

chapter:

11

>> Consumer Preferences and Consumer Choice

**Krugman/Wells
Economics**

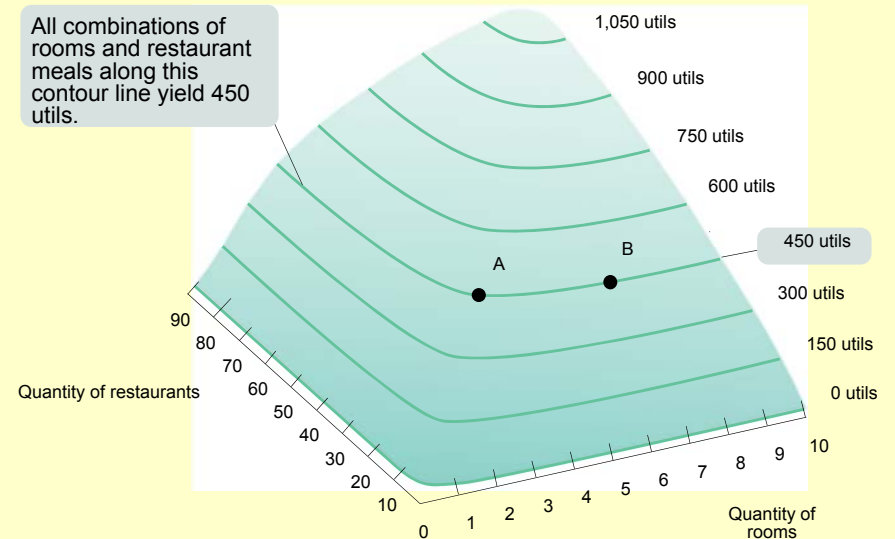
WHAT YOU WILL LEARN IN THIS CHAPTER

- Why economists use indifference curves to illustrate a person's preferences
- The importance of the marginal rate of substitution, the rate at which a consumer is just willing to substitute one good for another
- An alternative way of finding a consumer's optimal consumption bundle using indifference curves and the budget line
- How the shape of indifference curves helps determine whether goods are substitutes or complements
- An in-depth understanding of income and substitution effects

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



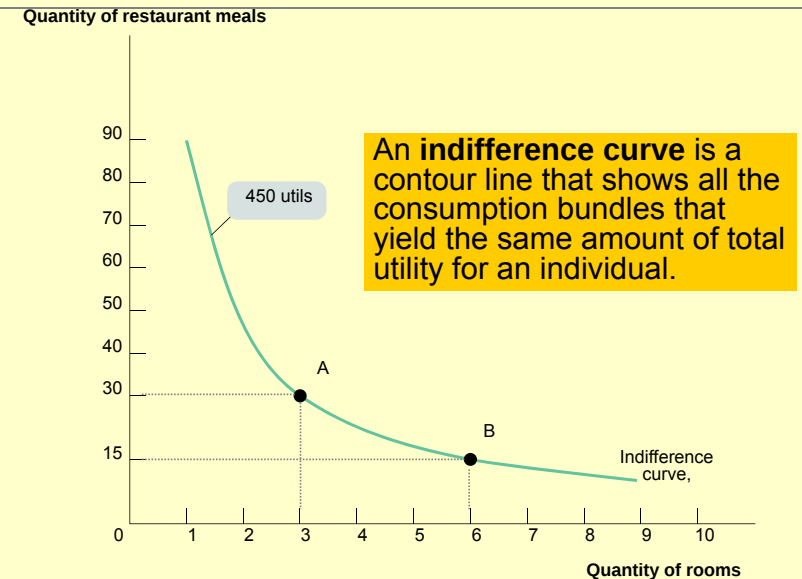
Ingrid's Utility Function

• 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**.

