**CONSUMER CHOICE**

|  |  |  |
| --- | --- | --- |
| Identify Goals and Constraints | _Pic1213 | **THE BUDGET CONSTRAINT** |
|  | Virtually all individuals must face two facts of economic life: (1) they have to pay prices for the goods and services they buy, and (2) they have limited funds to spend. These two facts are summarized by the consumer’s *budget constraint:* |

*A consumer’s* ***budget constraint*** *identifies which combinations of goods and services the consumer can afford with a limited budget, at given prices.*

Consider Max, a devoted fan of both movies and concerts, who has a total budget of $150 to spend on both each month. For each movie, Max must pay a di­rect money cost of $10 (the ticket price plus the cost of transportation), and for each concert, a direct money cost of $30. If Max were to spend all of his $150 budget on concerts at $30 each, he could see at most five each month. If he were to spend it all on movies at $10 each, he could see 15 of them.

**Budget constraint** The different combinations of goods a consumer can afford with a limited budget, at given prices.

But Max could also choose to spend *part* of his budget on concerts and *part* on movies. In this case, for each number of concerts, there is some *maximum* number of movies that he could see. For example, if he goes to one concert per month, it will cost him $30 of his $150 budget, leaving $120 available for movies. Thus, if Max were to choose one concert, the *maximum* number of films he could choose would be $120/$10 ~ 12.

Figure 1 lists—for each number of concerts—the maximum number of movies that Max could see. Each combination of goods in the table is affordable for Max, since each will cost him exactly $150. Combination *A,* at one extreme, represents no concerts and 15 movies. Combination *F,* the other extreme, represents 5 concerts and no movies. In each of the combinations between *A* and *F,* Max attends both concerts and movies.

The graph in Figure 1 plots the number of movies along the vertical axis and the number of concerts along the horizontal. Each of the points *A* through *F* corre­sponds to one of the combinations in the table. If we connect all of these points with a straight line, we have a graphical representation of Max’s budget constraint, which we call Max’s budget line.

Note that any point below or to the left of the budget line is affordable. For ex-ample, 2 concerts and 6 movies—indicated by point *G* —would cost only $60 ~ $60 ~ $120. Max could certainly afford this combination. On the other hand, he *cannot* afford any combination *above* and to the right of this line. Point *H,* repre­senting 3 concerts and 8 movies, would cost $90 ~ $80 ~ $170, which is beyond Max’s budget. The budget line therefore serves as a *border* between those combina­tions that are affordable and those that are not.

**Budget line** The graphical repre­sentation of a budget constraint.

Let’s look at Max’s budget line more closely. The *vertical intercept* is 15, the number of movies Max could see if he attended zero concerts. Starting at the verti­cal intercept (point *A),* notice that each time Max increases one unit along the hori­zontal axis (attends one more concert), he must decrease 3 units along the vertical (see three fewer movies). Thus, the slope of the budget line is equal to ~3. The slope tells us Max’s *opportunity cost* of one more concert. That is, the opportunity cost of 1 more concert is 3 movies foregone.

There is an important relationship between the *prices* of two goods and the op­portunity cost of having more of one or the other. The prices Max faces tell us how many dollars he must give up to get another unit of each good. If, however, we di-vide one money price by another money price, we get what is called a relative price—

**Relative price** The price of one good relative to the price of another.

The Budget Constraint **121**



|  |  |
| --- | --- |
| Number of Movies per Month15 | _Pic1220 |
| 12963 |

1 23 4 5

Number of Concerts per Month

Max’s Consumption Possibilities with Income of $150

|  |  |  |
| --- | --- | --- |
|  | Concerts at $30 each | Movies at $10 each |
|  | Quantity | Total Expenditureon Concerts | Quantity | Total Expenditureon Movies |
| **A** | 0 | $0 | 15 | $150 |
| **B** | 1 | $ 30 | 12 | $120 |
| **C** | 2 | $ 60 | 9 | $90 |
| **D** | 3 | $ 90 | 6 | $60 |
| **E** | 4 | $120 | 3 | $30 |
| **F** | 5 | $150 | 0 | $0 |

the price of one good *relative* to the other. Since *P*concert ~ $30 and *P*movie ~ $10, the *relative price of a concert* is the ratio *P*concert/*P*movie ~ $30/$10 ~ 3. Notice that 3 is the opportunity cost of another concert in terms of movies, and—except for the mi­nus sign—it is also the slope of the budget line. That is, *the relative price of a con­cert, the opportunity cost of another concert, and the slope of the budget line* have the same absolute value. This is one example of a general relationship:

The budget line shows all combinations of concerts and movies Max could at-tend by spending $150 each month. At point **A,** he could attend 15 movies, but no concerts. At **F,** he could at-tend 5 concerts but no movies. At points **B–E,** he attends both movies **and** concerts. The slope of the

line (~**P**concert/**P**movie ~ ~3)

shows that the opportunity cost of another concert is 3 movies.

