PARKIN
MICROECONOMICS
TENTH EDITION

8

UTILITY AND DEMAND

After studying this chapter, you will be able to:

- Explain the limits to consumption and describe preferences using the concept of utility
- Explain the marginal utility theory of consumer choice
- Use marginal utility theory to predict the effects of changes in prices and incomes and to explain the paradox of value
- Describe some new ways of explaining consumer choices

You want Ke$ha's album, *Animal.*

Will you buy the CD album from Amazon for $11.88 or will you download it from the iTunes store for $7.99?

What determines our choices as buyers of recorded music?

How much better off are we because we can download an album for less than $10 and some songs for less than $1?

You know that diamonds are expensive and water is cheap. Doesn't that seem odd?

Why do we place a higher value on useless diamonds than on essential-to-life water?

Consumption Choices

The choices you make as a buyer of goods and services is influenced by many factors, which economists summarize as

- Consumption possibilities
- Preferences

Consumption Possibilities

Consumption possibilities are all the things that you can afford to buy.

Consumption Choices

We'll study the consumption possibilities of Lisa, who buys only two goods: movies and soda.

A Consumer's Budget Line

Consumption possibilities are limited by income, the price of a movie, and the price of soda.

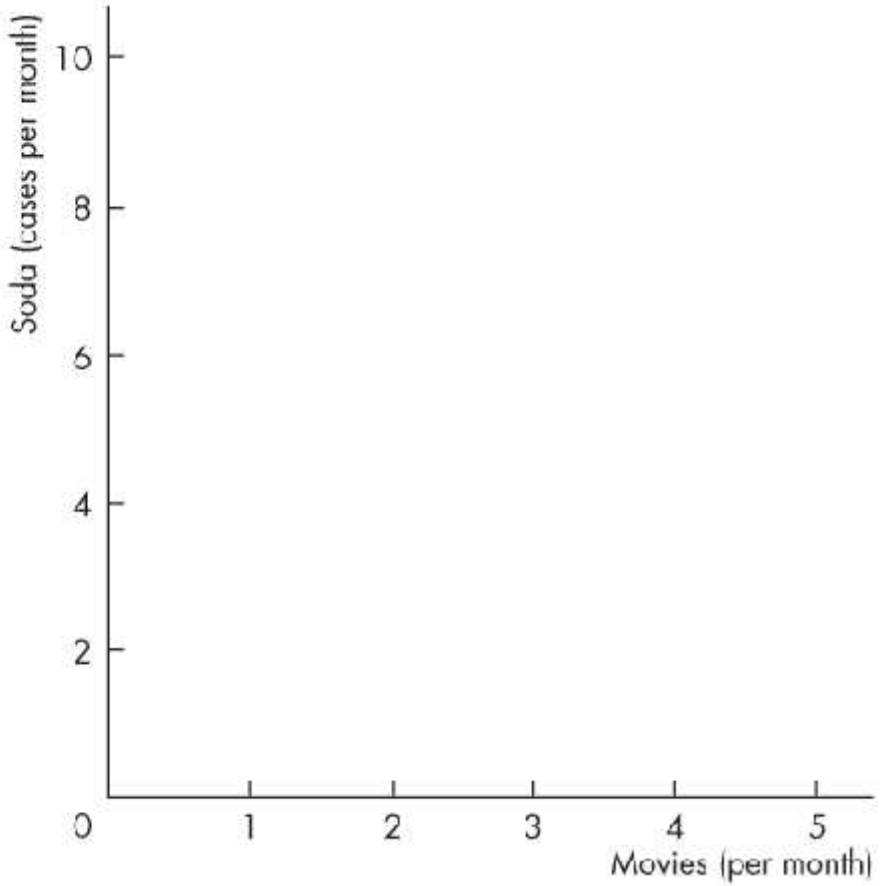
When Lisa spends all of her income, she reaches the limits of her consumption possibilities.

Lisa's **budget line** shows the limits of her consumption possibilities.

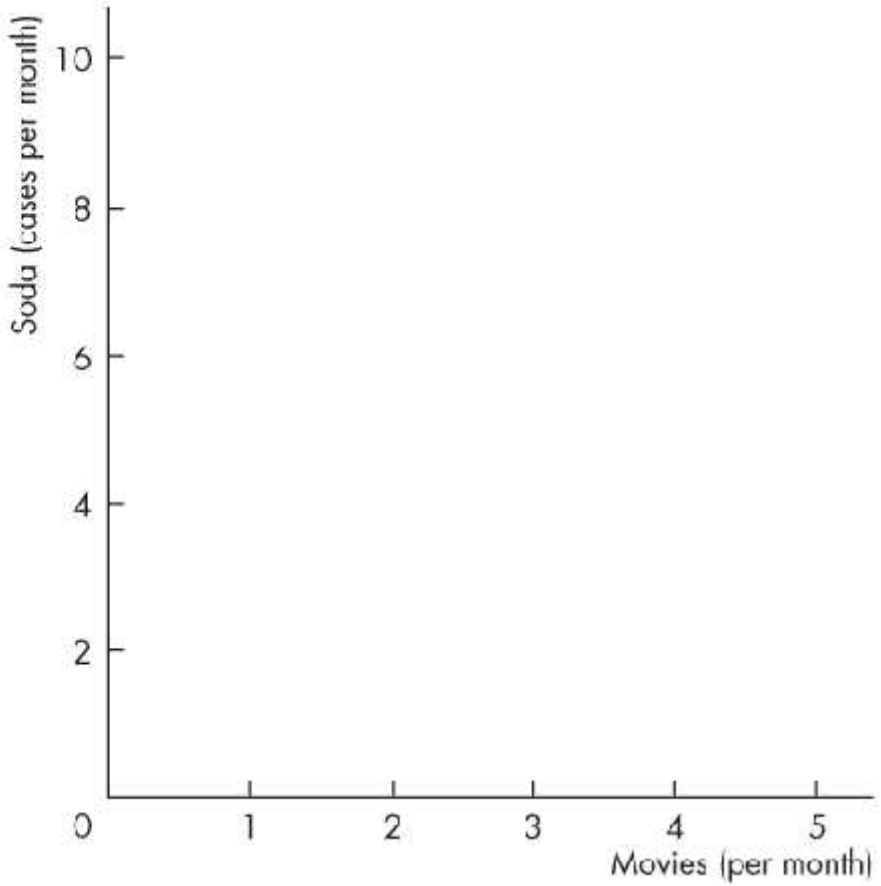
Consumption Possibilities

Lisa has $40 to spend, the price of a movie is $8 and the price of soda is $4 a case.

Consumption possibility	Movies (per month)	Soda (cases per month)



Consumption possibility	Movies (per month)	Soda (cases per month)



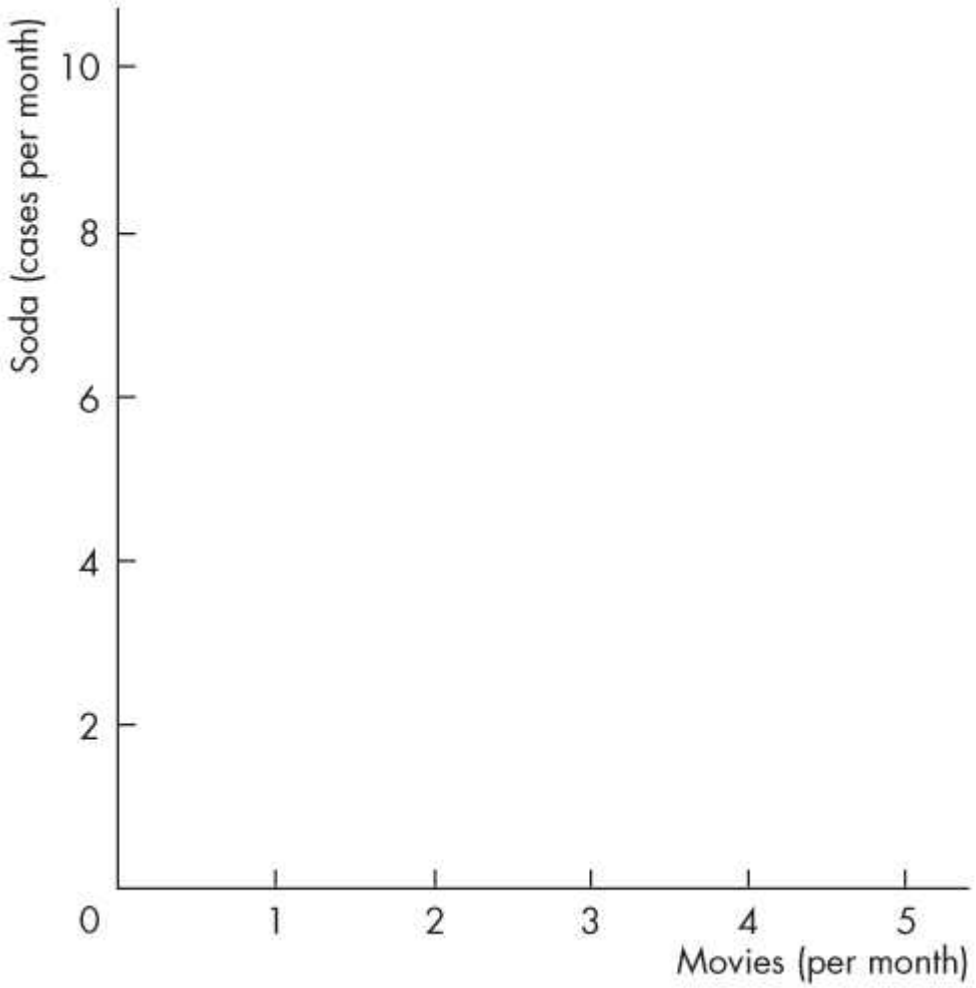
Consumption Possibilities

Lisa can afford any of the combinations at the points *A* to *F*.

Some goods are indivisible and must be bought in whole units at the points marked.

Other goods are divisible goods and can be bought in any quantity.

The line through points *A* to *F* is Lisa's budget line.

