Chapter 3

THEORY OF CONSUMER BEHAVIOR

The food and fiber industry is driven by consumers rather than by producers.

B. Senauer, E. Asp, and J. Kinsey:
Food Trends and the Changing Consumer, p. 2

Chapter Outline

Consumers are offered a broad array of items in U.S. supermarkets. How do consumers decide which products to purchase?

The biological process of photosynthesis, in which the addition of light to a plant's environment results in plant growth, can be thought of in a stimulus-response context. The stimulus is the addition of light and the response is plant growth. This process can be studied in a controlled environment using sophisticated measuring devices.

Economic behavior also can be thought of in a stimulus-response context. For example, a fall in the price of ice cream acts as a stimulus, causing consumers to purchase more ice cream. These purchases can be measured and recorded. In most respects, similarities end here. The complex process of photosynthesis can be examined and studied directly, but most economic behavior processes cannot. In fact, this example illustrates the distinction between the natural sciences (e.g., biology, chemistry, physics) and the social sciences (e.g., economics). Most economic behavior processes cannot be studied in a controlled environment.

We can examine the technical relationships of converting inputs to outputs in a production process, but we cannot observe the process of connecting the economic stimulus to an economic decision. Why does Robbin purchase more ice cream than Willis when both face the same prices and have the same income? The most prominent economic theories of consumer behavior assume that consumers are rational and seek to maximize their satisfaction while staying within their budget. In this chapter, we discuss consumer theory and how it can be used to understand the purchasing behavior of consumers.

Utility Theory

Consumers typically face a broad set of choices when allocating their income among food and nonfood goods and services. Considerable attention has been given historically to the development of a theoretical framework that will help us understand the choices consumers make. In the following

discussion, we will assume that consumers are rational individuals who maximize their satisfaction, or utility.

Total Utility

A consumer purchases a good or service because of the satisfaction he or she expects to receive. Early researchers of consumer behavior argued that utility was cardinally measurable.[1] They also argued that the utility derived from a given commodity is independent of the utility derived from other commodities. For example, the latter belief suggests that the consumer can determine the utility of taco consumption independently from hamburger consumption. Total utility accordingly would be equal to the total utility derived from each of the individual commodities. The psychological units of satisfaction derived from consumption are generally referred to as **utils**.

We assume that consumers are rational and maximize their satisfaction or utility. A utility function is an algebraic expression that allows us to rank consumption bundles.

A **utility function** is an algebraic expression that allows us to rank a consumption bundle by the total utility or satisfaction it provides. **Consumption bundles** refer to particular combinations of goods being considered. The utility function describes the **total utility** derived from consuming a particular bundle. Consequently, utility or satisfaction is a function of consuming individual commodities.

To clarify the meaning and use of the utility function, consider a consumer who has the following utility function (although it is highly unlikely the consumer is aware of this mathematical representation of his or her utility function):

$$\text{total utility} = (\text{quantity of hamburgers} \times \text{quantity of pizza}) \qquad (3.1)$$

If consumption bundle A consists of 2.5 hamburgers and 10 slices of pizza per week, the consumer with a utility function such as Equation 3.1 would derive a total utility of 25 from the consumption of this bundle (i.e., 2.5×10). This bundle, two other bundles of consumer goods, and the subsequent total utility they provide are summarized in Table 3.1.

If we wanted to know whether bundle B, which consists of 3 hamburgers and 7 pizza slices per week, is preferred, not preferred, or indifferent to bundle A, we know from Equation 3.1 that the utility this consumer derives from consuming bundle B would be 21 (i.e., 3×7). Therefore, this consumer would prefer bundle A to bundle B because the utility provided by bundle A (25) is greater than the utility provided by bundle B (21). Suppose that bundle C consists of 2 hamburgers and 12.5 slices of pizza. The utility derived from con-

Table 3.1 Example of Total Utility Derived from the Consumption of Hamburgers and Pizza

Bundle	Quantity of: Hamburgers	Quantity of: Pizza	Total Utility
A	2.5	10.0	25
B	3.0	7.0	21
C	2.0	12.5	25

[1] The term *cardinally measurable* is used in the same sense that a ruler measures distances, namely, an attempt is made to quantify the amount of satisfaction obtained from consumption. On the other hand, *ordinally measurable* implies only a ranking of distance, such as longest to shortest or vice versa.

suming this bundle also would equal 25. Therefore, this consumer would be indifferent between bundles *A* and *C*.

The notion of a utility function may seem mysterious. In fact, it is hard to imagine a consumer thinking in terms of a specific utility function when purchasing goods and services, as suggested by Equation 3.1. Yet, the concept of satisfaction that the utility function expresses is the foundation of consumer economic analysis.

Marginal Utility

If utility is measurable, it is appropriate to question how total utility changes as a greater amount of a particular good is consumed. The change in total utility, associated with a specific change in the consumption of a commodity, is referred to as **marginal utility**. In economics, the term *marginal* is synonymous with the word *change*. To illustrate this, the marginal utility of hamburgers is shown in Equation 3.2, where Δ indicates the change in a value.

$$MU_{\text{hamburgers}} = \frac{\Delta \text{ utility}}{\Delta \text{ hamburgers}} \tag{3.2}$$

This measure constitutes the change in utility associated with a change in the consumption of hamburgers. This value will always be greater than zero only if we assume that the consumer's appetite never becomes totally satiated. This value will fall (rise) as hamburger consumption increases (decreases).

