chapter:

10 Appendix

>> **Consumer Preferences and Consumer Choice**

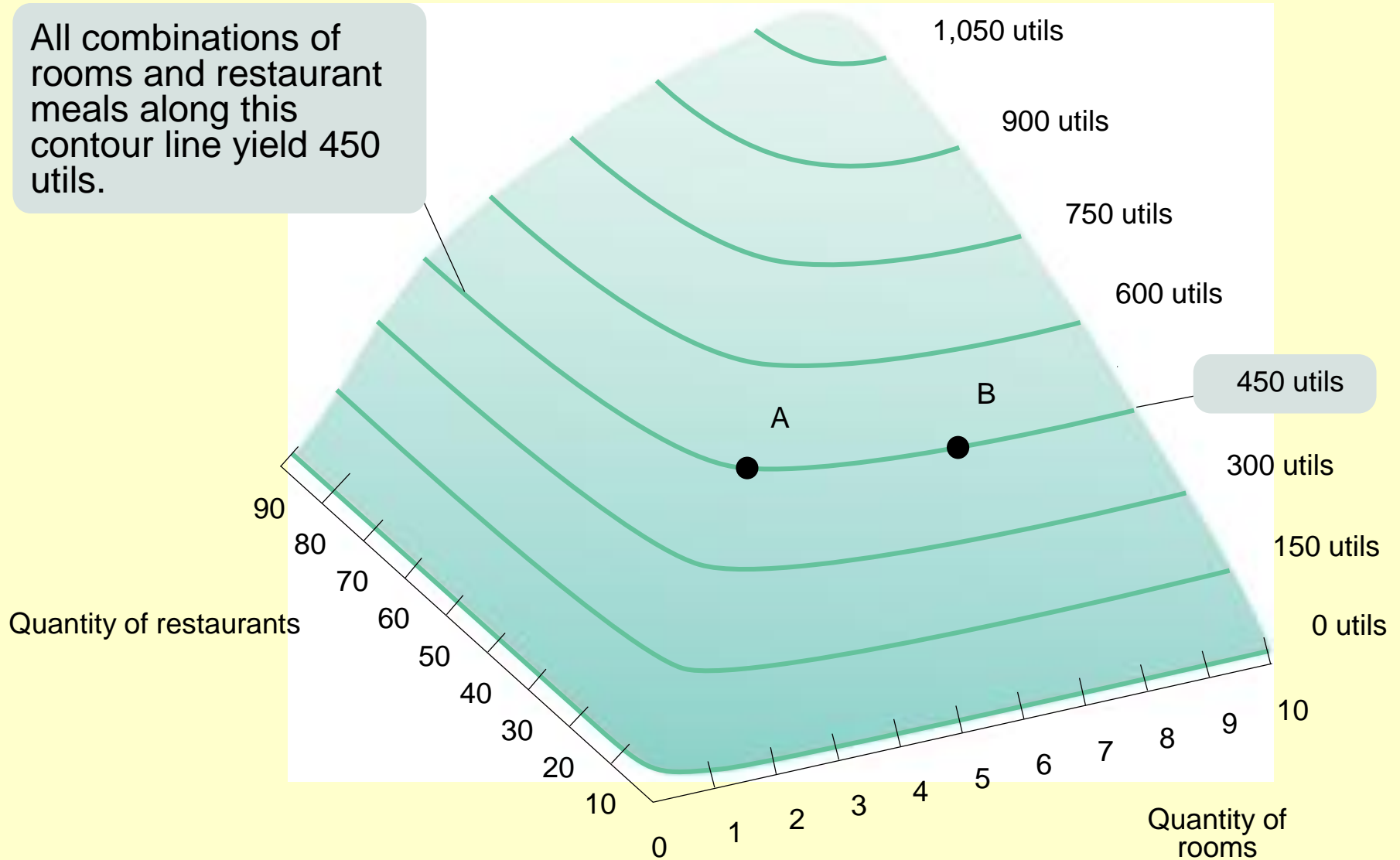**Krugman/Wells Economics**

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.
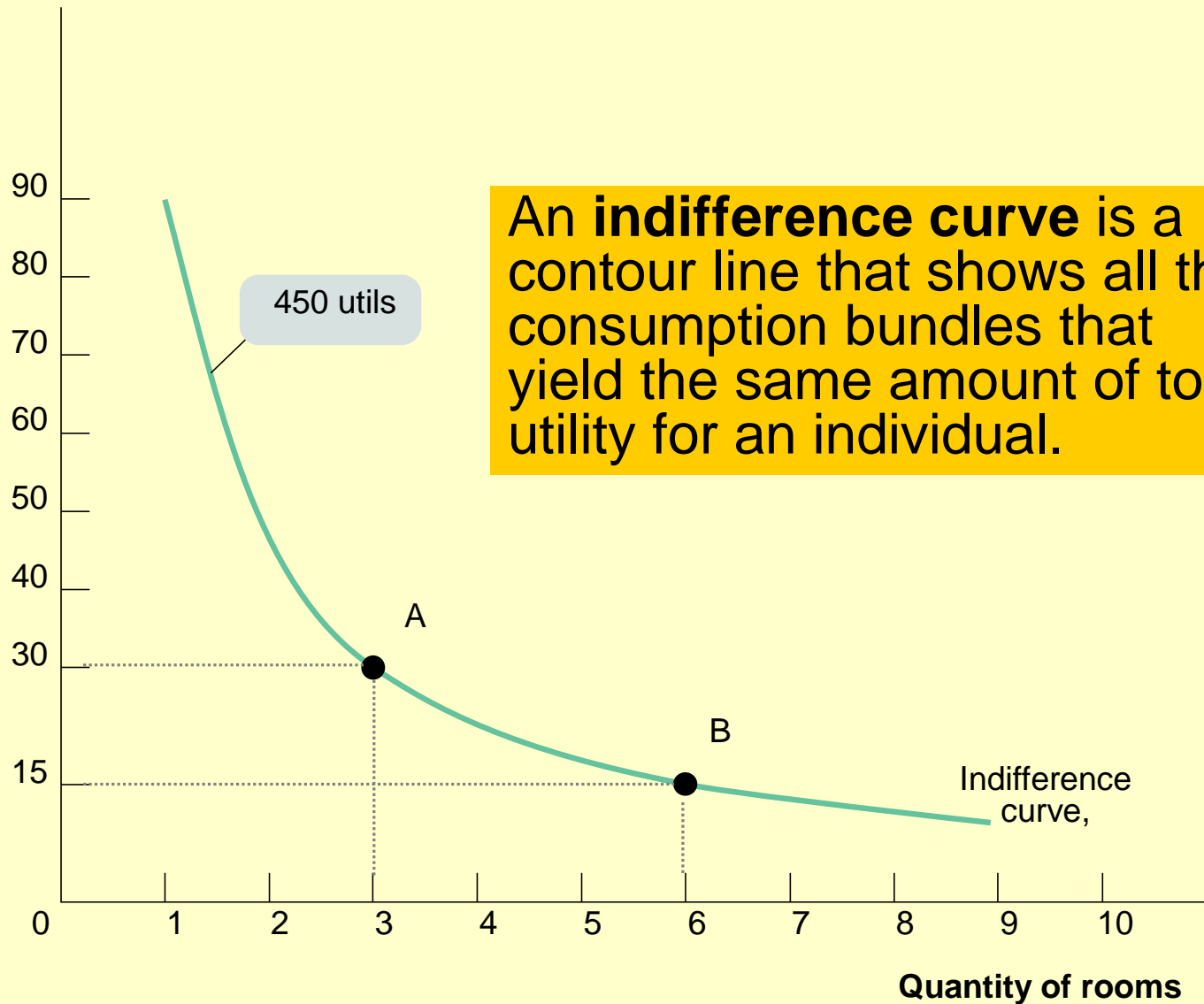
Ingrid's Utility Function