*The slope of the budget line indicates the spending trade-off between one good and another—the amount of one good that must be sacrificed in order to buy more of another good. If Py is the price of the good on the vertical axis and Px is the price of the good on the horizontal axis, then the slope of the budget line is* ~*Px /Py.*

**CHANGES IN THE BUDGET LINE**

It’s tempting to think that the slope of the budget line should be ~**Py** **/Px ,**

where the price of the vertical-axis good, **Py,** is in the numerator rather

than in the denominator. But this is wrong. The budget line’s slope is the

change in **quantity** along the vertical axis divided by the change in **quantity** along the horizontal. As our example shows, when the slope is expressed in

terms of **prices** rather than quantities, the formula is ~**Px** /**Py** , with the price of the **horizontal**-axisgood in the numerator.

To draw the budget line in Fig­ure 1, we have assumed given prices for movies and con­certs, and a given income that Max can spend on them. These “givens”—the prices of

the goods and the consumer’s

income—are always *assumed*

*constant* as we move along a budget line; if any one of them changes, the budget

line will change as well. Let’s see how.

**Changes in Income.** If Max’s available income increases from $150 to $300 per month, then he can afford to see more movies, more concerts, or more of both, as shown by the change in his budget line in Figure 2(a). If Max were to devote *all* of his income to movies, he could now see 30 of them each month, instead of the 15 he was able to see before. Devoting his entire income to concerts would enable him to attend 10, rather than 5. Moreover, for any number of concerts, he will be able to see more movies than before. For example, before, when his budget was only $150, choosing 2 concerts would allow Max to see only 9 movies. Now, with a budget of $300, he can have 2 concerts and *24* movies.

Notice that the old and new budget lines in Figure 2(a) are parallel—they have the same slope of ~3. This is because we changed Max’s income but *not* prices.



|  |  |
| --- | --- |
| **FIGURE 2** | **CHANGES IN THE BUDGET LINE** |

5 10 Number of 5 Number of 5 15 Number of



(a)

(b)

Number of Movies per Month

15

Number of Movies per Month

30

Number of Movies per Month

30

(c)

 Concerts Concerts Concerts

 per Month per Month per Month

In panel (a), an increase in income leads to a rightward, parallel shift of the budget line. In panel (b), a decrease in the price of a movie causes the budget line to rotate upward; the horizontal intercept is unaffected. In panel (c), a de-crease in the price of a concert leads to a rightward rotation of the budget line.

Since the ratio *P*concert/*P*movie has not changed, the spending trade-off between movies and concerts remains the same. Thus,



http://

The Bureau of Labor Statistics’ Consumer Expenditure Survey will give you a snapshot picture of the consumption behavior of typical U.S. households ([http://stats.bls. gov/news.release/cesan](http://stats.bls.gov/news.release/cesan) .toc.htm).

*An increase in income will shift the budget line upward (and rightward). A decrease in income will shift the budget line downward (and leftward). These shifts are parallel—changes in income do not affect the budget line’s slope.*

**Changes in Price.** Now let’s go back to Max’s original budget of $150 and ex­plore what happens to the budget line when a price changes. Suppose the price of a movie falls from $10 to $5. The graph in Figure 2(b) shows Max’s old and new budget lines. When the price of a movie falls, the budget line rotates outward—the vertical intercept moves higher. The reason is this: When a movie costs $10, Max could spend his entire $150 on them and see 15; now that they cost $5, he can see a maximum of 30. The horizontal intercept—representing how many concerts Max could see with his entire income—doesn’t change at all, since there has been no change in the price of a concert. Notice that the new budget line is also *steeper* than the original one, with slope equal to ~*P*concert/*P*movie ~ ~$30/$5 ~ ~6. Now, with movies costing $5, the trade-off between movies and concerts is 6 to 1, in-stead of 3 to 1.

Panel (c) of Figure 2 illustrates another price change. This time, it’s a fall in the price of a *concert* from $30 to $10. Once again, the budget line rotates, but now it is the horizontal (concerts) intercept that changes and the vertical (movies) intercept that remains fixed.

We could draw similar diagrams illustrating a *rise* in the price of a movie or a concert, but you should try to do this on your own. In each case, one of the budget line’s intercepts will change, as well as its slope:

*When the price of a good changes, the budget line rotates: Both its slope and one of its intercepts will change.*

The budget constraint, as illustrated by the budget line, is one side of the story of consumer choice. It indicates the trade-off consumers *are able to* make between one good and another. But just as important is the trade-off that consumers *want to* make between one good and another, and this depends on consumers’ *preferences,* the subject of the next section.