To illustrate the notion of marginal utility, assume that the data in Table 3.2 reflect the utility of Sue Shopper regarding hamburger consumption. The first column in this table indicates the quantity of hamburgers Sue consumes per

Table 3.2 Calculation of Marginal Utility for Sue Shopper

Quantity of Hamburgers Consumed per Week	Total Utility	Marginal Utility
1	20	
		10
2	30	
		9
3	39	
		8
4	47	
		7
5	54	
		6
6	60	
		5
7	65	
		4
8	69	
		3
9	72	
		2
10	74	
		0
11	74	
		−4
12	70	

week. The second column represents her total utility associated with each specific consumption level. The third column presents the corresponding levels of marginal utility. Note that each successive increment of hamburgers increases utility by a smaller amount. When consumption of hamburgers increases from 2 to 3, utility increases by 9 utils. When consumption of hamburgers increases from 8 to 9, utility increases by only 3 utils. When marginal utility is zero, total utility is maximized. In addition, marginal utility can be negative at higher levels of hamburger consumption. Utility actually decreases by 4 utils as hamburger consumption increases from 11 to 12. Figure 3.1 shows the shape of the total and marginal utility curves associated with the data presented in Table 3.2.

Law of Diminishing Marginal Utility

Is it clear why Sue's marginal utility declines when her consumption increases? If you consume one hamburger, then another, the second ham-

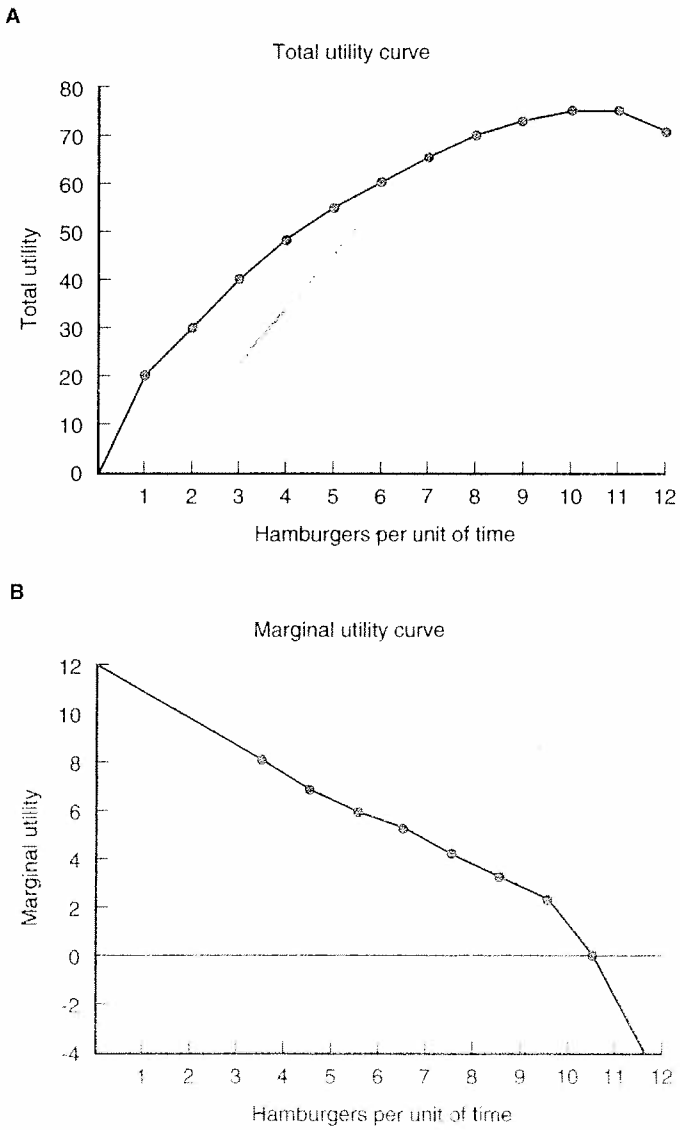


FIGURE 3.1 Total utility continues to increase as the number of hamburgers consumed increases, at least up to 11 hamburgers. At this point, total utility is maximized. Beyond 11 hamburgers, total utility decreases (*A*). Marginal utility declines as Sue increases her consumption of hamburgers (*B*).

burger gives you less satisfaction than the first. Because there is so much truth to this notion, it has been given law-like status. The **law of diminishing marginal utility** suggests that as consumption per unit of time increases, marginal utility decreases. The fact that marginal utility eventually becomes negative in Table 3.2 suggests that a local Wendy's or McDonald's would have to pay consumers to consume more than 10 hamburgers during the week.

The marginal utility of a good refers to the change in utility or satisfaction due to the change in consumption of that good. The law of diminishing marginal utility is one of the few laws in economics. This law stipulates that as consumption of a good increases, the associated marginal utility declines.

Does it seem logical to assume that the marginal utilities provided by different commodities are independent? Would the utility you derive from hamburger consumption depend on the amount of soft drinks, french fries, and tacos you consume? Because most people would answer in the affirmative, we must consider the consumer's consumption of all other goods and services before we can fully understand what influences consumer behavior.

■ Indifference Curves

Cardinal measurement for utility is unreasonable and unnecessary. Cardinality implies that society can add utils like it can add distances. The idea that bundle M yields a utility of 100 and bundle N provides a utility of 200 does not necessarily mean that bundle N provides twice as much satisfaction as bundle M. Instead, utility can be viewed as being ordinally measurable—that is, as a personal index of satisfaction in which the magnitude is used only to rank consumption bundles.

Modern consumption theory dismisses the notion that utility is cardinally measurable and instead measures utility in ordinal terms. All we really need to know is that bundle N is preferred to bundle M, not by how much.

Concept of Isoutility

The basic building block of modern consumption theory is the notion of an isoutility curve, which accounts for substitution in consumption for two products. The term *iso* is of Greek origin and means "equal."[2] An isoutility curve is often referred to as an **indifference curve**. A consumer is indifferent to consumption bundles that yield an equal level of satisfaction or utility.

