The Theory of Consumer Choice

PART II

CONSUMER PREFERENCES AND CONSUMER CHOICE

Consumer preferences

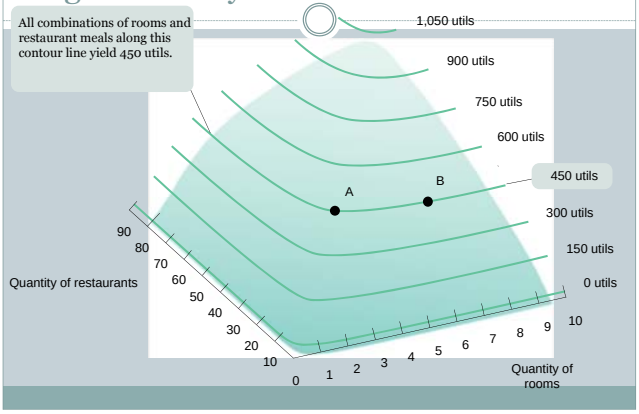
Properties of preference orderings:

- ***Completeness:*** the consumer is able to rank all possible combinations of goods and services.
- ***More-Is-Better:*** other things equal, more of a good is preferred to less.
- ***Transitivity:*** for any three bundles A, B, and C, if he prefers A to B and prefers B to C, then he always prefers A to C.
- ***Convexivity:*** mixtures of goods are preferable to extremes.

Mapping the Utility Function

- A utility function determines a consumer's total utility given his or her consumption bundle.
- Using indifference curves, which represent a consumer's utility function, we will deepen our understanding of the trade-off involved when choosing the optimal consumption bundle and of how the optimal consumption bundle itself changes in response to changes in the prices of goods.

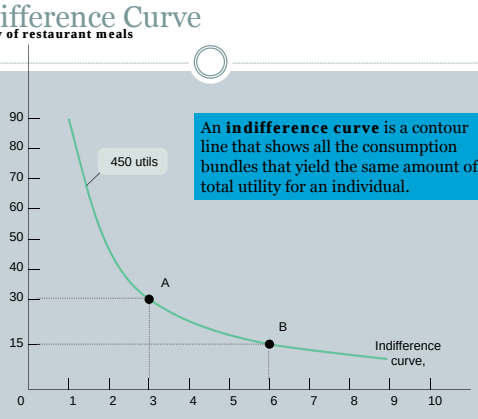
Ingrid's Utility Function



Ingrid's Utility Function

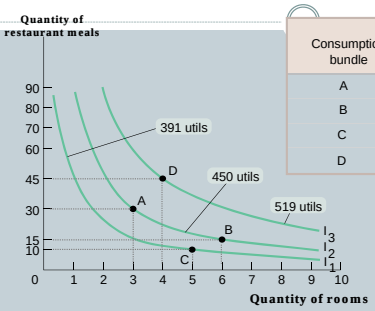
- Ingrid is *indifferent* between *A* and *B:* because *A* and *B* yield the same total utility level, Ingrid is equally well off with either bundle.
- Hence, a contour line that maps consumption bundles yielding the same amount of total utility is known as an **indifference curve.**

An Indifference Curve



An **indifference curve** is a contour line that shows all the consumption bundles that yield the same amount of total utility for an individual.

An Indifference Curve Map



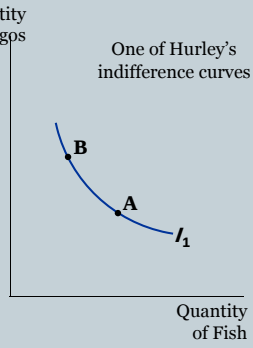
Consumption bundle	Quantity of rooms	Quantity of meals	Total utility (utils)
A	3	30	450
B	6	15	450
C	5	10	391
D	4	45	519

The entire utility function of an individual can be represented by an **indifference curve map**, a collection of indifference curves in which each curve corresponds to a different total utility level.

