

# Possibilities, Preferences, and Choices

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# Announcements

- Assigned reading:

- Textbook, Chapter 9, 10

- Problem set 5

- Ch8: 1-13, 25

- Ch9: 1-5, 7-11

- Due dates will be announced on CANVAS.

# The Budget Equation

- We can describe the budget line by using a budget equation.
- Call the price of soda  $P_S$ , the quantity of soda  $Q_S$ , the price of a movie  $P_M$ , the quantity of movies  $Q_M$ , and income  $Y$ .
- Lisa's budget equation is:

$$P_S Q_S + P_M Q_M = Y$$

# The Budget Equation

- Divide both sides of this equation by  $P_S$  :

$$Q_S + (P_M/P_S)Q_M = Y/P_S$$

- Re-arrange:

$$Q_S = Y/P_S - (P_M/P_S)Q_M$$

- $Y/P_S$  is Lisa's real income in terms of soda.
- $P_M/P_S$  is the relative price of a movie in terms of soda.
- In economics, relative price is a very important concept – opportunity cost again!

# The Budget Equation

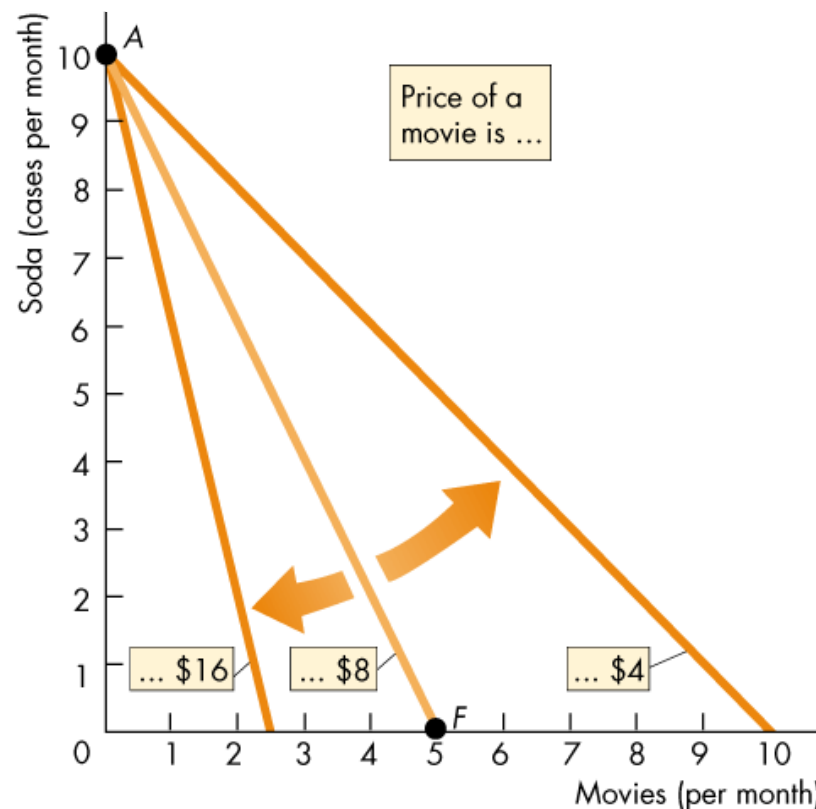
- **Real income** is the income expressed as a quantity of goods that can afford to buy.
  - Lisa's real income in terms of soda is the point on her budget line that meets the y-axis.
- A **relative price** is the price of one good divided by the price of another good.
  - Relative price is the magnitude of the slope of the budget line (**Be careful what good is on x-axis and what is on y-axis**).
  - i.e., How many cases of soda must be forgone to see an additional movie – opportunity cost!

# The Budget Equation

## A Change in Prices

–A change in the price of the good on the x-axis changes the **slope** of the budget line.

–Figure 9.2(a) shows the rotation of a budget line after a change in the relative price of movies.



(a) A change in price

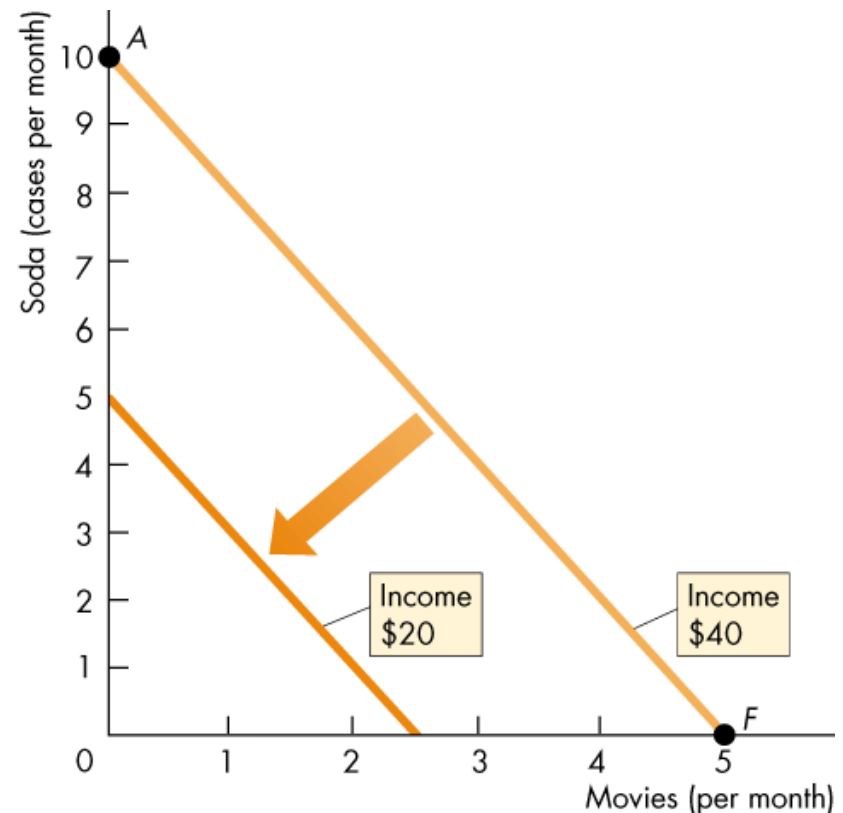
# The Budget Equation

## A Change in Income

–An change in money income brings a **parallel shift** of the budget line.

–The slope of the budget line doesn't change because the relative price doesn't change.

–Figure 9.2(b) shows the effect of a fall in income.