The different combinations of goods in which indifference occurs have special significance because total utility is equal at all points along the indifference curve. The combinations of hamburgers and tacos, which represent specific levels of utility to Carl Consumer, are graphed in Figure 3.2. The curve labeled I_2 illustrates specific combinations of these two goods that yield a certain level of utility to Carl.

Changes in the utility Carl receives from consumption would be indicated by outward (inward) shifts of an indifference curve. Indifference curve I_7 represents a *higher* level of utility than indifference curve I_2. Maximization of utility derived by Carl requires that he be on the highest possible indifference curve. Carl prefers indifference curve I_7 to I_2 because it means a higher level of utility.

[2] For example, consider an isosceles triangle that has two equal sides.

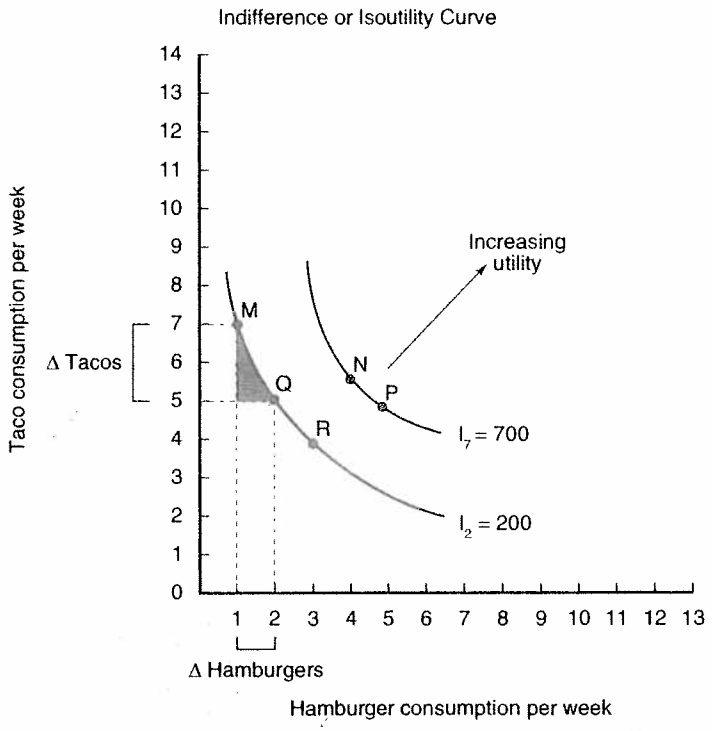


FIGURE 3.2 An indifference curve represents all combinations of two goods that yield an equal level of satisfaction or utility. In other words, the total utility derived from consumption is equal at all points along an indifference curve. The utility associated with consuming seven tacos and one hamburger per week (point *M*) by Carl Consumer is equal to the utility associated with consuming five tacos and two hamburgers (point *Q*). Indifference curve I_7 represents a higher level of utility than curve I_2. Why? Bundle *P* on curve I_7 corresponds to approximately the same number of tacos but more hamburgers than bundle *Q*.

Marginal Rate of Substitution

To maintain a constant level of utility, one must change consumption of one commodity to obtain additional consumption of another; that is, a consumer may substitute one commodity for another to maintain a constant level of utility. The rate at which the consumer is willing to substitute one good for another is called the **marginal rate of substitution**. The marginal rate of substitution of hamburgers for tacos, for example, represents the number of tacos Carl is willing to give up for an additional hamburger to maintain the same level of satisfaction; or, in mathematical terms, as

$$\begin{pmatrix}\text{marginal rate of}\\ \text{substitution of}\\ \text{hamburgers for tacos}\end{pmatrix} = \frac{\Delta \text{ tacos}}{\Delta \text{ hamburgers}} \tag{3.3}$$

The marginal rate of substitution associated with moving from point *M* to *Q* in Figure 3.2 would be approximately −2 (i.e., −2 ÷ 1). Carl is willing to give up 2 tacos for 1 additional hamburger. If he instead moved from point *Q* to *R*, we see that the marginal rate of substitution would fall to about −1 (i.e., −1 ÷ 1).

The marginal rate of substitution represents the slope for a specific segment of an indifference curve for two goods. For Carl Consumer, the cutback in taco consumption times the marginal utility of tacos is identical to the increase in hamburger consumption times the marginal utility of hamburgers. We can also equate the marginal rate of substitution of hamburgers for tacos in Equation 3.3 with the ratio of their marginal utilities, or

$$\frac{\Delta \text{ tacos}}{\Delta \text{ hamburgers}} = \frac{MU_{\text{hamburgers}}}{MU_{\text{tacos}}} \tag{3.4}$$

The loss in utility from consuming fewer tacos is just matched by the gain in utility Carl receives from consuming more hamburgers.

Why does the marginal rate of substitution fall as we move down the indifference curve? In Figure 3.2, the marginal rate of substitution fell from -2 to -1 when Carl moved down the indifference curve. When Carl consumed 7 tacos (point M), he was willing to give up 2 tacos to eat 1 more hamburger (a movement from point M to Q). When Carl consumed 5 tacos (point Q), he was willing to give up only 1 taco to receive 1 more hamburger (a movement from point Q to R). Carl is satisfied giving up one commodity (tacos) for more of another (hamburgers).

Perhaps the most intuitive explanation we can offer at this point relies on the notion of diminishing marginal utility. As taco consumption falls, its marginal utility rises. As hamburger consumption increases, its marginal utility falls. Thus, the marginal rate of substitution *falls* as one moves *down* an indifference curve (e.g., increasing hamburger consumption and reducing taco consumption).

The indifference curve or iso-utility curve represents the combination of consumption bundles that provide a consumer a given level of satisfaction. The slope of the indifference curve is the marginal rate of substitution.