**UTILITY AND MARGINAL UTILITY**

Figure 3 provides a graphical view of utility—in this case, the utility of a consumer named Lisa who likes ice cream cones. Look first at panel (a). On the horizontal axis, we’ll measure the number of ice cream cones Lisa consumes each week. On the vertical axis, we’ll measure the utility she derives from consuming each of them. If Lisa values ice cream cones, her utility will increase as she acquires more of them, as it does in the figure. There we see that when she has 1 cone, she enjoys total utility

|  |  |  |
| --- | --- | --- |
| _Pic1266 | **FIGURE 3** | _Pic1267 |
| **TOTAL AND MARGINAL UTILITY** |

Utils



10

30 20 10

Utils



Marginal Utility



1 2 3

4

70 60 50 40 30 20

Marginal Utility

30 utils

20 utils

10 utils

5 utils

3 utils

0 utils



Total Utility

0 utils

30 utils

50 utils

60 utils

65 utils

68 utils

68 utils

|  |
| --- |
| 1 2 3 4 5 6Ice Cream Conesper WeekPanel (a) shows Lisa’s total utility from her consumption of ice cream cones. As her consumption of ice cream rises, so does her total utility. Panel (b) shows the corresponding marginal utility. **MU** falls as ice cream consumption rises, indicating that each additional ice cream cone per week provides less **additional** utility than the previous one did. |

of 30 “utils,” but when she has 2 cones, her total utility grows to 50 utils, and so on. Throughout the figure, the total utility Lisa derives from consuming ice cream cones keeps rising as she gets to consume more and more of them.

But notice something interesting—and important: Although Lisa’s utility in-creases every time she acquires more ice cream, the *additional* utility she derives from each *successive* cone gets smaller and smaller as she gets more cones. We call the *change in utility* derived from consuming an *additional unit* of a good the *mar­ginal utility* of that additional unit:

***Marginal utility*** *is the change in utility an individual enjoys from consuming an additional unit of a good.*

**Marginal utility** The change in total utility an individual obtains from consuming an additional unit of a good or service.

What we’ve observed about Lisa’s utility can be restated this way: As she eats more and more ice cream cones in a given week, her *marginal utility* from another cone declines. In the nineteenth and early twentieth centuries, economists thought this pattern was typical of virtually *all* consumers consuming virtually any good or service, and they called it the law of diminishing marginal utility. The great econo­mist Alfred Marshall (1842–1924) put it this way:

**Law of diminishing marginal utility** As consumption of a good or service increases, marginal utility decreases.

*The marginal utility of a thing to anyone diminishes with every increase in the amount of it he already has.*1

According to the law of diminishing marginal utility, when you consume your first unit of some good, like an ice cream cone, you derive some amount of utility. When you get your second cone that week, you enjoy greater satisfaction than when you only had one, but the *extra* satisfaction you derive from the second is likely to be smaller than the satisfaction you derived from the first. Adding the third cone to your weekly consumption will no doubt increase your utility further, but again the *marginal utility* you derive from that third cone is likely to be less than the marginal utility you derived from the second. Figure 3 will again help us see what’s going on. The table summarizes the information in the total utility graph. The first two columns show, respectively, the quantity of cones Lisa consumes each week and the

total utility she receives each week from consuming them. The third column is new. It shows the marginal utility she receives from each successive cone she consumes per week. As you can see in the table, Lisa’s total utility keeps increasing (marginal utility is always positive) until she consumes 5 cones per week, but the rate at which total utility increases gets smaller and smaller (her marginal utility diminishes) as her consumption increases.

Marginal utility is shown in panel (b) of Figure 3. Because marginal utility is the change in utility caused by a *change* in consumption from one level to another, we plot each marginal utility entry *between* the old and new consumption levels.

Notice the close relationship between the graph of total utility in panel (a) and the corresponding graph of marginal utility in panel (b). If you look closely at the two graphs, and you will see that for every one-unit increment in Lisa’s ice cream consumption her marginal utility is equal to the *change* in her total utility. The downward-sloping curve in panel (b) gives us a vivid illustration of the law of di­minishing marginal utility.

1 *Principles of Economics,* Book III, Ch. III, Appendix notes 1 & 2. Macmillan & Co., 1930.

Preferences **127**

One last thing about Fig­ure 3: Because marginal util­ity diminishes for Lisa, by the time she has consumed a total of 5 cones per week, the marginal utility she de-rives from an additional cone has fallen all the way to zero. At this point, she is fully *satiated* with ice cream and gets no extra satisfaction or utility from eating any more of it in a typical week.

Once this satiation point is reached, even if ice cream were free, Lisa would turn it down (“Yechhh! Not more ice cream! ! ”).



The word **marginal** is one you will encounter again and again in your study

of economics. Literally, a margin is an “edge,” or something **beyond.** In

economics, marginal means “additional” or “incremental” and is used to

describe what happens when a decision maker considers a small **change** from his current situation.