(b) A change in income

## Quick Check

Tonya, who is rich, and Jerome, who is poorer, both buy orange juice and croissants for lunch at the student cafeteria. Their budget constraints on a diagram with orange juice on the vertical axis and croissants on the horizontal have the same

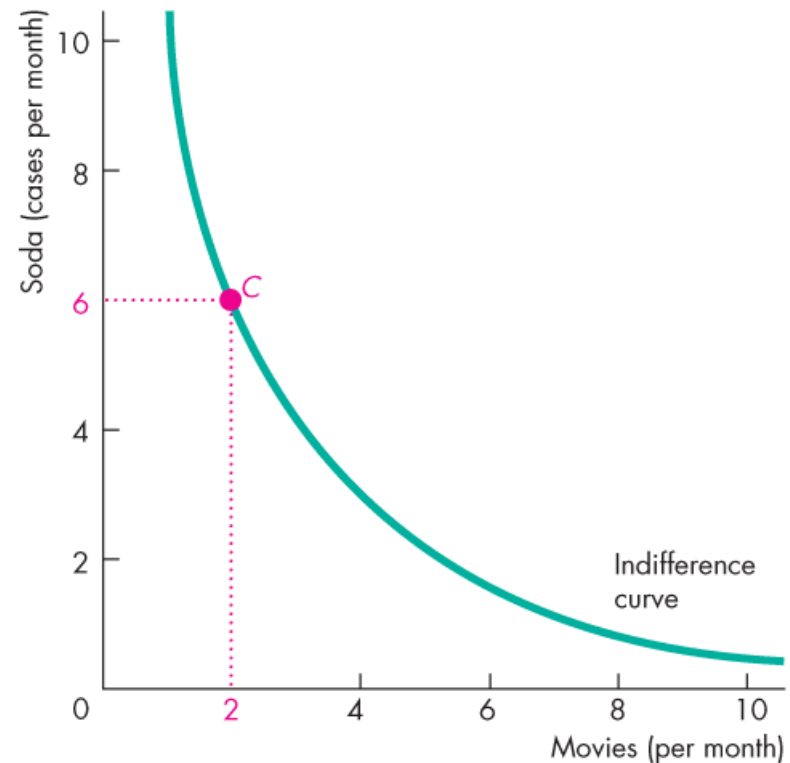
- A) horizontal intercepts.
- B) vertical intercepts.
- C) slopes.
- D) midpoints.
- E) none of the above.



# Quick Check

# Preferences and Indifference Curves

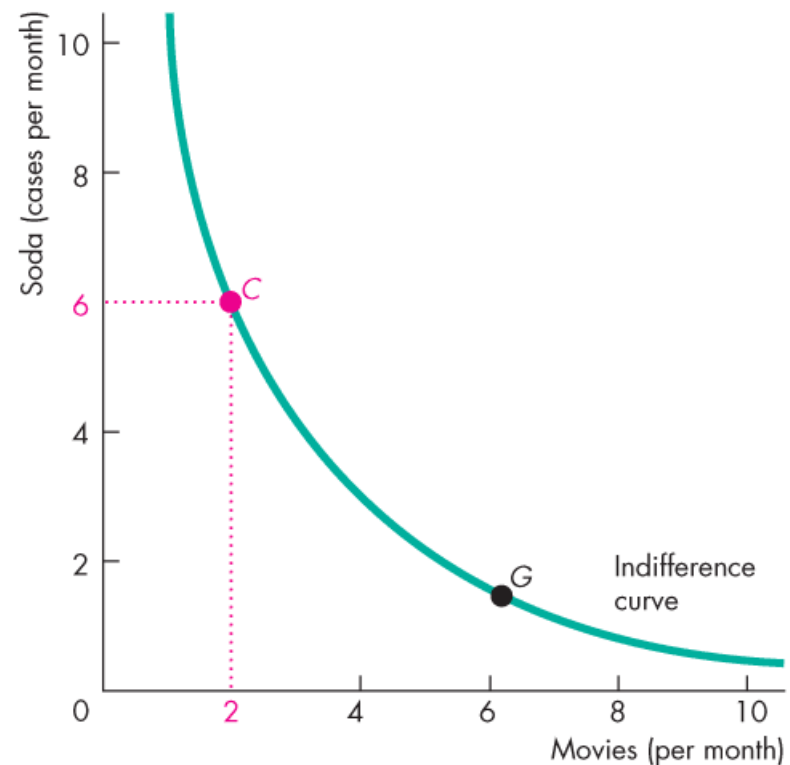
- An indifference curve is a curve that shows combinations of goods among which a consumer is **indifferent**.
- At point **C**, Lisa sees 2 movies and drinks 6 cases of soda a month.
- Figure 9.3(a) illustrates Lisa's indifference curve.



(a) An indifference curve

# Preferences and Indifference Curves

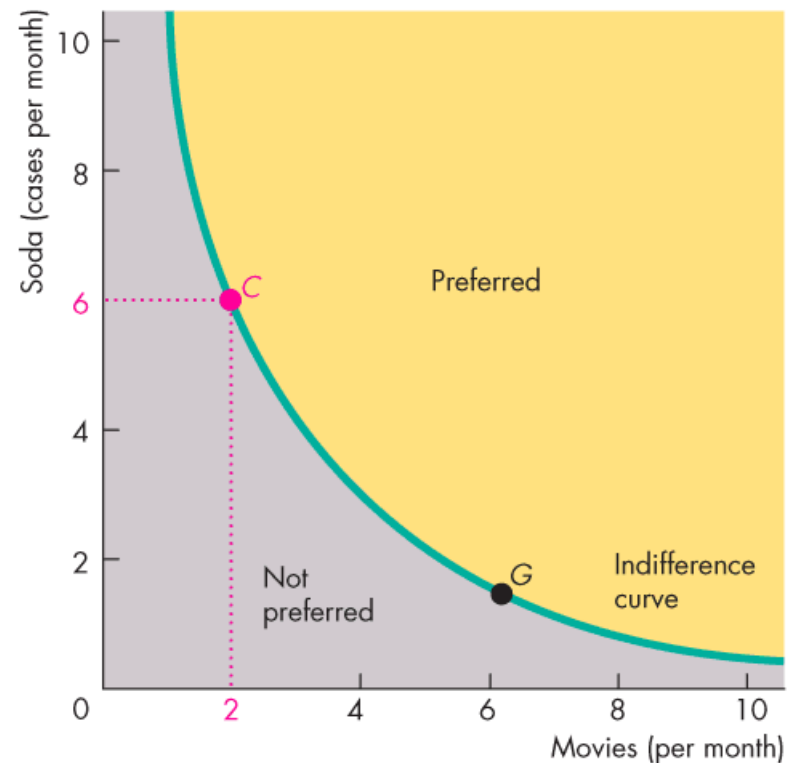
- Lisa can sort all possible combinations of goods into three groups: *preferred*, *not preferred*, and *just as good*.
- An indifference curve joins all those points that Lisa says are just as good as **C**.
- G** is such a point. Lisa is indifferent between **C** and **G**.



(a) An indifference curve

# Preferences and Indifference Curves

- Lisa prefers any point **above** the indifference curve to any point **on** the curve.
- Lisa prefers any point **on** the indifference curve to any point **below** the indifference curve.



(a) An indifference curve

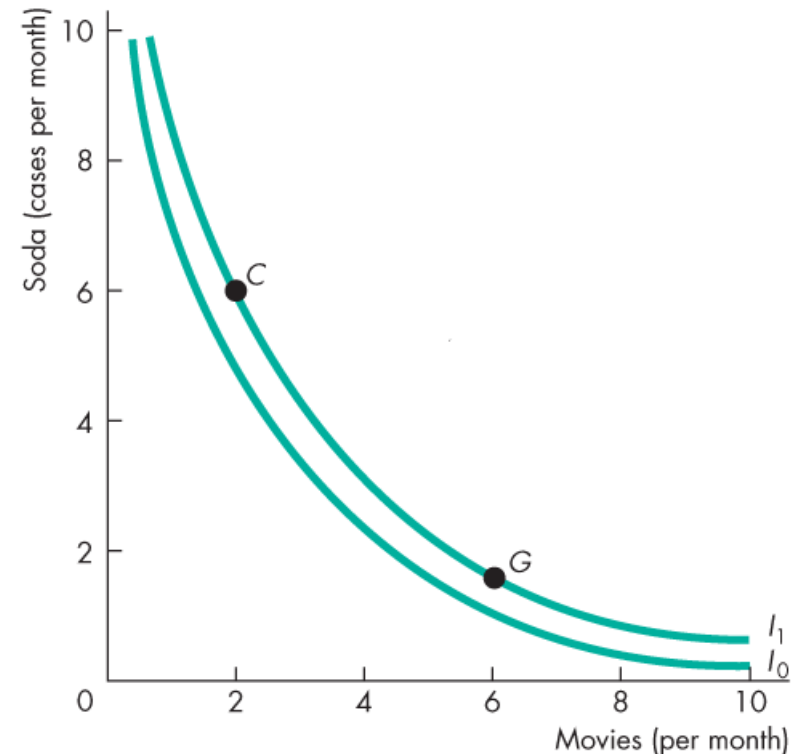
# Preferences and Indifference Curves

A preference map is a series of indifference curves.