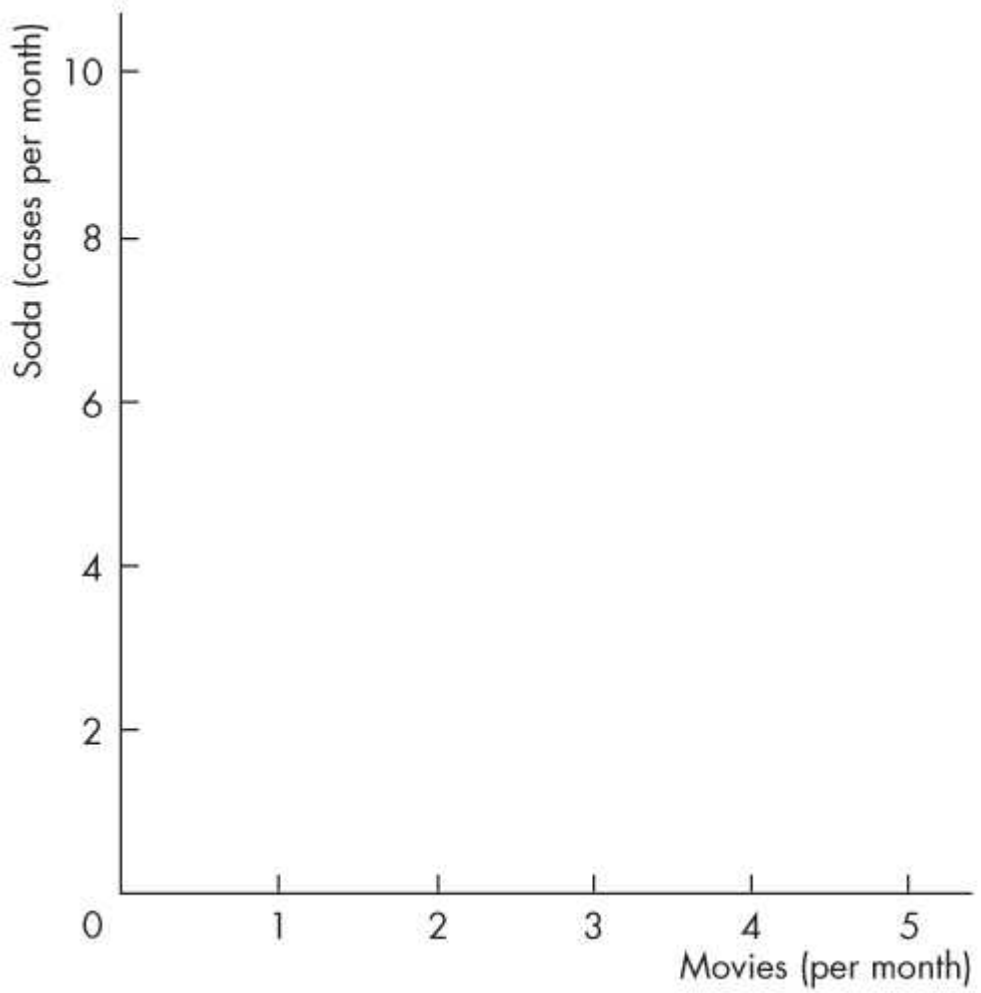


Consumption Possibilities

The budget line is a constraint on Lisa's consumption choices.

Lisa can afford any point on her budget line or inside it.

Lisa cannot afford any point outside her budget line.



Consumption Choice

Preferences

The choice that Lisa makes depends on her **preferences**—her likes and dislikes.

Her benefit or satisfaction from consuming a good or service is called **utility**.

Total Utility

Total utility is the total benefit a person gets from the consumption of goods. Generally, more consumption gives more total utility.

Maximizing Utility

Table 8.1 shows Lisa's total utility schedule.

Total utility from a good increases as the quantity of the good increases.

For example, as Lisa sees more movies in a month, her total utility from movies increases.

TABLE 8.1 Lisa's Utility from Movies and Soda

Movies		Soda	
Quantity (per month)	Total utility	Cases (per month)	Total utility
0	0	0	0
1	50	1	75
2	90	2	123
3	122	3	159
4	150	4	183
5	176	5	205
6	200	6	225
7	222	7	238
8	242	8	248
9	259	9	255
10	275	10	260

TABLE 8.1 Lisa's Utility from Movies and Soda

Movies			Soda		
Quantity (per month)	Total utility	Marginal utility	Cases (per month)	Total utility	Marginal utility
0	0	 50	0	0	 75
1	50	 40	1	75	 48
2	90	 32	2	123	 36
3	122	 28	3	159	 24
4	150	 26	4	183	 22
5	176	 24	5	205	 20
6	200	 22	6	225	 13
7	222	 20	7	238	 10
8	242	 17	8	248	 7
9	259	 16	9	255	 5
10	275		10	260	

Maximizing Utility

Marginal Utility

Marginal utility from a good is the *change* in total utility that results from a unit-increase in the quantity of the good consumed.

As the quantity consumed of a good increases, the marginal utility from it decreases.

We call this decrease in marginal utility as the quantity of the good consumed increases the principle of **diminishing marginal utility**.

Maximizing Utility

Table 8.1 shows Lisa's marginal utility schedules.

Marginal utility from a good decreases as the quantity of the good increases.

For example, as the number of movies seen in a month increases, marginal utility from movies decreases.

TABLE 8.1 Lisa's Utility from Movies and Soda

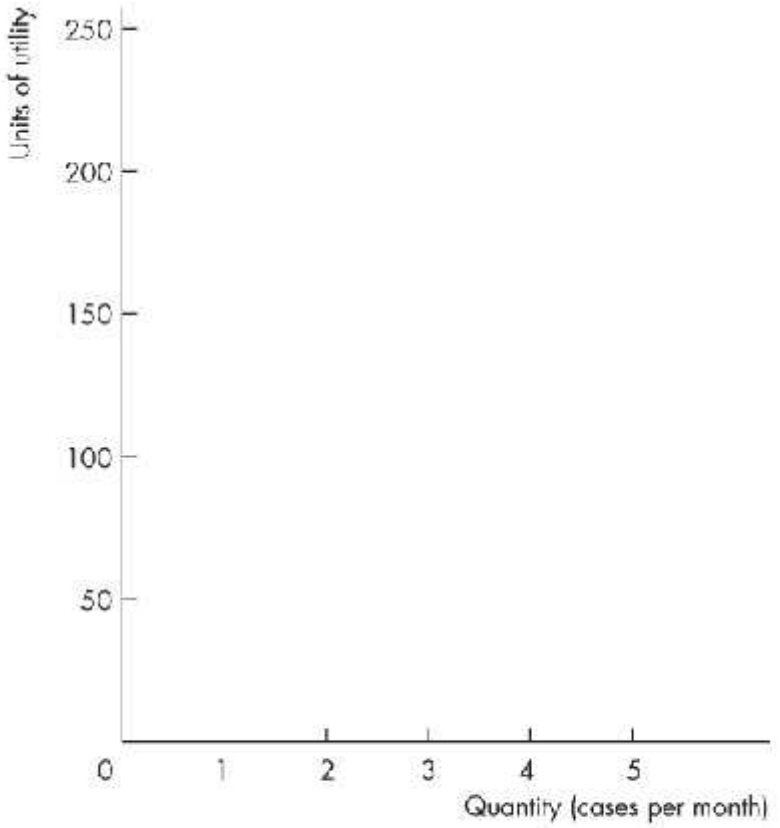
Movies		Soda	
Quantity (per month)	Total utility	Cases (per month)	Total utility
0	0	0	0
1	50	1	75
2	90	2	123
3	122	3	159
4	150	4	183
5	176	5	205
6	200	6	225
7	222	7	238
8	242	8	248
9	259	9	255
10	275	10	260

Maximizing Utility

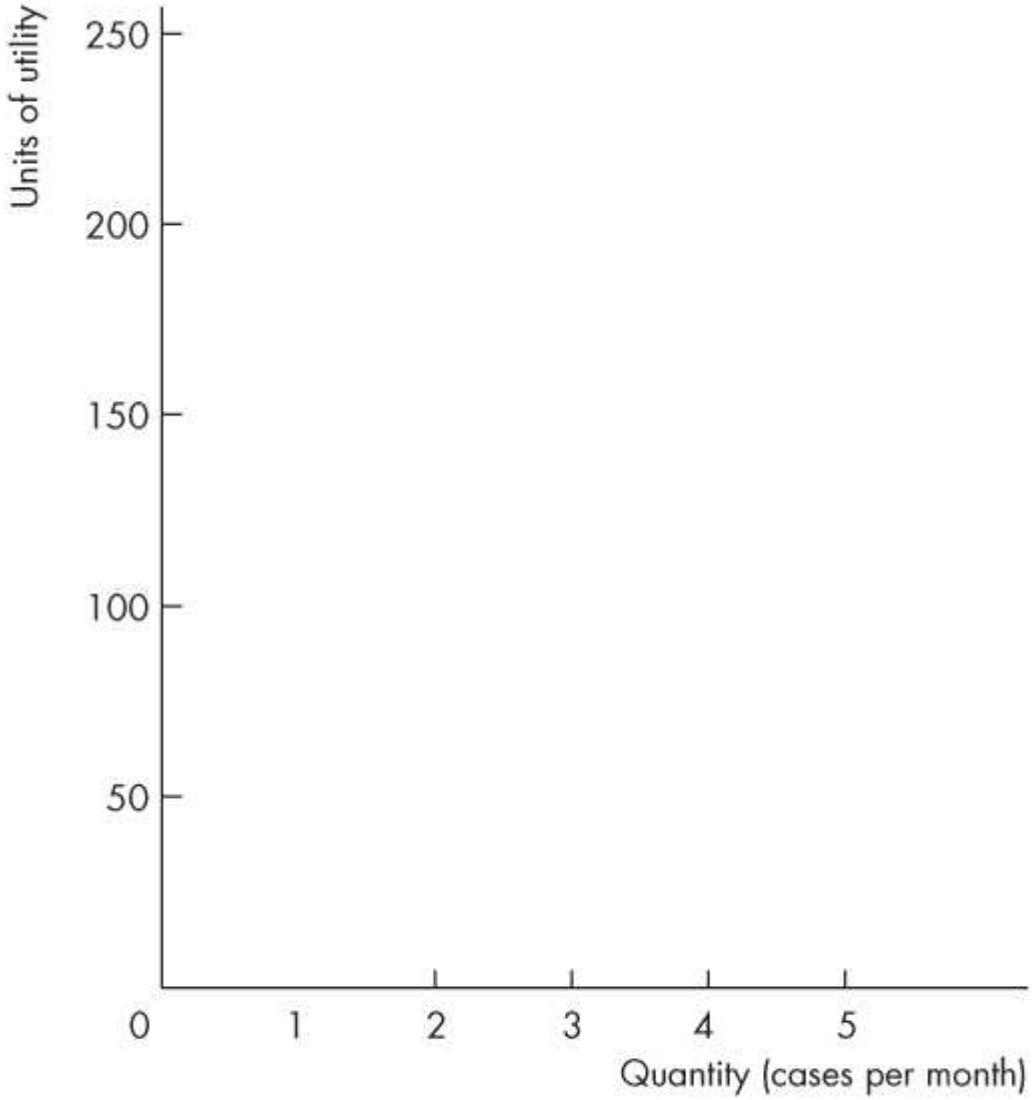
Figure 8.2(a) shows Lisa's total utility and marginal utility from soda.