■ The Budget Constraint

We often hear the phrase "I wanted to purchase it, but I just could not afford it." This phrase portrays that we are all faced with what economists call a **budget constraint**; that is, purchases by a consumer cannot exceed his or her income. If consumption decisions are made as a household, income should include all forms of family income. It should also *exclude* tax obligations to reflect the **disposable income** of the household.[3] We must discuss the budget constraint using a unit of time, such as the maximum expenditures per day, per week, and so on.

If all other factors remain constant, when the disposable income of a consumer increases, the percentage of income spent for food decreases. For a poor consumer, a greater percentage of income is used to purchase food. This observation is commonly referred to as **Engel's Law**, previously encountered in Chapter 2. In the United States, we have a relatively high per capita national income, and we spend a relatively small percentage of our total consumption expenditures, roughly 10%, on food. In India and the Philippines, the budget share for food items is approximately 51% and 56%, respectively. Figure 3.3 illustrates Engel's Law, using information from the household portion of the 1987–88 Nationwide Food Consumption Survey. Engel's Law states that the greater the weekly income, the lower the proportion of income spent on food. Each point in this graph corresponds to a particular household, a total of approximately 4,000.

The total expenditures made by a consumer on a number of items can be determined by multiplying the total quantity of each good or service purchased by its respective price and then totaling the value of all purchases. For example, suppose Carl Consumer had a specific amount of money to spend on food eaten away from home per week. If he limited this consumption to purchases of hamburgers and tacos, Carl's total expenditure would be equal to the price of hamburgers times the quantity of

[3] **Disposable income** is defined as income after taxes.

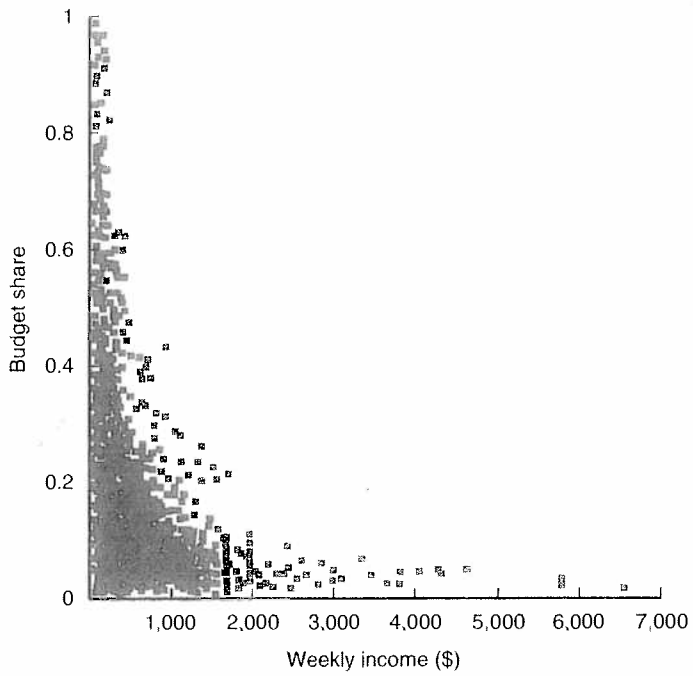


FIGURE 3.3 Scatter plot of weekly income and total food budget share.

hamburgers he consumed *plus* the price of tacos times the quantity of tacos he consumed, or

$$\left\{\begin{matrix}\text{price of}\\ \text{hamburgers}\end{matrix}\times\begin{matrix}\text{quantity of}\\ \text{hamburgers}\end{matrix}\right\}+\left\{\begin{matrix}\text{price of}\\ \text{tacos}\end{matrix}\times\begin{matrix}\text{quantity of}\\ \text{tacos}\end{matrix}\right\}=\begin{matrix}\text{income spent on}\\ \text{food eaten away from home}\end{matrix}\qquad(3.5)$$

This budget constraint limits Carl's consumption of hamburgers and tacos to no more than the total income allocated to their consumption.

The budget constraint defines the feasible set of consumption choices facing a consumer. This constraint depends upon the prices of goods in question and the income available to a consumer.

When the budget constraint is graphed, it is referred to as the *budget line.* The slope of Carl's budget line is equal to the negative of the price ratio, or

$$\begin{matrix}\text{slope of}\\ \text{budget line}\end{matrix}=-\frac{\text{price of hamburgers}}{\text{price of tacos}}\qquad(3.6)$$

which suggests that the budget constraint will become *steeper* (flatter) as the price of hamburgers rises (falls) relative to the price of tacos (see Figure 3.4, *D*). Similarly, the budget constraint will become steeper (flatter) as the price of tacos falls (rises) (see Figure 3.4, *C*).[4]

To illustrate, suppose that Carl has $5 a week to divide between the consumption of tacos and hamburgers. Tacos cost $0.50 each and hamburgers cost $1.25 each. Some of the combinations of tacos and hamburgers Carl can afford with a weekly budget of $5 appear in Table 3.3. This budget

[4] The slope of the budget line can be derived by rearranging Equation 3.5 to read

$$\begin{matrix}\text{quantity of}\\ \text{tacos}\end{matrix}=\frac{\text{income}}{\text{price of tacos}}-\left[\frac{\text{price of hamburgers}}{\text{price of tacos}}\times\begin{matrix}\text{quantity of}\\ \text{hamburgers}\end{matrix}\right]$$