Call the indifference curve that we've just seen  $I_1$ .

$I_0$  is an indifference curve below  $I_1$ .

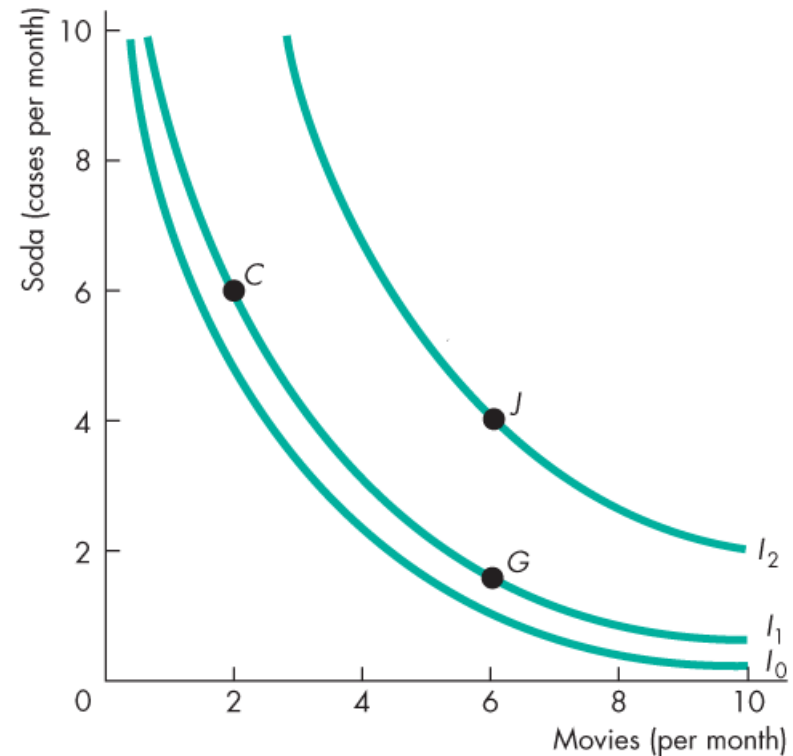
Lisa prefers any point on  $I_1$  to any point on  $I_0$ .



(b) Lisa's preference map

# Preferences and Indifference Curves

- $I_2$  is an indifference curve above  $I_1$ .
- Lisa prefers any point on  $I_2$  to any point on  $I_1$ .
- Example: Lisa prefers point  $J$  to either point  $C$  or point  $G$
- *Can two indifference curve crosses each other?*
- *Why bow inwards?*



(b) Lisa's preference map

# Preferences and Indifference Curves

- **Marginal rate of substitution** (MRS)

measures the rate at which a person is willing to give up good  $y$  to get an additional unit of good  $x$  while at the same time remaining indifferent (remaining on the same indifference curve).

- The slope of the indifference curve measures the marginal rate of substitution.

# Preferences and Indifference Curves

- If the indifference curve is relatively steep, the **MRS** is high.
  - In this case, the person is willing to give up a large quantity of **y** to get a bit more **x**.
- If the indifference curve is relatively flat, the MRS is low.
  - In this case, the person is willing to give up a small quantity of **y** to get more **x**.

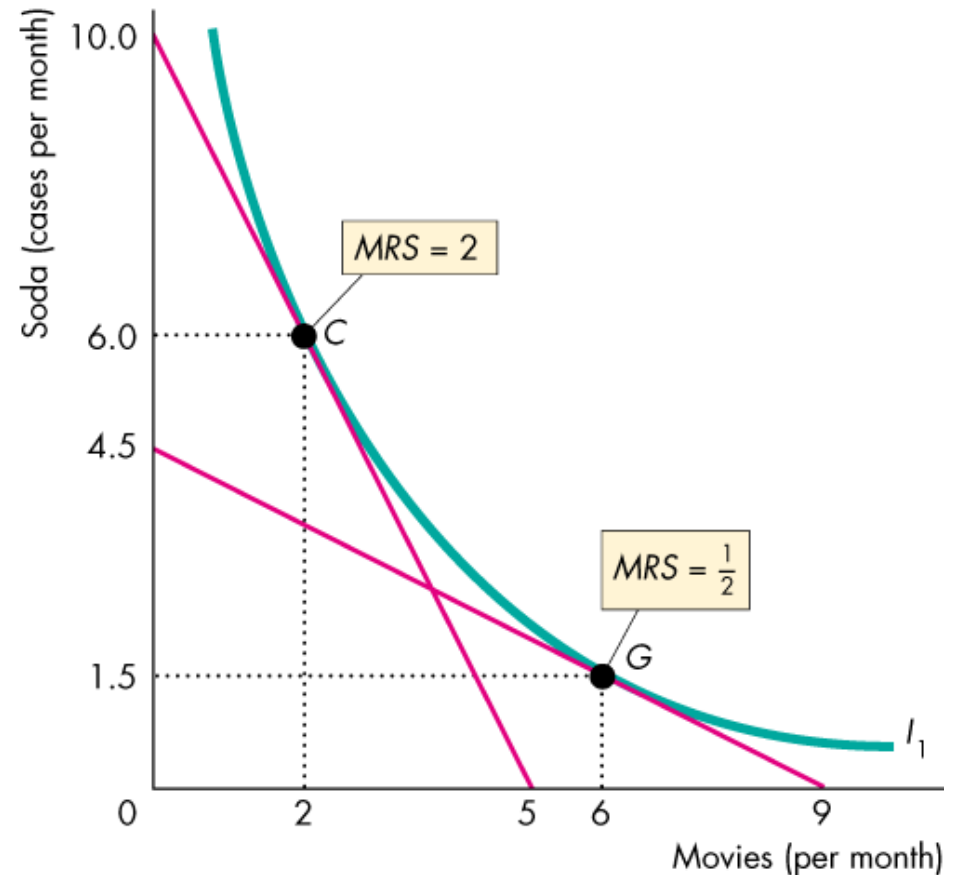


# Preferences and Indifference Curves

Figure 9.4 shows the diminishing  $MRS$  of movies for soda.

At point C, Lisa is willing to give up 2 cases of soda to see one more movie—her  $MRS$  is 2.

At point G, Lisa is willing to give up 1/2 a case of soda to see one more movie—her  $MRS$  is 1/2.