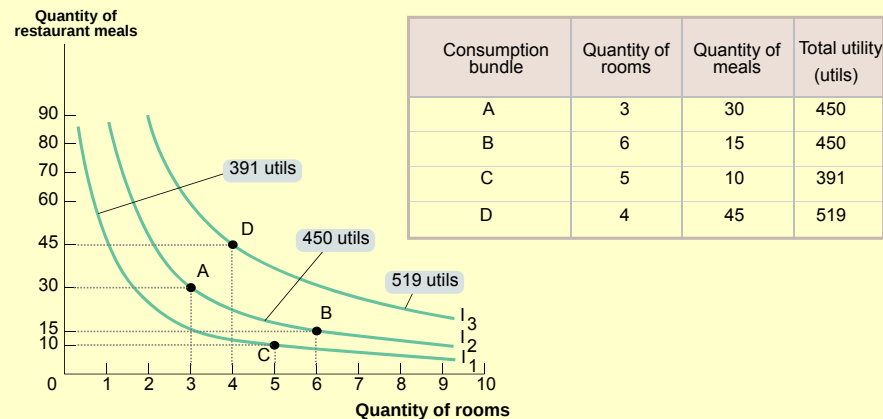
5 of 47

An Indifference Curve



6 of 47

An Indifference Curve Map



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.

7 of 47

FOR INQUIRING MINDS

Are Utils Useful?

- The indifference curve map tells us all we need to know in order to find a consumer's optimal consumption bundle.
- Economists say that bundle X is better than bundle Y. The theory does not, however, require "cardinal" utility, which actually assigns a specific number to the total utility yielded by each bundle.
- So why introduce the concept of utils at all? The answer is that it is much easier to understand the basis of rational choice by using the concept of measurable utility.

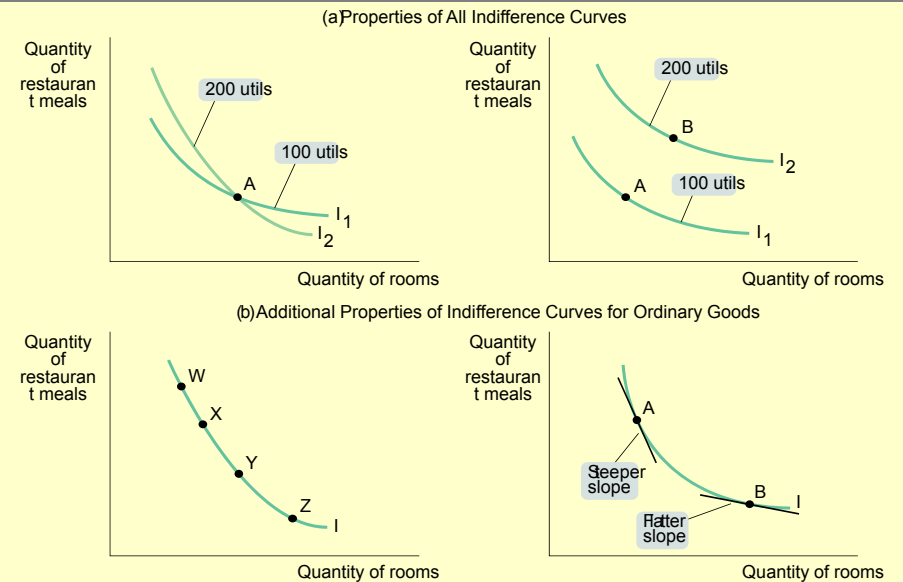
8 of 47

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.

9 of 47

Properties of Indifference Curves



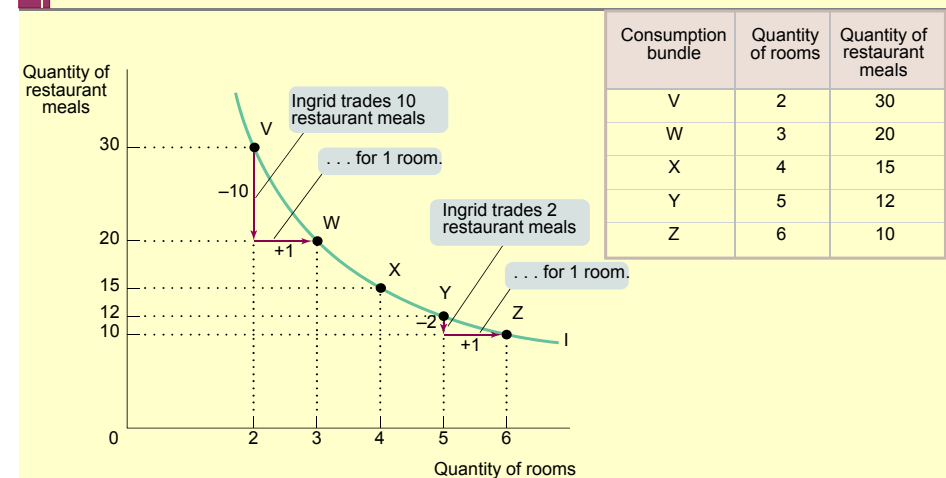
10 of 47

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**.