Total utility from soda increases as more soda is consumed.

The bars along the total utility curve show the extra total utility (marginal utility) from each additional case of soda.



(a) Total utility

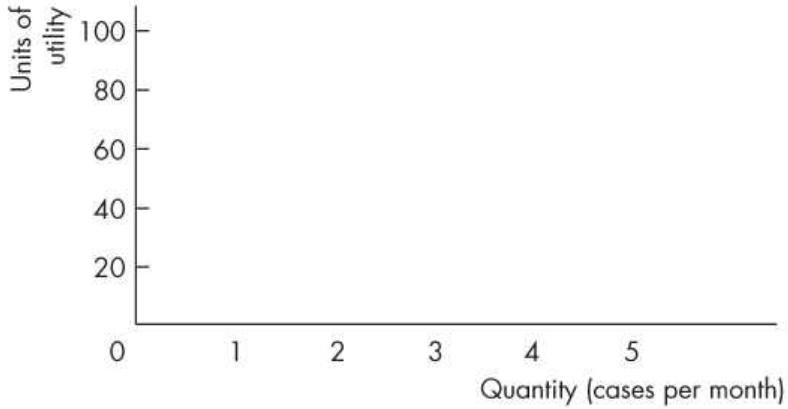


(a) Total utility

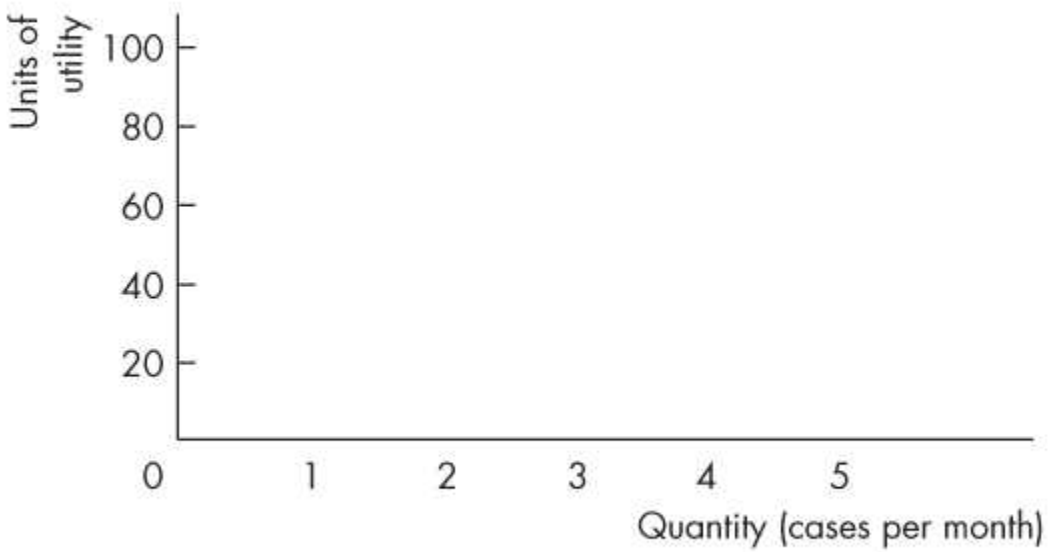
Maximizing Utility

Figure 8.2(b) illustrates diminishing marginal utility.

As Lisa increases the quantity of soda she drinks, her marginal utility from soda diminishes.



(b) Marginal utility



(b) Marginal utility

Utility-Maximizing Choice

The key assumption is that the household chooses the consumption possibility that maximizes total utility.

A Spreadsheet Solution

The direct way to find the utility-maximizing choice is to make a table in a spreadsheet and do the calculations.

- Find the just-affordable combinations
- Find the total utility for each just-affordable combination
- The utility-maximizing combination is the consumer's choice

Utility-Maximizing Choice

Find Just-Affordable Combinations

Lisa has $40 a month to spend on movies and soda.

The price of a movie is $8 and the price of soda is $4 a case.

Each row of Table 8.2 shows a combination of movies and soda that exhausts Lisa's $40.

TABLE 8.2 Lisa's Utility-Maximizing Choice

	Movies $8	Soda $4
	Quantity (per month)	Cases (per month)
A	0	10
B	1	8
C	2	6
D	3	4
E	4	2
F	5	0

TABLE 8.2 Lisa's Utility-Maximizing Choice

	Movies $8		Total utility from movies and soda	Soda $4	
	Quantity (per month)	Total utility		Total utility	Cases (per month)
A	0	0	260	260	10
B	1	50	298	248	8
C	2	90	315	225	6
D	3	122	305	183	4
E	4	150	273	123	2
F	5	176	176	0	0

Utility-Maximizing Choice

Find the Total Utility for Each Just-Affordable Combination

When Lisa sees 1 movie and drinks 8 cases of soda a month,

she gets 50 units of utility from the 1 movie and 248 units of utility from the 8 cases of soda.

Her total utility is 298 units.

TABLE 8.2 Lisa's Utility-Maximizing Choice

	Movies $8	Soda $4
	Quantity (per month)	Cases (per month)
A	0	10
B	1	8
C	2	6
D	3	4
E	4	2
F	5	0

Utility-Maximizing Choice

Consumer Equilibrium

Lisa chooses the combination that gives her the highest total utility.

Lisa maximizes her total utility when she sees 2 movies and drinks 6 cases of soda a month.

Lisa gets 90 units of utility from the 2 movies and 225 units of utility from the 6 cases of soda.

TABLE 8.2 Lisa's Utility-Maximizing Choice

	Movies $8	Soda $4
	Quantity (per month)	Cases (per month)
A	0	10
B	1	8
C	2	6
D	3	4
E	4	2
F	5	0

Utility-Maximizing Choice

Consumer equilibrium is the situation in which Lisa has allocated all of her available income in the way that maximizes her total utility, given the prices of movies and soda.

Lisa's consumer equilibrium is 2 movies and 6 cases of soda a month.

TABLE 8.2 Lisa's Utility-Maximizing Choice

	Movies $8	Soda $4
	Quantity (per month)	Cases (per month)
A	0	10
B	1	8
C	2	6
D	3	4
E	4	2
F	5	0

Utility-Maximizing Choice

A more natural way of finding the consumer equilibrium is to use the idea of choices made at the margin.

Choosing at the Margin

Having made a choice, would spending a dollar more or a dollar less on a good bring more total utililty?

Marginal utility is the increase in total utility that results from consuming *one more unit* of the good.

The **marginal utility per dollar** is the marginal utility from a good that results from spending *one more dollar* on it.

Utility-Maximizing Choice

The **marginal utility per dollar** equals the marginal utility from a good divided by its price.

Calling the marginal utility from movies MU_M and the price of a movie P_M, then the marginal utility per dollar from movies is MU_M/P_M.

Calling the marginal utility of soda MU_S and the price of soda P_S, *t*hen the marginal utility per dollar from soda is MU_S/P_S.

By comparing MU_M/P_M and MU_S/P_S, we can determine whether Lisa has allocated her budget in the way that maximizes her total utility.

Utility-Maximizing Choice

Utility-Maximizing Rule

A consumer's total utility is maximized by following the rule:

- Spend all available income
- Equalize the marginal utility per dollar for all goods

Utility-Maximizing Choice

Lisa's Marginal Calculation

Figure 8.3 shows why the utility-maximizing rule works.

Each row of the table (on the next slide) shows a just-affordable combination.

Start by choosing a row—a point on the budget line.