Preferences: What the Consumer Wants

Indifference curve: shows consumption bundles that give the consumer the same level of satisfaction

A, **B**, and all other bundles on I_1 make Hurley equally happy: he is *indifferent* between them.



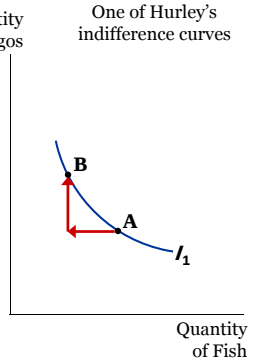
Properties of Indifference Curves

- All indifference curve maps share two general properties:
  - indifference curves never cross, and
  - the farther out an indifference curve is from the origin, the higher the level of total utility it indicates.
- In addition, indifference curves for most goods, called ordinary goods, have two more properties:
  - they are downward sloping and
  - are convex (bowed-in toward the origin) as a result of diminishing marginal utility.

Four Properties of Indifference Curves

1. Indifference curves are downward-sloping.

If the quantity of fish is reduced, the quantity of mangos must be increased to keep Hurley equally happy.

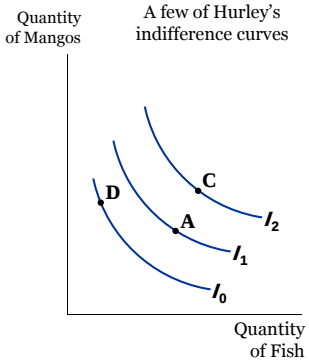


Four Properties of Indifference Curves

2. Higher indifference curves are preferred to lower ones.

Hurley prefers every bundle on I_2 (like **C**) to every bundle on I_1 (like **A**).

He prefers every bundle on I_1 (like **A**) to every bundle on I_0 (like **D**).



Four Properties of Indifference Curves

3. Indifference curves cannot cross.

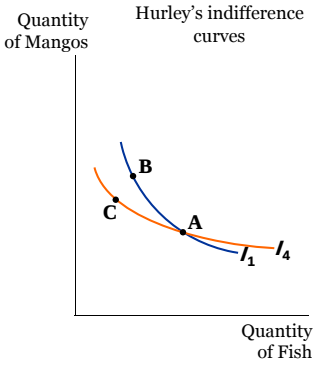
Suppose they did.

Hurley should prefer **B** to **C**, since **B** has more of both goods.

Yet, Hurley is indifferent between **B** and **C**:

He likes **C** as much as **A** (both are on I_4).

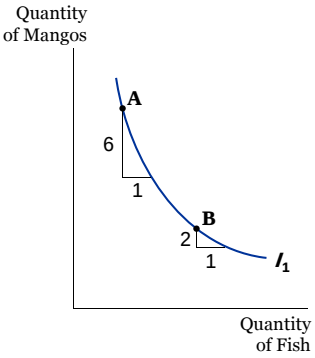
He likes **A** as much as **B** (both are on I_1).



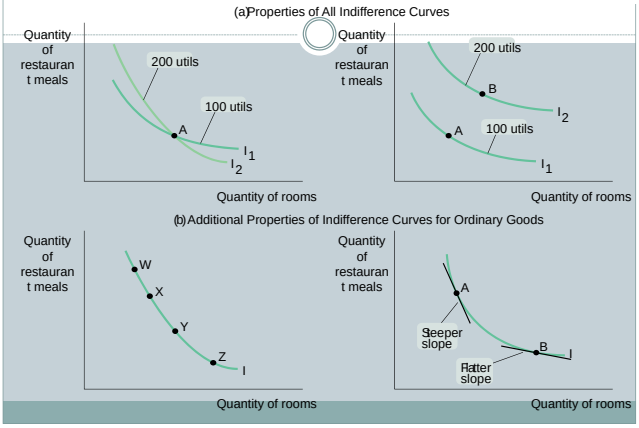
Four Properties of Indifference Curves

4. Indifference curves are bowed inward.

Hurley is willing to give up more mangos for a fish if he has few fish (**A**) than if he has many (**B**).