11 of 47

The Changing Slope of an Indifference Curve



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?

12 of 47

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.

13 of 47

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:*
 $-MU_M \times \Delta Q_M = MU_R \times \Delta Q_R$

14 of 47

Marginal Rate of Substitution

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

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

- Economists have a special name for the ratio of the marginal utilities in the LHS of this equation and it is called the **marginal rate of substitution, MRS**.

15 of 47

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.

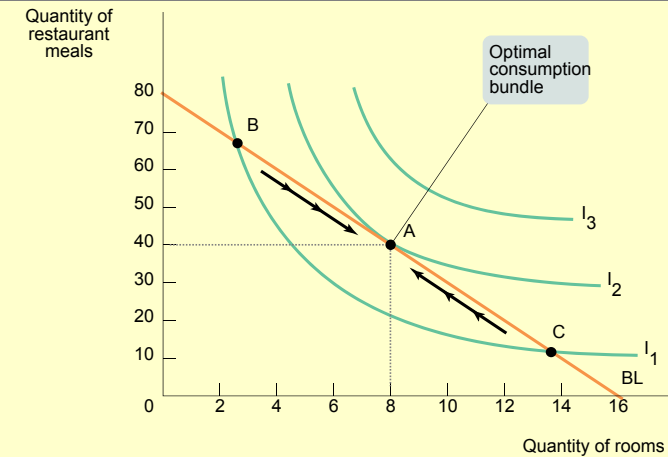
16 of 47

Diminishing Marginal Rate of Substitution

- The principle of **diminishing marginal rate of substitution** states that the more of good R a person consumes in proportion to good M, the less M he or she is willing to substitute for another unit of R.
- Two goods, R and M, are **ordinary goods** in a consumer's utility function when (1) the consumer requires additional units of R to compensate for less M, and vice versa: and (2) the consumer experiences a diminishing marginal rate of substitution when substituting one good in place of another.

17 of 47

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.