It is easy to confuse a **total** measure of something with its associated **mar‑**

**ginal** measure because they are both measured in the same units. But they are not the same thing. The marginal always tells us the **change in the total** caused by **one more** of some-thing. For example, both total utility and marginal utility are measured in utils. But marginal utility tells us the **change** in **total utility** when a consumer gets one more unit of a good.

**PREFERENCES**

In the previous section, we explored how a consumer’s well-being, or utility, changes as she consumes more and more of a *single* good. But ultimately, we want to understand how consumers make *choices* among *different combinations* of goods. As you’ll see, the concept of utility can help us here as well. More specifi­cally, it helps us to characterize people’s *preferences.*

How can we possibly speak systematically about people’s preferences? After all, people are different. They like different things. American teens delight in having a Coke with dinner, while the very idea makes a French person shudder. What would satisfy a Buddhist monk would hardly satisfy the typical American.

And even among “typical Americans,” there is little consensus about tastes. Some read Jane Austen, while others pick John Grisham. Some like to spend their vacations traveling to distant lands, whereas others would prefer to stay home and sleep in every day. Even those who like Häagen-Dazs ice cream can’t agree on which is the best flavor—the company notices consistent, regional differences in consumption. In Los Angeles, chocolate chocolate chip is the clear favorite, while on most of the East Coast, it’s butter pecan (except in New York City, where cof­fee wins hands down).

In spite of such wide differences in preferences, we can find some important common denominators—things that seem to be true for a wide variety of people. In our theory of consumer choice, we will focus on these common denominators.

**PREFERENCES AND MARGINAL UTILITY**

Another feature of preferences that virtually all of us share is this: We generally feel that *more is better.* Specifically, if we get more of some good or service, and nothing else is taken away from us, we will generally feel better off. Since marginal utility measures the change in utility from getting one more unit of a good, we can also state the “more is better” assumption this way: *Marginal utility is positive.*

This condition seems to be satisfied for the vast majority of goods we all con­sume. Of course, there are exceptions. If you hate eggplant, then the more of it you have, the worse off you are. In this case, the marginal utility of eggplant would be negative, violating the assumption. Similarly, a dieter who says, “Don’t bring any ice cream into the house. I don’t want to be tempted,” also violates the assumption. The model of consumer choice in this chapter is designed for preferences that sat­isfy the “more is better” condition, and it would have to be modified to take ac-count of exceptions like these.

In addition to presuming that “more is better,” we’ll make one other assump­tion about people’s tastes: The more of a good someone consumes, the less *addi­tional* satisfaction that person will get from consuming still more of it. Here, we are assuming that *marginal utility diminishes as more of a good is consumed.* This is what we assumed for Lisa and her ice cream, and it seems plausible that it would hold for most things that we value. Once again, there may be exceptions. If a fan takes special pride in owning every CD ever recorded by Garth Brooks, then each time she acquires another one, she comes closer to her goal, and her marginal util­ity might *rise* with each additional CD acquired. But—as with “more is better”— such exceptions are rare.

**CONSUMER DECISION MAKING**

In order to understand demand, we need to bring the consumer’s preferences and the consumer’s constraints together. But are we really ready? After all, while you’ve learned quite a bit about the consumer’s budget constraint, our characterization of consumer preferences has been rather minimal. We have made only three assump­tions: (1) Consumers are rational, (2) the marginal utility of a good is positive, and (3) marginal utility declines as more of the good is consumed. With so little to go on, what can we hope to say about the *choices* a consumer will actually make? Sur­prisingly, we can say quite a bit.

Our first conclusion about consumer choice is very basic:

*The consumer will always choose a point on the budget line, rather than a point below it.*



|  |  |
| --- | --- |
| Number of Movies per Month_Pic132315 | _Pic1325 |
| 12963 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | 1 2 3 | 4 5Numberof Concertsper Month |  |
|  |
|  | CONCERTS at $30 each |  |  | MOVIES at $10 each |  |
| (1)Point onBudgetLine | **00049 Hall erman Art**(2) (3)**Fig.5.4 ar1**Number of Marginal**South-West Economics)**Concerts per Utility from**17p7 wide x 6 deep**Month Last Concert | (4)MarginalUtilityper DollarSpent onLast Concert(**MU**concerts /**P**concerts) | (5)Numberof Moviesper Month | (6)MarginalUtility fromLast Movie | (7)MarginalUtilityper DollarSpent onLast Movie(**MU**movies/**P**movies) |
| **A** | 0 —**2/4/00** | **—** | 15 | 50 | 5 |
| **B** | 1 1,500 | 50 | 12 | 100 | 10 |
| **C** | 2 1,200 | 40 | 9 | 150 | 15 |
| *D* | 3 600 | 20 | 6 | 200 | 20 |
| **E** | 4 390 | 13 | 3 | 350 | 35 |
| **F** | 5 300 | 10 | 0 | — |  |