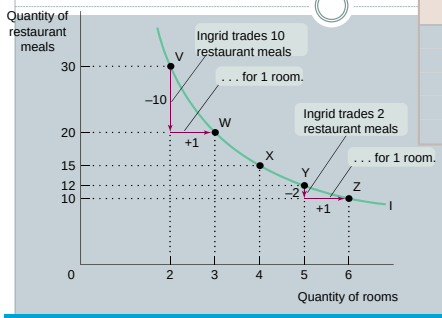
Properties of Indifference Curves



Indifference Curves and Consumer Choice

- We will use indifference curve maps to find the utility-maximizing consumption bundle of a consumer given his/her budget constraint.
- The optimal consumption bundle lies on the budget line, and the marginal utility per dollar is the same for every good in the bundle.
- The first component of our approach is a new concept, the ***marginal rate of substitution***.

The Changing Slope of an Indifference Curve



Consumption bundle	Quantity of rooms	Quantity of restaurant meals
V	2	30
W	3	20
X	4	15
Y	5	12
Z	6	10

The terms of the trade-off between the reduced consumption of restaurant meals for increased consumption of housing changes as the consumer moves from *V* to *W*. Why?

Two opposing effects on total utility:

- Moving down the indifference curve—reducing restaurant meal consumption and increasing housing consumption—will produce two opposing effects on Ingrid's total utility:
  - Lower restaurant meal consumption will reduce her total utility,
  - but higher housing consumption will raise her total utility.
- And since we are moving down the indifference curve, these two effects must exactly cancel out.

Two opposing effects on total utility:

- Hence, we can calculate the change in total utility generated by a change in the consumption bundle using the following equations:
- Change in total utility arising from a change in consumption of restaurant meals = $MU_M \times \Delta Q_M$
- Change in total utility arising from a change in consumption of rooms = $MU_R \times \Delta Q_R$
- *Along the indifference curve:*
  $-MU_M \times \Delta Q_M = MU_R \times \Delta Q_R$

Marginal Rate of Substitution

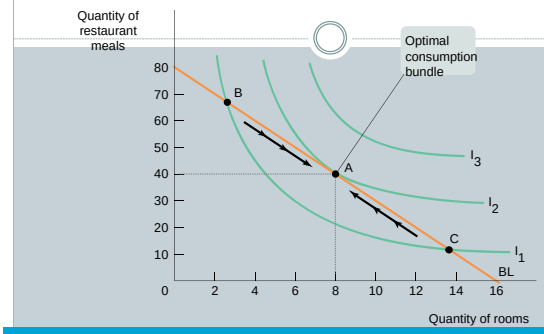
- The following equation would also hold along the indifference curve:

$$-MU_R / MU_M = \Delta Q_M / \Delta Q_R$$

Diminishing Marginal Rate of Substitution

- The flattening of indifference curves as you slide down them to the right—which reflects the same logic as the principle of diminishing marginal utility—is known as the principle of **diminishing marginal rate of substitution.**
- It says that an individual who consumes only a little bit of good *A* and a lot of good *B* will be willing to trade off a lot of *B* in return for one more unit of *A;* an individual who already consumes a lot of *A* and not much *B* will be less willing to make that trade-off.

The Optimal Consumption Bundle



The **tangency condition** between the indifference curve and the budget line holds when the indifference curve and the budget line just touch. This condition determines the optimal consumption bundle when the indifference curves have the typical convex shape.

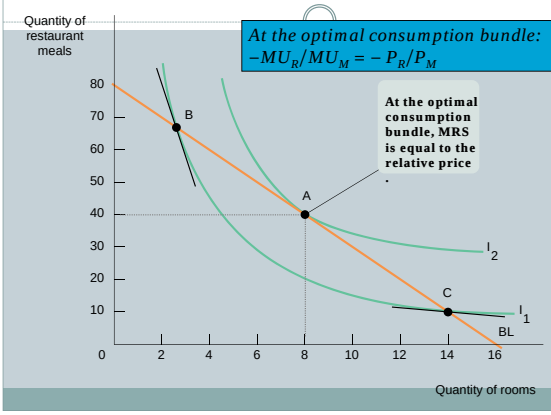
The Slope of the Budget Line

- The relative price of good R in terms of good M is equal to P_R/P_M, the rate at which R trades for M in the market.
- The **relative price rule** says that at the optimal consumption bundle, the marginal rate of substitution between two goods is equal to their relative price.