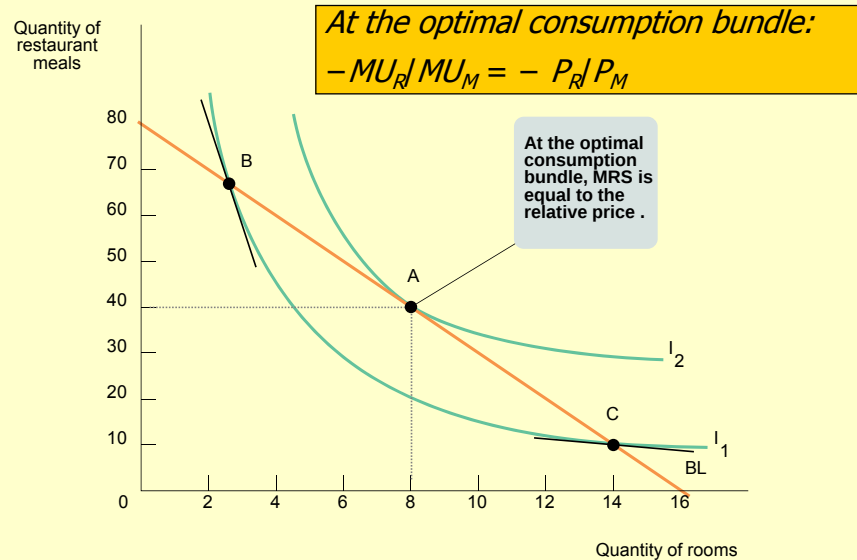
19 of 47

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:** $MU_R/P_R = MU_M/P_M$

20 of 47

Understanding the Relative Price Rule



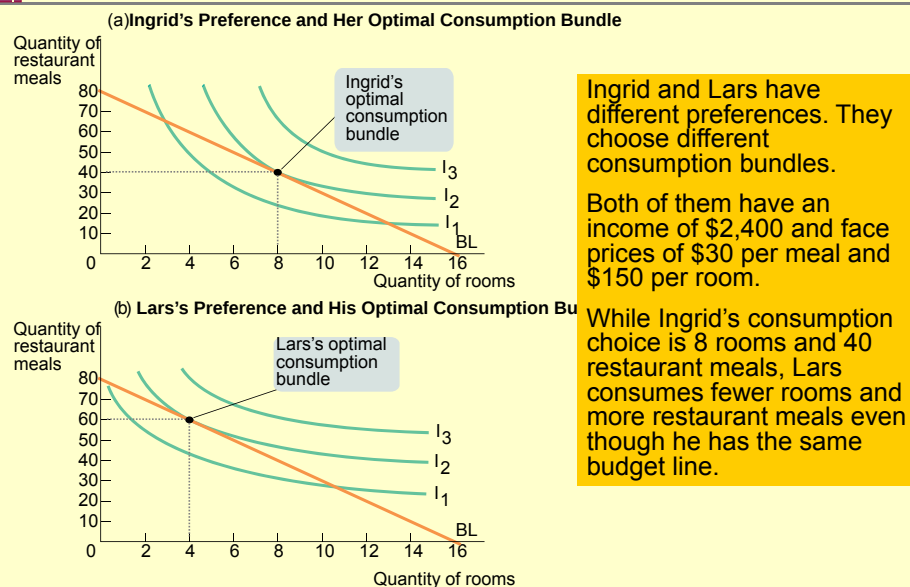
21 of 47

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.

22 of 47

Differences in Preferences



23 of 47

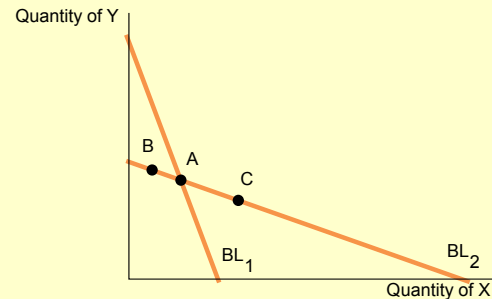
ECONOMICS IN ACTION

Rats and Rational choice

- The theory of consumer choice does not bear much resemblance to the way most of us think about our consumption decisions. The purpose of the theory to help economists think systematically about how a rational consumer would behave. The practical consumers actually behave rationally.
- Economists have conducted experiments in which rats are presented with a "budget constraint"- a limited number of times per hour they can push either of two levers. One of the levers yields small cups of water; the other yields pellets of food. After the rats choice have been observed, the budget constraint is changed by varying the number of lever pushes required to get each good. Sure enough, the rats satisfy the rule for rational choice.
- If rats are rational, can people be far behind?

24 of 47

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!

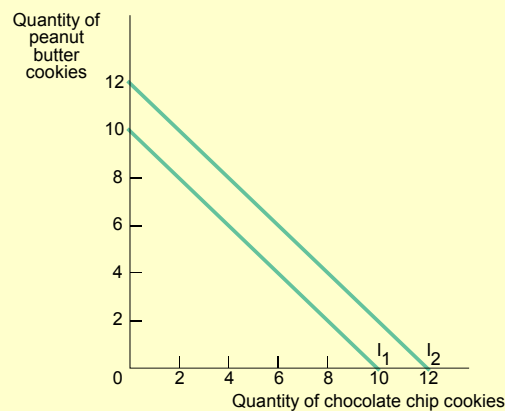
25 of 47

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*.

26 of 47

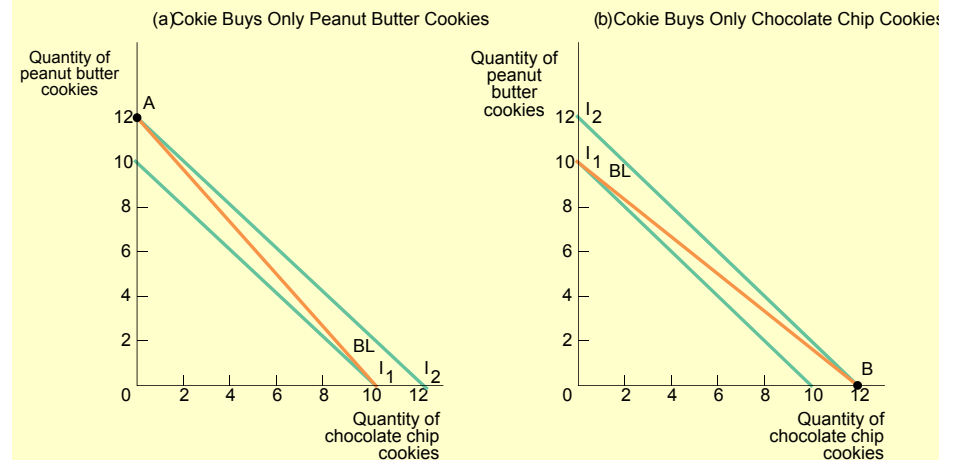
Perfect Substitutes



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.