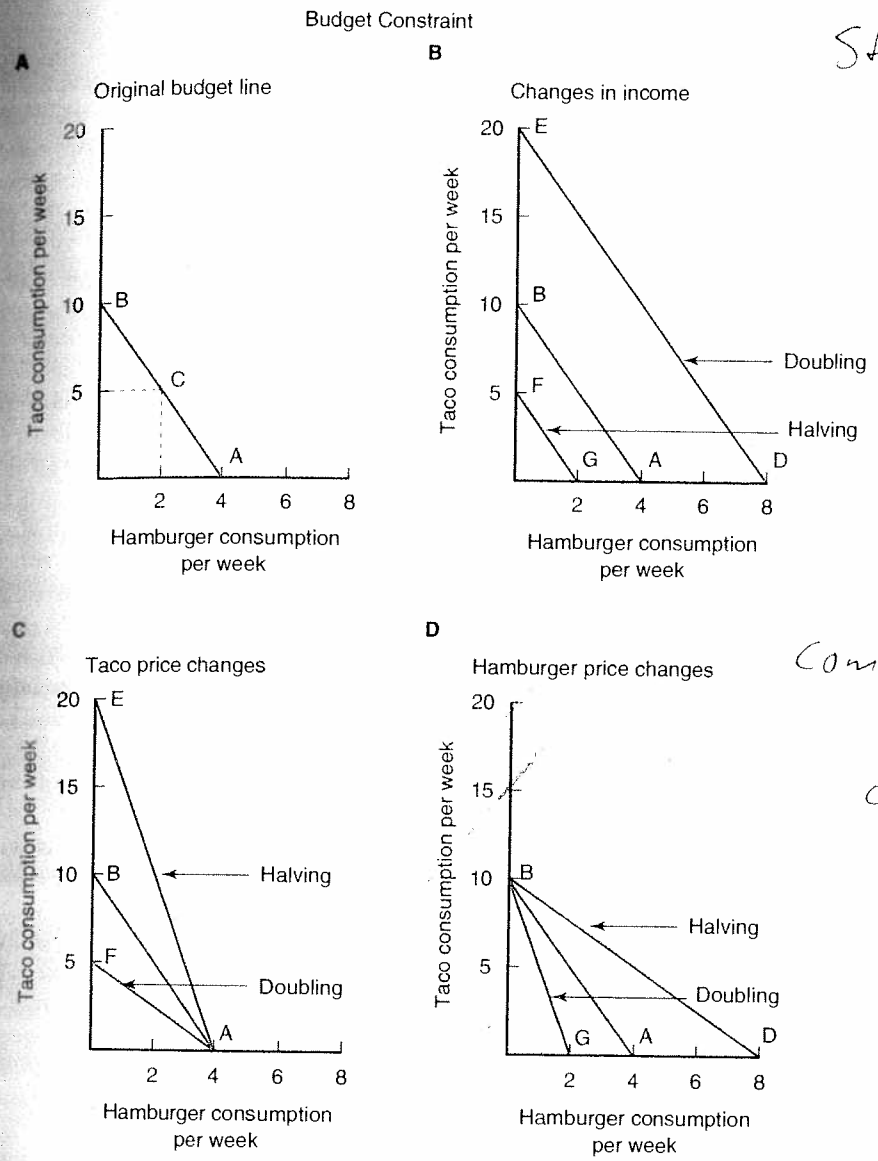


FIGURE 3.4 Let the line connecting points *A* and *B* (A) represent the original budget constraint or budget line. This line suggests that Carl Consumer could spend his entire weekly budget of $5 to buy 4 hamburgers costing $1.25 each, 10 tacos costing $0.50 each, or some combination of these two food items that appears along line *AB*.

Table 3.3 Example of Budget Constraint

Tacos ($0.50 Each)	Hamburgers ($1.25 Each)	Expenditure
10	0	$5
5	2	$5
0	4	$5

constraint is illustrated graphically in Figure 3.4, *A*. We know from Equation 3.5 that if just hamburgers are desired, taco consumption would be zero, and the quantity of hamburgers consumed would be 4 (i.e., total income [$5] ÷ price of hamburgers [$1.25]). Carl can afford a maximum of 4 hamburgers per week. If only tacos are desired (i.e., hamburger consumption is zero), Carl could afford a maximum of 10 tacos (i.e., income [$5] ÷ price of tacos [$0.50]).

All feasible consumption possibilities would, thus, appear along budget line *AB*. For example, the consumption of 2 hamburgers and 5 tacos also requires an income of $5, as indicated by point *C* in Figure 3.4, *A*.

What will happen to the budget line if income changes and prices remain unchanged? The answer is that the budget line will move in a parallel fashion. Suppose that the income Carl can devote to these two products doubled to $10. His maximum hamburger consumption would increase from 4 hamburgers at point *A* to 8 hamburgers at point *D* (i.e., 8 = $10 ÷ $1.25). Carl's maximum taco consumption would increase from 10 tacos at point *B* to 20 tacos at point *E* (i.e., 20 = $10 ÷ $0.50) (Figure 3.4, *B*). Thus, a line connecting 8 hamburgers on the horizontal axis with 20 tacos on the vertical axis would represent a new budget constraint (*DE*), which lies *to the right* of the original budget line. By similar logic, the budget line would take a parallel shift inward (leftward) to line *FG* if Carl reduced the amount of income he devoted to these two products by one-half. Finally, a doubling (halving) of *both* prices will also shift the budget line inward (outward) as illustrated in Figure 3.4, *B*.

Changes in the price ratio for two products will change the slope of the budget line. For example, if the price of tacos doubles, Carl's budget line will rotate to the left from line *AB* to line *AF* (Figure 3.4, *C*). This change suggests that fewer tacos can be purchased for any given level of hamburger consumption. If the price of tacos falls in half, Carl's budget line would instead rotate to the right from line *AB* to line *AE* (Figure 3.4, *C*). In both instances, the budget lines continue to have point *A* in common. At point *A*, only hamburgers are consumed; therefore, a price change in tacos would have absolutely no effect. Similarly, changes in the price of hamburgers would rotate the budget line as shown in Figure 3.4, *D*. A rightward (leftward) rotation from line *BA* to *BD* (*BG*) signifies halving (doubling) of hamburger prices.