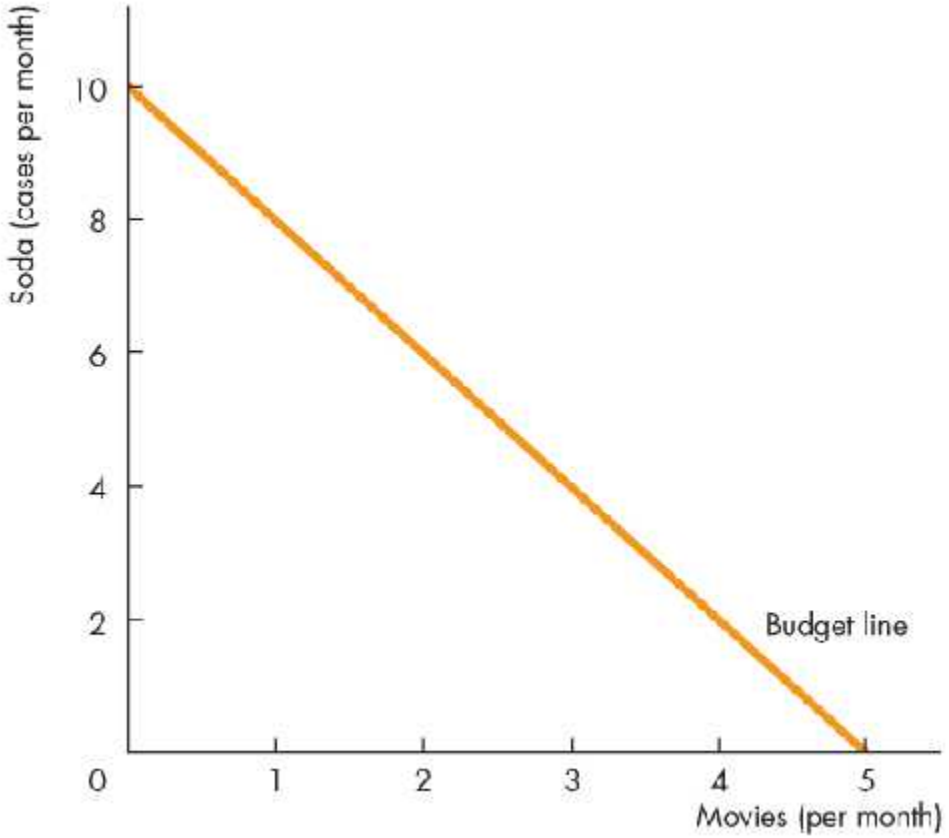
Utility-Maximizing Choice

In row *B*,

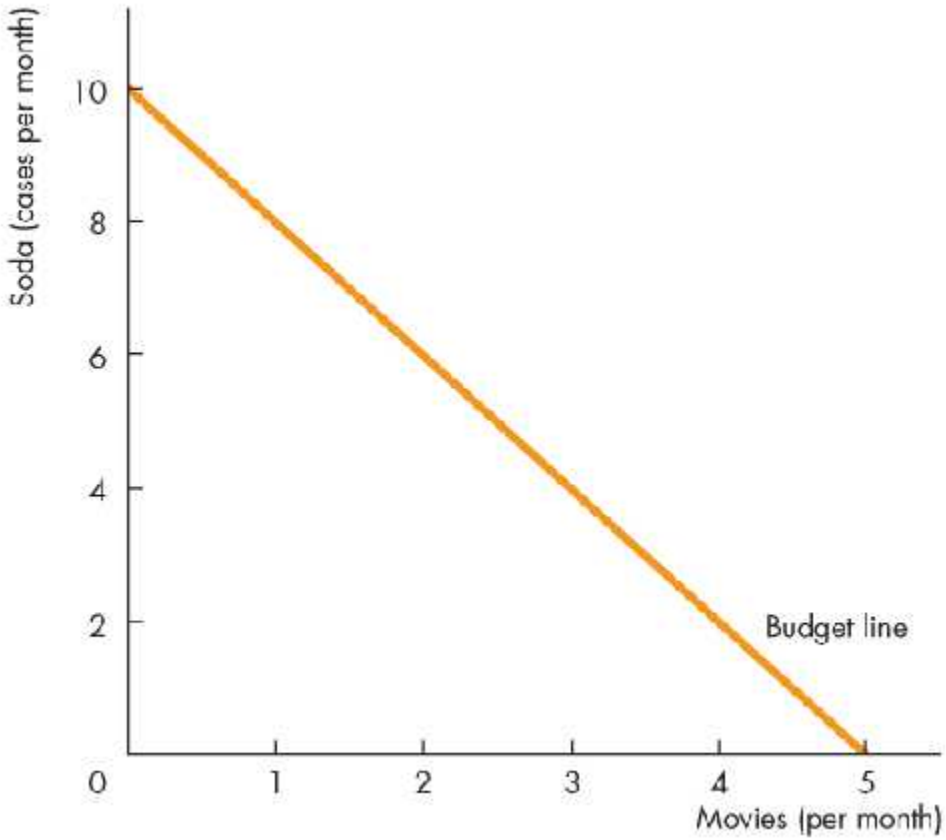
$MU_S/P_S < MU_M/P_M$.

Lisa spends too much on soda and too little on movies.

Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar



Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar

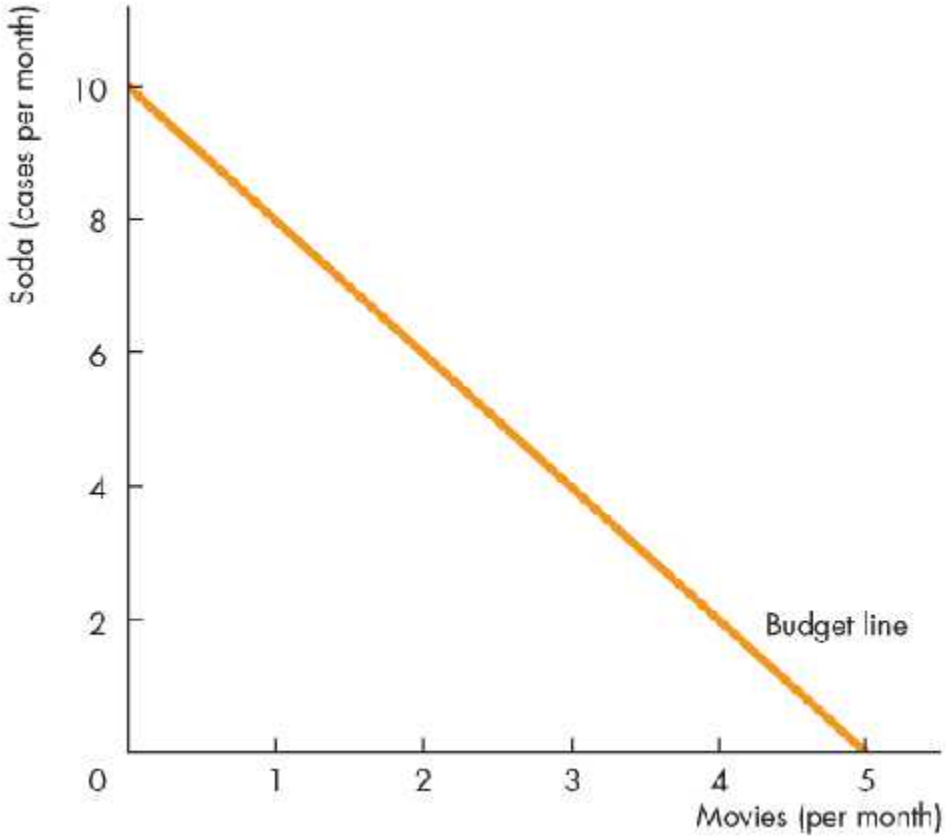


Utility-Maximizing Choice

If Lisa spends less on soda and more on movies, …

MU_S increases and MU_M decreases.

Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar



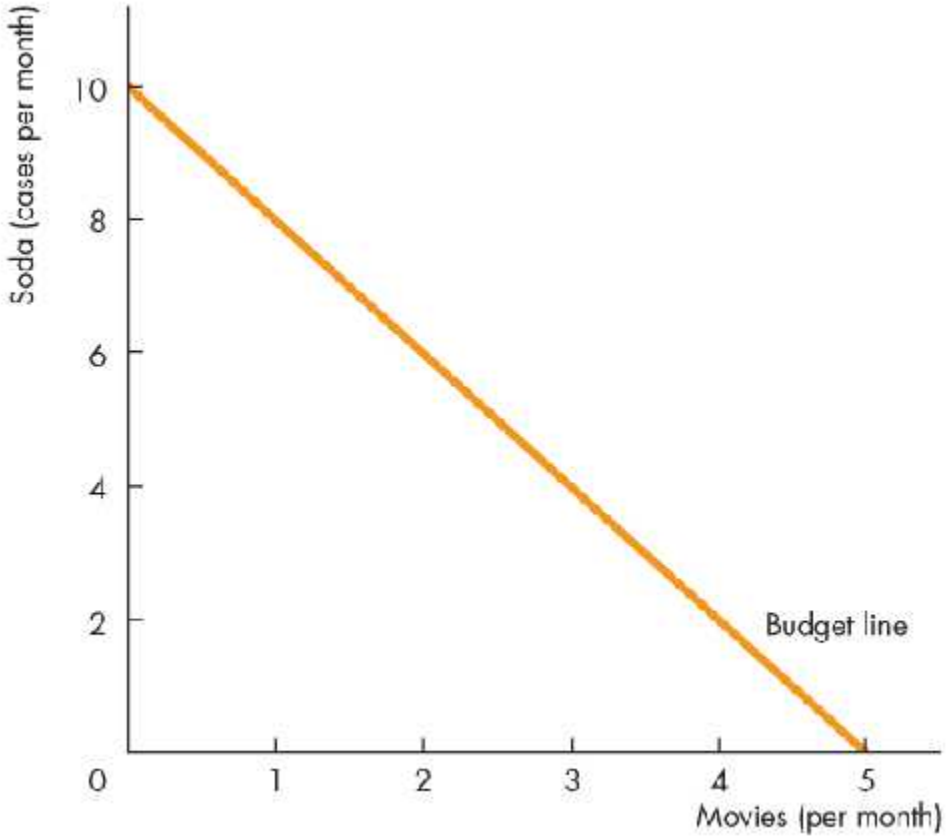
Utility-Maximizing Choice

In row *D*,

$MU_S/P_S > MU_M/P_M$.

Lisa spends too little on soda and too much on movies.

Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar

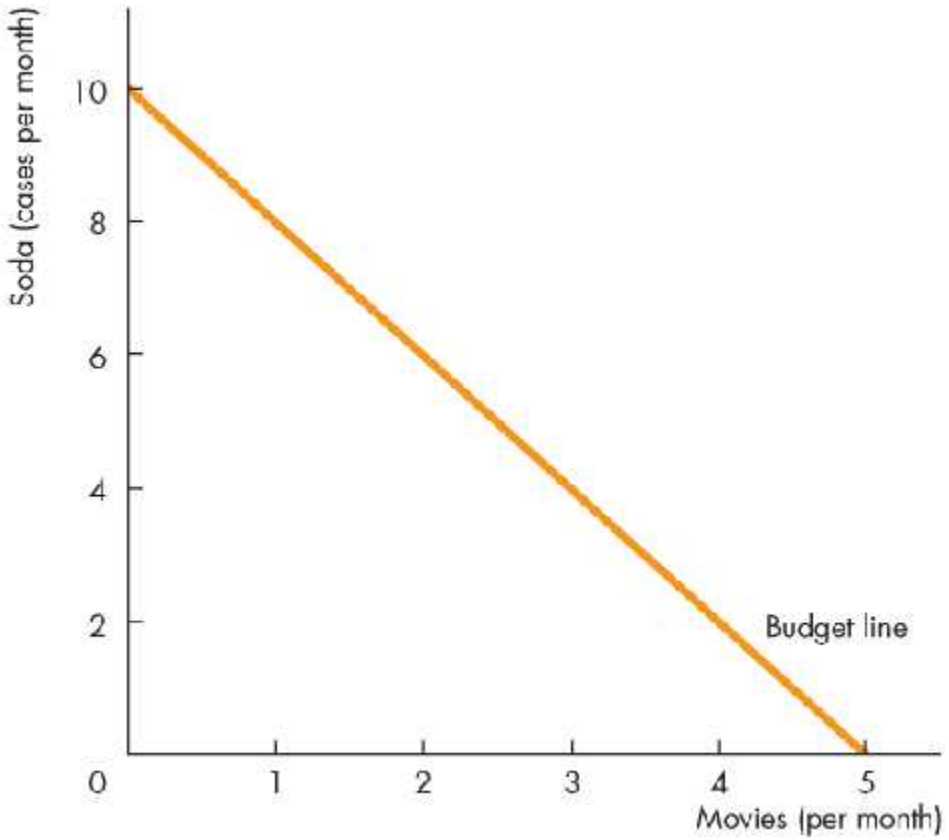


Utility-Maximizing Choice

If Lisa spends more on soda and less on movies.