The budget line shows the maximum number of movies Max could attend for each number of concerts he attends. He would never choose an interior point like **G** because there are affordable points—on the line—that make him better off. Max will choose a point **on** the budget line. More specifically, he will choose the point at which the marginal utilities per dollar spent on movies and concerts are equal. From the table, this occurs at point **D.**

To see why this is so, look at Figure 4. There you’ll see Max’s budget line, repro­duced from Figure 1, where the price of concerts is $30, the price of movies is $10, and his monthly budget is $150. Max would never choose point *G,* representing 2 concerts and 6 movies, since there are affordable points—on the budget line—that we know make him better off. For example, point *C* has the same number of con­certs (2), but more movies (9). “More is better” tells us that Max will prefer *C* to

**Marginal decision making** To un­derstand and predict the behavior of individual decision makers, we focus on the incremental or mar­ginal effects of their actions.

*G,* so we know *G* won’t be chosen. For the same reason, Max must prefer point *D,* with 3 concerts and 6 movies, to point *G.* Indeed, if we look at any point below the budget line, we can always find at least one point *on* the budget line that is pre­ferred, as long as more is better.

Knowing what Max will not do—knowing he *will not* choose a point inside his budget line—is helpful. It tells us that we can narrow our search for the point he *will* choose to just the ones along the budget line *AF.* But how can Max find the one point along the budget line that gives him a higher utility than all the others?

To answer this question, we’ll introduce a concept we’ll be coming back to again and again in this text: marginal decision making.

*To understand and predict the behavior of individual decision makers, we fo­cus on the incremental or marginal effects of their actions.*

Marginal decision making can be compared to the children’s game in which one child is blindfolded and must find a hidden object. As he moves around, the others tell him only “warmer” or “colder” to indicate whether he is getting closer or far­ther away from the object. Eventually the child will find the object with only these hints to direct him. In consumer theory, we can think of maximum utility as the hid-den object the consumer is looking for, and we imagine him deciding whether some change in his collection of goods makes him better off or worse off—“warmer” or “colder.” If he continually makes changes that make him better off, until no such changes are left, then he will discover the combination that makes him as well off as possible.

Marginal decision making is a central concept in economics in general and con­sumer theory in particular. Before we put it to use, however, a small warning: Taken literally, consumer theory will seem hopelessly unrealistic. “Surely,” you may think, “people don’t actually *use* concepts like budget lines or marginal utility when they make decisions.” And you would be absolutely correct. After all, you’ve been mak­ing economic decisions all your life without even *knowing* about these concepts.

But keep in mind that consumer theory, like many theories in economics, is an “as-if” theory. Economists do not claim that the model of consumer choice de-scribes the psychological mechanics consumers actually use when they make deci­sions. Rather, they claim that consumers generally choose their goods and services *as if* they follow the model. This is why our highly structured way of looking at de­cision making—while not a realistic description of *how* people make choices—has proven so useful in explaining the nature of those choices.

With this perspective in mind, let’s apply marginal decision making to Max and his choice between movies and concerts. To do this, we need hypothetical informa­tion about Max’s preferences, which is provided in the table in Figure 4.

Each row of the table corresponds to a different point on Max’s budget line. For example, the row labeled *C* corresponds to point *C* on the budget line. The second entry in each row tells us the number of concerts that Max attends each month, and the third entry tells us the marginal utility he gets from consuming *the last* concert. For example, at point *C,* Max attends two concerts, and the second one gives him an additional 1,200 utils beyond the first. Notice that as we move *down* along the budget line, from point *A* to *B* to *C* and so on, the number of concerts increases, and the marginal utility numbers in the table get smaller, consistent with the law of diminishing marginal utility.

The fourth entry in each row shows something new: the *marginal utility per dol­lar* spent on concerts, obtained by dividing the marginal utility of the last concert by the price of a concert (*MU*concerts/*P*concerts). This tells us the gain in utility Max

gets for each dollar he spends on the last concert. For example, at point *C,* Max gains 1,200 utils from his second concert during the month, so his marginal utility per dollar spent on that concert is 1,200 utils/$30 ~ 40 utils per dollar. Marginal utility per dollar, like marginal utility itself, declines as more concerts are consumed.

The last three entries in each row give us similar information for movies: the num­ber of movies attended, the marginal utility derived from the last movie, and the mar­ginal utility per dollar spent on the last movie (*MU*movies/*P*movies). As we travel *up* this column, Max attends more movies, and both marginal utility and marginal utility per dollar decline—once again, consistent with the law of diminishing marginal utility.

To understand how Max can find the best point on his budget line—the one that gives him the highest utility—suppose that he is initially at point *B:* 1 concert and 12 movies. Is he maximizing his utility? Let’s see. Comparing the fourth and seventh entries in row *B* of the table, we see that Max’s marginal utility per dollar spent on concerts is 50 utils, while his marginal utility per dollar spent on movies is only 10 utils. Since he gains more additional utility from each dollar spent on con­certs than from each dollar spent on movies, he will have a net gain in utility if he shifts some of his dollars from movies to concerts. To do this, he must travel farther down his budget line.