To summarize, the slope of the budget line is given by the negative of the price ratio. This ratio indicates that the consumption of tacos associated with a one-unit increase in consumption of hamburgers is equal to the price of hamburgers divided by the price of tacos. An increase (decrease) in income will shift the budget line outward to the right (inward to the left) from the origin. This shift will be parallel in nature as long as the price ratio does not change. A change in the ratio of the two product prices, however, will alter the slope of the budget line.

Summary

The major points made in the chapter may be summarized as follows:

1. The budget constraint represents the amount of income the consumer has to commit to consumption in the current period. A proportional change in all prices and income has *no effect* on the budget constraint. For this reason, economists argue that only relative price changes matter. When presented graphically, the budget constraint is frequently referred to as the budget line. The slope of the budget line, which tells us the rate of exchange between two goods as their prices change, is given by the negative of the price ratio. A change in relative prices will change the slope of the budget line. Finally, an increase (decrease) in income will shift the budget line to the right (left).
2. We assume that consumers are rational and maximize their satisfaction, or utility. Thus, consumers are assumed to be able to rank all their choices. Furthermore, consumers are assumed to be willing to substitute commodities of equal value.
3. Early researchers of consumer behavior argued that utility could be measured. The term *utils* was used as a unit of measure. A hamburger might yield 10 utils, a soda 4 utils, and so on. Marginal utility describes the change in utility or utils as more of a good is consumed and is thought to diminish as consumption increases, but not reach zero, according to the assumption of nonsatiation.
4. Today no one really believes that utility can be measured in utils. Instead, utility is thought of in the context of a personal index of satisfaction. The magnitude of this index (or function) serves to order the consumption bundles, or combinations of goods the consumer faces.
5. All consumption points that provide the same utility form an isoutility, or indifference curve. Increases (decreases) in utility are indicated by a shift in an indifference curve to the right (left). The negative of the slope of this curve is known as the marginal rate of substitution (MRS). This rate indicates the willingness of the consumer to substitute one good for another. The declining rate as one moves down an indifference curve indicates the existence of the principle of diminishing marginal utility.

Key Terms

Budget constraint
Consumption bundles
Disposable income
Engel's Law
Indifference curve
Law of diminishing marginal utility
Marginal rate of substitution
Marginal utility
Total utility
Utility function
Utils

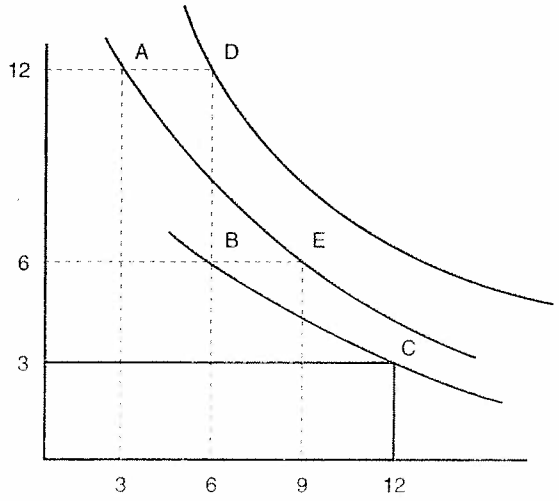
Testing Your Economic Quotient

1. Based on the following table, graph the total utility curve of Robbin Denison for buffalo wings. Secondly, calculate the marginal utility between each point and plot the corresponding graph. Why is the slope of the MU curve negative?

Robbin's Utility Function

# of Wings	Total Utility
1	30
2	58
3	84
6	150
12	222
24	306

2. Robbin likes a beverage (Coca-Cola, of course) with her wings. There is only one place to buy this combination, Wings 'n' Suds. Using the graph on the following page, let the number of Coca-Colas be on the vertical axis and the number of wings on the horizontal axis. Label the graph.
   - **a.** Robbin has her choice of getting 12 bottles of Coca-Cola and 3 wings or 3 bottles of Coca-Cola and 12 wings, free of charge. Which bundle will she choose? Why?
   - **b.** Which would Robbin choose if she could have either 12 bottles of Coca-Cola and 6 wings or 6 bottles of Coca-Cola and 9 wings?
   - **c.** Calculate the MRS between points *A* and *E*.



3. After careful scrutiny, Robbin budgets $12/week for Wings 'n' Suds. Consider the following:
   - **a.** Graph and label the axes to show how much of each good Robbin is *able* to buy, if the price of a buffalo wing is $.50, while the price of Coca-Cola is $1.50.
   - **b.** In order to attract more customers to Wings 'n' Suds, management decides to lower the price of Coca-Cola to a buck. Show what happens to Robbin's budget line compared to **a**.

c. Instead of b, assume there is a sudden shortage of buffalo wings available. Now, Wings 'n' Suds has to raise the price of a wing to $3. Show how this event changes Robbin's budget line relative to a.

d. Robbin, after winning $1,000 in the Texas lottery, decides that she can now spend $40/week at Wings 'n' Suds. Show how this event changes Robbin's budget line relative to a.

e. What combination of wings and Coca-Colas *should* Robbin buy in a? b? c? d?

4. Given the following set of indifference curves, calculate the marginal rate of substitution between the following:

a. Points *A* and *B*.

b. Interpret this measure.