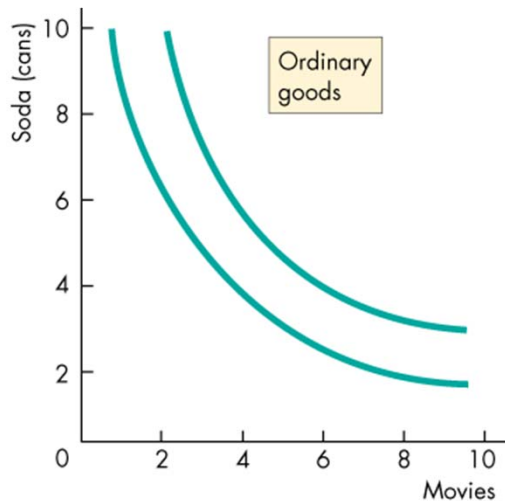
# Preferences and Indifference Curves

- Diminishing marginal rate of substitution is the key assumption of consumer theory.
- A diminishing marginal rate of substitution is a general tendency for a person to be willing to give up less of good  $y$  to get one more unit of good  $x$ , while at the same time remaining indifferent, as the quantity of good  $x$  increases.

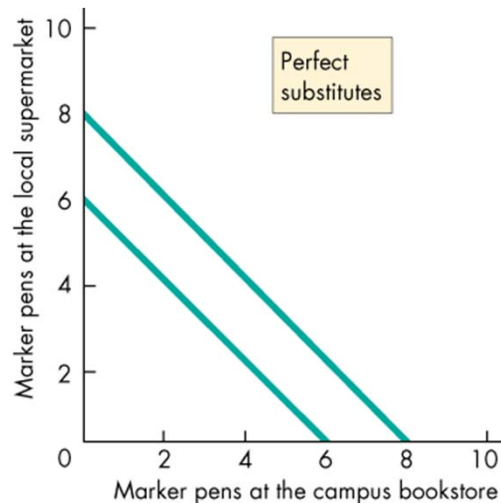
# Preferences and Indifference Curves

## Degree of Substitutability

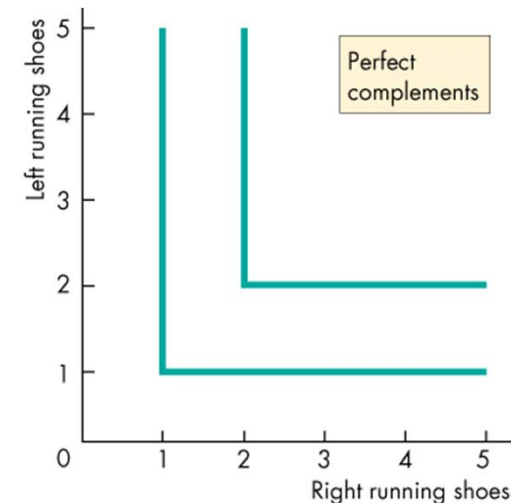
- The shape of the indifference curves reveals the degree of substitutability between two goods.
- Figure 9.5 shows the indifference curves for *ordinary goods*, *perfect substitutes*, and *perfect complements*



(a) Ordinary goods



(b) Perfect substitutes



(c) Perfect complements

## Quick Check

Along an ordinary indifference curve

- A) the marginal rate of substitution is constant but not equal to zero.
- B) the consumer does not prefer one consumption point to another.
- C) the marginal rate of substitution is equal to 0.
- D) the consumer prefers some of the consumption points to others.
- E) none of the above.

# Quick Check

## Exercise

It's so hard to put a price on happiness, isn't it? But if you've ever had to choose between a job you like and a better-paying one that you like less, you probably wished some economist would tell you how much job satisfaction is worth. Trust in management is by far the biggest component to consider. Say you get a new boss and your trust in management goes up a bit (say, up 1 point on a 10-point scale). That's like getting a 36 percent pay raise. In other words, that increased level of trust will boost your level of overall satisfaction in life by about the same amount as a 36 percent raise would.

Source: CNN, March 29, 2006

## Exercise

Measure trust in management on a 10–point scale, measure pay on the same 10–point scale, and think of them as two goods. Sketch an indifference curve (with trust on the  $x$ -axis) that is consistent with the news clip.

## Exercise

What is the MRS  
between trust in  
management and pay  
according to this news  
clip?



## Exercise

What does the news clip imply about the principle of diminishing MRS? Is that implication likely to be correct?

# Preferences and Indifference Curves

## Best Affordable Choice (Solution 3)

Satisfy the following conditions:

- On the budget line;
- On the highest attainable indifference curve;
- Has a MRS equal to the relative price.

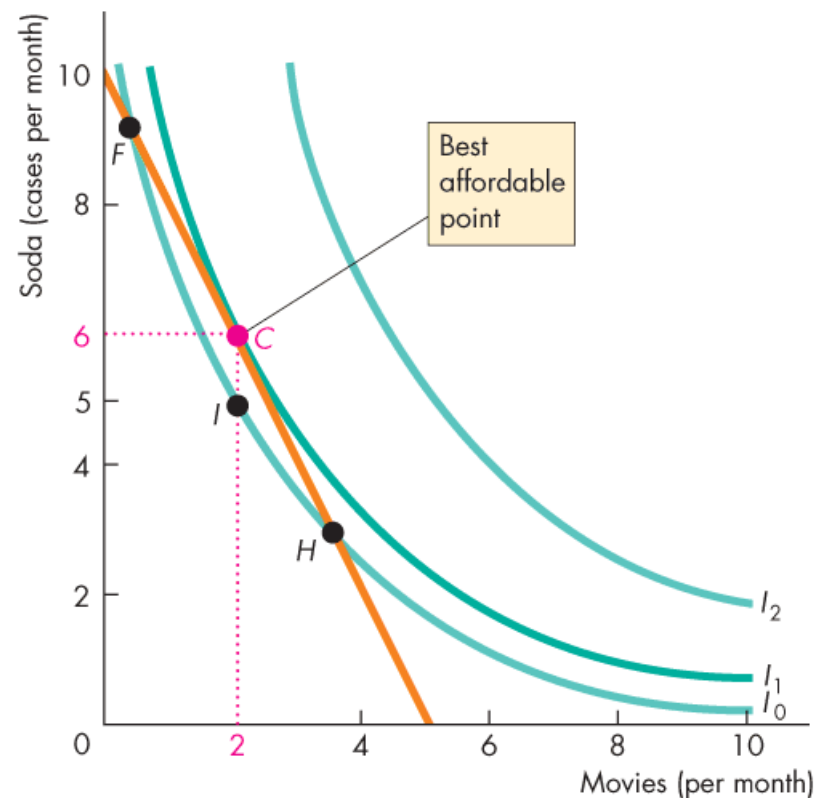
# Preferences and Indifference Curves

Here, the best affordable point is  $C$ .

Lisa can afford to consume more soda and see fewer movies at point  $F$ .

And she can afford to see more movies and consume less soda at point  $H$ .

But she is indifferent between  $F$ ,  $I$ , and  $H$  and she prefers  $C$  to *any other points on her budget line*.

