2 The Economic Problem
Production Possibilities and Opportunity Cost

The *production possibilities frontier* (PPF) is the boundary between those combinations of goods and services that can be produced and those that cannot.

To illustrate the PPF, we focus on two goods at a time and hold the quantities of all other goods and services constant.

That is, we look at a model economy in which everything remains the same (*ceteris paribus*) except the two goods we’re considering.
Any point *on* the frontier such as $E$ and any point *inside* the *PPF* such as $Z$ are attainable.

Points outside the *PPF* are unattainable.
Production Efficiency

We achieve production efficiency if we cannot produce more of one good without producing less of some other good.

=> tradeoff

Points on the frontier are efficient.
Any point inside the frontier, such as $Z$, is \textit{inefficient}.

At such a point, it is possible \textbf{to produce more of one good without producing less of the other good}.

At $Z$, resources are either \textbf{unemployed} or \textbf{misallocated}.
Tradeoff Along the PPF

Every choice along the PPF involves a tradeoff.

On this PPF, we must

- give up some cola to get more pizzas or
- give up some pizzas to get more cola.
Opportunity Cost

As we move down along the PPF, we produce more pizzas, but the quantity of cola we can produce decreases.

The opportunity cost of a pizza is the cola forgone.
In moving from \( E \) to \( F \):

The quantity of pizzas increases by 1 million.

The quantity of cola decreases by 5 million cans.

The opportunity cost of the fifth: 1 million pizzas is 5 million cans of cola.

One of these pizzas costs 5 cans of cola.
In moving from $F$ to $E$:

The quantity of cola increases by 5 million cans.

The quantity of pizzas decreases by 1 million.

The opportunity cost of the first 5 million cans of cola is 1 million pizzas.

One of these cans of cola costs 1/5 of a pizza.
Opportunity Cost Is a Ratio

Note that the opportunity cost of a can of cola is the \textit{inverse} of the opportunity cost of a pizza.

Point E to F

One pizza costs 5 cans of cola.

One can of cola costs $1/5$ of a pizza.
Production Possibilities and Opportunity Cost

Increasing Opportunity Cost

Because resources are not equally productive in all activities, the PPF bows outward.

The outward bow of the PPF means that as the quantity produced of each good increases, so does its opportunity cost.
Production Possibilities and Opportunity Cost

PPF with flatter slope (point A to B) – the opportunity cost of producing pizza is a small quantity of cola

PPF with stepper slope (point E to F) - opportunity cost is large
Comparative Advantage and Absolute Advantage

A person has a **comparative advantage** in an activity if that person can perform the activity at a **lower opportunity cost** than anyone else.

A person has an **absolute advantage** if that person is more productive than others.
Gains from Trade

Liz's Smoothie Bar

In an hour, Liz can produce 30 smoothies or 30 salads.

Liz's opportunity cost of producing 1 smoothie is 1 salad.

Liz's opportunity cost of producing 1 salad is 1 smoothie.

Liz’s customers buy salads and smoothies in equal number, so she produces 15 smoothies and 15 salads an hour.

<table>
<thead>
<tr>
<th>Item</th>
<th>Minutes to produce 1</th>
<th>Quantity per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothies</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Salads</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>
Gains from Trade

Joe's Smoothie Bar

In an hour, Joe can produce 6 smoothies or 30 salads.

Joe's opportunity cost of producing 1 smoothie is 5 salads.

Joe's opportunity cost of producing 1 salad is 1/5 smoothie.

Joe spends 10 minutes making salads and 50 minutes making smoothies, so he produces 5 smoothies and 5 salads an hour.

<table>
<thead>
<tr>
<th>Item</th>
<th>Minutes to produce 1</th>
<th>Quantity per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothies</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Salads</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>
**Gains from Trade**

**Joe’s Comparative Advantage**

Joe’s opportunity cost of a salad is $\frac{1}{5}$ smoothie. 
Liz’s opportunity cost of a salad is 1 smoothie. 
Joe’s opportunity cost of a salad is less than Liz’s. 
So Joe has a comparative advantage in producing salads.

**TABLE 2.1** Liz’s Production Possibilities

<table>
<thead>
<tr>
<th>Item</th>
<th>Minutes to produce 1</th>
<th>Quantity per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothies</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Salads</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

**TABLE 2.2** Joe’s Production Possibilities

<table>
<thead>
<tr>
<th>Item</th>
<th>Minutes to produce 1</th>
<th>Quantity per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothies</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Salads</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>
Liz and Joe produce the good in which they have a comparative advantage:

- Liz produces 30 smoothies and 0 salads.
- Joe produces 30 salads and 0 smoothies.

### TABLE 2.3 Liz and Joe Gain from Trade

<table>
<thead>
<tr>
<th></th>
<th>Liz</th>
<th>Joe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a) Before trade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothies</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Salads</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td><strong>(b) Specialization</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothies</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Salads</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td><strong>(c) Trade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothies</td>
<td>sell 10</td>
<td>buy 10</td>
</tr>
<tr>
<td>Salads</td>
<td>buy 20</td>
<td>sell 20</td>
</tr>
<tr>
<td><strong>(d) After trade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothies</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Salads</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td><strong>(e) Gains from trade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoothies</td>
<td>+5</td>
<td>+5</td>
</tr>
<tr>
<td>Salads</td>
<td>+5</td>
<td>+5</td>
</tr>
</tbody>
</table>
Gains from Trade

Joe’s opportunity cost of producing a salad is less than Liz’s.

=> Joe has a comparative advantage in producing salad.

Liz’s opportunity cost of producing a smoothie is less than Joe’s.

=> Liz has a comparative advantage in producing smoothies.
Gains from Trade

Joe specializes in producing salad and he produces 30 salads an hour at point $B$ on his PPF.

Liz specializes in producing smoothies and produces 30 smoothies an hour at point $B$ on her PPF.
They trade salads for smoothies along the red “Trade line.”

The price of a salad is 2 smoothies or the price of a smoothie is \( \frac{1}{2} \) of a salad.
Gains from Trade

Joe produces salad & buys smoothies from Liz and moves to point $C$—a point outside his PPF.

Liz produces smoothies & buys salads from Joe and moves to point $C$—a point outside her PPF.
Economic Coordination

To reap the gains from trade, the choices of individuals must be coordinated.

To make coordination work, four complimentary social institutions have evolved over the centuries:

- Firms
- Markets
- Property rights
- Money
Economic Coordination

A **firm** is an economic unit that **hires factors of production** and organizes those factors **to produce and sell goods and services**.

A **market** is any **arrangement that enables buyers and sellers** to get information and do business with each other.

**Property rights** are the social arrangements that govern the ownership, use, and disposal of resources, goods or services. E.g. intellectual property, financial property

**Money** is any commodity or token that is generally **acceptable as a means of payment**.
Circular Flows Through Markets

Figure 2.7 illustrates how households and firms interact in the market economy.

Factors of production, and ... goods and services flow in one direction.

Money flows in the opposite direction.
Economic Coordination

Coordinating Decisions

Markets coordinate individual decisions through price adjustments.
After studying this chapter, you will be able to:

- Define the production possibilities frontier and use it to calculate opportunity cost
- Distinguish between production possibilities and preferences and describe an efficient allocation of resources
- Explain how current production choices expand future production possibilities
- Explain how specialization and trade expand production possibilities
- Describe the economic institutions that coordinate decisions