All combinations of rooms and restaurant meals along this contour line yield 450 utils.
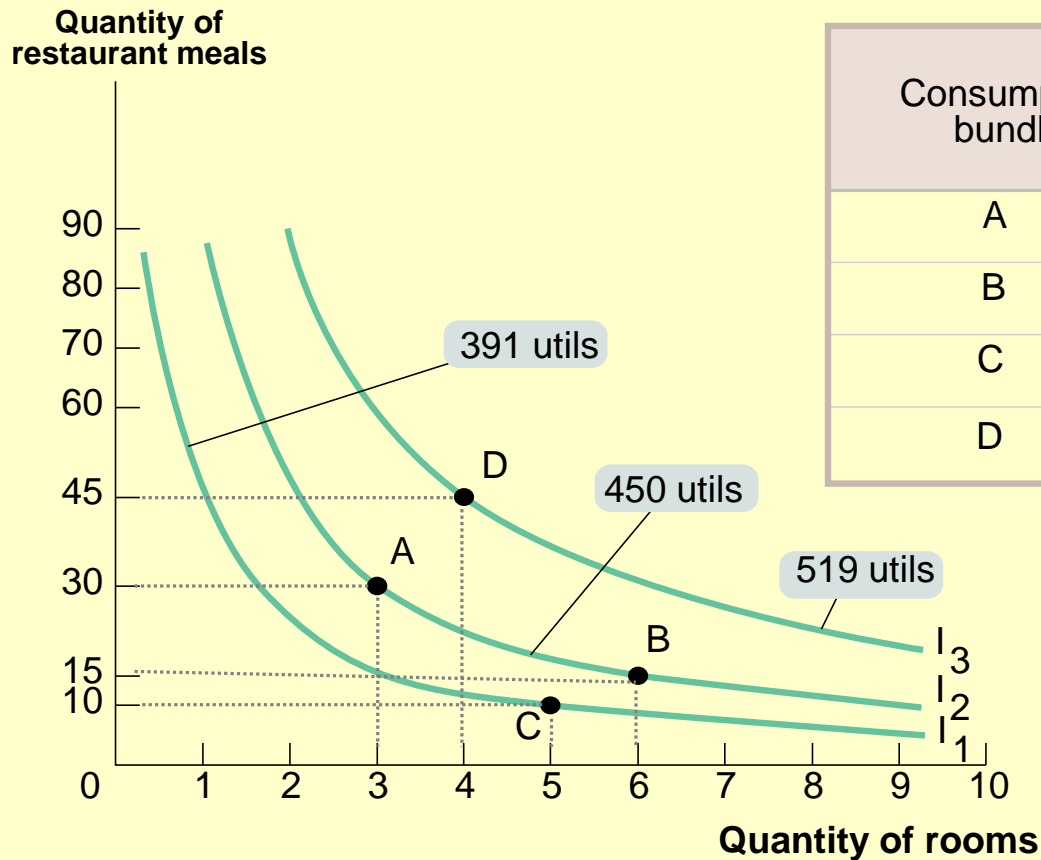
An Indifference Curve

Quantity of restaurant meals

450 utils

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

A

B

Indifference curve,

Quantity of rooms

An Indifference Curve Map

Quantity of restaurant meals

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

391 utils

450 utils

519 utils

I_3
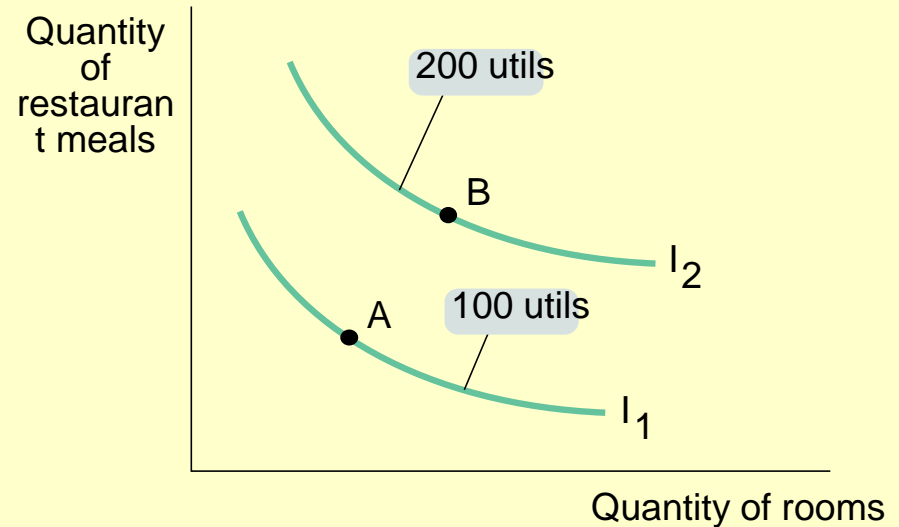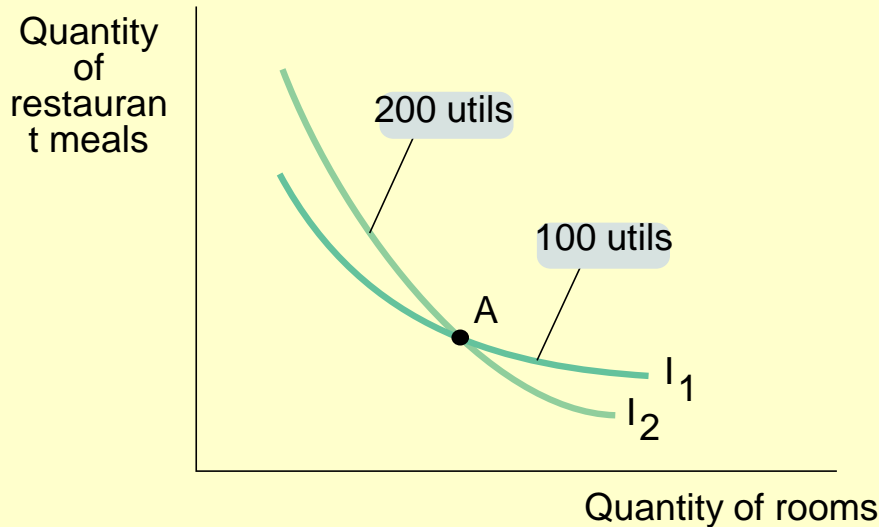
I_2

I_1

Quantity of rooms

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.
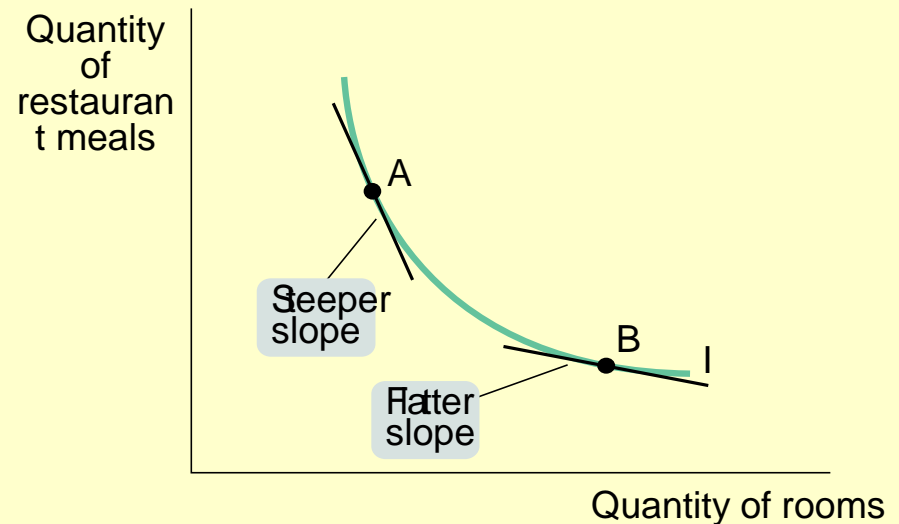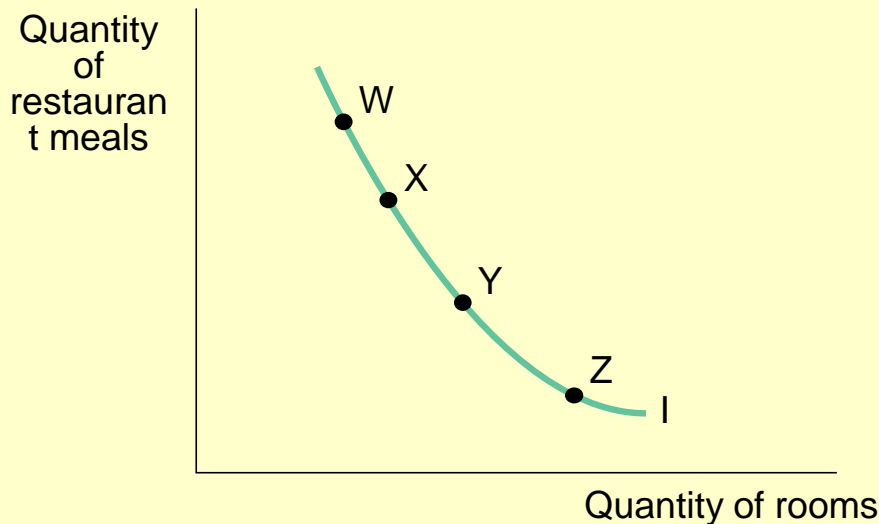
Properties of Indifference Curves