MU_S decreases and MU_M increases.

Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar



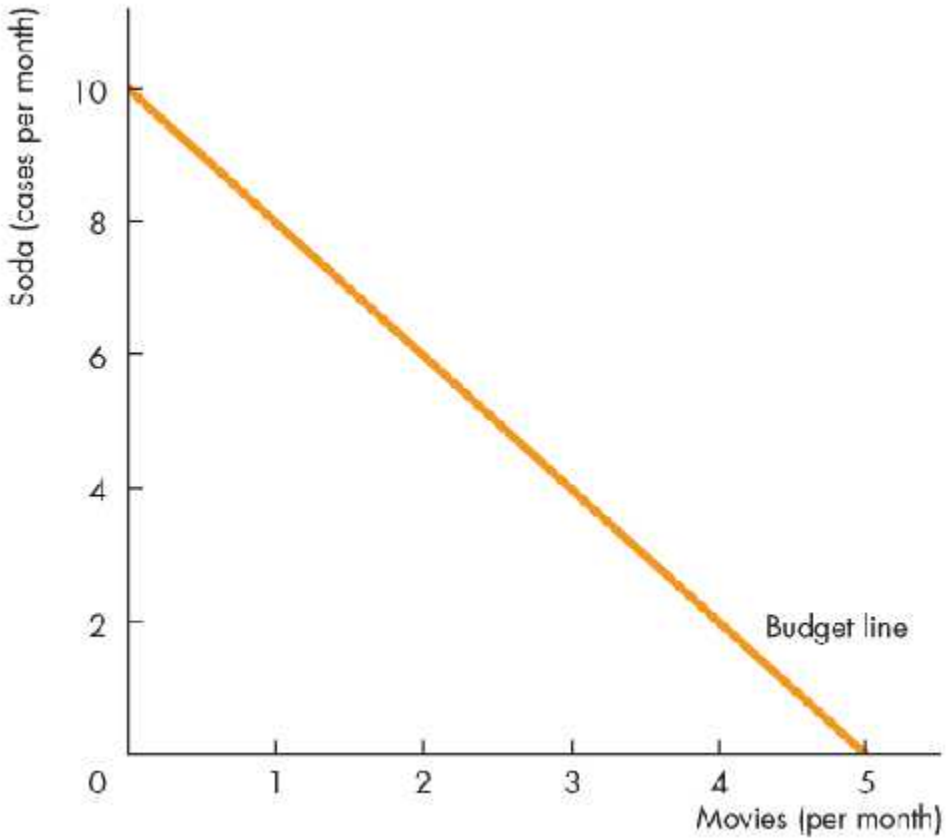
Utility-Maximizing Choice

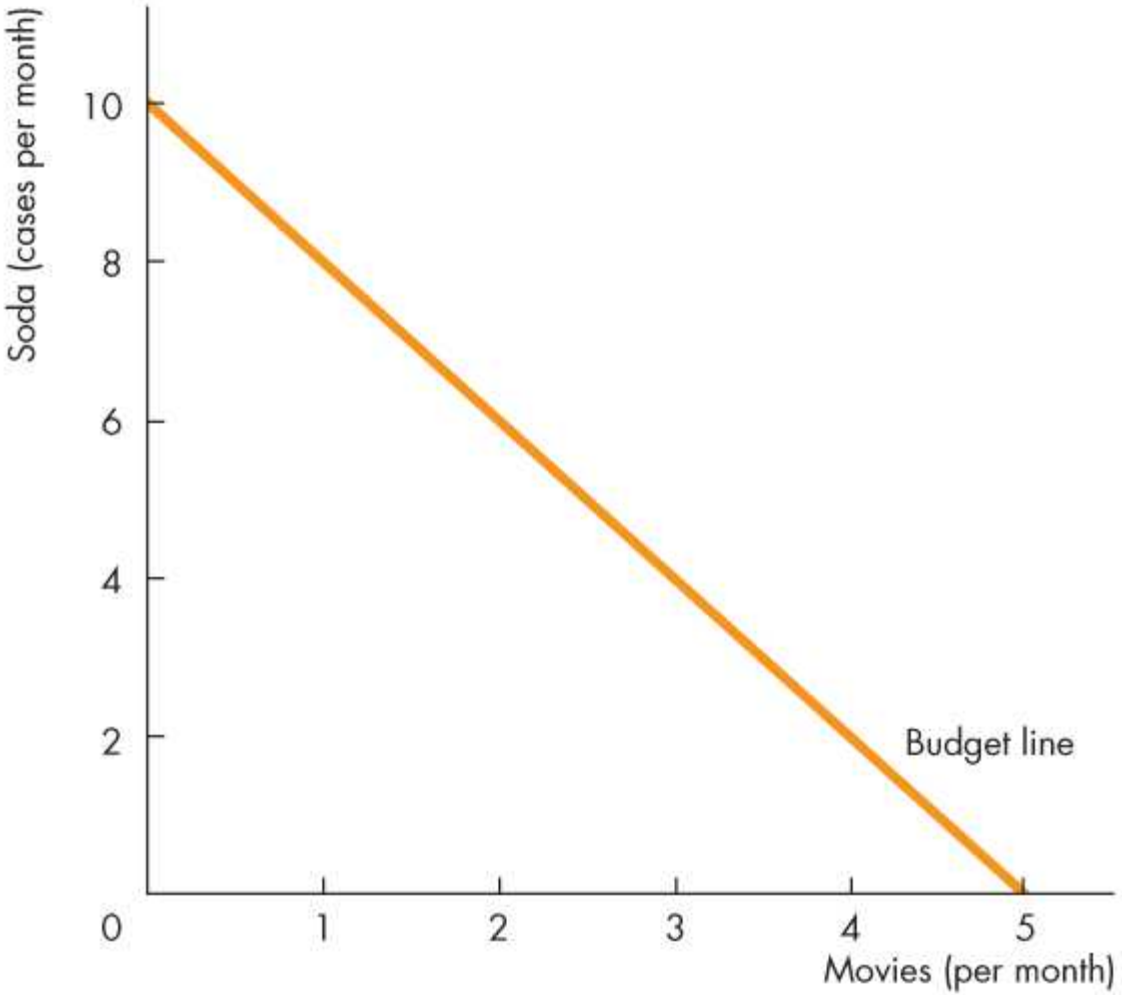
In row *C*,

$MU_S/P_S = MU_M/P_M$.

Lisa is maximizing utility.

Movies ($8 each)			Soda ($4 per case)		
Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar





Predictions of Marginal Utility Theory

A Fall in the Price of a Movie

When the price of a good falls the quantity demanded of that good increases—the demand curve slopes downward.

For example, if the price of a movie falls, we know that MU_M/P_M rises, so before the consumer changes the quantities bought, $MU_M/P_M > MU_S/P_S$.

To restore consumer equilibrium (maximum total utility), the consumer increases the movies seen to drive down the MU_M and restore $MU_M/P_M = MU_S/P_S$.

Predictions of Marginal Utility Theory

A change in the price of one good changes the demand for another good.

You've seen that if the price of a movie falls, MU_M/P_M rises, so before the consumer changes the quantities consumed, $MU_M/P_M > MU_S/P_S$.

To restore consumer equilibrium (maximum total utility), the consumer decreases the quantity of soda consumed to drive up the MU_S and restore $MU_M/P_M = MU_S/P_S$.

Predictions of Marginal Utility Theory

Table 8.3 shows Lisa's just-affordable combinations when the price of a movie is $4.

Before Lisa changes what she buys

$$MU_M/P_M > MU_S/P_S.$$

To maximize total utility, Lisa sees more movies and drinks less soda.

TABLE 8.3 How a Change in the Price of Movies Affects Lisa's Choices

	Movies ($4 each)			Soda ($4 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	0	0		10	5	1.25
	1	50	12.50	9	7	1.75
A	2	40	10.00	8	10	2.50
	3	32	8.00	7	13	3.25
B	4	28	7.00	6	20	5.00
	5	26	6.50	5	22	5.50
C	6	24	6.00	4	24	6.00
	7	22	5.50	3	36	9.00
	8	20	5.00	2	48	12.00
	9	17	4.25	1	75	18.75
	10	16	4.00	0	0	

TABLE 8.3 How a Change in the Price of Movies Affects Lisa's Choices

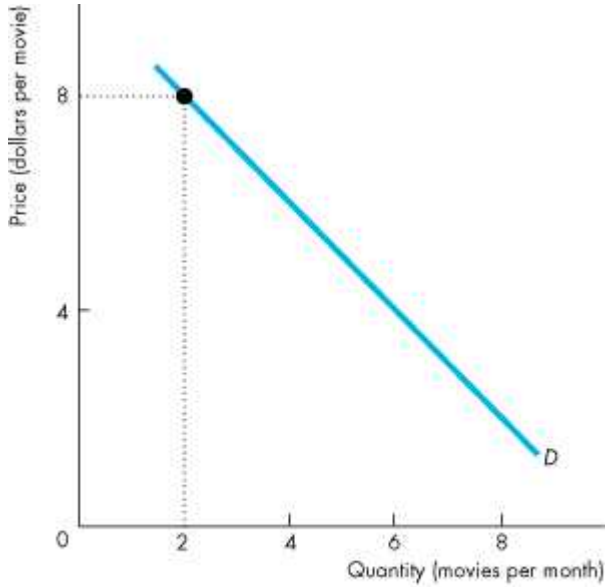
	Movies ($4 each)			Soda ($4 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	0	0		10	5	1.25
	1	50	12.50	9	7	1.75
A	**2**	40	**10.00**	8	10	2.50
	3	32	8.00	7	13	3.25
B	4	28	7.00	**6**	20	**5.00**
	5	26	6.50	5	22	5.50
C	6	24	6.00	4	24	6.00
	7	22	5.50	3	36	9.00
	8	20	5.00	2	48	12.00
	9	17	4.25	1	75	18.75
	10	16	4.00	0	0	

Predictions

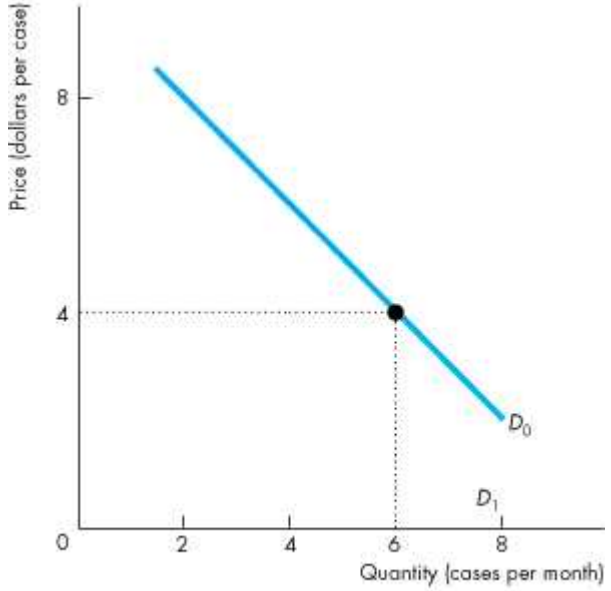
Figure 8.4 illustrates these predictions.

