

6

CHAPTER 6

Consumer Choice, Demand, and Welfare

What consumers want meets what they can afford, and out of it comes the demand curve and a measure of the gains from buying.

What this chapter covers



6.2–6.3 The choice

- The budget constraint
- The best affordable bundle
- The equimarginal rule



6.4–6.5 The payoff

- Income & price changes
- From choices to demand
- Consumer surplus & welfare



6.6–6.8 Evidence

- Case: Giffen goods
- Empirical: free digital goods
- Experimental tests of choice

THE MOTIVATING QUESTION

\$40 to spend, coffee at \$4 a cup and donuts at \$2 each: what is the best a consumer can do? The model in this chapter answers that, and explains where the demand curve comes from.

6.1



Introduction

- Three questions about choice
- Combining wants with means
- The road through the chapter

Three questions this chapter answers



Best affordable

With \$40, coffee at \$4 and donuts at \$2, what is the best a consumer can do?



A price falls

Why does she usually buy more of a good, and could she ever buy less?



A free service

How much is a service worth when its price is zero, like a search engine?

THE PLAN

We combine what consumers want, from Chapter 5, with what they can afford. Budget line (6.2), best bundle (6.3), responses to income and prices (6.4), and consumer surplus (6.5).

6.2

The Budget Constraint

- What income and prices allow
- Intercepts and slope
- Shifts vs. pivots

6.2 THE BUDGET CONSTRAINT

What a consumer can afford

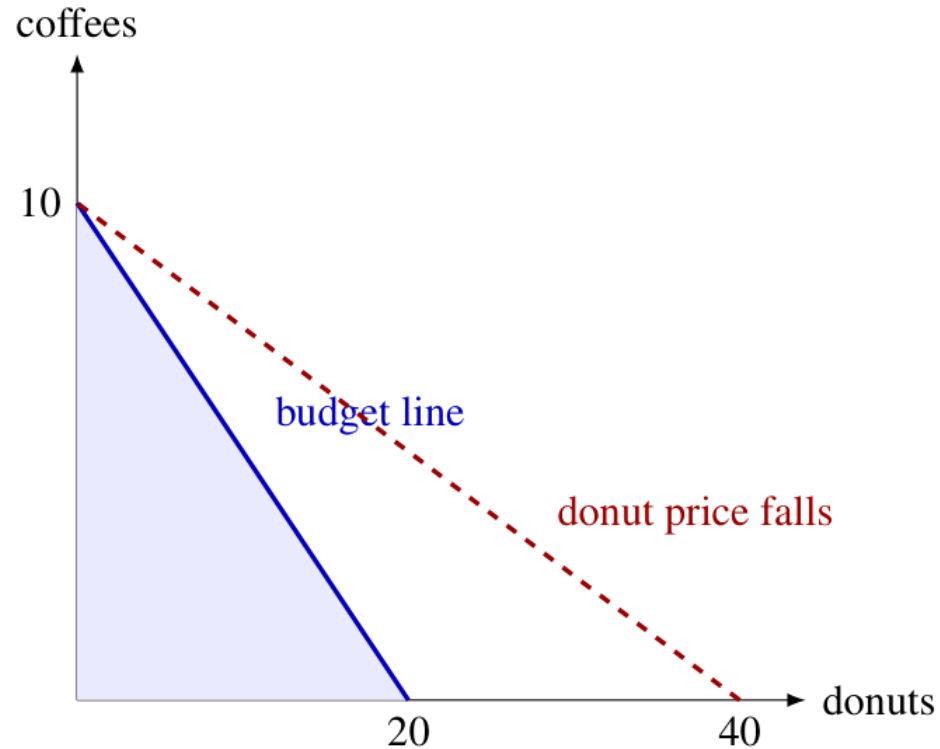
■ Budget line

With \$40 to spend, coffee at \$4 a cup and donuts at \$2 each: spend it all on coffee and buy 10 cups; spend it all on donuts and buy 20. Every combination that exactly uses the \$40 lies on the straight line between these two points.

- Bundles below the line are affordable but leave money unspent.
- Bundles above the line are out of reach.