- All indifference curve maps share two general properties:
  - indifference curves never cross
  - 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
  - are convex (bowed-in toward the origin) as a result of diminishing marginal utility

Properties of Indifference Curves

Quantity of restaurant meals

200 utils

100 utils

A

I_1

I_2

Quantity of rooms

Quantity of restaurant meals

200 utils

B

I_2

A

100 utils

I_1

Quantity of rooms

(b) Additional Properties of Indifference Curves for Ordinary Goods

Quantity of restaurant meals

W

X

Y

Z

I

Quantity of rooms

Quantity of restaurant meals

A

Steeper slope

B

I

Flatter slope

Quantity of rooms

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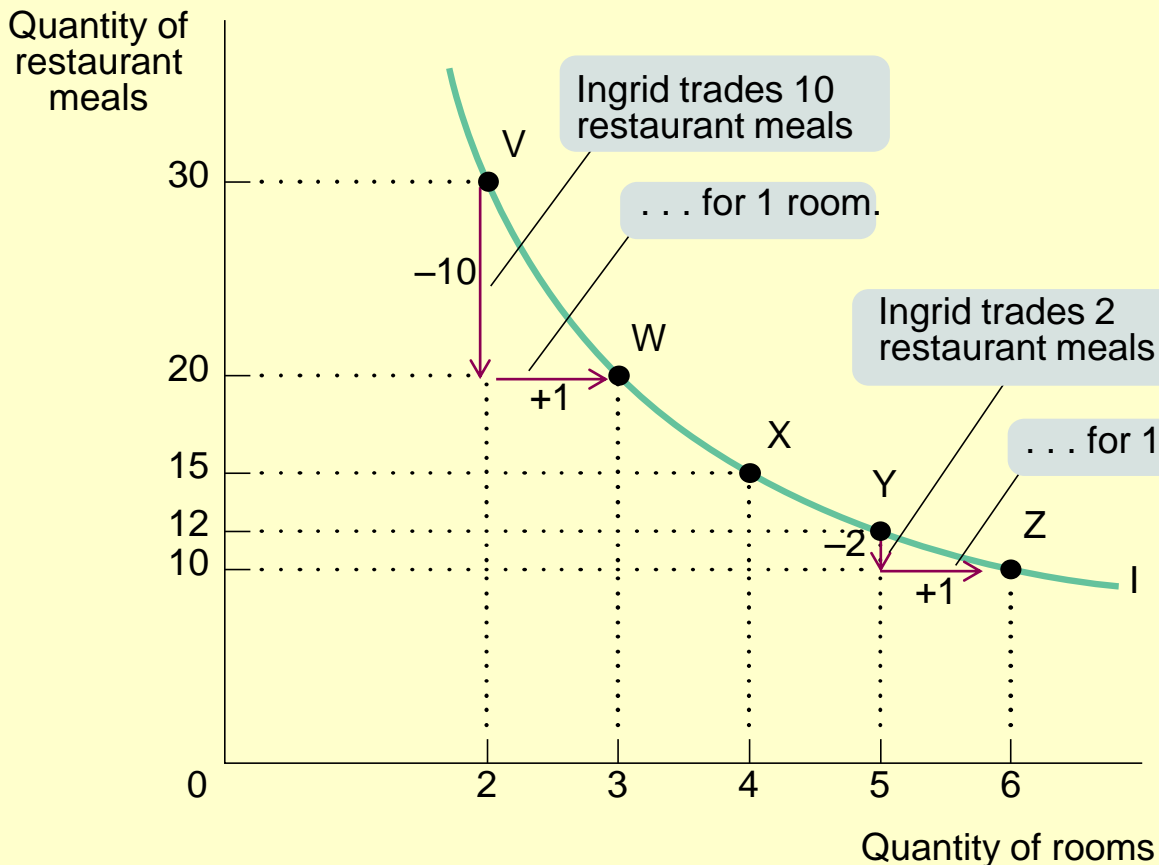
Consumption bundle	Quantity of rooms	Quantity of restaurant meals
V	2	30
W	3	20
X	4	15
Y	5	12
Z	6	10

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

- 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:

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

- 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.**

- 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*.

