

Monday, November 6, 2023

Consumer Choice

ECO 304K: Introduction to Microeconomics

The more money you have, the happier you'll be?... **Not so fast**

Some lottery winners do just fine, of course; but it's common for winners to deal badly with the sudden wealth, and all the attention from "friends" who suddenly emerge from the woodwork, that there's a name for this phenomenon: the lottery curse. The root problem is that winners suddenly face a whole ton of choices they hadn't faced before and aren't well-equipped to make. In this chapter, we use our understanding of income constraints, price, and personal satisfaction to determine which economic choices yield the greatest benefits.

Big Questions

- How do economists model consumer satisfaction?
 - Economists model consumer satisfaction by examining utility, which is a measure of the level of satisfaction that a consumer enjoys from the consumption of goods and services
 - Utility diminishes with additional consumption; this property limits the amount of any particular good or service that a person will consume
- How do consumers optimize their purchasing decisions?
 - Consumers optimize their purchasing decisions by finding the combination of goods and services that maximizes the level of satisfaction from a given income or budget. The consumer optimum occurs when a consumer maximizes the utility from his or her income or budget, so that the marginal utility per dollar spent on every item purchased is equal to that of every other item purchased.
 - Changes in price have two distinct effects on consumer behavior: if the price falls, the marginal utility per dollar spent will be higher, as a result, consumers will substitute the product that has become relatively less expensive. This is the substitution effect, if the lower price also results in substantial savings, it causes an increase in purchasing power, known as the real-income effect.

- What is the diamond-water paradox?
 - The diamond-water paradox explains why water, which is essential to life, is inexpensive, while diamonds, which do not sustain life are expensive; Many people of Adam Smith's era, in the 18th century, found the paradox perplexing. We can save the diamond-water paradox by recognizing that the price of water is low because its supply is abundant, and the price of diamonds, and the price of diamonds is high because their supply is small; if water is rare as diamonds, there is no doubt that the price of water exceed the price of diamonds.

How do economists model consumer satisfaction?

Economists typically feel the ideal solution to this problem achieves the highest **utility** summed across all people—what is often called “the greatest good for the greatest number”. In this chapter, we show how economists put numbers to happiness and calamity; that may seem coldhearted, but the goal is to benefit society by using scarce resources to do the most good. In doing so, economists are often forced to consider the opportunity costs of taking one path and forgoing another; when economists make these choices, they use particular economic tools.

To better understand the decisions that consumers make, economists attempt to measure the satisfaction that consumers get when they make purchases. **Utility** is defined as a measure of satisfaction that a consumer enjoys from the consumption of goods and services. Utility theory seeks to measure contentment, or satisfaction; to understand why people buy the goods and services they do, we need to recognize that some products produce more utility than others and that everyone receives the different levels of satisfaction from the same good or service. In other words, utility varies from individual to individual; to quantify this idea of relative satisfaction, economists measure utility with a unit they refer to as a **util**.

There is tremendous value in modeling decisions this way; when we understand utility, we can predict what people are likely to purchase. We model consumer behavior in a manner similar to the way we model how a firm makes decisions or how the labor market works. We expect the firm to maximize profits, the laborer to accept the best offer, and the consumer to find the combination of goods that gives the most utility.

Utility, or what most of us think of as satisfaction, is a balance between economic and personal factors. Even though there is an inherent problem with equating money and satisfaction, this has not stopped researchers from exploring the connection.

In the next section, we explore the connection between total utility and marginal utility; this connection will help us understand why more money does not necessarily bring more satisfaction.

Total Utility and Marginal Utility

Thinking about the choices that consumers make can help us understand how to increase total utility. **Marginal utility** is the additional satisfaction derived from consuming one more unit of a good or service.

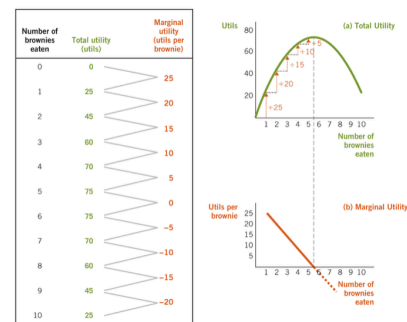
The graph in panel (a) of Figure 16.1 reveals that while the total utility (*the green curve*) rises until it reaches 75, the rate of increase (that is, the increase in marginal utility) falls from 25 utils for the first brownie down to 5 additional utils for the fifth. The marginal utility values from the table are plotted in panel (b), which shows that marginal utility declines steadily as consumption rises.

The relationship between total utility and marginal utility is evident when we observe the dashed line that connects panel (a) and (b); because the marginal utility becomes negative after five brownies are consumed, the total utility eventually falls. To the left of the dashed line, the marginal utility is positive in panel (b) and the total utility is rising in panel (a). Conversely, to the right of the dashed line, the marginal utility is negative, and the total utility is falling.