6.2 THE BUDGET CONSTRAINT

The budget line for \$40 of income



- Coffee intercept: 10 cups. Donut intercept: 20 donuts.
- A lower donut price swings the line out along the donut axis.

Figure 6.1 The budget line for \$40 of income; a fall in the donut price pivots it outward.

6.2 THE BUDGET CONSTRAINT

The slope is the price ratio

SLOPE = PRICE RATIO

The slope of the budget line is the ratio of the prices. Since a donut costs \$2 and a coffee \$4, buying one more donut means giving up half a cup of coffee.

- The slope is the opportunity cost, in coffee, of one more donut.
- It is set entirely by relative prices, not by income.

Two kinds of change: shift vs. pivot



Income change → shift

With \$60 instead of \$40, she could buy 15 coffees or 30 donuts: a parallel outward shift. The slope does not change.



Price change → pivot

If the donut price falls to \$1, she can now buy 40 donuts rather than 20. The line swings out along the donut axis; the coffee intercept stays at 10.

THE DISTINCTION

A change in income moves the line in or out without changing its slope; a change in a price pivots it.

6.3

The Best Affordable Bundle

- The highest reachable indifference curve
- MRS equals the price ratio
- The equimarginal rule

6.3 THE BEST AFFORDABLE BUNDLE

Reaching the highest curve she can afford

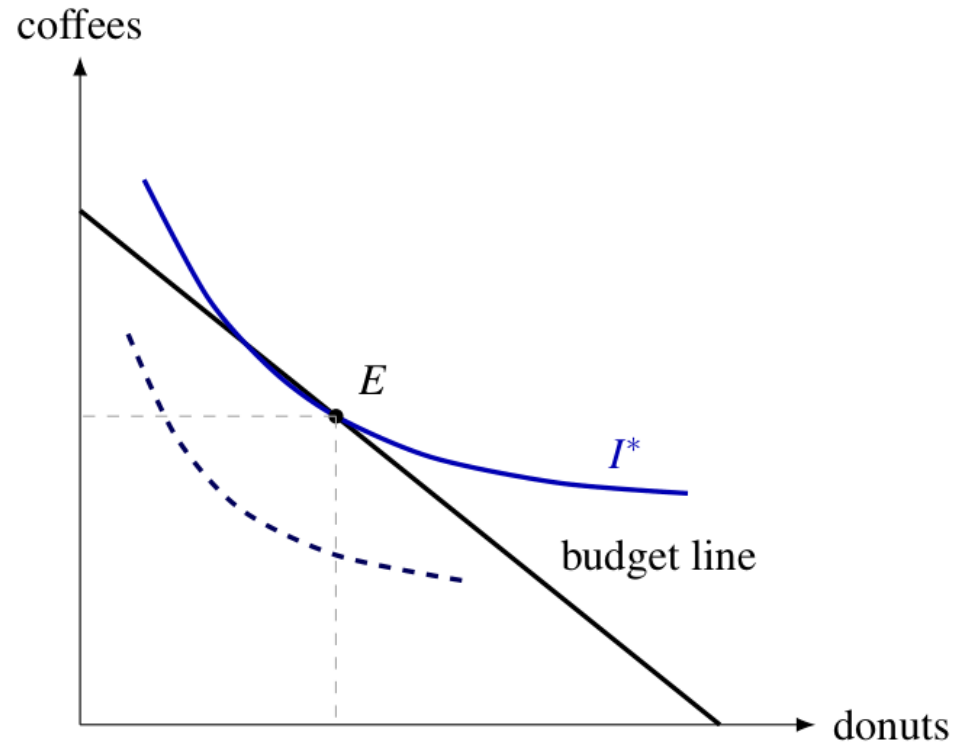
■ The best affordable bundle (point E)

Combining the budget line with the preferences of Chapter 5, the consumer wants the highest indifference curve she can afford. That is the bundle where her budget line just touches a single indifference curve, bundle E.

- Any bundle on a higher curve is unaffordable.
- Any affordable bundle on a lower curve leaves her less satisfied than she could be.