A fall in the price of a movie increases the quantity of movies demanded—a movement along the demand curve for movies,

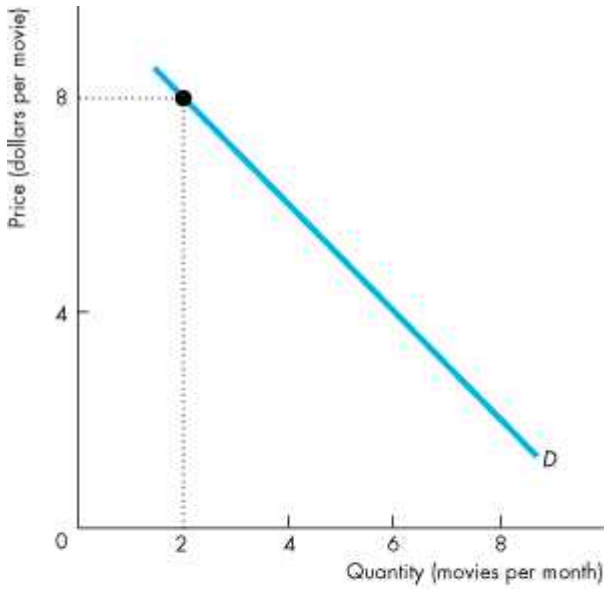
and decreases the demand for soda—a shift of the demand curve for soda.



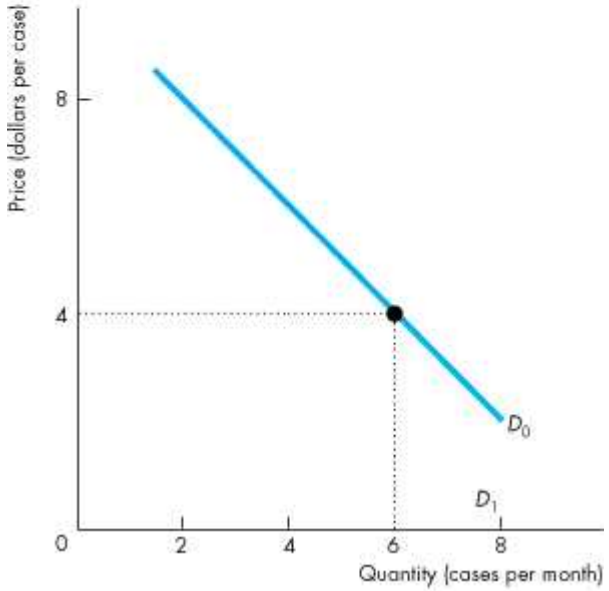
(a) Demand for movies



(b) Demand for soda



(a) Demand for movies



(b) Demand for soda

Predictions of Marginal Utility Theory

A Rise in the Price of Soda

Now suppose the price of soda rises.

We know that MU_S/P_S falls, so before the consumer changes the quantities bought, $MU_S/P_S < MU_M/P_M$.

To restore consumer equilibrium (maximum total utility), the consumer decreases the quantity of soda consumed to drive up the MU_S and increases the quantity of movies seen to drive down MU_M.

These changes restore $MU_M/P_M = MU_S/P_S$.

Predictions of Marginal Utility Theory

Table 8.4 shows Lisa's just-affordable combinations when the price of soda is $8 and the price of a movie is $4.

Before Lisa changes what she buys

$$MU_M/P_M < MU_S/P_S.$$

To maximize her total utility, Lisa drinks less soda.

TABLE 8.4 How a Change in the Price of Soda Affects Lisa's Choices

	Movies ($4 each)			Soda ($8 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	0	0		5	22	2.75
A	2	40	10.00	4	24	3.00
	4	28	7.00	3	36	4.50
B	6	24	6.00	2	48	6.00
	8	20	5.00	1	75	9.38
	10	16	4.00	0	0	

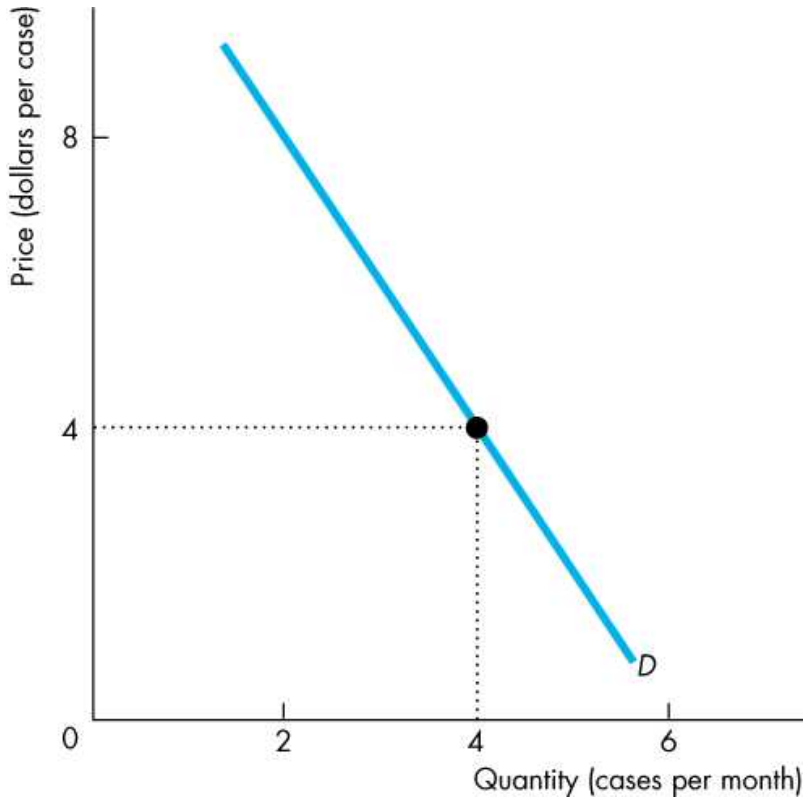
TABLE 8.4 How a Change in the Price of Soda Affects Lisa's Choices

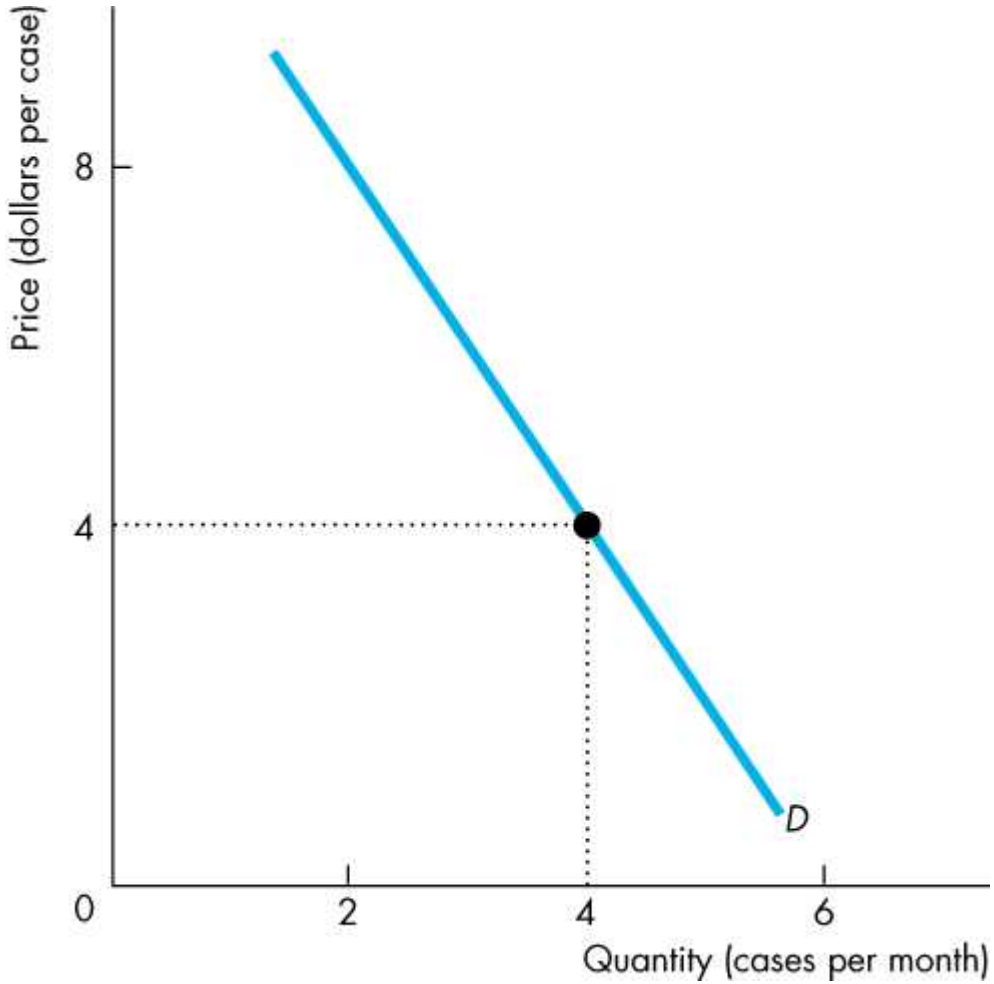
	Movies ($4 each)			Soda ($8 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	0	0		5	22	2.75
A	2	40	10.00	4	24	3.00
	4	28	7.00	3	36	4.50
B	6	24	6.00	2	48	6.00
	8	20	5.00	1	75	9.38
	10	16	4.00	0	0	

Predictions of Marginal Utility Theory

Figure 8.5 illustrates these predictions.