No domínio contínuo
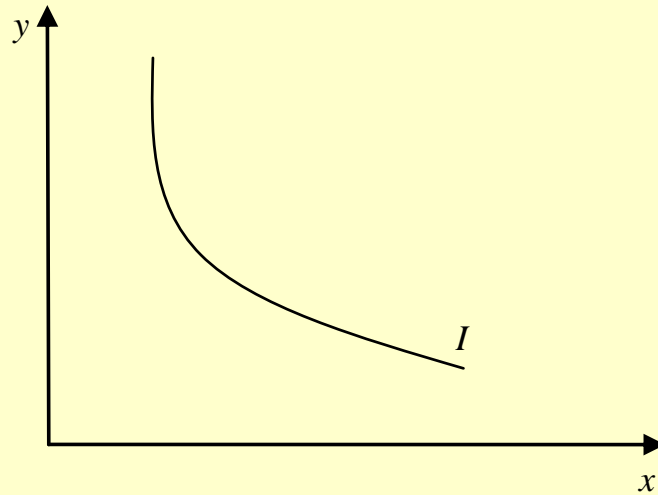
$$TMS_{Y,X} = -\frac{dy}{dx}$$ ⋯⋯⋯⋯▶ Taxa marginal de substituição do bem *Y* pelo bem *X*
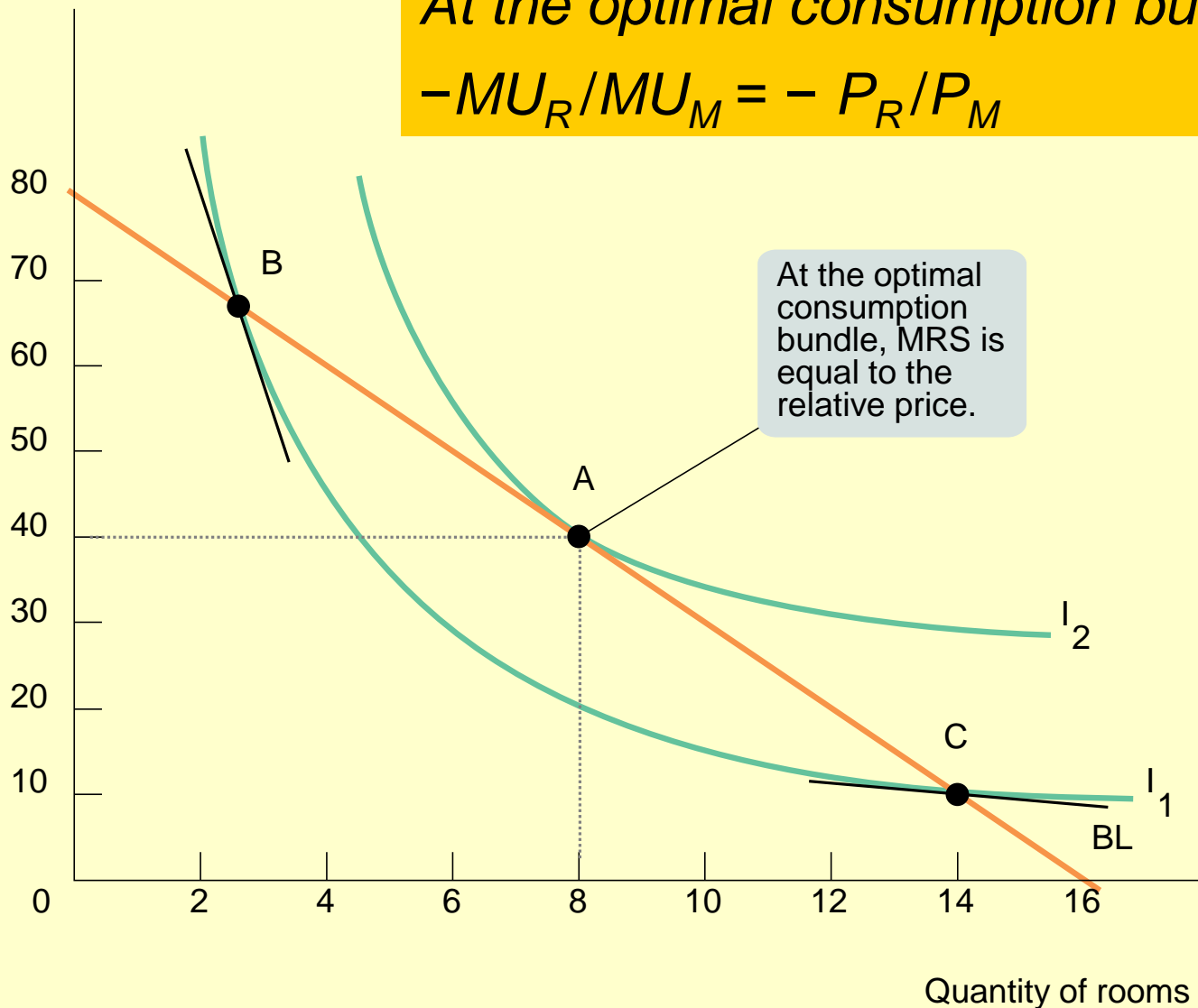
The Optimal Consumption Bundle
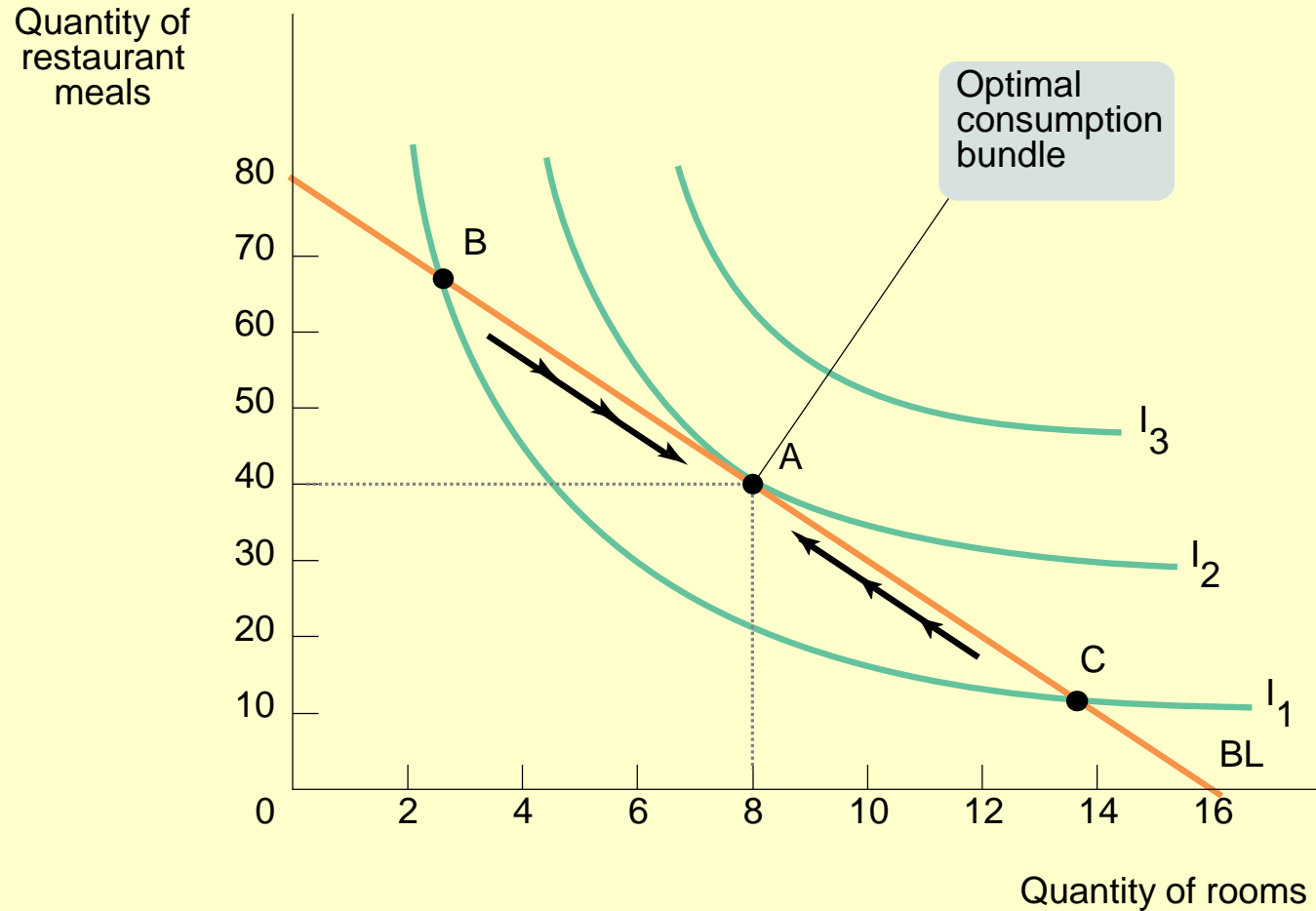
The **tangency condition** between the indifference curve and the budget line holds when the indifference curve and the budget line just touch. This condition determines the optimal consumption bundle when the indifference curves have the typical convex shape.
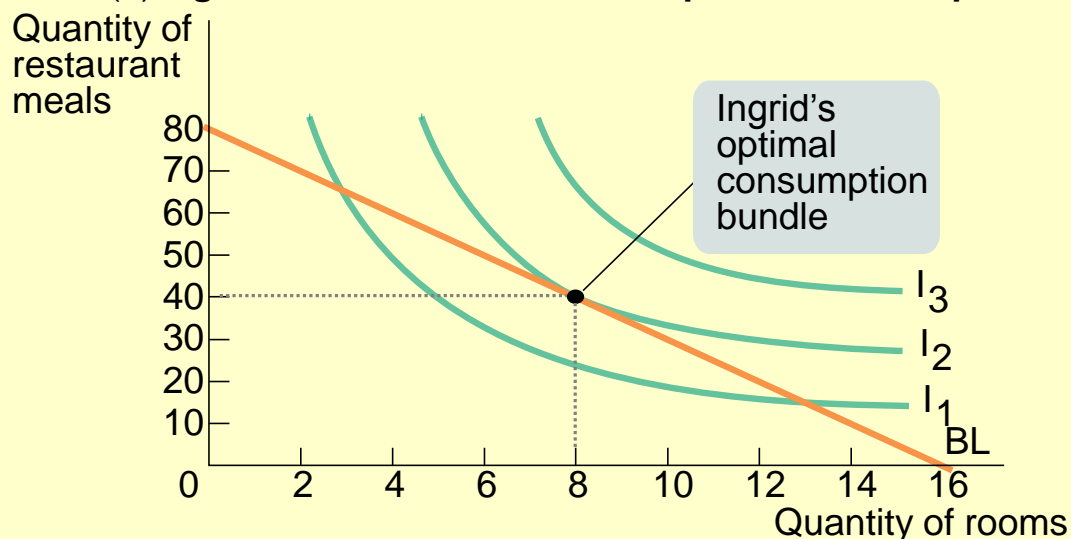
Understanding the Relative Price Rule

At the optimal consumption bundle:
$$-MU_R/MU_M = -P_R/P_M$$

At the optimal consumption bundle, MRS is equal to the relative price.