6.3 THE BEST AFFORDABLE BUNDLE

Where the budget line just touches the curve



- At E the budget line is tangent to the indifference curve.
- No affordable bundle she prefers exists, this is the optimum.

Figure 6.2 The best affordable bundle E , touching the highest reachable indifference curve.

6.3 THE BEST AFFORDABLE BUNDLE

At the optimum, MRS equals the price ratio

THE CONDITION

At the best bundle, the consumer's willingness to trade equals the market's: her marginal rate of substitution equals the price ratio.

INTUITIVELY

It is a simple arbitrage. If she would give up a whole cup of coffee for one more donut (her MRS), but the market only asks half a cup (the price ratio), donuts are a bargain and she buys more. She keeps adjusting until her personal valuation and the market price line up, only then is no improvement possible.

The equimarginal rule

■ Equimarginal rule

A rational consumer should get the same satisfaction from the last dollar she spends on each good. If a dollar on coffee brought more extra utility than a dollar on donuts, she could do better by moving a dollar to coffee, she shifts until marginal utility per dollar is equal across all goods.

SAME POINT, TWO WAYS

Equal marginal utility per dollar is just the equimarginal-rule version of “MRS equals the price ratio.” The two conditions are identical.

6.3.1 SPENDING THE LAST DOLLAR

Bang for the buck guides spending

Coffee: cup	MU	MU per \$	Donut	MU	MU per \$
1	40	10	1	20	10
2	32	8	2	16	8
3	24	6	3	12	6

Table 6.1 Marginal utility per dollar guides the consumer's spending.

HOW SHE SPENDS

She spends in order of bang for the buck: the first cup and first donut each give 10 units per dollar, then 8, and so on.

Where MU per dollar is equal across goods, no reallocation can help, the same point as Figure 6.2.

6.4

How the Best Bundle Responds to Income and Prices

- Income changes: normal vs. inferior
- A price fall: two effects
- Giffen goods previewed
- From choices to the demand curve

When income rises



Normal goods

Higher income lets her reach a higher budget line, and she buys more, most goods are like this.



Inferior goods

She buys less and switches to preferred alternatives, instant noodles, bus rides.

WHY THIS MATTERS

The real payoff of the model is that it predicts how purchases change when circumstances do, the comparative statics of Chapter 1.

A price fall splits into two effects

■ 1. Substitution effect

The good is now cheaper relative to others, so the consumer substitutes toward it. This effect always raises the quantity bought of the cheaper good.

■ 2. Income effect

A lower price stretches income, she can now afford more overall. For a normal good this reinforces the substitution effect; for an inferior good it works against it.

Why demand slopes down, and the one exception

THE USUAL CASE

For most goods both effects push the same way, which is why demand curves slope downward.

THE GIFFEN EXCEPTION

Only for a strongly inferior good, where a large income effect overwhelms the substitution effect, could a lower price lead to less being bought: an upward-sloping demand curve, called a Giffen good. Whether such goods exist was open for over a century (Section 6.6).

6.4.1 FROM CHOICES TO THE DEMAND CURVE

Optimal choice builds the demand curve

- Lower the price of coffee step by step, holding income and the donut price fixed.
- At each price the consumer finds her best affordable bundle; as coffee gets cheaper she chooses more of it.
- Plotting price against the quantity chosen builds up her individual demand curve, sloping downward, as the law of demand requires.

WHERE DEMAND COMES FROM

Adding up every consumer's demand gives the market demand curve of Chapter 2. Preferences, budgets, and optimal choice are the machinery behind that curve.

6.5

Consumer Surplus: Measuring the Gains from Buying

- What consumer surplus is
- A worked concert-ticket example
- The area below demand
- Why surplus matters

6.5 CONSUMER SURPLUS

Measuring how much better off a buyer is

■ Consumer surplus

Buying is voluntary, so a buyer who makes a purchase must be at least as well off as before. Consumer surplus measures how much better off: the difference between the most a buyer would have been willing to pay and the price she actually pays.

It turns “the buyer gained” into a number we can add up and compare.

A worked example: five concert fans

THE SETUP

Five fans value a ticket at \$50, \$40, \$30, \$20, and \$10. The price is \$25.