FIGURE 16.1

Total Utility and Marginal Utility

The relationship between total utility and marginal utility can be seen by observing the dashed line that connects panels (a) and (b). Because the marginal utility becomes negative after five brownies are consumed, the total utility eventually falls after a certain number of brownies are eaten. To the left of the dashed line, the marginal utility is positive in panel (b) and the total utility is rising in panel (a). Conversely, to the right of the dashed line, the marginal utility is negative and the total utility is falling.



Diminishing Marginal Utility

As you can see in panel (b) of Figure 16.1, the satisfaction that a consumer derives from consuming a good or service declines with each additional unit is consumed. Consider what happens when you participate in a favorite activity for an hour and then decide to do something else. **Diminishing marginal utility** occurs when marginal utility declines as consumption increases; the concept of diminishing marginal utility is so universal that it is one of the most widely held ideas in all of economics.

Your own intuition should confirm this theory; if increasing marginal utility were possible, you would find that with every passing second you would enjoy what

you were doing more and never want to stop, because economists do not observe this behavior among rational consumers, we can be highly confident that diminishing marginal utility has tremendous explanatory power.

How do consumers optimize their purchasing decisions?

Maximizing utility requires that consumers get the most satisfaction out of every dollar they spend, or what is commonly called “getting the biggest bang for the buck.” When a consumer gets the most bang for the buck, we say the consumer has optimized his or her purchasing decisions; however, optimization is easier said than done. Over the course of the year, each of us will make thousand of purchases of different amounts; our budgets are generally not unlimited, and we try to spend in a way that enables us to meet both short-run and our long-run needs. The combination of goods and services that maximizes the satisfaction, or utility, we get from income or budget is the **consumer optimum**.

In this section, we examine the decision process that leads to the consumer optimum. We start with two goods and then generalize those findings across a consumer’s entire income or budget.

Consumer Purchasing Decisions

To reach your consumer optimum, you must allocate your available money by choosing goods that give you the most utility per dollar spent; by getting the biggest bang for your buck, you will end up optimizing your choices. This relationship, shown below in terms of marginal utility (MU), helps quantify the decision. If we divide the marginal utility of a good by its price, we get the utility per dollar spent.

By thinking at the margin about which good provides the highest marginal utility, you also maximize your total utility; of course, most people rarely think this way, but as consumers we make marginal choices all the time. Instead of adding up utils, we think “that isn’t worth it” or “that’s a steal”. Consumer choice is not such a conscious calculation as an instinct to seek the most satisfaction; next we extend our analysis by generalizing two-good example.

Marginal Thinking with more than two goods

The idea of measuring utility makes our instinctive sense more explicit and enables us to solve simple optimization problems. Consumers optimum captures this idea by comparing the utility gained with the price paid for every

item a consumer buys. In other words, a consumer's income or budget is balanced so that the ratio of the marginal utility (MU) per dollar spent on every item, from good A to good Z, is equal. In mathematical terms:

$$\frac{MU_A}{Price_A} = \frac{MU_B}{Price_B} = \dots = \frac{MU_Z}{Price_Z}$$

It should be noted that, because goods aren't infinitely divisible (we can't buy a fraction of a soda can), we can't always make the fraction come out exactly equal. Still, we maximize utility by buying the goods with the higher fractions, and in the end the marginal utilities per dollar spent for each good end up approximately equal.

In the next section, we explore the relationship between changes in price and changes in the consumer optimum.

Price Changes and the Consumer Optimum

We can say lower prices increase the marginal utility per dollar spent and cause consumers to buy more of a good. Higher prices have the opposite effect by lowering the marginal utility per dollar spent; if that conclusion sounds an awful lot like the law of demand, it is! We have just restated the law of demand in terms of marginal utility.

We know that according to the law of demand (see Chapter 3), the quantity demanded falls when the price rises, and the quantity demanded rises when price falls—all other things being equal. If we think of consumer desire for a particular product as demand, it makes sense to find a connection between the prices consumers pay, the quantity they buy, and the marginal utility they receive.

A lower price has two effects, **first**, because the marginal utility per dollar spent is now higher, consumers substitute the product that has become relatively less expensive—that is the **substitution effect**. Second, at the same time, a lower price can also change the purchasing power of income—this is the **real-income effect**.

The real-income effect matters only when prices change enough to cause a measurable effect on the purchasing power of the consumer's income or budget; however, the real-income effect is negligible.

What is the Diamond-Water Paradox?

Now that you understand the connection between prices and utility we can tackle one of the most interesting puzzles in economics—the **diamond-water paradox**. First described by Adam Smith in 1776, the diamond-water paradox explains why water, which is essential to life, is inexpensive, while diamonds, which do not sustain life, are expensive. Many people of Smith's era found that the paradox perplexing; today, we can use consumer choice theory to answer the question.