Quantity of restaurant meals

Quantity of rooms

Differences in Preferences

(a) **Ingrid's Preference and Her Optimal Consumption Bundle**

(b) **Lars's Preference and His Optimal Consumption Bund**

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.
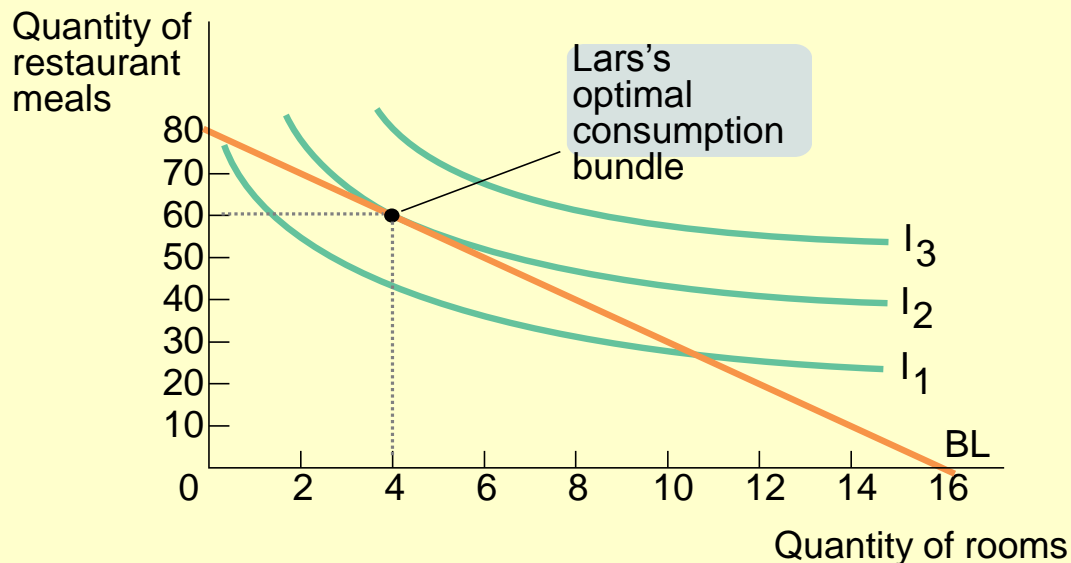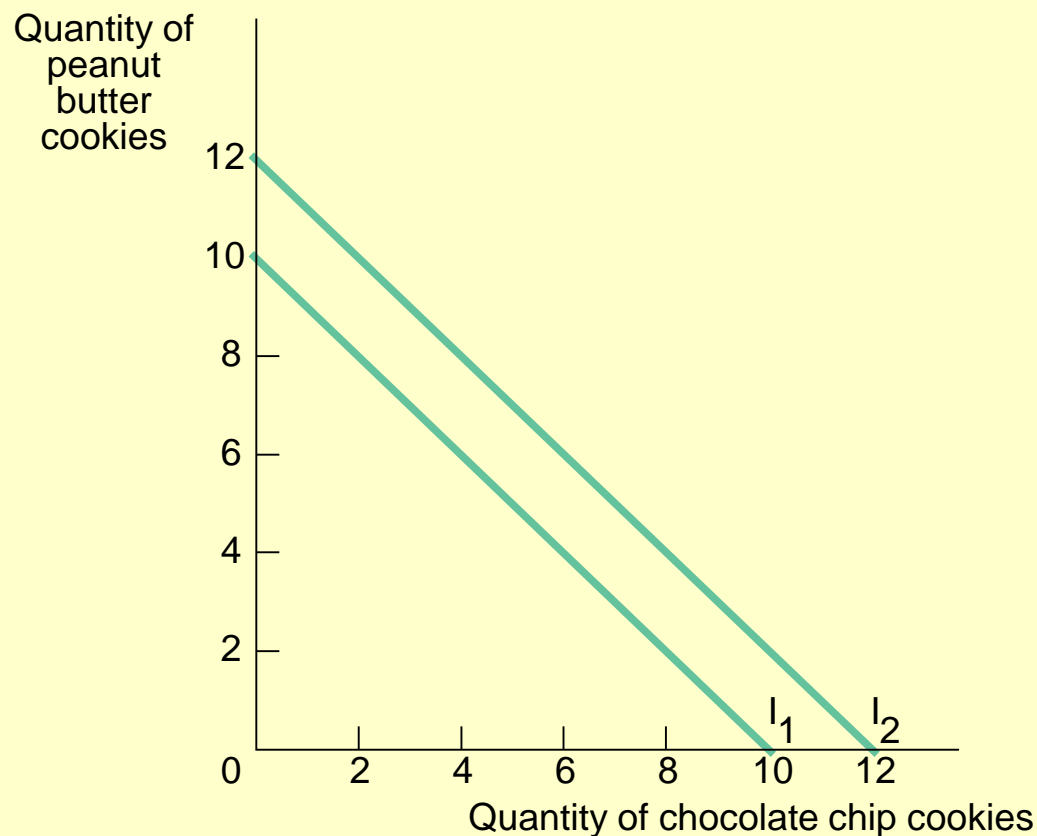
- What determines whether two goods are substitutes or complements?

- 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*.
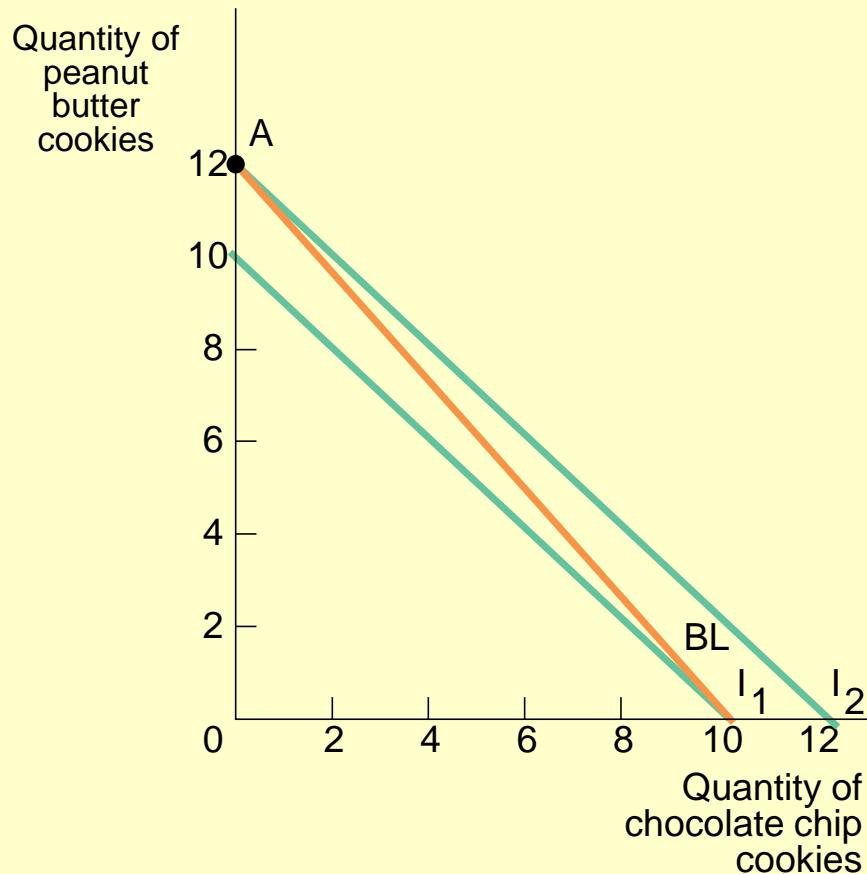
Perfect Substitutes

