notice that the indifference curve always slopes down:

- Every time a friend moves from Michaela's building, she would need more square footage to remain indifferent
- Any apartment with less space would require more friends in the building to keep her equally well off

Next figure shows two of Michaela's indifference curves. Which corresponds to the higher level of utility?

Graphical representation



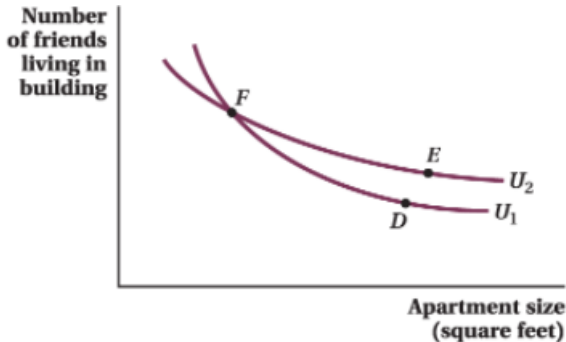
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Figure: A Consumer's Indifference Curves

Properties of Indifference Curves

- Consumer prefer higher indifference curves
- Indifference curves are downward sloping
- Indifference curves never cross
- Indifference curves are convex to the origin

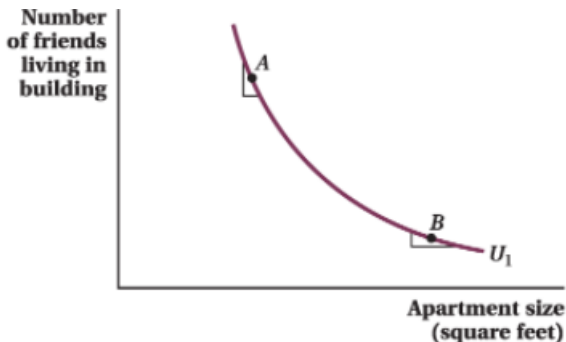
Indifference curves never cross



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Figure: A Consumer's Indifference Curves Cannot Cross

Indifference curves are convex to the origin



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Figure: A Consumer's Indifference Curves Cannot Cross

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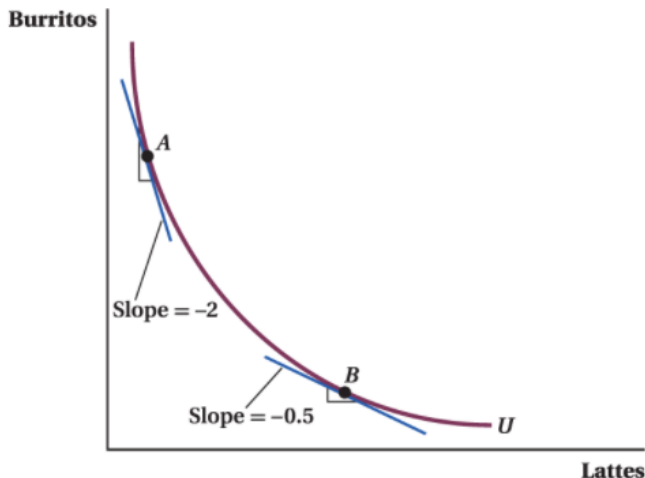
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The Marginal Rate of Substitution

The Marginal Rate of Substitution, MRS_{XY} , is the rate at which a consumer is willing to substitute good Y for more of good X and feel equally well off, with utility held constant

$$MRS_{XY} = -\frac{\Delta Y}{\Delta X}$$

The Marginal Rate of Substitution



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Figure: The Slope of an Indifference Curve is the MRS

The Marginal Rate of Substitution

The Marginal Rate of Substitution between two goods at any point on an indifference curve equals the inverse ratio of those two goods' marginal utilities

$$MRS_{XY} = -\frac{\Delta Y}{\Delta X} = \frac{MU_X}{MU_Y}$$

where $MU_X = \frac{\partial U(X,Y)}{\partial X}$ and $MU_Y = \frac{\partial U(X,Y)}{\partial Y}$

MRS: Example

Maria consumes music downloads (M) and concert tickets (C).
Her utility function is given by

$$U = 0.5M^2 + 2C^2$$

where $MU_M = M$ and $MU_C = 4C$

- Write an equation for MRS_{MC}

$$MRS_{MC} = \frac{MU_M}{MU_C} = \frac{M}{4C}$$

MRS: Example

- Would bundles of $(M=4, C=1)$ and $(M=2, C=2)$ be on the same indifference curve?
- For bundles to lie on the same indifference curve, they must provide the same level of utility to the consumer
 - For $(M=4, C=1)$

$$U = 0.5(4)^2 + 2(1)^2 = 8 + 2 = 10$$

- For $(M=2, C=2)$

$$U = 0.5(2)^2 + 2(2)^2 = 2 + 8 = 10$$

Each bundle provides Maria with the same level of utility, so they must lie on the same indifference curve

MRS: Example

- Calculate the MRS for (M=4,C=1) and (M=2,C=2)
 - For (M=4,C=1)

$$MRS = \frac{4}{4(1)} = 1$$

- For (M=2,C=2)

$$MRS = \frac{2}{4(2)} = \frac{1}{4}$$

- Based on your answers, are Maria's indifference curves convex?