Prices and the Marginal Rate of Substitution

- At the optimal consumption point, the slope of the indifference curve is just equal to the slope of the budget line:
  - Slope of indifference curve = $-MU_R/MU_M$
  - Slope of budget line = $-(N/P_M)/(N/P_R) = -P_R/P_M$
- Putting these two equations together, we arrive at the **relative price rule.**
- *At the **optimal consumption bundle**:*
  - $-MU_R/MU_M = -P_R/P_M$
- **Optimal consumption rule**: $MU_R/P_R = MU_M/P_M$

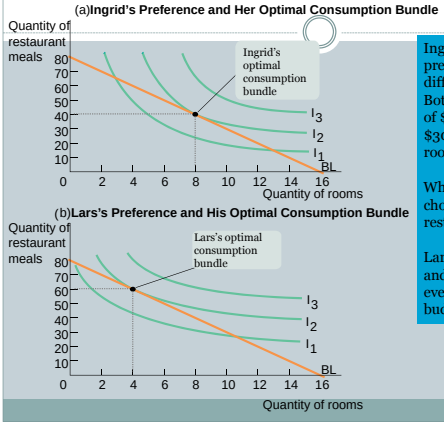
Understanding the Relative Price Rule



Preferences and Choices

- When we say that two consumers have different preferences, we mean that they have different utility functions.
- This in turn means that they will have indifference curve maps with different shapes.
- And those different maps will translate into different consumption choices, even among consumers with the same income who face the same prices.

Differences in Preferences

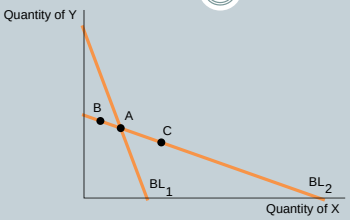


Ingrid and Lars have different preferences. They choose different consumption bundles. Both of them have an income of $2,400 and face prices of $30 per meal and $150 per room.

While Ingrid's consumption choice is 8 rooms and 40 restaurant meals

Lars consumes fewer rooms and more restaurant meals even though he has the same budget line.

A Test for Rationality

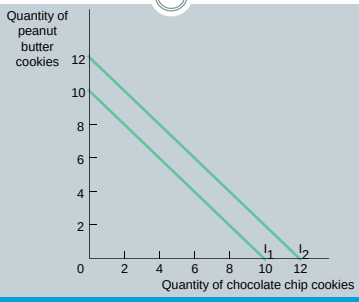


A consumer has the budget line BL1 and chooses the bundle A. If that consumer is now given a new budget line—BL2, it would be irrational to choose a bundle such as B; the consumer could have afforded that bundle before but chose A instead. A rational consumer would always at least stay at A or choose a new bundle that was not affordable before, such as C. It's difficult to test people in this way—but it works for rats!

Using Indifference Curves

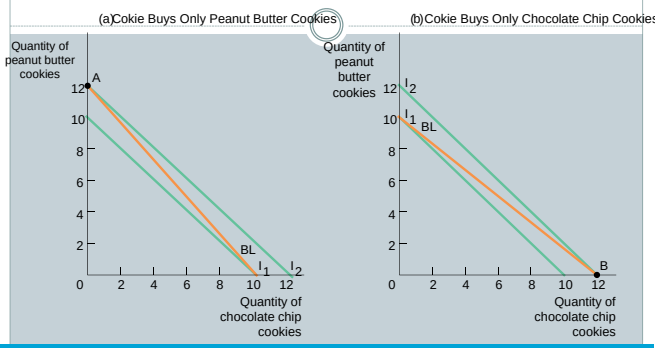
- What determines whether two goods are substitutes or complements?
- It depends on the shape of a consumer's indifference curves.
- This relationship can be illustrated with two extreme cases: the cases of *perfect substitutes* and *perfect complements*.