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

(a) Cokie Buys Only Peanut Butter Cookies

(b) Cokie Buys Only Chocolate Chip Cookies
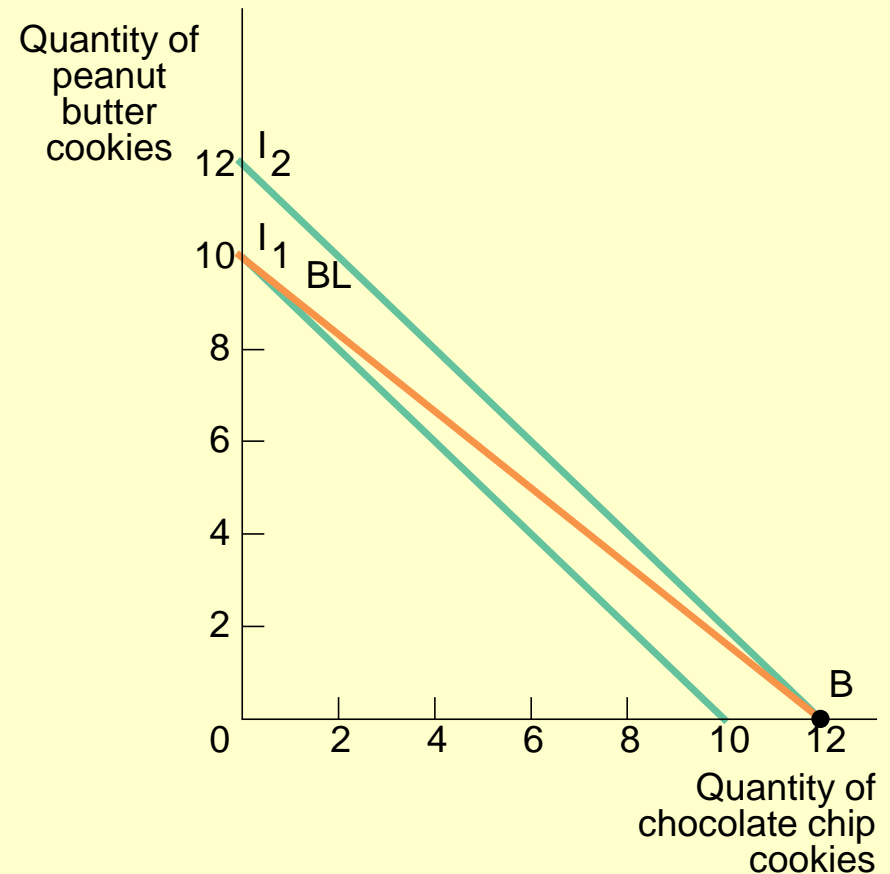
When two goods are perfect substitutes, small price changes can lead to large changes in the consumption bundle.

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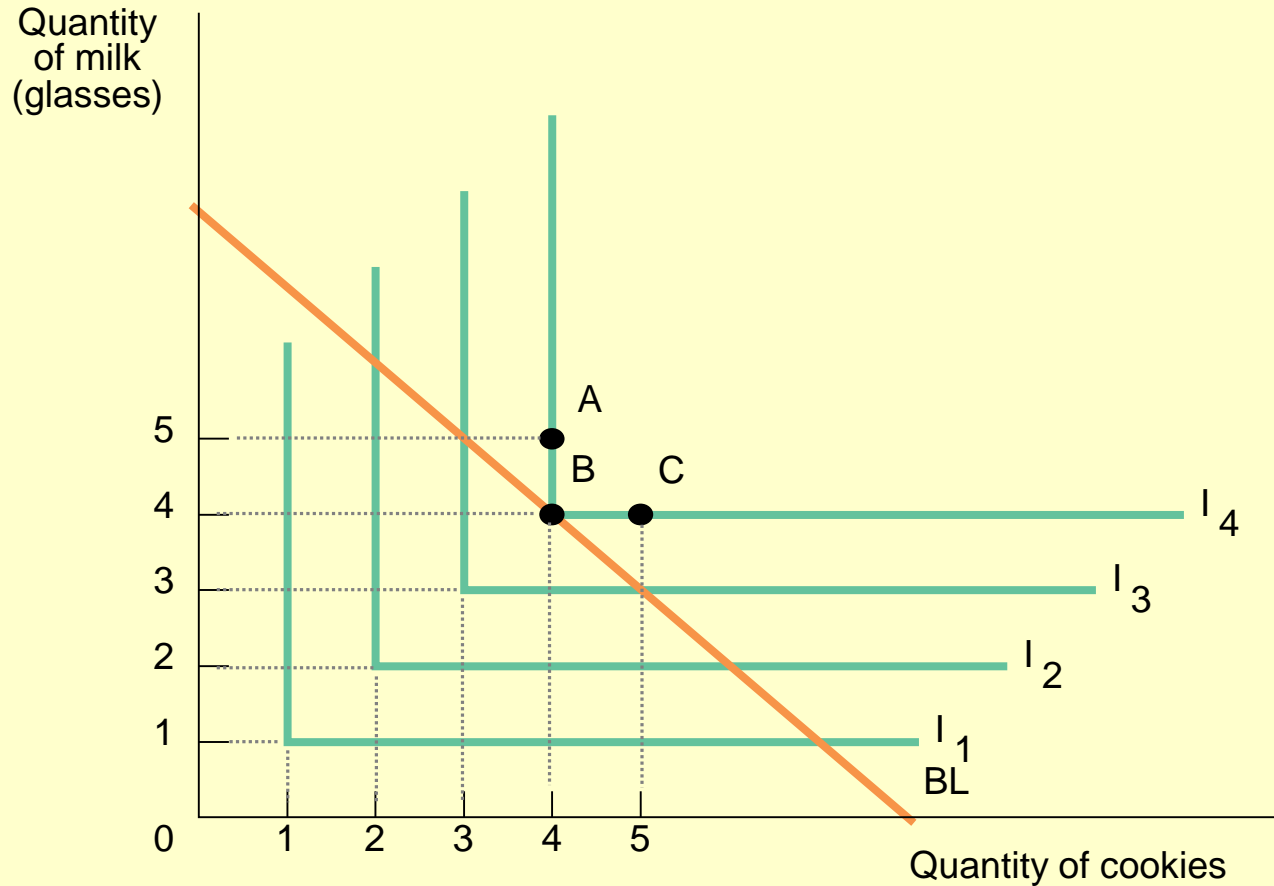
Two goods are **perfect complements** when a consumer wants to consume the goods in the same ratio regardless of their relative price.

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.