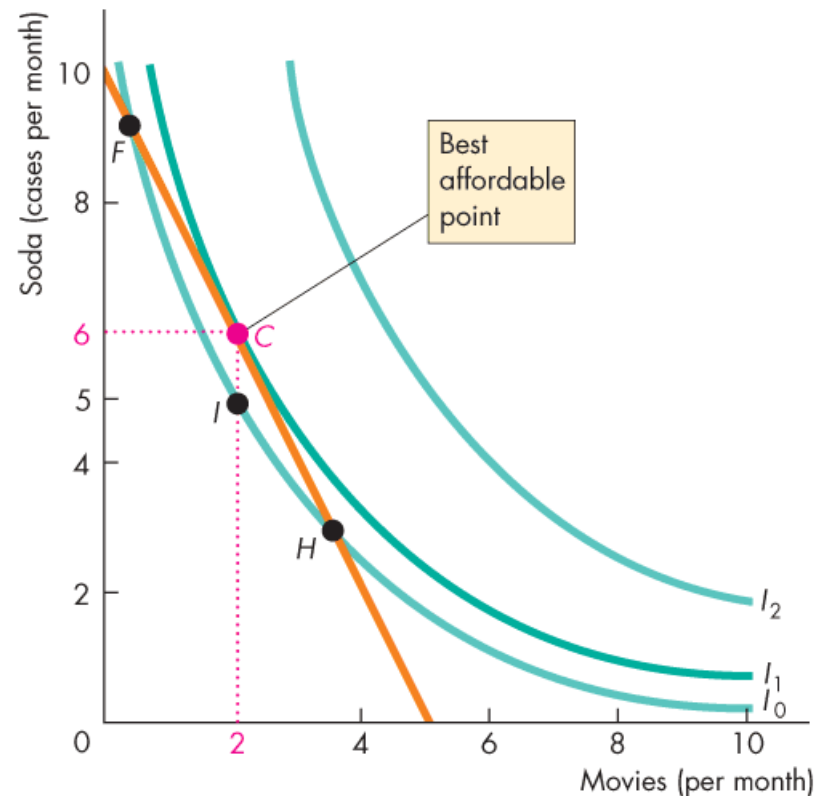


# Preferences and Indifference Curves

At point  $F$ , Lisa's  $MRS$  is *greater* than the relative price.

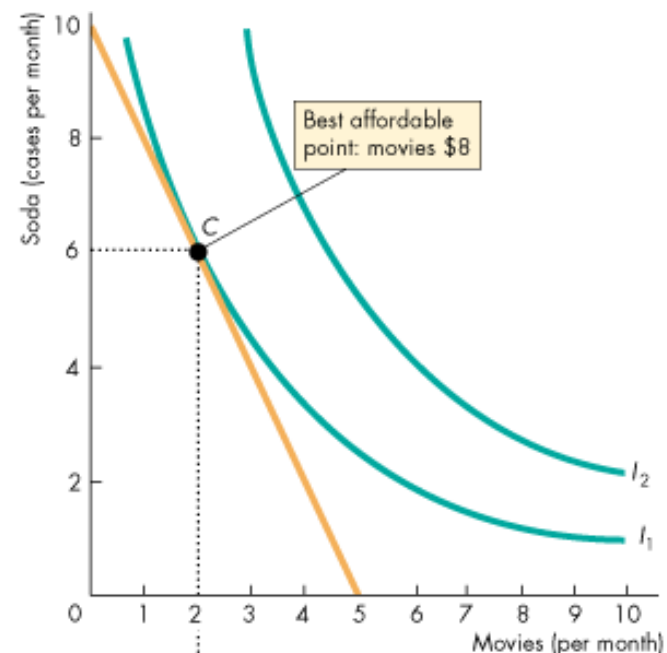
At point  $H$ , Lisa's  $MRS$  is *less* than the relative price.

At point  $C$ , Lisa's  $MRS$  is *equal* to the relative price.

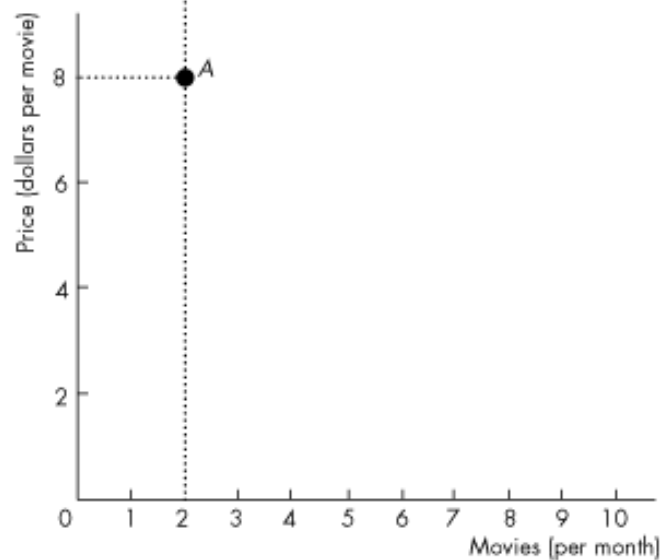


## A Change in Price

- The effect of a change in the price of a good on the quantity of the good consumed is called the **price effect**
- Figure 9.7 illustrates the price effect and shows how the consumer's demand curve is generated.
- Initially, the price of a movie is \$8 and Lisa consumes at point C in part (a) and at point A in part (b).

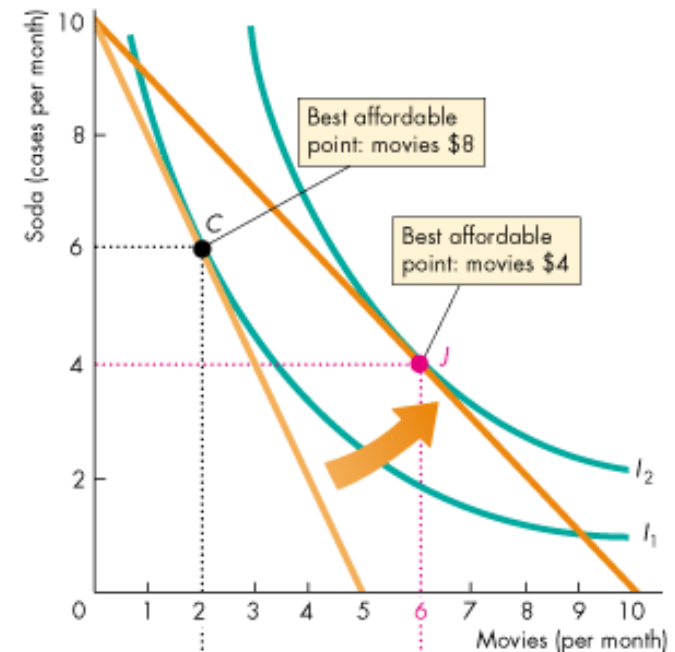


(a) Price effect

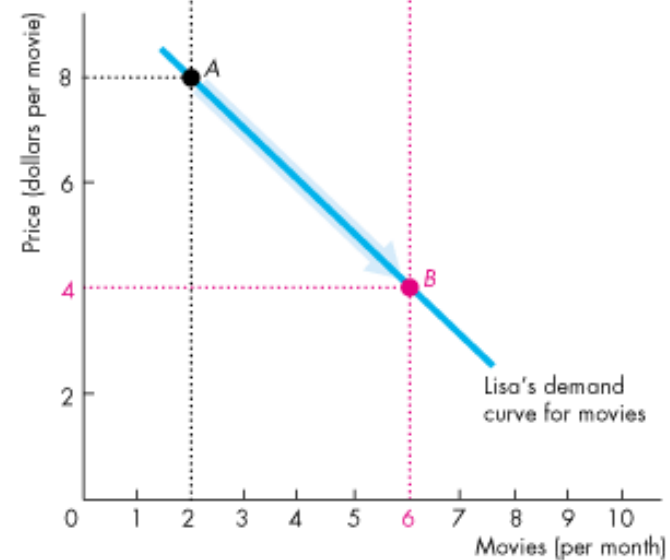


(b) Demand curve

- The price of a movie then falls to \$4.
- The budget line rotates outward.
- Lisa's best affordable point is now **J** in part (a).
- In part (b), Lisa moves to point **B**, which is a movement along her demand curve for movies.