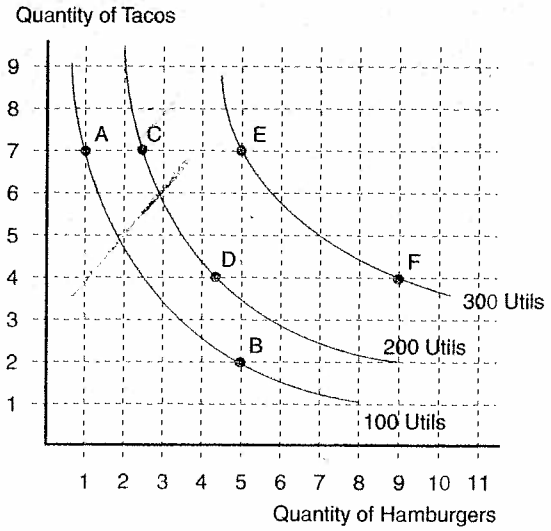
c. Which combination of tacos and hamburgers yields the highest level of satisfaction? Circle the correct answer(s).

i. 7 tacos, 1 hamburger

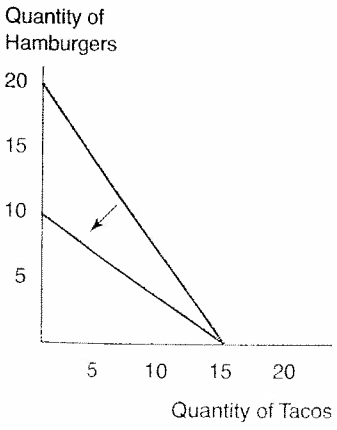
ii. 2 tacos, 5 hamburgers

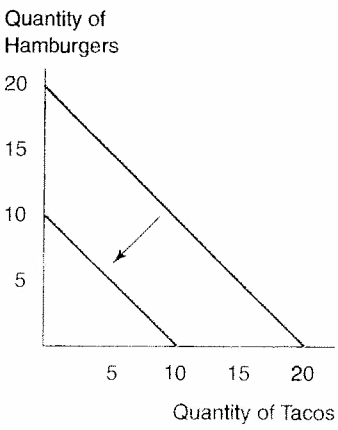
iii. 5 tacos, 7 hamburgers

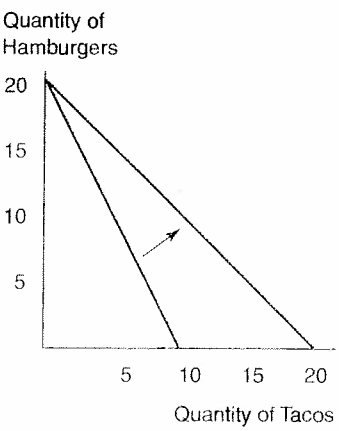
iv. 7 tacos, 5 hamburgers



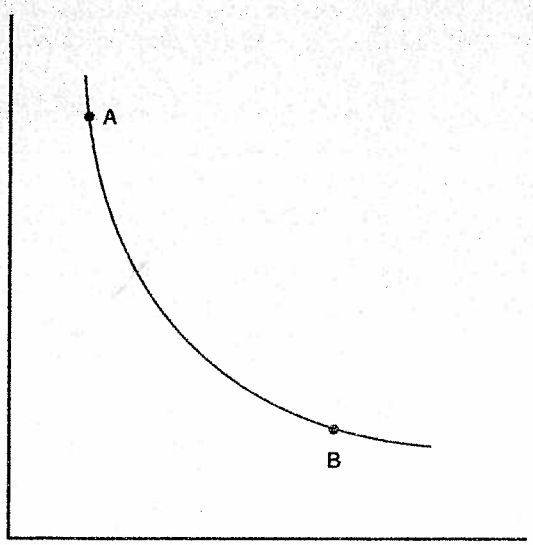
5. Given the following changes in a consumer's budget constraint, please indicate in writing to the right of each graph what caused the budget constraints to change.







6. Assume you have interest in only two goods: cheap food and environmental quality. That is, these goods are the only ones that provide utility to you. Consider the following graph:



Let point *A* correspond to 80 units of cheap food and 20 units of environmental quality. Let point *B* correspond to 50 units of cheap food and 30 units of environmental quality.

a. Label the axes. What is the technical name of the curve given above?
b. Calculate how many units of cheap food you are willing to give up to receive one more unit of environmental quality in order to maintain the same level of satisfaction.

7. Suppose Glenn Gibbs (a native of Manchester, England) has an income of $30. He derives satisfaction from the consumption of tea and biscuits. The price of tea is $3.00 per cup and the price of biscuits is $.50/unit.

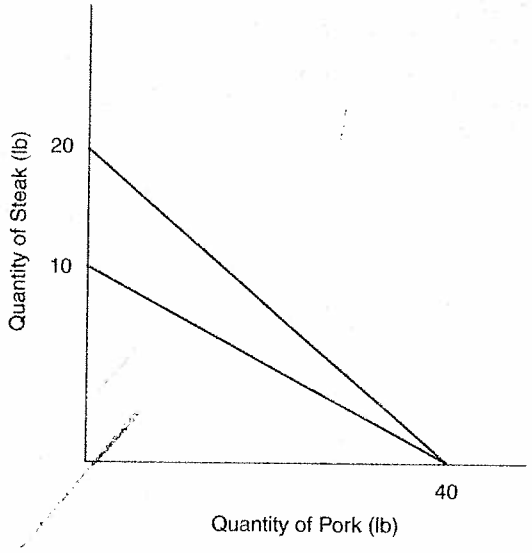
a. Graphically construct the budget line for this situation. Label your axes carefully.
b. Now, suppose the price of tea increases to $5.00 per cup, and Glenn's income remains at $30. Assuming the price of biscuits remains at $.50/unit, redraw the budget line to reflect this situation.

8. Given the following data

Quantity Sodas	*Total Utility*	*Marginal Utility*
1	20	—
2	25	?(a)
6	37	?(b)

a. MU between 1 and 2 is _____.
b. MU between 2 and 6 is _____.