27 of 47

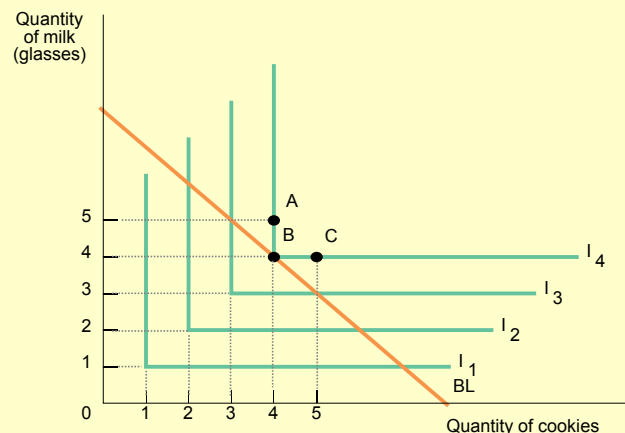
Consumer Choice Between Perfect Substitutes



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

28 of 47

Perfect Complements



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

29 of 47

► ECONOMICS IN ACTION

Publicity or Piracy?

- When the practice of audio file-sharing took off in the late 1990s, a controversy erupted at the same time.
- Musicians argued that the widespread sharing of audio files was a modern version of theft.
- On the other hand were those who argued that instead of serving as a substitute for buying the CD, file-sharing actually acted as a complement. After hearing one or two tracks, from a CD via file sharing, a listener was more likely to go out and buy the CD.
- The music industry was right because most people want one or two songs and once they have downloaded these, they won't go out and buy the CD. So file sharing and CD purchases are substitutes not compliments.

30 of 47

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.

31 of 47

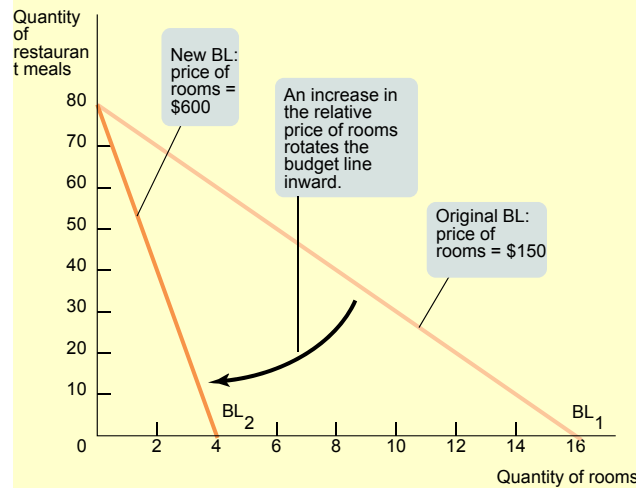
PITFALLS

“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.

32 of 47

Effects of a Price Increase on the Budget Line

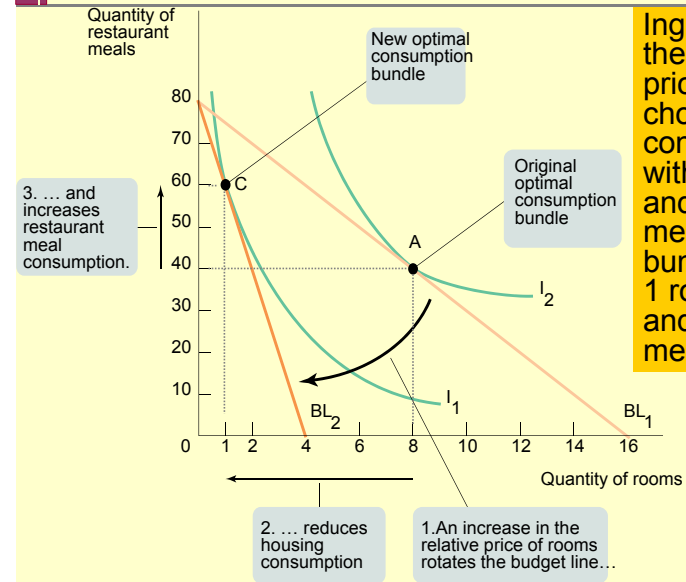


An increase in the price of rooms, holding the price of restaurant meals constant, increases the relative price of rooms in terms of restaurant meals. As a result, Ingrid's original budget line, BL₁, rotates inward to BL₂.