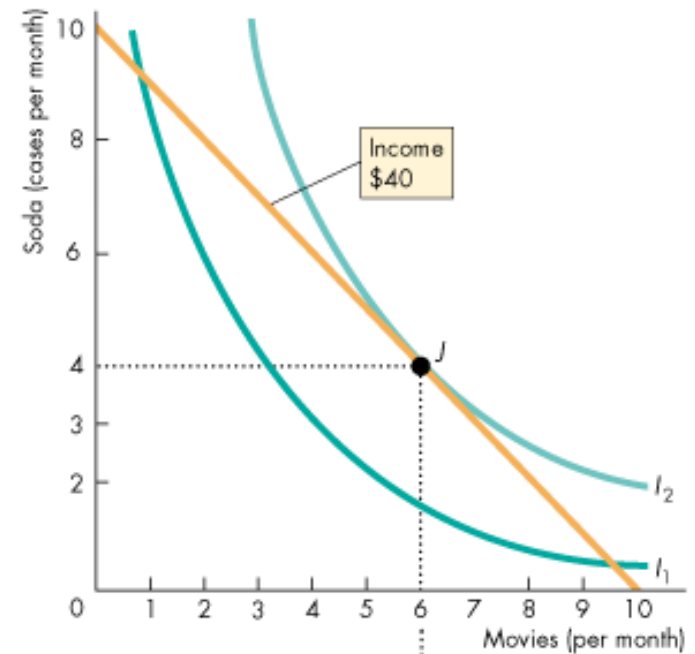
(a) Price effect



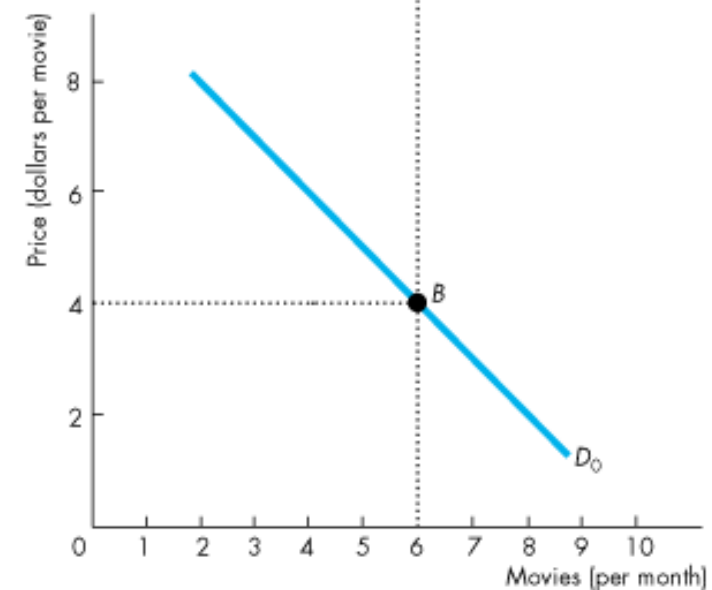
(b) Demand curve

## A Change in Income

- The effect of a change in income on the quantity of a good consumed is called the **income effect**
- Figure 9.8 illustrates the effect of a decrease in Lisa's income
- Initially, Lisa consumes at point *J* in part (a) and at point *B* on demand curve  $D_0$  in part (b)



(a) Income effect

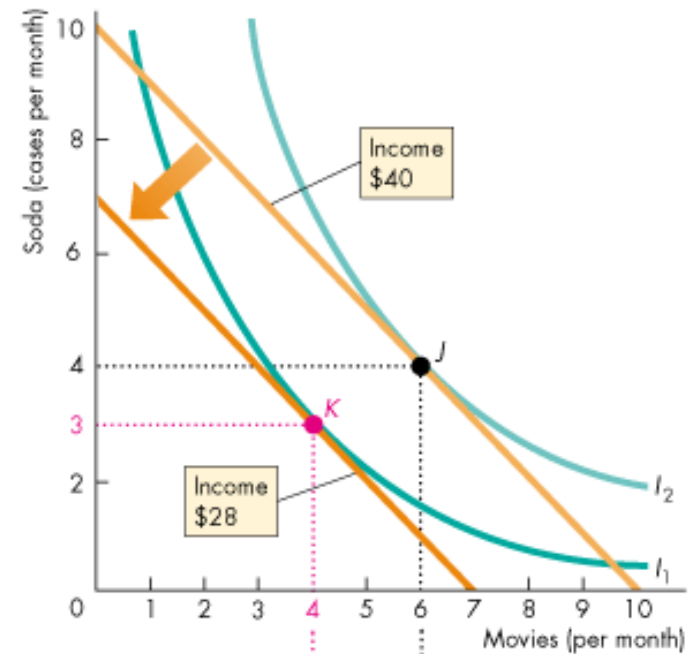


(b) Demand curve for movies

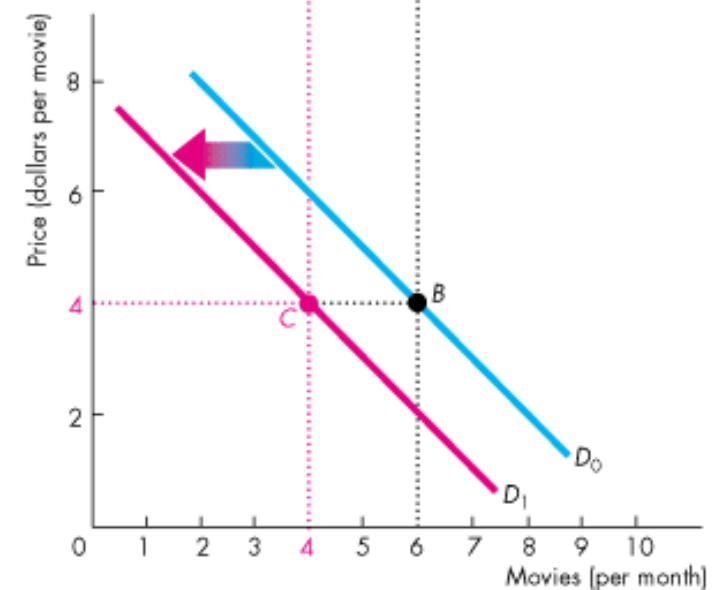
Lisa's income decreases and her budget line shifts leftward in part (a).

Her new best affordable point is *K* in part (a).

Her demand for movies decreases, shown by a leftward shift of her demand curve for movies in part (b).



(a) Income effect



(b) Demand curve for movies



## Quick Check

The price of one good changes and Sue is now at a point on her indifference curve where the marginal rate of substitution exceeds the relative price. Sue will now choose to buy \_\_\_\_\_ of the good that is measured on the \_\_\_\_\_.

- A) more;  $x$ -axis
- B) more;  $y$ -axis
- C) the same quantity;  $x$ -axis
- D) less;  $x$ -axis
- E) none of the above

# Quick Check

# Predicting Consumer Choices

## Substitution Effect and Income Effect

For a **normal** good, a fall in price **always** increases the quantity consumed.

We can prove this assertion by **dividing the price effect in two parts**:

- **Substitution effect**

- **Income effect**

# Predicting Consumer Choices

Initially, Lisa has an income of \$40, the price of a movie is \$8, and she consumes at point *C*.

The price of a movie falls from \$8 to \$4 and her budget line rotates outward.

Lisa's best affordable point is then *J*.

