In this chapter, look for the answers to these questions

- How does the budget constraint represent the choices a consumer can afford?
- How do indifference curves represent the consumer’s preferences?
- What determines how a consumer divides her resources between two goods?
- How does the theory of consumer choice explain decisions such as how much a consumer saves, or how much labor she supplies?

Introduction

- Recall one of the Ten Principles from Chapter 1: 
  *People face tradeoffs.*
  - Buying more of one good leaves less income to buy other goods.
  - Working more hours means more income and more consumption, but less leisure time.
  - Reducing saving allows more consumption today but reduces future consumption.
- This chapter explores how consumers make choices like these.
The Budget Constraint: What the Consumer Can Afford

- Example:
  Hurley divides his income between two goods: fish and mangos.
- A “consumption bundle”

- Budget constraint:

**ACTIVE LEARNING 1**

The budget constraint

Hurley’s income: $1200

Prices: \( P_F = $4 \) per fish, \( P_M = $1 \) per mango

A. If Hurley spends all his income on fish, how many fish does he buy?
B. If Hurley spends all his income on mangos, how many mangos does he buy?
C. If Hurley buys 100 fish, how many mangos can he buy?
D. Plot each of the bundles from parts A – C on a graph that measures fish on the horizontal axis and mangos on the vertical, connect the dots.

**ACTIVE LEARNING 1**

Answers

<table>
<thead>
<tr>
<th>Quantity of Fish</th>
<th>Quantity of Mangos</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>
The Slope of the Budget Constraint

From C to D,
"rise" =
"run" =
Slope =
Hurley must

ACTIVE LEARNING 2
Budget constraint, continued
Show what happens to Hurley's budget constraint if:
A. His income falls to $800.
B. The price of mangos rises to $P_m = $2 per mango

ACTIVE LEARNING 2
Answers, part A
Preferences: What the Consumer Wants

Indifference curve:

A, B, and all other bundles on $I_1$

Four Properties of Indifference Curves

If the quantity of fish is reduced, the quantity of mangos must be increased to keep Hurley equally happy.
Four Properties of Indifference Curves

Hurley prefers every bundle on $I_2$ (like C) to every bundle on $I_1$ (like A). He prefers every bundle on $I_1$ (like A) to every bundle on $I_0$ (like D).

Four Properties of Indifference Curves

3. Indifference curves cannot cross.

Suppose they did.

Four Properties of Indifference Curves

4. Indifference curves are bowed inward.

Hurley is willing to give up more mangos for a fish if
The Marginal Rate of Substitution

Marginal rate of substitution (MRS):

Hurley's MRS is

MRS falls as you move down along an indifference curve.

One Extreme Case: Perfect Substitutes

Perfect substitutes:

Example: nickels and dimes
Consumer is always willing to trade two nickels for one dime.

Another Extreme Case: Perfect Complements

Perfect complements:

Example: Left shoes, right shoes
{7 left shoes, 5 right shoes}
is just as good as
{5 left shoes, 5 right shoes}
Less Extreme Cases:
Close Substitutes and Close Complements

Indifference curves for close substitutes

Indifference curves for close complements

Optimization: What the Consumer Chooses

A is the optimum:

Hurley prefers B to A, but he cannot afford B.
Hurley can afford C and D, but A is on a higher indifference curve.

At the optimum,

Consumer optimization is another example of "thinking at the margin."
The Effects of an Increase in Income

An increase in income

If both goods are "normal,"

ACTIVE LEARNING

Inferior vs. normal goods

- An increase in income increases the quantity demanded of normal goods and reduces the quantity demanded of inferior goods.
- Suppose fish is a normal good but mangos are an inferior good.
- Use a diagram to show the effects of an increase in income on Hurley's optimal bundle of fish and mangos.

ACTIVE LEARNING

Answers
The Effects of a Price Change

Initially,
\[ P_F = \$4 \]
\[ P_M = \$1 \]

\[ P_F \] falls to $2

The Income and Substitution Effects

A fall in the price of fish has two effects on Hurley’s optimal consumption of both goods.

- **Income effect**

- **Substitution effect**

Notice:

The Income and Substitution Effects

Initial optimum at A.

\[ P_F \] falls.

*Substitution effect:* from A to B, buy more fish and fewer mangos.

*Income effect:* from B to C, buy more of both goods.
The substitution effect in two cases

Do you think the substitution effect would be bigger for substitutes or complements?

- Draw an indifference curve for Coke and Pepsi, and, on a separate graph, one for hot dogs and hot dog buns.
- On each graph, show the effects of a relative price change (keeping the consumer on the initial indifference curve).

Answers

Active Learning 4

Deriving Hurley's Demand Curve for Fish
Application 1: Giffen Goods

- Do all goods obey the Law of Demand?
- Suppose the goods are potatoes and meat, and potatoes are an inferior good.
- If price of potatoes rises,
  - substitution effect:
  - income effect:
- If then potatoes are a Giffen good,

Application 2: Wages and Labor Supply

**Budget constraint**

- The relative price of an hour of leisure is the amount of consumption she could buy with an hour’s wages.
  
  **Indifference curve**
Application 2: Wages and Labor Supply

An increase in the wage has two effects on the optimal quantity of labor supplied.

- **Substitution effect (SE):**

- **Income effect (IE):**

For this person, 

\[ SE > IE \]

So her labor supply increases with the wage.
Application 2: Wages and Labor Supply

For this person, $SE < IE$

So his labor supply falls when the wage rises.

Could This Happen in the Real World???

Cases where the income effect on labor supply is very strong:

- Over last 100 years, technological progress has increased labor demand and real wages. The average workweek fell from 6 to 5 days.
- When a person wins the lottery or receives an inheritance, his wage is unchanged—hence no substitution effect. But such persons are more likely to work fewer hours, indicating a strong income effect.

Application 3: Interest Rates and Saving

A person lives for two periods.

- Period 1:
- Period 2:

The interest rate determines
A change in the interest rate

- Suppose the interest rate rises.
- Describe the income and substitution effects on current and future consumption, and on saving.
CONCLUSION:  
Do People Really Think This Way?  
- People do not make spending decisions by writing down their budget constraints and indifference curves.  
- Yet, they try to make the choices that maximize their satisfaction given their limited resources.  
- The theory in this chapter is only intended as a metaphor for how consumers make decisions.  
- It explains consumer behavior fairly well in many situations and provides the basis for more advanced economic analysis.