Next suppose that, after shifting his spending from movies to concerts, Max ar­rives at point *C* on his budget line. What should he do then? At point *C,* Max’s *MU* per dollar spent on concerts is 40 utils, while his *MU* per dollar spent on movies is 15 utils. Once again, he would gain utility by shifting from movies to concerts, trav­eling down his budget line once again.

Now suppose that Max arrives at point *D.* At this point, the *MU* per dollar spent on both movies and concerts is the same: 20 utils. There is no further gain from shifting spending from movies to concerts. At point *D,* Max has exploited all opportunities to make himself better off by moving down the budget line. He has maximized his utility.

But wait . . . what if Max had started at a point on his budget line *below* point *D,* with too many movies and too few concerts? Would he still end up at the same place? Yes, he would. Suppose Max finds himself at point *E,* with 4 concerts and 3 movies. Here, marginal utilities per dollar are 13 utils for concerts and 35 utils for movies. Now, Max could make himself better off by shifting spending away from

concerts and toward movies. He will travel *up* the budget line, once again arriving at point *D,* where no further move will improve his well-being.

As you can see, whether Max begins at a point on his budget line above point *D* or below it, marginal decision making will always bring him back to point *D.* What is so special about point *D?* It is the only point on the budget line where *marginal utility per dollar* is the same for both goods. When this condition holds, there is nothing to gain by shifting spending in either direction.

What is true for Max and his choice between movies and concerts is true for *any* consumer and *any* two goods. We can generalize our result this way: For any two goods *x* and *y,* with prices *Px* and *Py,* whenever *MUx*/*Px* ~ *MUy*/*Py,* a consumer is made better off shifting spending away from *y* and toward *x.* When *MUy*/*Py* > *MUx*/*Px,* a consumer is made better off by shifting spending away from *x* and to-ward *y.* This leads us to an important conclusion:

*A utility-maximizing consumer will choose the point on the budget line where marginal utility per dollar is the same for both goods* (MUx/Px ~ MUy/Py). *At that point, there is no further gain from reallocating expenditures in either direction.*

In finding the utility-maximizing combination of goods for a consumer, why

We can generalize even fur­ther. Suppose there are more than two goods an individual can buy. For example, we could imagine that Max wants to divide his entertainment budget among movies, con­certs, plays, football games, and what have you. Or we can think of a consumer who must allocate her entire income among thousands of different goods and services each month: different types of food, clothing, entertainment, trans­portation, and so on. Does our description of the optimal choice for the consumer still hold? Indeed, it does. No mat-ter how many goods there are to choose from, when the con‑

sumer is doing as well as possible, it must be true that *MUx*/*Px* ~ *MUy* /*P* *y* for any pair of goods *x* and *y.* If this condition is *not* satisfied, the consumer will be better off consuming more of one and less of the other good in the pair.2

do we use marginal utility **per dollar** instead of just marginal utility?

Shouldn’t the consumer always shift spending wherever **marginal utility**

is greater? The answer is no. The following thought experiment will help you see why. Imagine that you like to ski and you like going out for dinner.

Further, given your current combination of skiing and dining out, your marginal utility for one more skiing trip is 2,000 utils, and your marginal utility for an additional dinner is 1,000 utils. Should you shift your spending from dining out to skiing? It might seem so, since skiing has the higher marginal utility.

But what if skiing costs $200 per trip, while a dinner out costs only $20? Then, while it’s true that another skiing trip will give you twice as much utility as another dinner out, it’s also true that **skiing costs ten times as much.** You would have to sacrifice **ten** restaurant meals for one skiing trip, and that would make you **worse** off. Instead, you should shift your spending in the other direction: from skiing to dining out. Money spent on additional skiing trips will give you 1,000 utils/$200 ~ 5 utils per dollar, while money spent on additional dinners will give you 1,000 utils/$20 ~ 50 utils per dollar. Dining out clearly gives you “more bang for the buck” than skiing. The lesson of this ex-ample: When trying to find the utility-maximizing combination of goods, compare marginal utilities **per dollar,** not marginal utilities alone.

**WHAT HAPPENS WHEN THINGS CHANGE?**

**CHANGES IN INCOME**

Figure 5 illustrates how an increase in income might affect Max’s choice between movies and concerts. As before, we assume that movies cost $10 each, that concerts cost $30 each, and that these prices will remain constant. Initially, Max has $150 in income to spend on the two goods, so his budget line is the line from point *A* to point *F.* As we’ve already seen, under these conditions, Max would choose point *D* (3 concerts and 6 movies) to maximize utility.