The move from point *C* to point *J* is the **price effect**



(a) Price effect

# Predicting Consumer Choices

We're going to break the move from point *C* to point *J* into two parts:

1. The substitution effect
2. The income effect

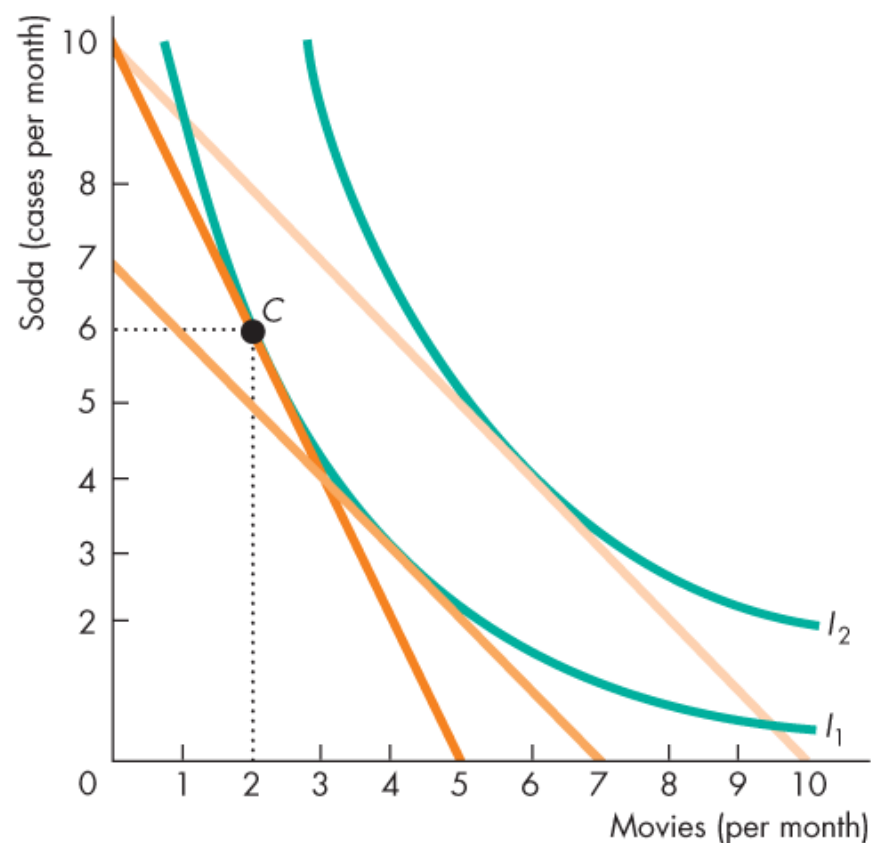


(a) Price effect

# Predicting Consumer Choices

## Substitution Effect

- The **substitution effect** is the effect of a change in price on the quantity bought when the consumer remains on the same indifference curve.



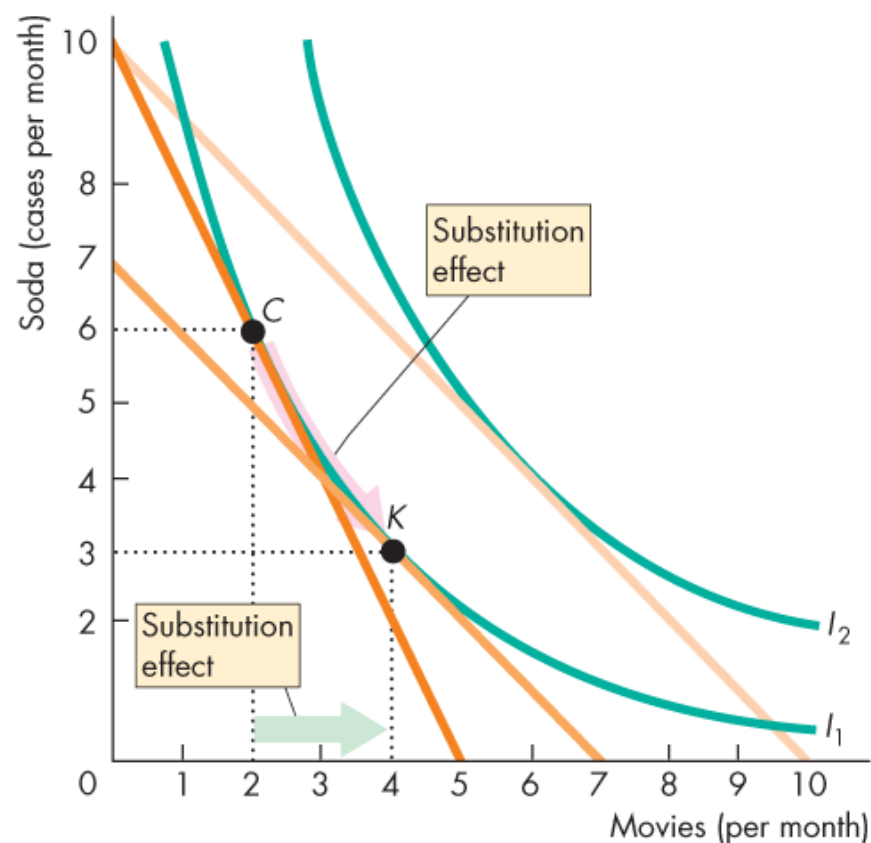
(b) Substitution effect

# Predicting Consumer Choices

To isolate the substitution effect, we give Lisa a hypothetical pay cut.

Lisa is now back on her original indifference curve but with a lower price of movies and her best affordable point is  $K$ .

The move from  $C$  to  $K$  is the **substitution effect**.

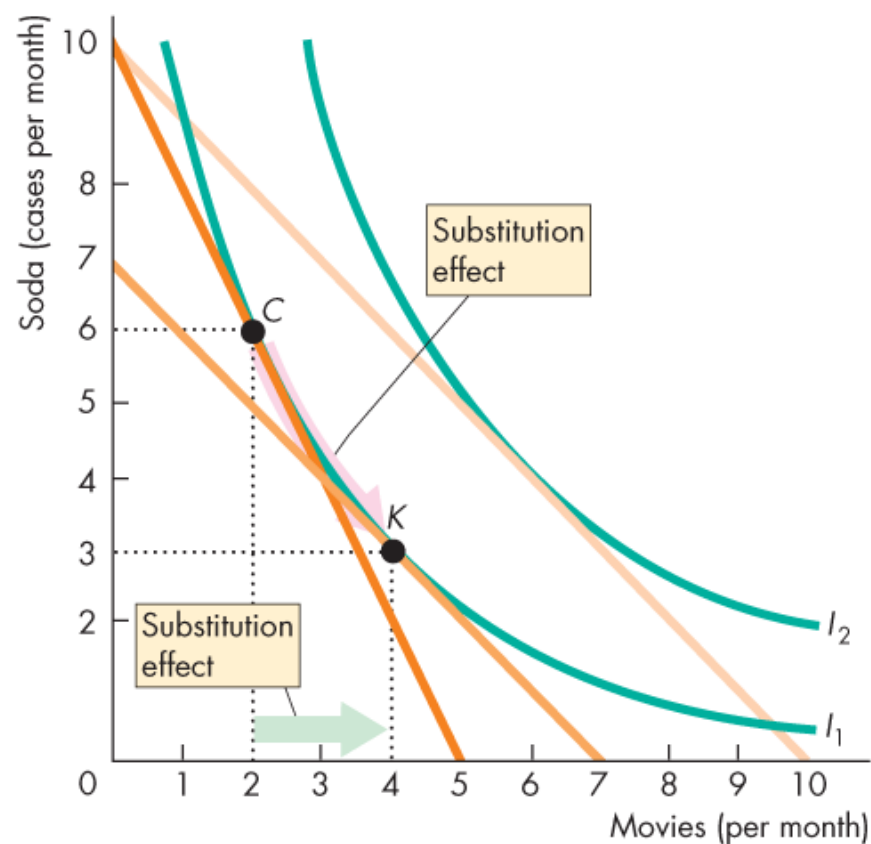


(b) Substitution effect

# Predicting Consumer Choices

The direction of the substitution effect never varies:

- When the relative price falls, the consumer always substitutes more of that good for other goods.
- The substitution effect is the first reason why the demand curve slopes downward.