A rise in the price of soda decreases the quantity of soda demanded—a movement along the demand curve for soda.





Predictions of Marginal Utility Theory

A Rise in Income

When income increases, the demand for a normal good increases.

Given the prices of movies and soda, when Lisa's income increases from $40 to $56 a month, she buys more movies and more soda.

Movies and soda are normal goods.

Table 8.5 shows these predictions.

Predictions of Marginal Utility Theory

Table 8.5 shows Lisa's just-affordable combinations when she has $56 to spend.

With $40 to spend, Lisa sees
6 movies and drinks
4 cases of soda a month.

With $56 to spend, Lisa spends the extra $16, so she buys more of both goods.

She sees 8 movies and drinks
6 cases of soda a month.

TABLE 8.5 Lisa's Choices with an Income of $56 a Month

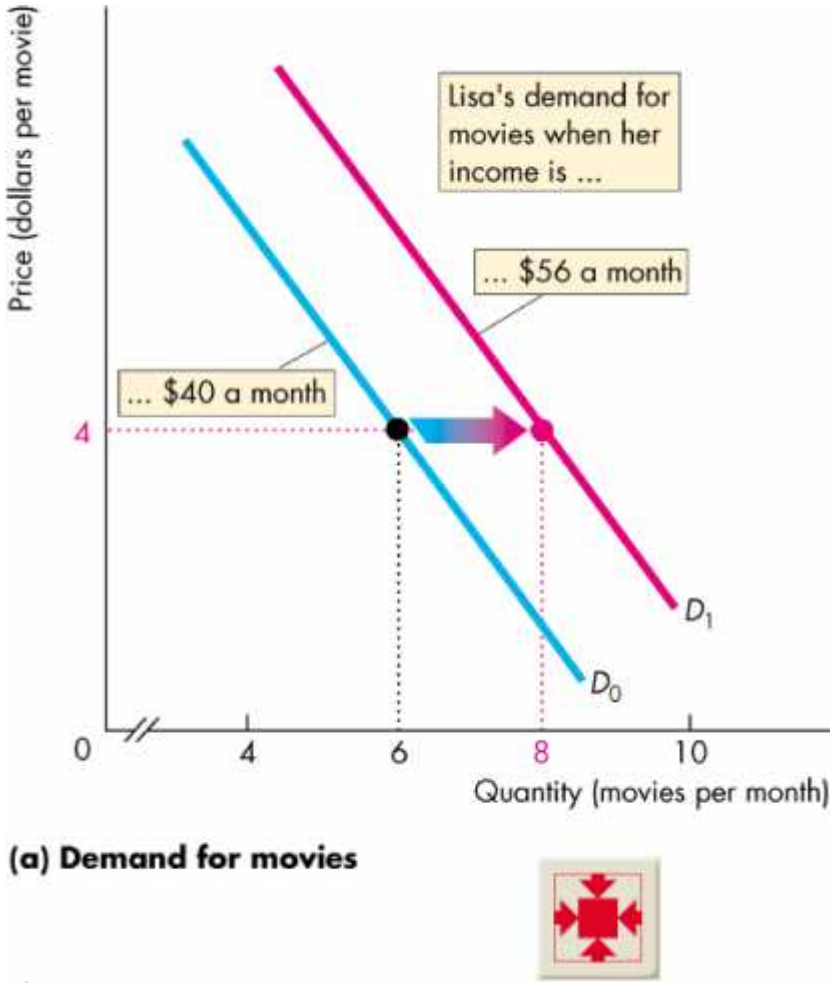
	Movies ($4 each)			Soda ($4 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	4	28	7.00	10	5	1.25
	5	26	6.50	9	7	1.75
A	6	24	**6.00**	8	10	2.50
	7	22	5.50	7	13	3.25
B	8	20	**5.00**	6	20	**5.00**
	9	17	4.25	5	22	5.50
C	10	16	4.00	**4**	24	**6.00**

TABLE 8.5 Lisa's Choices with an Income of $56 a Month

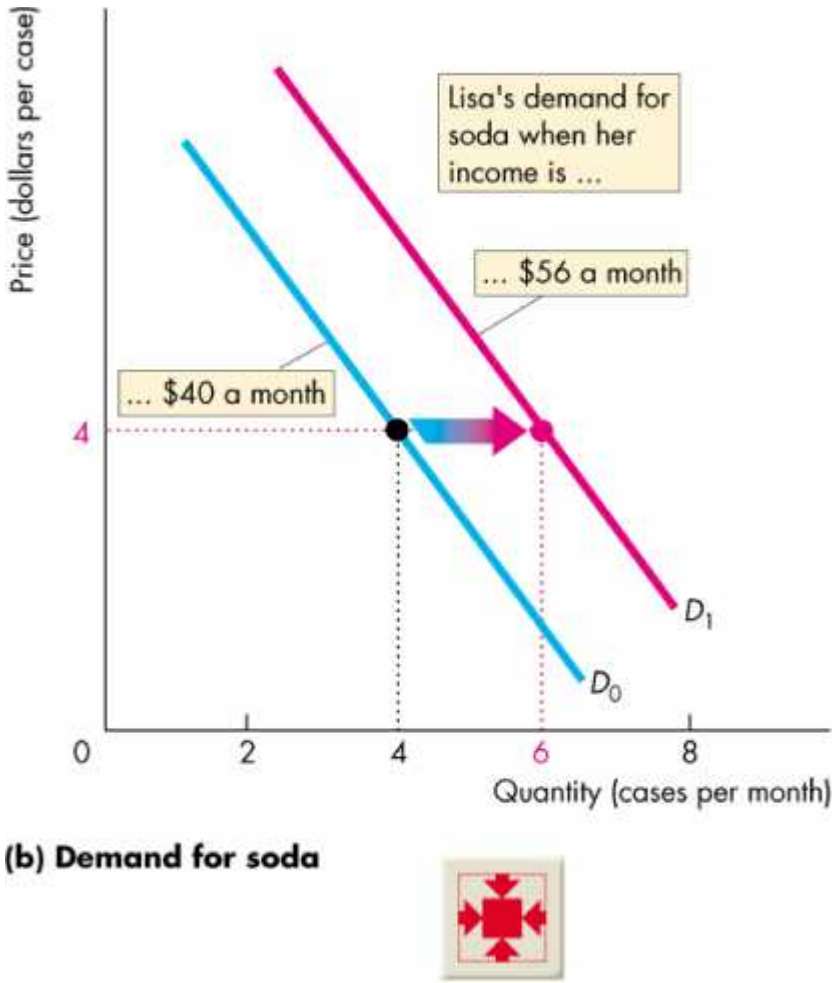
	Movies ($4 each)			Soda ($4 per case)		
	Quantity	Marginal utility	Marginal utility per dollar	Cases	Marginal utility	Marginal utility per dollar
	4	28	7.00	10	5	1.25
	5	26	6.50	9	7	1.75
A	6	24	**6.00**	8	10	2.50
	7	22	5.50	7	13	3.25
B	8	20	**5.00**	6	20	**5.00**
	9	17	4.25	5	22	5.50
C	10	16	4.00	**4**	24	**6.00**

Predictions of Marginal Utility Theory

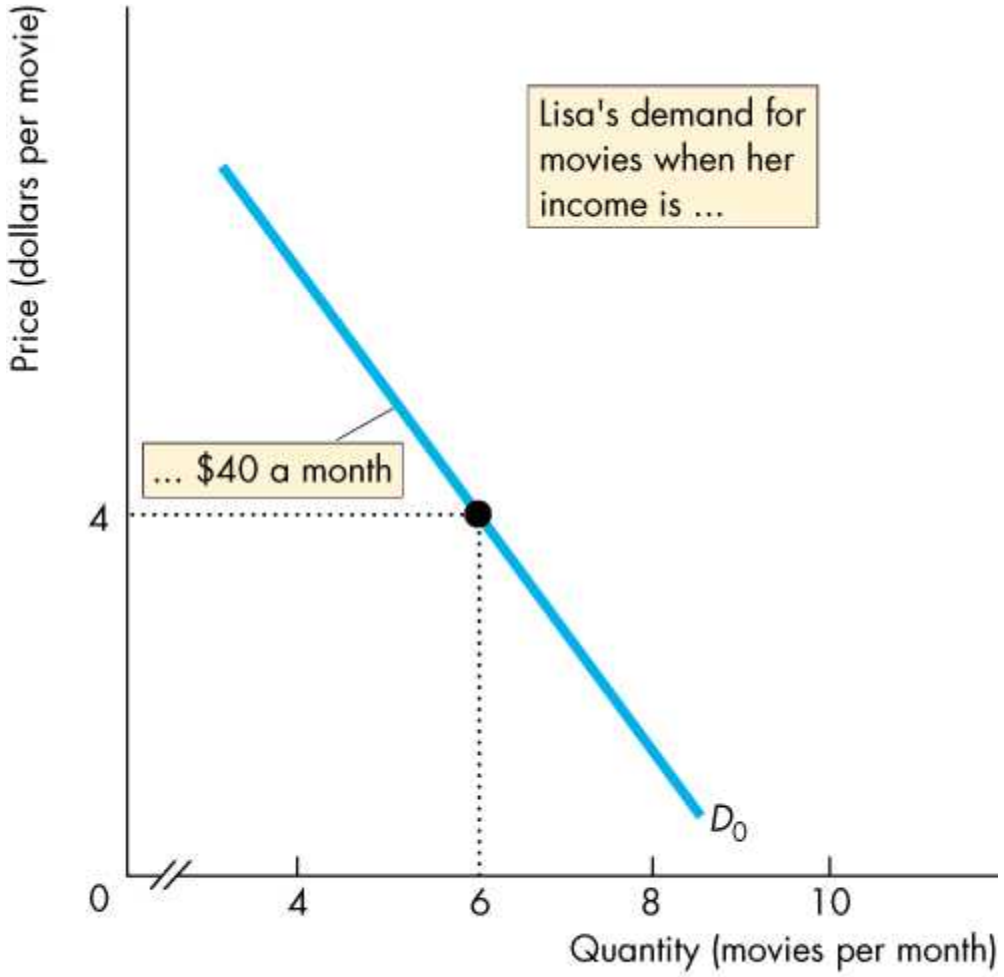
Figure 8.6 illustrates these predictions.