Responding to a Price Increase

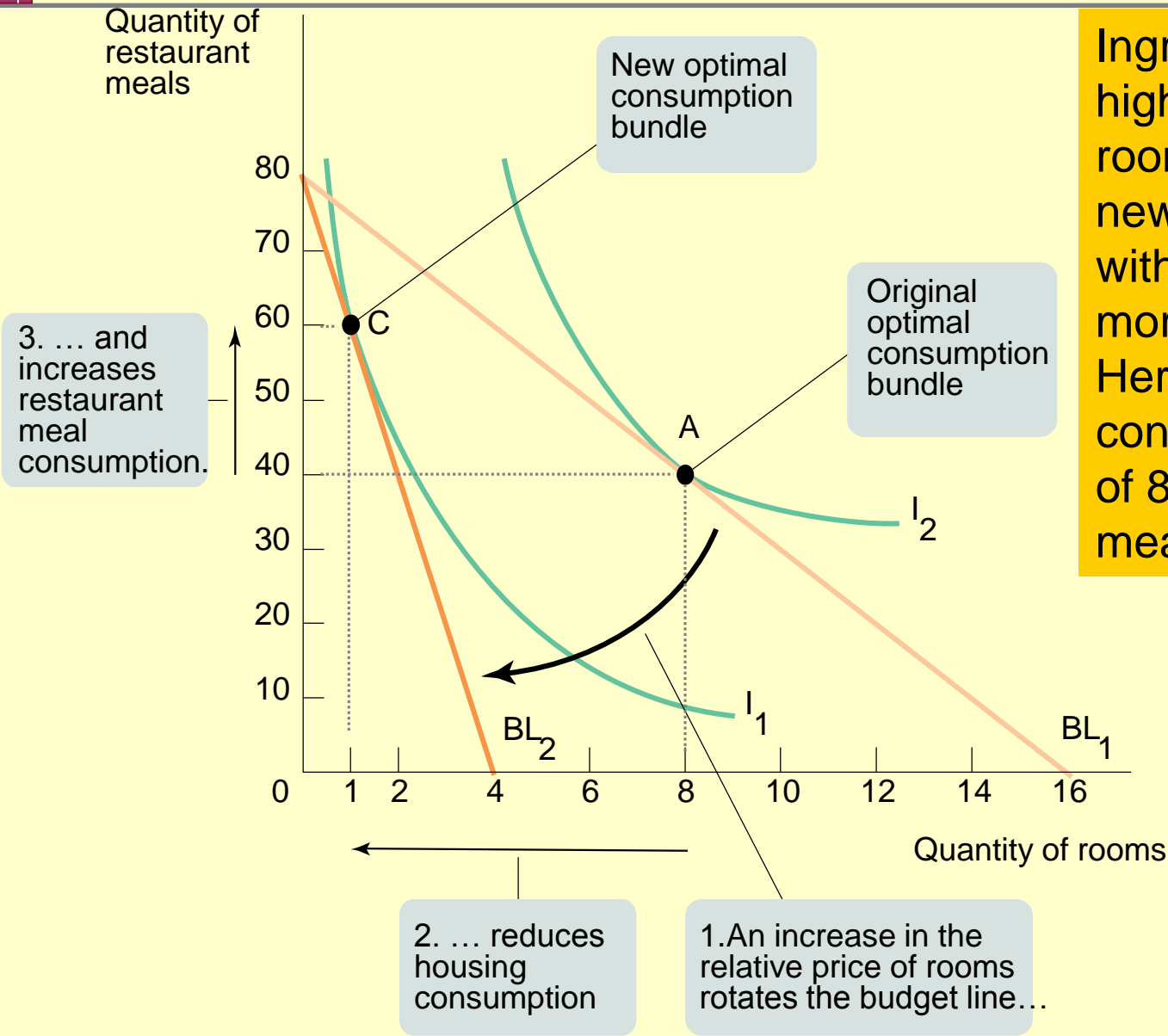Quantity of restaurant meals

New optimal consumption bundle

Original optimal consumption bundle

3. … and increases restaurant meal consumption.

80
70
60 • C
50
40 ⋯⋯⋯⋯⋯ A
30
20
10

I_2

I_1

BL$_2$

BL$_1$

0   1   2   4   6   8   10   12   14   16

Quantity of rooms

2. … reduces housing consumption …

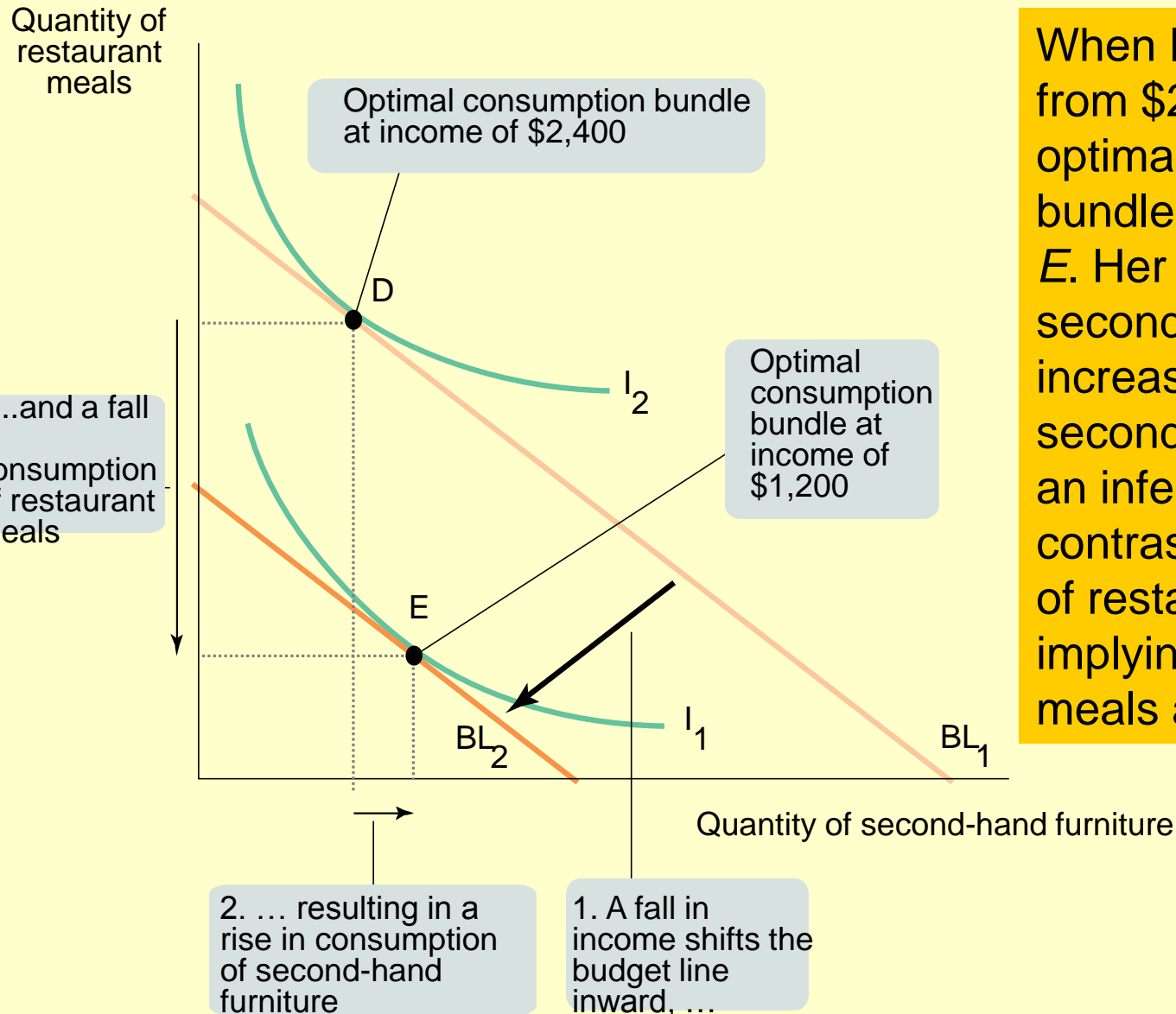1. An increase in the relative price of rooms rotates the budget line…

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.