Perfect Substitutes



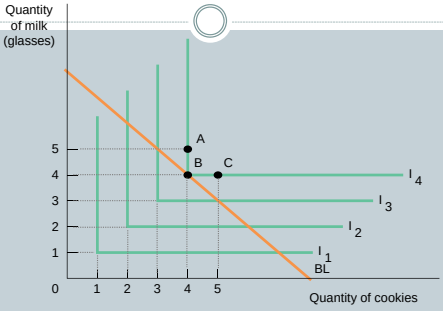
Two goods are **perfect substitutes** if the marginal rate of substitution of one good in place of the other good is constant, regardless of how much of each an individual consumes.

Consumer Choice Between Perfect Substitutes



When two goods are perfect substitutes, small price changes can lead to large changes in the consumption bundle.

Perfect Complements



Two goods are **perfect complements** when a consumer wants to consume the goods in the same ratio regardless of their relative price.

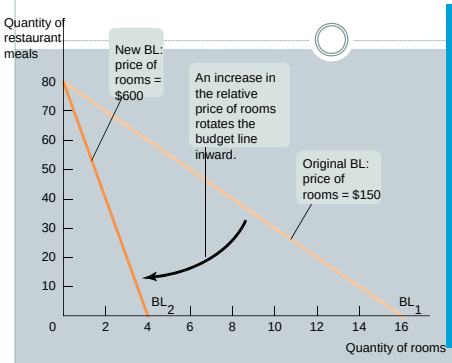
Prices, Income, and Demand

- How would our consumption choice change if either the prices of goods or our income change?
- First, let's see the effects of a price increase illustrated in the following figure
- Then, we will consider the impact of a change in income

"Other Things Equal", Revisited

- One of the biggest sources of confusion and error in economics- both in the classroom and in the real world- is failure to keep in mind the principle that all economic relationships are defined "other things equal."
- The law of demand, which says that increasing the price of a good reduces the quantity demanded, is only an "other things equal" proposition; a higher price results in a lower quantity demanded, holding other prices and income constant.

Effects of a Price Increase on the Budget Line

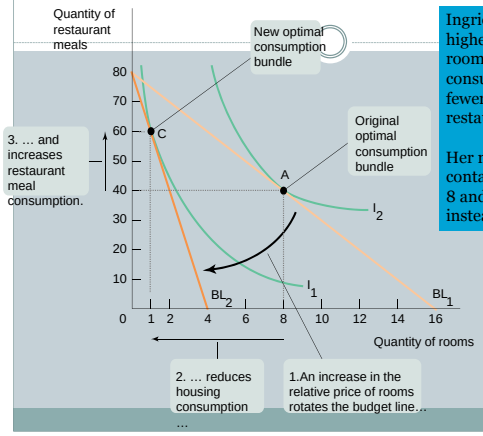


An increase in the price of rooms, holding the price of restaurant meals constant, increases the relative price of rooms in terms of restaurant meals

As a result, Ingrid's original budget line, BL1, rotates inward to BL2

Her maximum possible purchase of restaurant meals is unchanged, but her maximum possible purchase of rooms is reduced