If Max’s income increases to $300, his budget line will shift upward and out-ward in the figure. How will he respond? As always, he will search along his budget

2 There is one exception to this statement: Sometimes the optimal choice is to buy *none* of some good. For example, if *MUy* /*Py* ~ *MUx*/*Px,* no matter how small a quantity of good *x* a person consumes, it will always pay to reduce consumption of good *x* further, until its quantity is zero. Economists call this a “corner solution,” because—when there are only two goods being considered—the individual will locate at one of the endpoints of the budget line in a corner of the diagram.



Number of Movies per Month

30

27

15

12

9

6

3



1 2 3 4 5 6 7 8 9 10 Number of Concerts per Month

A doubling of Max’s income causes a parallel, rightward shift of his budget line. More combinations of movies and concerts are now available to him. He will choose the point on the new budget line at which marginal utili­ties per dollar are equal for the two goods.

line until he finds the point where the marginal utility per dollar spent on both goods is the same. Without more information—such as that provided in the table in Figure 4—we can’t be certain which point will satisfy this condition. But we can dis­cuss some of the possibilities.

Figure 5 illustrates three alternative possibilities. If Max’s best combination ends up being point *H,* he would attend 12 movies and 6 concerts. If we compare his ini­tial choice (point *D)* with this new choice (point *H),* we see that the rise in income has caused him to consume more of *both* goods. As you learned in Chapter 3, when an increase in income causes a consumer to buy *more* of something, we call that thing a *normal good.* If, for Max, point *H* happens to be where the marginal utili­ties per dollar for the two goods are equal, then, for him, both movies and concerts are normal goods.

Alternatively, Max’s marginal utilities per dollar might be equal at a point like *H*~*,* with 9 concerts and 3 movies. In this case, the increase in income would cause Max’s consumption of concerts to increase (from 3 to 9), but his consumption of

It’s tempting to think that **inferior** goods are of lower quality than **normal**goods. But economists don’t define normal or inferior based on the in‑
trinsic properties of a good, but rather by the choices people make when
their incomes increase. For example, Max may think that both movies and
concerts are high-quality goods. When his income is low, he may see movies
on most weekends because, being cheaper, they enable him to have some en‑
tertainment every weekend. But if his income increases, he can afford to switch
from movies to concerts on some of his weekends. If Max makes this choice—and attends fewer
movies—then his **behavior** tells us that movies are inferior for him. If instead he chose to see more
movies and fewer concerts when his income increased, then concerts would be the inferior good.

movies to *fall* (from 6 to 3). If so, movies would be an *in­ferior good* for Max—one for which demand decreases when income increases— while concerts would be a *normal* good.

Finally, let’s consider an-other possible outcome for Max: point *H*~*.* At this point, he attends more movies and fewer concerts compared to point *D.* If point *H*~is where

Max’s marginal utilities per dollar are equal after the increase in income, then *con­certs* would be the inferior good, and movies would be normal.

**CHANGES IN PRICE**

In Chapter 3, you were introduced to the *law of demand,* which holds that a rise in the price of a good reduces the quantity demanded, and a fall in price increases quantity demanded. In this section, we use the tools of consumer theory to analyze what is *behind* the law of demand, to see *why* consumers behave as they do when a price changes. In the process, you will learn why exceptions to the law of demand are so rare.

Let’s explore what happens to Max when the price of a concert decreases from $30 to $10, while his income remains at $150 and the price of a movie remains $10. The drop in the price of concerts rotates Max’s budget line rightward, pivot­ing around its vertical intercept, as illustrated in the upper panel of Figure 6. What will Max do after his budget line rotates in this way? Again, he will select the com­bination of movies and concerts on his budget line that makes him as well off as possible. This will be the combination at which the marginal utility per dollar spent on both goods is the same. In the figure, we assume that this occurs at point *J* on the new budget line, where Max consumes 4 concerts and 11 movies.

If the price of a concert drops once again, to $5, the budget line rotates right-ward again. In the figure, Max will now choose point *K,* attending 6 concerts and 12 movies.concerts would have led him to want *fewer* of them, and his demand curve (which you are invited to draw for yourself) would have sloped *upward.* Is that possible?

**Substitution effect** As the price of a good falls, the consumer substitutes that good in place of other goods whose prices have not changed.



Cheaper cell phone calls, and the substitution effect, may soon drive pay phones out of the market.

The answer is yes . . . and no. Yes, it is theoretically possible, but no, it does not seem to happen in practice. To understand why, we must look deeper into the ef­fects of a price change on quantity demanded. In doing so, we’ll gain more insight into the process of consumer decision making.

**The Substitution Effect.** When the price of a good changes, we can identify two separate effects on quantity demanded. As you will see, these two effects sometimes work together and sometimes work in opposite directions.