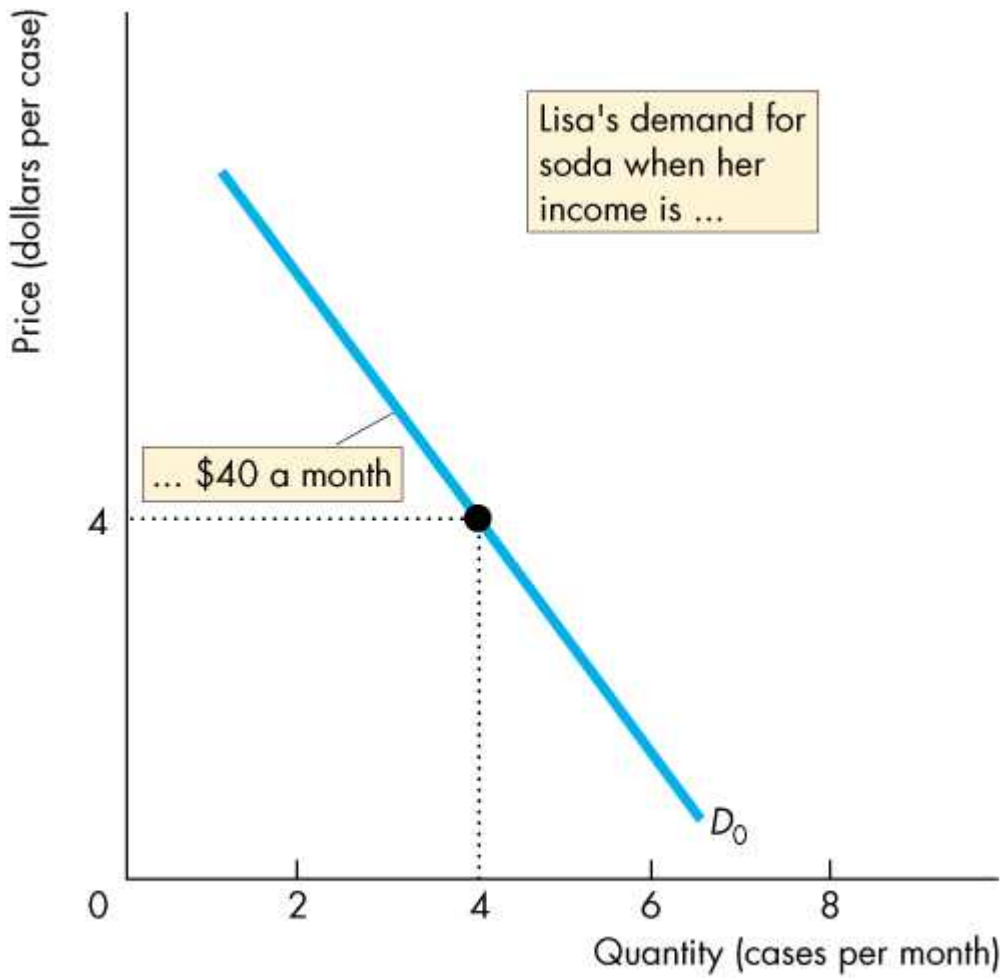
(a) Demand for movies



(b) Demand for soda



(a) Demand for movies



(b) Demand for soda

Predictions of Marginal Utility Theory

The Paradox of Value

The paradox of value "Why is water, which is essential to life, far cheaper than diamonds, which are not essential?" is resolved by distinguishing between total utility and marginal utility.

We use so much water that the marginal utility from water consumed is small, but the total utility is large.

We buy few diamonds, so the marginal utility from diamonds is large, but the total utility is small.

Predictions of Marginal Utility Theory

Paradox Resolved

The paradox is resolved by distinguishing between total utility and marginal utility.

For water, the price is low, total utility is large, and marginal utility is small.

For diamonds, the price is high, total utility is small, and marginal utility is high.

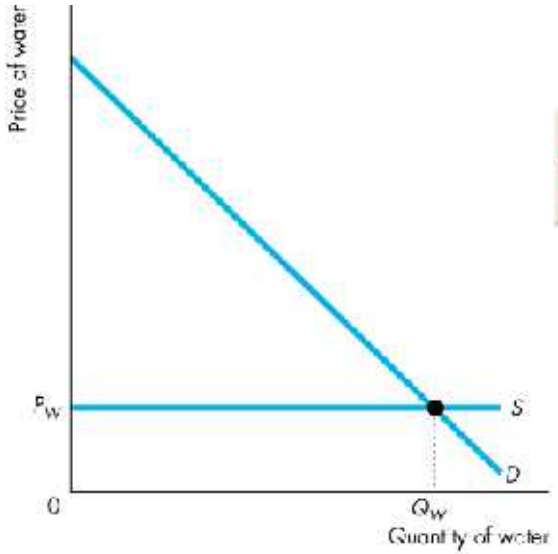
But marginal utility per dollar is the same for water and diamonds.

Predictions …

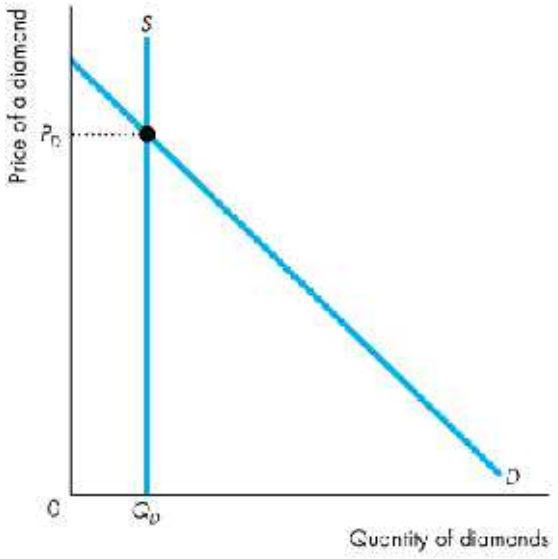
Value and Consumer Surplus

The supply of water is perfectly elastic, so the quantity of water consumed is large and the consumer surplus from water is large.

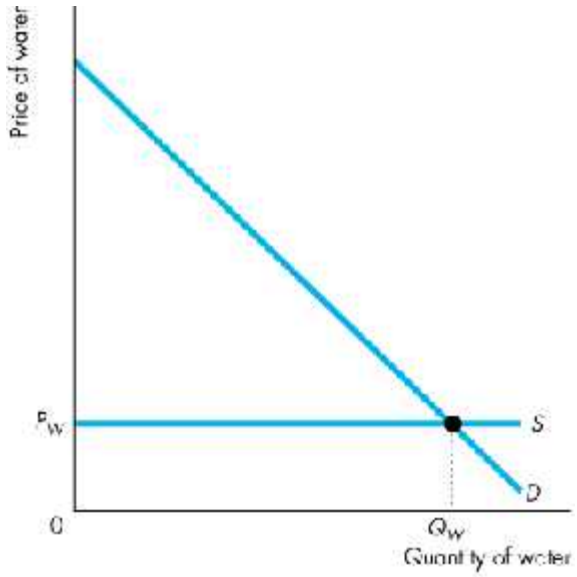
In contrast, the supply of diamonds in perfectly inelastic, so the price is high and the consumer surplus from diamonds is small.



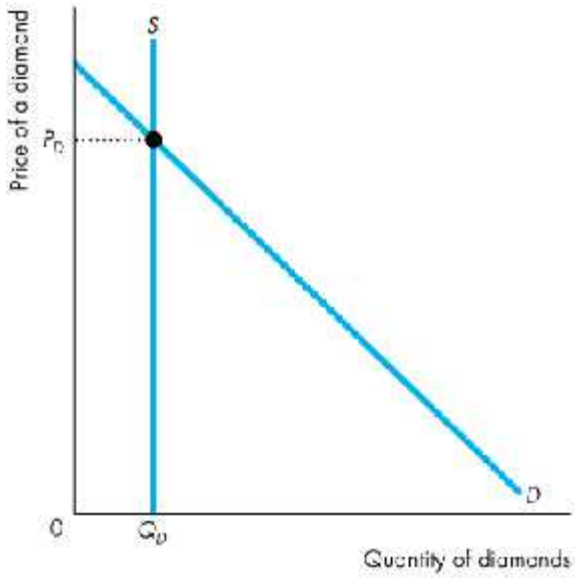
(a) Water



(b) Diamonds



(a) **Water**



(b) **Diamonds**

Predictions of Marginal Utility Theory

Temperature: An Analogy

Utility is similar to temperature. Both are abstract concepts, and both have units of measurement that are arbitrary.

The concept of utility helps us make predictions about consumption choices in much the same way that the concept of temperature enables us to predict when water will turn to ice or steam.

The concept of utility helps us understand why people buy more of a good when its price falls and why people buy more of most goods when their incomes increases.

New Ways of Explaining Consumer Choices

Behavioral Economics

Behavioral economics studies the ways in which limits on the human brain's ability to compute and implement rational decisions influences economic behavior—both the decisions that people make and the consequences of those decisions for the way markets work.

There are three impediments to rational choice:

- Bounded rationality
- Bounded willpower
- Bounded self-interest

New Ways of Explaining Consumer Choices

Bounded Rationality

Bounded rationality is rationality that is bounded by the computing power of the human brain.

Faced with uncertainty, consumers cannot rationally make choices and instead rely on other decision-making methods such as rules of thumb, listening to the views of others, or gut instinct.

New Ways of Explaining Consumer Choices

Bounded Willpower

Bounded will-power is the less-than-perfect willpower that prevents us from making a decision that we know, at the time of implementing the decision, we will later regret.

Bounded Self-Interest

Bounded self-interest is the limited self-interest that sometimes results in suppressing our own interests to help others.

Main applications are in finance where uncertainty is the key factor and savings where future is the key factor.

New Ways of Explaining Consumer Choices

One behavior observed by behavioral economists is more general and might affect your choices.

The Endowment Effect

The **endowment effect** is the tendency for people to value something more highly simply because they own it.

New Ways of Explaining Consumer Choices

Neuroeconomics

Neuroeconomics is the study of the activity of the human brain when a person makes an economic decision.

Different decisions appear to activate different areas of the brain. Some decisions are made

- In the pre-frontal cortex where memories are stored and data analyzed and might be deemed rational.
- In the hippocampus where memories of anxiety and fear are stored and might be deemed irrational.

New Ways of Explaining Consumer Choices

Controversy

Should economics focus on explaining the decisions we observe or should it focus on what goes on inside people's heads?

This is the controversy.

For most economists, the goal of economics is to explain the decisions that we observe people make, and not to explain what goes on inside people's heads.