Quantity of restaurant meals

Optimal consumption bundle income at of $1,200

Optimal consumption bundle at income of $2,400
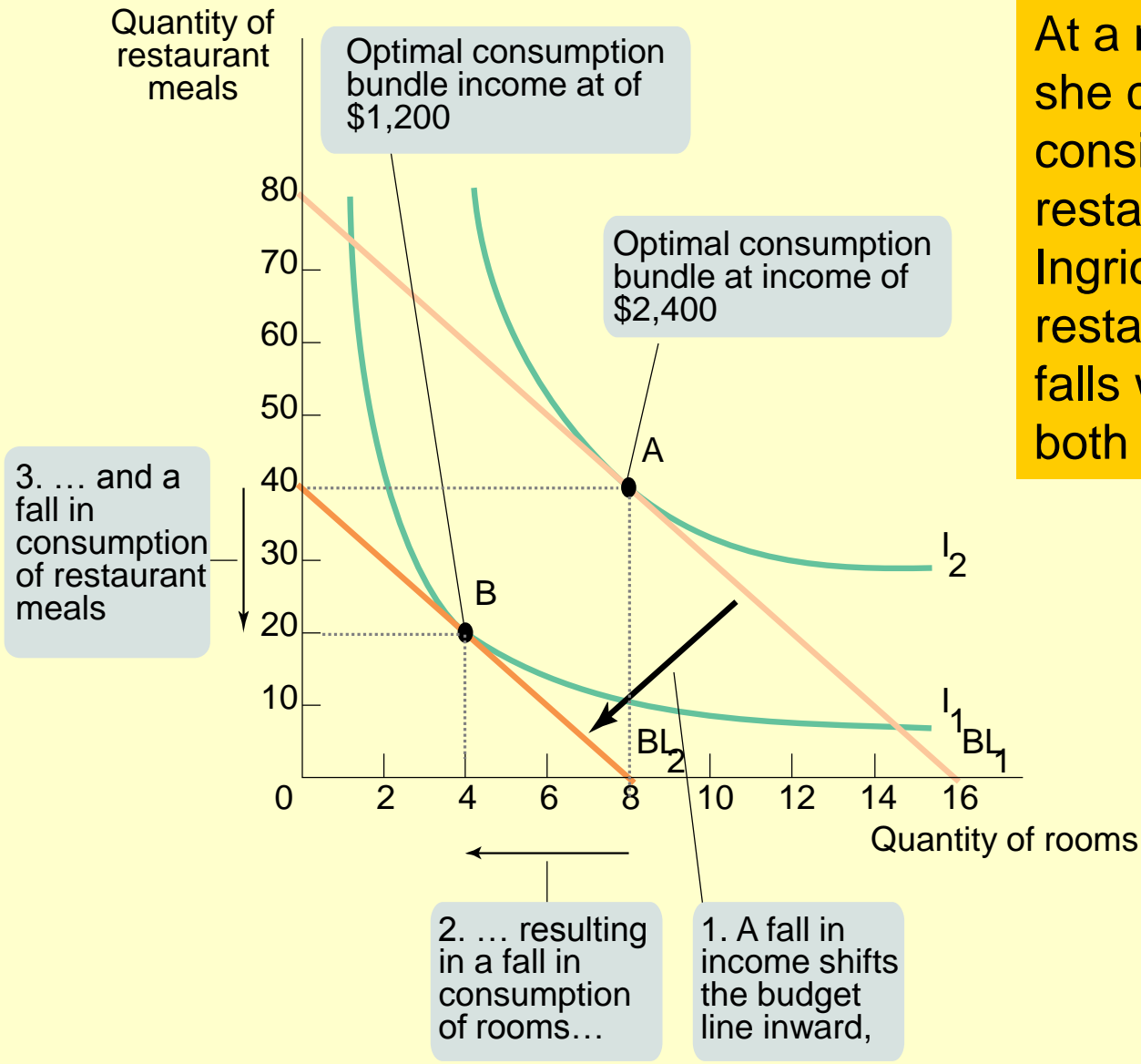
At a monthly income of $1,200, she chooses bundle B, consisting of 4 rooms and 20 restaurant meals. Since Ingrid's consumption of both restaurant meals and rooms falls when her income falls, both goods are normal goods.

3. … and a fall in consumption of restaurant meals

A

I_2

B

I_1

BL_2

BL_1

Quantity of rooms

2. … resulting in a fall in consumption of rooms…

1. A fall in income shifts the budget line inward, …

Income and Consumption: An Inferior Good

Quantity of restaurant meals

Optimal consumption bundle at income of $2,400

D

I_2

Optimal consumption bundle at income of $1,200

3...and a fall in consumption of restaurant meals

E

I_1

BL_2

BL_1

Quantity of second-hand furniture

2. … resulting in a rise in consumption of second-hand furniture

1. A fall in income shifts the budget line inward, …

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.
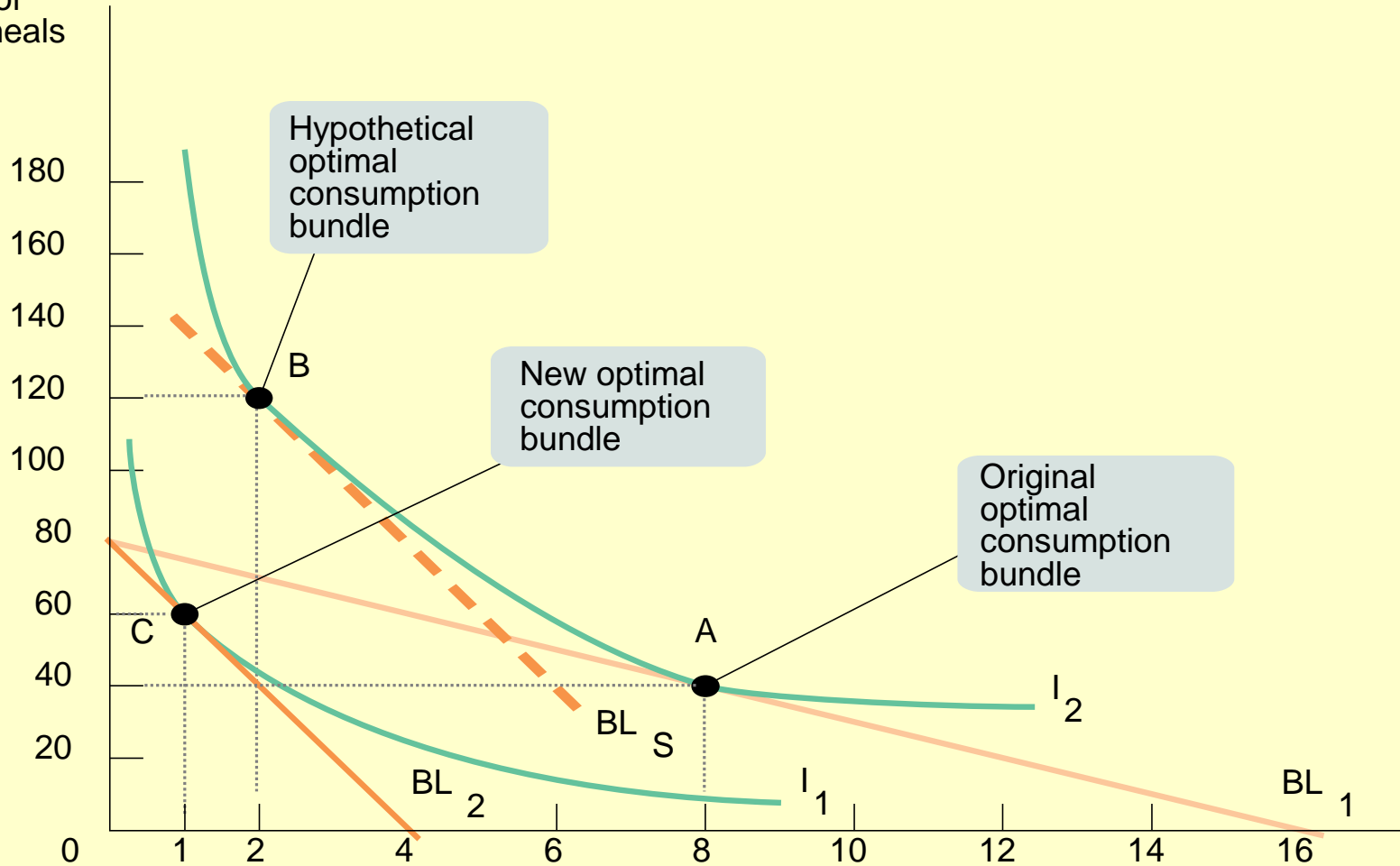
Income and Substitution Effects

- 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.

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 new 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***.

Income and Substitution Effects

The End of Chapter 10 Appendix

Coming attraction:
**Chapter 11:
Behind the Supply Curve:
Inputs and Costs**