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

33 of 47

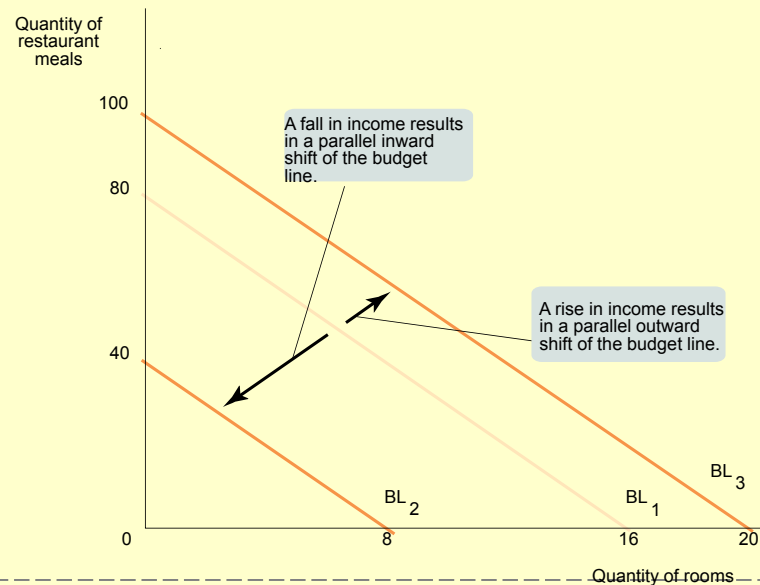
Responding to a Price Increase



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.

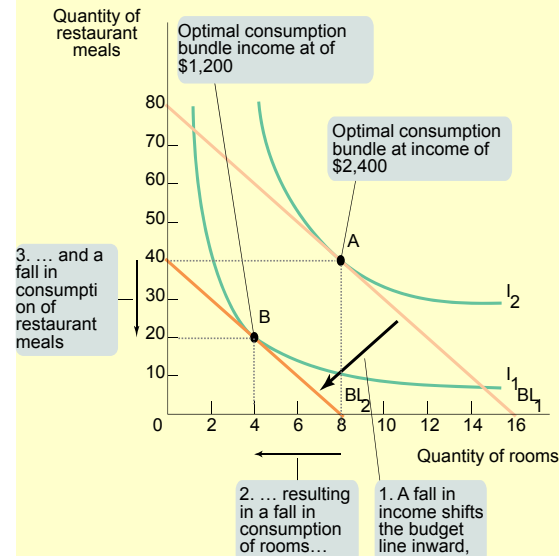
34 of 47

Effect of a Change in Income on the Budget Line



35 of 47

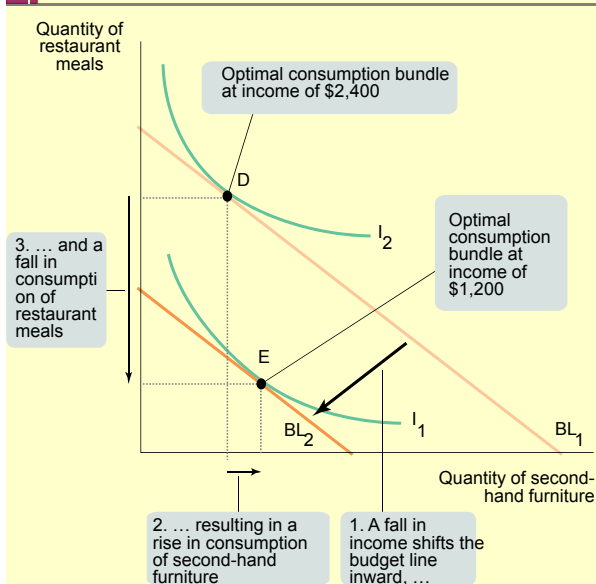
Income and Consumption: Normal Goods



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.

36 of 47

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.

37 of 47

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.