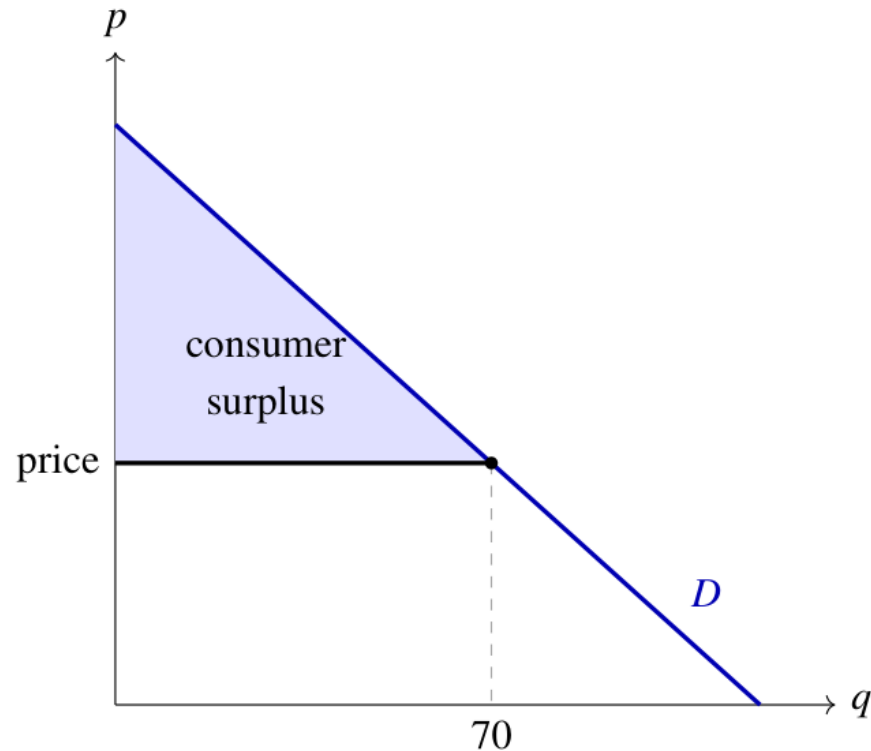
The first three buy (each values it at \$25 or more); the last two do not.

Fan value	Buys?	Surplus
\$50	yes	\$25
\$40	yes	\$15
\$30	yes	\$5
\$20	no	
\$10	no	

Total consumer surplus = \$25 + \$15 + \$5 = \$45.

6.5 CONSUMER SURPLUS

Surplus is the area below demand, above price



- Each buyer's surplus is value minus price; summed, it is the shaded area.
- When the price falls, this area grows, the benefit of a price cut.
- It is also the welfare loss from the taxes and price floors of Chapter 4.

Figure 6.3 Consumer surplus is the area below the demand curve and above the price.

6.5.1 WHY CONSUMER SURPLUS MATTERS

A yardstick for judging policies

- When a tax raises a price, the loss of consumer surplus measures the harm to buyers.
- When competition or new technology lowers a price, the gain in surplus measures the benefit.
- Deadweight losses (Chapter 4) and the harm from monopoly (Chapter 11) are all measured as lost surplus.

TOTAL SURPLUS

Combined with producer surplus (Chapter 10), consumer surplus gives a single yardstick, total surplus, for judging whether a market makes the pie larger or smaller.

6.5.1 WHY CONSUMER SURPLUS MATTERS

Self-check: a used textbook

SELF-CHECK

Four buyers value a used textbook at \$80, \$60, \$40, and \$20. The price is \$45. Which buyers purchase, and what is the total consumer surplus?

The \$80 and \$60 buyers purchase (each value is at or above \$45); the \$40 and \$20 buyers do not. Consumer surplus is $(\$80 - \$45) + (\$60 - \$45) = \$35 + \$15 = \$50$.

6.6

Case Study: The Search for Giffen Goods

A century-old curiosity, finally found in real data.

6.6 CASE STUDY

A century-old puzzle

■ Giffen good

A good people buy more of when its price rises. For more than a century it was a textbook curiosity no one had convincingly found in real data.