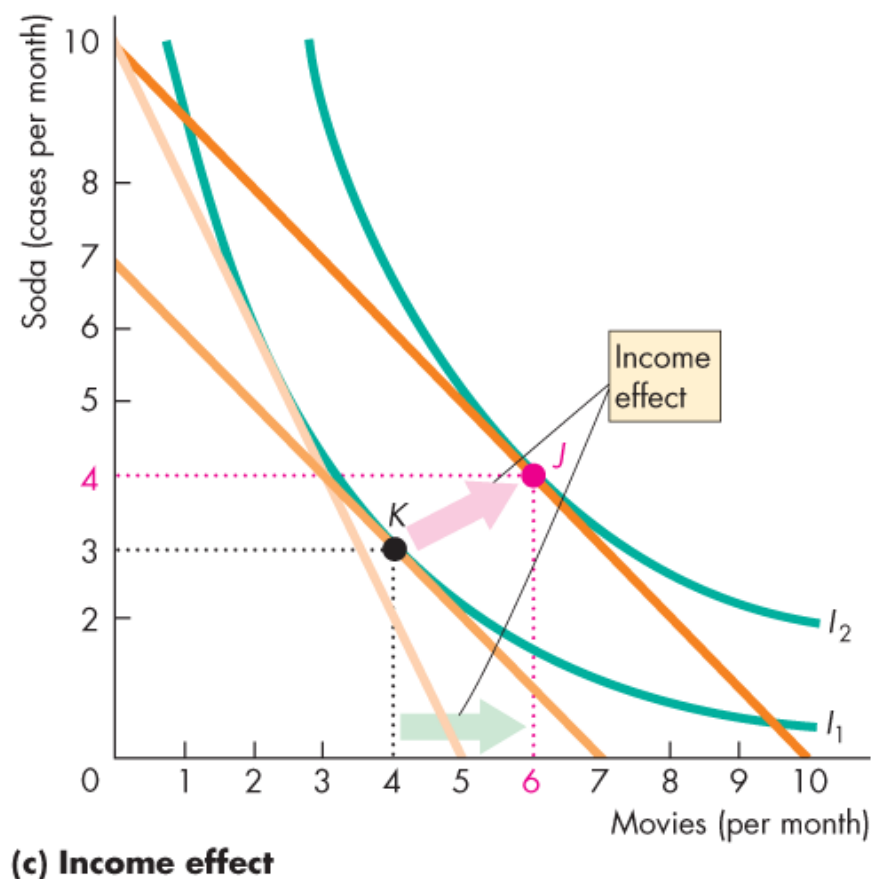
(b) Substitution effect



# Predicting Consumer Choices

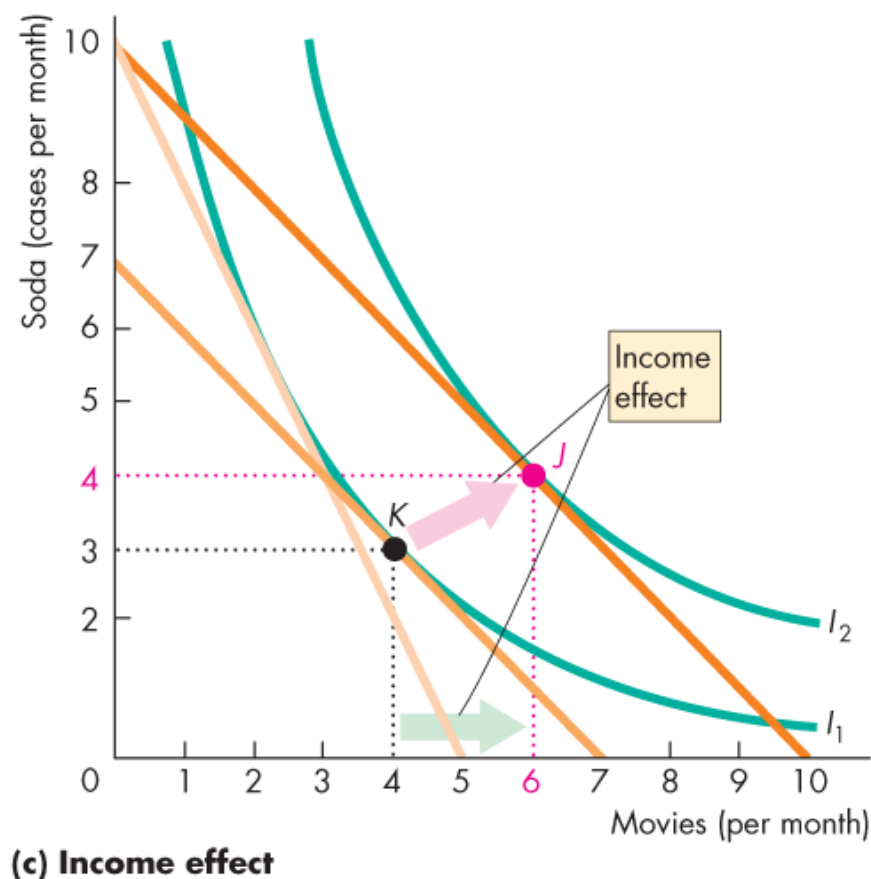
## Income Effect

- To isolate the income effect, we reverse the hypothetical pay cut and restore Lisa's income to its original level (its actual level).
- Lisa is now back on indifference curve  $I_2$  and her best affordable point is  $J$ .
- The move from  $K$  to  $J$  is the income effect.



# Predicting Consumer Choices

- For Lisa, movies are a **normal good**.
- With more income to spend, she sees more movies—the income effect is positive.
- For a normal good, the income effect *reinforces* the substitution effect and is the **second reason why the demand curve slopes downward**.



# Predicting Consumer Choices

## Inferior Goods

For an inferior good, when income increases, the quantity bought decreases.

The income effect is negative and works against the substitution effect.

As long as the substitution effect dominates, the demand curve still slopes downward.

# Predicting Consumer Choices

If the negative income effect is stronger than the substitution effect, a lower price for inferior goods brings a decrease in the quantity demanded—the demand curve slopes upward!

- This case does not appear to occur in the real world.

# Predicting Consumer Choices

	Substitution effect	Income effect
Deals with	Relative price change	Purchase power change
<b>P<sub>x</sub></b> ↓	Good x cheaper	Real income larger
Normal goods:	<b>Q<sub>x</sub></b> ↑	<b>Q<sub>x</sub></b> ↑
Inferior goods:	<b>Q<sub>x</sub></b> ↑	<b>Q<sub>x</sub></b> ↓

## Quick Check

Indifference curves shift or rotate

- A) only when income changes.
- B) only when prices change.
- C) only when both income and prices change.
- D) when either income or prices change.
- E) with none of the above because changes in income and prices do not shift indifference curves.

# Quick Check

Thank you very much  
End for today 😊  
See you next time !