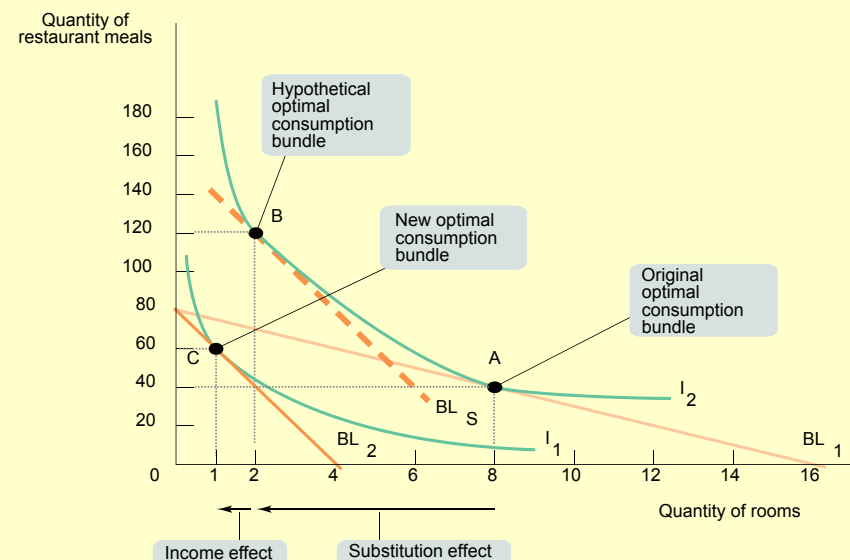
38 of 47

Income and Substitution Effects

- 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*.
- Although these effects work in opposite directions for inferior goods, their *demand curves usually slope downward* as well because the substitution effect is typically stronger than the income effect. The exception is the case of a **Giffen good**.

39 of 47

Income and Substitution Effects



40 of 47

► ECONOMICS IN ACTION

How Much Housing?

- To illustrate the substitution effect, an example was given where an individual moves from Cincinnati to San Jose, gaining higher income but facing a higher price of housing. Also, the cost of living in San Jose is also about twice that in Cincinnati. So, on average, families live about as well in the two metropolitan areas.
- But they don't live the same way because the relative prices are different. Houses are typically smaller in San Jose, with fewer rooms and fewer square feet. Most noticeably, the great majority of new homes in the Cincinnati area are single-family houses on big lots; in San Jose, people are much more likely to live in townhouses or apartments.

41 of 47

SUMMARY

1. Preferences can be represented by an **indifference curve map**, a series of **indifference curves**. Each curve shows all the consumption bundles that yield a given level of total utility. Indifference curves never cross, and greater distance from the origin indicates higher total utility levels. The indifference curves of ordinary goods slope downward and are convex in shape.

42 of 47

SUMMARY

2. The **marginal rate of substitution**, or **MRS** – the rate at which a consumer is willing to substitute more R for less M—is equal to MUR/MUM and is also equal to minus the slope of the indifference curve when R is on the horizontal axis and M is on the vertical axis.
3. Most goods are **ordinary goods**, goods for which a consumer requires additional units of some other good as compensation for giving up some of the good and for which there is **diminishing marginal rate of substitution**.

43 of 47

SUMMARY

4. A consumer maximizes utility by moving to the highest indifference curve his or her budget constraint allows. Using the **tangency condition**, the consumer chooses the bundle at which the indifference curve just touches the budget line. At this point, the **relative price** of R in terms of M, PR/PM is equal to the marginal rate of substitution of R in place of M, MUR/MUM . This gives us the **relative price rule**: at the optimal consumption bundle, the relative price is equal to the marginal rate of substitution.

44 of 47

SUMMARY

5. When the marginal rate of substitution is constant, two goods are **perfect substitutes** and indifference curves are straight lines: there is only one relative price at which the consumer is willing to purchase both goods. When a consumer wants to consume the two goods in the same ratio, regardless of the relative price, the goods are **perfect complements**. In this case, the indifference curves form right angles and the marginal rate of substitution is undefined.

SUMMARY

6. The **substitution effect** is shown by a movement along the original indifference curve in response to the change in relative price, as the consumer substitutes more of the relatively cheaper good in place of the relatively more expensive good. The **income effect** is shown by a change to a new indifference curve, reflecting the fact that a change in a good's price alters the purchasing power of a given level of income.
7. The income and substitution effects work in the same direction for normal goods, ensuring that demand curves slope downward.