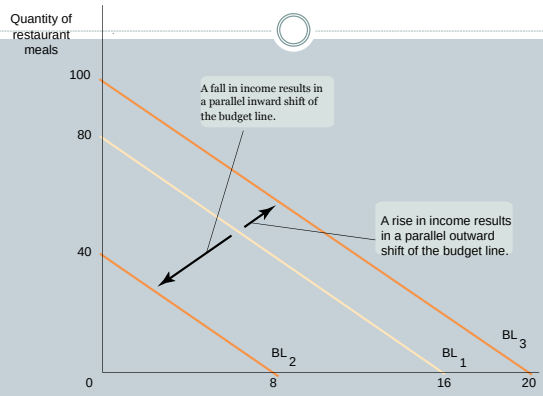
Responding to a Price Increase



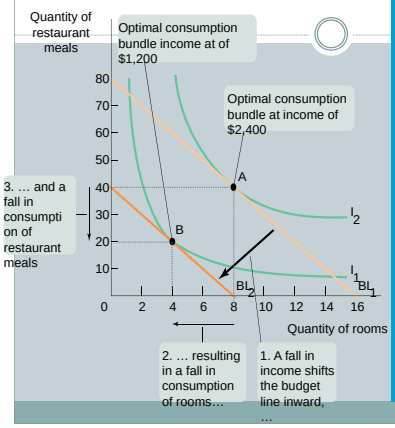
Ingrid responds to the higher relative price of rooms by choosing a new consumption bundle with fewer rooms and more restaurant meals

Her new bundle, C, contains 1 room instead of 8 and 60 restaurant meals instead of 40

Effect of a Change in Income on the Budget Line



Income and Consumption: Normal Goods



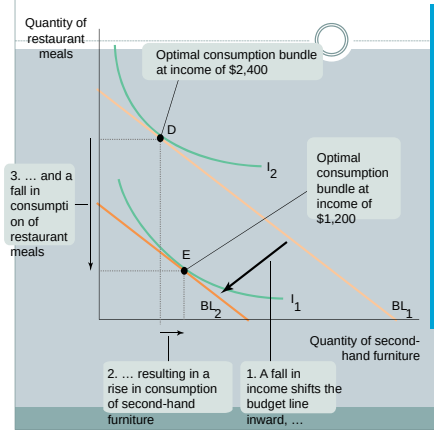
At a monthly income of $2,400, Ingrid chooses bundle A, consisting of 8 rooms and 40 restaurant meals

When relative price remains unchanged, a fall in income shifts her budget line inward to BL2

At a monthly income of $1,200, she chooses bundle B, consisting of 4 rooms and 20 restaurant meals

Since Ingrid's consumption of both restaurant meals and rooms falls when her income falls, both goods are normal goods

Income and Consumption: An Inferior Good



When Ingrid's income falls from $2,400 to $1,200, her optimal consumption bundle changes from *D* to *E*

Her consumption of second-hand furniture increases, implying that second-hand furniture is an inferior good

In contrast, her consumption of restaurant meals falls, implying that restaurant meals are a normal good

Income and Substitution Effects

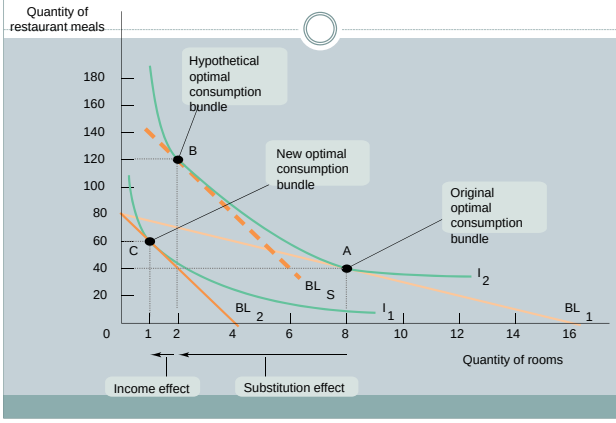
- The change in a consumer's optimal consumption bundle caused by a change in price can be decomposed into two effects: the substitution effect, due to the change in relative price, and the income effect, due to the change in purchasing power.

- The **substitution effect** refers to the substitution of the good that is now relatively cheaper for the good that is now relatively more expensive, holding the utility level constant. It is represented by movement along the original indifference curve.

- When a price change alters a consumer's purchasing power, the resulting change in consumption is the **income effect**. It is represented by a movement to a different indifference curve, keeping the relative price unchanged.

- For ***normal goods***, the income and substitution effects work in the same direction; so their *demand curves always slope downward*.

Income and Substitution Effects



Source:

- Krugman, P. and Robin Wells (2008)