Essentially, the diamond-water paradox unfairly compares the amount of marginal utility a person receives from a small quantity of something rare (the diamond) with the marginal utility received from consuming a small amount of additional water after already consuming a large amount.

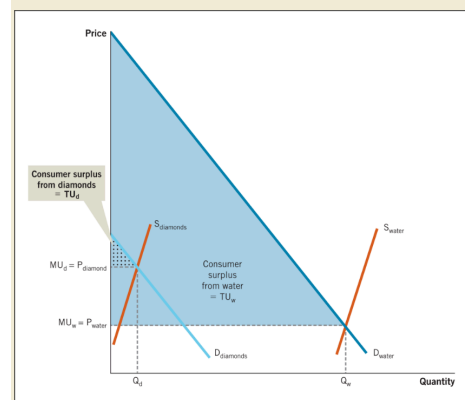
We know that marginal utility is captured in the law of demand and therefore by the price of a good. For example, when the price of diamonds increases, the quantity demanded declines; we learned in Chapter 5 that in graphical terms, the consumer surplus is the area under the demand curve and above the price, or the gains from trade that a consumer enjoys. Therefore, if the price of diamonds rises, consumers will enjoy less surplus when buying them.

Figure 16.2 contrasts the demand supply equilibrium in both the market for water and the market for diamonds. Notice that the consumer surplus is the area highlighted in blue for water and the triangular area highlighted with dots for diamonds; the blue area of total utility for water (TU_W) is much larger than the dotted area of total utility for diamonds (TU_D) because water is essential for life. Therefore, water creates significantly more total utility than diamonds do; however, in most places in the United States, water is very plentiful, so people take additional units of it for granted. In fact, it is so plentiful that if someone were to offer you a gallon of water, you would probably hesitate to take it; but what if someone offered a gallon-size bucket of diamonds? You bet you would take that, therefore, it should not surprise you that something quite as plentiful, water, would yield less marginal utility than

FIGURE 16.2

The Diamond-Water Paradox

The diamond-water paradox exists because people fail to recognize that demand and supply are equally important in determining the total utility created in society. The demand for water is large, while the demand for diamonds is small. If we look at the amount of consumer surplus, we observe that the blue area (TU_W , which represents the consumer surplus for water) is much larger than the dotted area (TU_D , which represents the consumer surplus for diamonds) because water is essential for life. As a result, water creates significantly more total utility (TU) than diamonds. However, because water is abundant in most places, the price, P_{water} , is low. In contrast, diamonds are rare and the price, P_{diamond} , is high.



something rare, diamonds ($MU_W < MU_D$). However, if water were as rare as diamonds, there is no doubt that the price of water would exceed the price of diamonds.

Let's consider how we use water; we can bathe in it, cook with it, and drink it. Each of these uses has high value, so the marginal utility of water is high; but we also use it to water our lawns and fill our fish tanks, those uses are not nearly as essential, so the marginal utility of water for those uses is much lower. The reason we use water in both essential and nonessential ways is that its price is relatively low, so low-value uses, like filling fish tanks, yield enough utility to justify the cost; because water is abundant in most places, the price P_{water} is low, in contrast, diamonds are rare and their price P_{Diamond} is high. The cost of obtaining a diamond means that a consumer must get a great deal of marginal utility from the purchase of a diamond to justify the expense, which explains why diamonds are given as gifts for extremely special occasions.

Conclusion

Does having more money make people more satisfied? The answer is no. More money enables people to buy more goods, but because of diminishing marginal utility, the increase in satisfaction from being able to buy more goods or higher-quality goods become progressively smaller with rising income, so we could say that having more money makes people somewhat satisfied; but it seems appropriate to add that the relationship between quality of life and money is not direct. More money sometimes lead to more utility, and at other times more money means more problems.

As we have seen in this chapter, price plays a key role in determining utility because consumers face a budget and wish to maximize their utility, the prices they pay determine their marginal utility per dollar spent. Comparing the marginal utility per dollar spent across many goods helps us understand individuals' consumption patterns; diminishing marginal utility also helps to describe consumer choice because marginal utility declines with additional consumption, consumer do not exclusively purchase their favorite products. Instead, they diversify their choices in order to gain more utility; in addition, changes in prices have two different effects: one on real income and a separate substitution effect that together determine the composition of the bundle of goods purchased.

In the next chapter, we question how much individuals use consumer choice theory to make their decisions. The approach known as behavioral economics argue that decision-makers are not entirely rational about the choices they make.

Finally, in the appendix that follows, we refine consumer theory by discussing indifference curves; please read the appendix to get a glimpse into how economists model consumer choice in great detail.