We found that as Maria consumes more music and fewer concerts, she actually becomes more willing to trade concert tickets for additional music downloads! Most consumers would not behave in such a way. This means that her indifference curve will be concave to the origin rather than convex.

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Perfect Substitutes

- Two goods are **perfect substitutes** if the consumer is willing to substitute one good for the other at a constant rate
- Suppose, for example, that we are considering a choice between red pencils and blue pencils, and the consumer involved likes pencils, but doesn't care about color at all
- Thus the indifference curves for this consumer are all parallel straight lines with a slope of $MRS = -1$

Perfect Substitutes

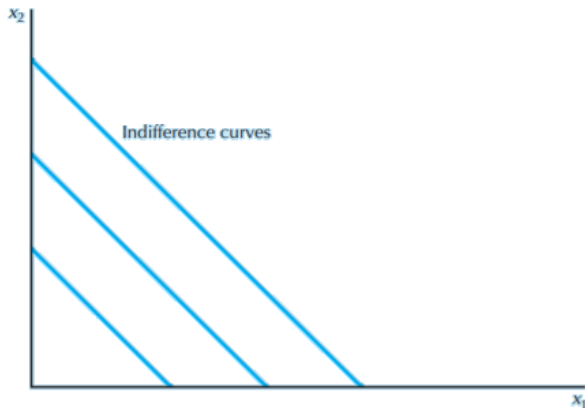
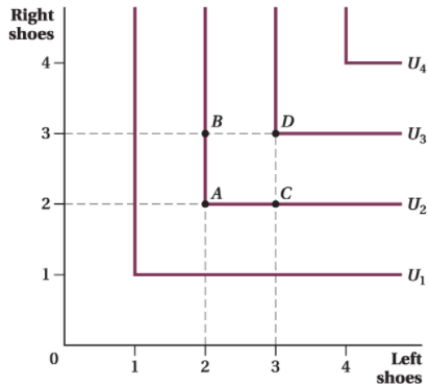


Figure: Indifference Curves of Perfect Substitutes (Source: Varian, Intermediate Microeconomics 8e, 2010)

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. The consumer likes shoes, but always wears right and left shoes together
- Thus the indifference curves are L-shaped, with the vertex of the L occurring where the number of left shoes equals the number of right shoes
- At the horizontal part of the indifference curve, MRS equals zero, while on the vertical portion, the MRS is infinite

Perfect Complements



Goolsbee et al., *Microeconomics*, 3e, © 2020 Worth Publishers

Figure: Indifference Curves for Perfect Complements

Bads

- A **bad** is a commodity that the consumer doesn't like
- For example, suppose that the commodities in question are now pepperoni and anchovies. The consumer loves pepperoni but dislikes 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
- The direction of increasing preference is down and to the right

Bads

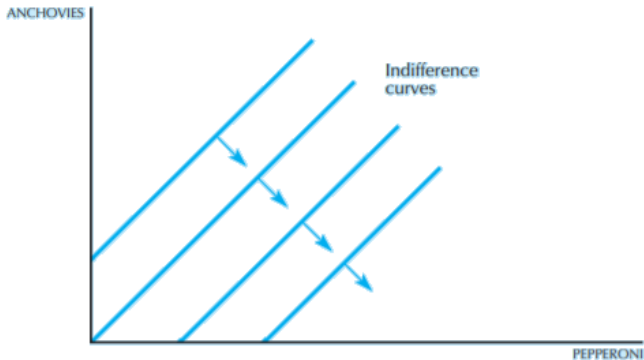


Figure: Indifference Curves for Bads (Source: Varian, Intermediate Microeconomics 8e, 2010)

Neutrals

- A good is **neutral** if the consumer doesn't care about it one way or the other
- What if a consumer is just neutral about anchovies?
- In this case his indifference curves will be vertical lines

Neutrals

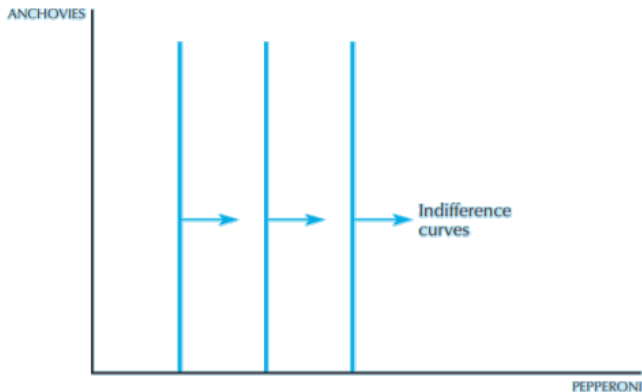


Figure: Indifference Curves for Neutrals (Source: Varian, Intermediate Microeconomics 8e, 2010)