WHAT THE THEORY REQUIRED

The theory said it required a staple that takes up a large share of a poor household's budget and has few substitutes, so that the income effect is both large and adverse.

6.6 CASE STUDY

Jensen and Miller (2008) finally found it

- A field experiment in two Chinese provinces randomly gave poor households vouchers subsidizing their main staple, rice in Hunan, wheat flour in Gansu.
- For poor households in Hunan (though not the very poorest, who had no substitution margin), lowering the price of rice led them to consume less; raising it led them to consume more, clear Giffen behavior.

WHY IT HAPPENED

The mechanism is exactly the model's. Rice was such a large part of these families' budgets that the subsidy made them effectively richer; feeling richer, they spent some of the gain on meat and vegetables, reducing rice consumption even though rice had become cheaper.

6.6 CASE STUDY

Real, but only under precise conditions

THE VERDICT

The evidence was strong for rice in Hunan and weaker for wheat in Gansu, where staples played a smaller dietary role. After a century of doubt, the Giffen good turned out to be real, but only under the precise conditions the theory specified.

6.7

Empirical Evidence: The Value of “Free” Digital Goods

Surplus that is enormous, and invisible in GDP.

How do you price something that's free?

THE PROBLEM

Consumer surplus is usually hidden, but it is especially large, and especially invisible, for digital goods priced at zero. How can we measure the benefit of a search engine or a social network that costs nothing?

- Brynjolfsson, Collis, and Eggers (2019) ran large online experiments.
- They asked the smallest payment people would accept to give up a service for a period of time, a direct measure of the surplus it provides.

6.7 EMPIRICAL EVIDENCE

The numbers are striking in scale

\$48

to give up Facebook for one month
(median)

~\$17,500/yr

needed to do without search engines

~\$8,400/yr

needed to do without email

WHY IT'S INVISIBLE

Because these services are free, none of this surplus shows up in the prices people pay, and so almost none appears in GDP. The chapter's two ideas at once: the gain from a good is its value minus its price, and when the price is zero that gain can be enormous.

6.8

A Look at the Experimental Evidence

Testing the theory of choice in the laboratory.

Does the theory of choice hold up?

THE ASSUMPTION

Consumer theory relies on a strong assumption: that people have stable, consistent preferences and choose the bundle they most prefer. Economists have tested it in the lab, with real money on the line.

THE VERDICT

The verdict is mixed in an interesting way: the theory describes most choices well, but it fails in systematic, repeatable ways that have reshaped the field.

Three experimental tests of standard choice

Study	What it tested	Method	Key result
Grether & Plott (1979)	Preferences are stable and consistent	Chose between two bets, then separately priced them, for real money	Preference reversals: a chosen bet was often priced below a rejected one
Kahneman, Knetsch & Thaler (1990)	Value is independent of ownership	Half a group was given a mug, then a market was opened	Owners demanded about twice what buyers would pay (endowment effect)
Iyengar & Lepper (2000)	More options make choosers better off	A store displayed 6 or 24 jams to shoppers	The larger display drew more interest but one-tenth the purchases

Table 6.2 Three experimental tests of the standard theory of consumer choice.

Boundaries, not a refutation

THE MODEL STILL WORKS

None of these results overturns the theory; most everyday purchases are well described by stable preferences and the best-affordable-bundle rule of Section 6.3.

- But each marks a boundary: preferences can depend on how a choice is framed, on what one already owns, and on how many options are presented.
- Together they gave rise to the behavioral economics that complements the standard model throughout this book.

Key takeaways

1

Budget constraint

Income sets the line's position; relative prices set its slope. Income shifts it, a price pivots it.

2

Best bundle

Where the budget line touches the highest indifference curve, MRS equals the price ratio.

3

Equimarginal rule

Equalize marginal utility per dollar across goods; the same point, stated with marginal utility.

4

Income & substitution

A price fall splits into both effects; together they make demand slope down (Giffen is the exception).

5

From choice to demand

Tracing the best bundle as price falls builds the demand curve of Chapter 2.

6

Consumer surplus

Value minus price, the area below demand and above price, a yardstick for welfare; Giffen, free goods, and lab tests.