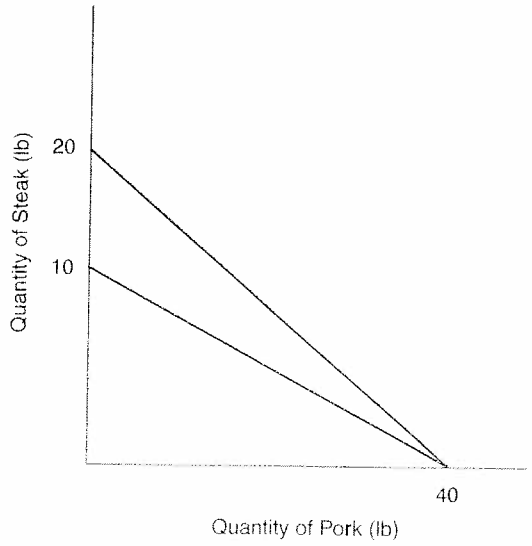
9. What caused the budget constraint to change? Circle the correct answer.



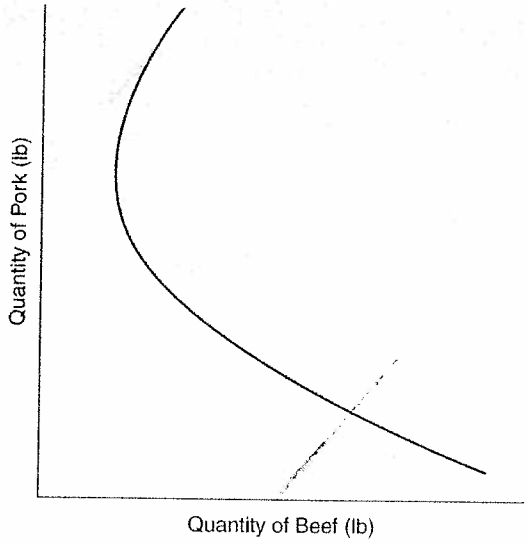
a. The price of steak rose.
b. The price of steak fell.
c. The expenditure on steak and pork rose.
d. The price of pork fell.

10. If expenditure on steak and pork equals $100, what is the price/lb of pork?

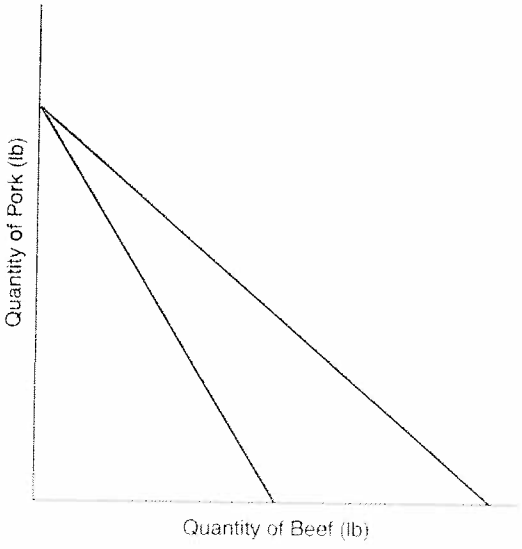
_____



11. A rational consumer maximizes his/her satisfaction or _____.
12. The marginal utility of a good (e.g., ice cream) declines with increases in the consumption of that good. This phenomenon is referred to as the _____.
13. **a.** For a representative consumer, 4 wings and 3 bottles of Dr. Pepper generate the same utility as 6 wings and 2 bottles of Dr. Pepper. How many wings must the consumer give up in order to get one more bottle of Dr. Pepper? _____
    b. What is the technical name associated with the trade-off in (a)? _____
14. What is the name associated with this graph? _____

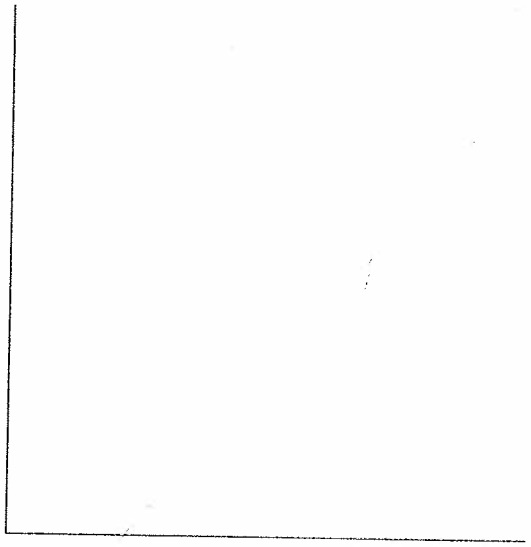


15. **a.** What is the name associated with the diagram below? _____



b. What happened to shift the curve above? _____

16. Suppose that a college student can spend $50 on entertainment. This student derives satisfaction only from watching movies and playing video games. The price of a movie is $5 and the price of a video game is $2.



a. Draw the correct budget line for this student.
b. Label the axes.
c. Provide the numerical amounts of movies and video games at the "extreme points."

17. Circle the correct answer.
Engel's Law states that

a. marginal utility declines as more of a good is consumed during a specified period of time.
b. as income rises, the portion of the dollar we spend on food falls.
c. as income rises, the portion of the dollar we spend on food rises.
d. as income rises, food expenditure also increases.

18. According to the chart below, which bundle is preferred? _____

Bundle	Number of Wings	Bottles of Coca-Cola	Total Utility
A	3	3	18
B	6	4	48
C	9	2	36
D	12	1	24

19. When total utility is at a maximum, marginal utility is _____.
20. We do not need to actually measure the level of satisfaction derived by a consumer from the consumption of goods. We only need a ranking among the alternative consumption bundles. Thus, utility is a(n) _____ concept.
21. The mathematical representation of the satisfaction a consumer derives from a bundle of goods is called the _____ function.
22. The graph of alternative consumption bundles that provide a consumer a given level of satisfaction is called a(n) _____ curve.

References

Deaton A, and J Muellbauer: *Economics and consumer behavior,* Cambridge University Press, 1980.

Senauer B, E Asp, and J Kinsey: *Food Trends and the Charging. Consumer,* St. Paul, 1991, Eagen Press.