Suppose the price of a good falls. Then it becomes less expensive *relative to* other goods whose prices have not fallen. Some of these other goods are *substitutes* for the now cheaper good—they are different goods, but they are used to satisfy the same general desire. (For example, Coke and Pepsi are very close substitutes for each other, since they both satisfy the same desire for a carbonated cola drink with a little caffeine.) When *one* of the ways of satisfying a desire becomes relatively cheaper, consumers will purchase more of it, and purchase less of the substitute good.

In Max’s case, concerts and movies, while different, both satisfy his desire to be entertained. When the price of concerts falls, so does its relative price (relative to movies). Max can now get more entertainment from his budget by substituting con­certs in place of movies, so he will demand more concerts.

This impact of a price decrease is called a substitution effect—the consumer sub­stitutes *toward* the good whose price has decreased, and away from other goods whose prices have remained unchanged.

*The* substitution effect *of a price change arises from a change in the relative price of a good, and it always moves quantity demanded in the* opposite direc­tion *to the price change. When price decreases, the substitution effect works to increase quantity demanded; when price increases, the substitution effect works to decrease quantity demanded.*

The substitution effect is a powerful force in the marketplace. For example, while the price of cellular phone calls has fallen in recent years, the price of pay phone calls has remained more or less the same. This fall in the relative price of cell phone calls has caused consumers to substitute toward them and away from using regular pay phones. As a result, many private providers of pay phones are having financial difficulty.

The substitution effect is also important from a theoretical perspective: It is the main factor responsible for the law of demand. Indeed, if the substitution effect were the *only* effect of a price change, the law of demand would be more than a law; it would be a logical necessity. But as we are about to see, a price change has another effect as well.

**The Income Effect.** In Figure 6, when the price of concerts decreases from $30 to $10, Max’s budget line rotates rightward. Max now has a wider range of options than before: He can consume more concerts, more movies, or *more of both.* The price decline of *one* good has increased Max’s total purchasing power over *both* goods.

A price cut gives the consumer a gift, which is rather like an increase in *income.* Indeed, in an important sense, it *is* an increase in *available* income: Point *D* (3 con­certs and 6 movies) originally cost Max $150, but after the decrease in the price of concerts, the same combination would cost him just (6 ~ $10) ~ (3 ~ $10) ~ $90,

leaving him with $60 in *available income* to spend on more movies or concerts or both. This leads to the second effect of a change in price:

*The* ***income effect*** *of a price change is the impact on quantity demanded that arises from a change in purchasing power over both goods. A drop in price in-creases purchasing power, while a rise in price decreases purchasing power.*

**Income effect** As the price of a good decreases, the consumer’s purchasing power increases, caus­ing a change in quantity demanded for the good.

How will a change in purchasing power influence the quantity of a good de­manded? That depends. Recall that an increase in income will increase the demand for normal goods and decrease the demand for inferior goods. The same is true for the *income effect* of a price cut: It can work to either *increase* or *decrease* the quan­tity of a good demanded, depending on whether the good is normal or inferior. For example, if concerts are a normal good for Max, then the income effect of a price cut will lead him to consume more of them; if concerts are inferior, the income ef­fect will lead him to consume fewer.

**Combining Substitution and Income Effects.** Now let’s look again at the impact of a price change, considering the substitution and income effects together. A change in the price of a good changes both the relative price of the good (the substitution ef­fect) and the overall purchasing power of the consumer (the income effect). The ulti­mate impact of the price change on quantity demanded will depend on *both* of these effects. In most cases, these two effects work together to push quantity demanded in the same direction, but they can occasionally oppose each other. To help clarify this, we’ll consider the total impact of a price change on different types of goods.

***Normal Goods.*** Normal goods are the easier category to consider. When the price of a normal good falls, the substitution effect *increases* quantity demanded. The price drop will also increase the consumer’s purchasing power, and—for a normal good—*increase* quantity demanded even further. The opposite occurs when price increases: The substitution effect decreases quantity demanded, and the decline in purchasing power further decreases it. Figure 7 summarizes how the substitution and income effects combine to make the price and quantity of a normal good move in opposite directions:

*For normal goods, the substitution and income effects work together, causing quantity demanded to move in the opposite direction of the price. Normal goods, therefore, must always obey the law of demand.*

***Inferior Goods.*** Now let’s see how a price change affects the demand for *inferior* goods. As an example, consider ground beef. For many people, ground beef is an inferior good: A rise in income would decrease demand for it, since it would make steak—a preferable alternative—more affordable. If the price of ground beef falls, the substitution effect would work, as always, to *increase* quantity demanded. The price cut will also, as always, increase the consumer’s purchasing power. But if ground beef is inferior, the rise in purchasing power will *decrease* quantity de­manded. Thus, we have two opposing effects: the substitution effect, increasing quantity demanded, and the income effect, decreasing quantity demanded. In the­ory, either of these effects could dominate the other, so the quantity demanded could move in either direction. In practice, however, the substitution effect almost always dominates for inferior goods.