

# PART 2

## How Markets Function

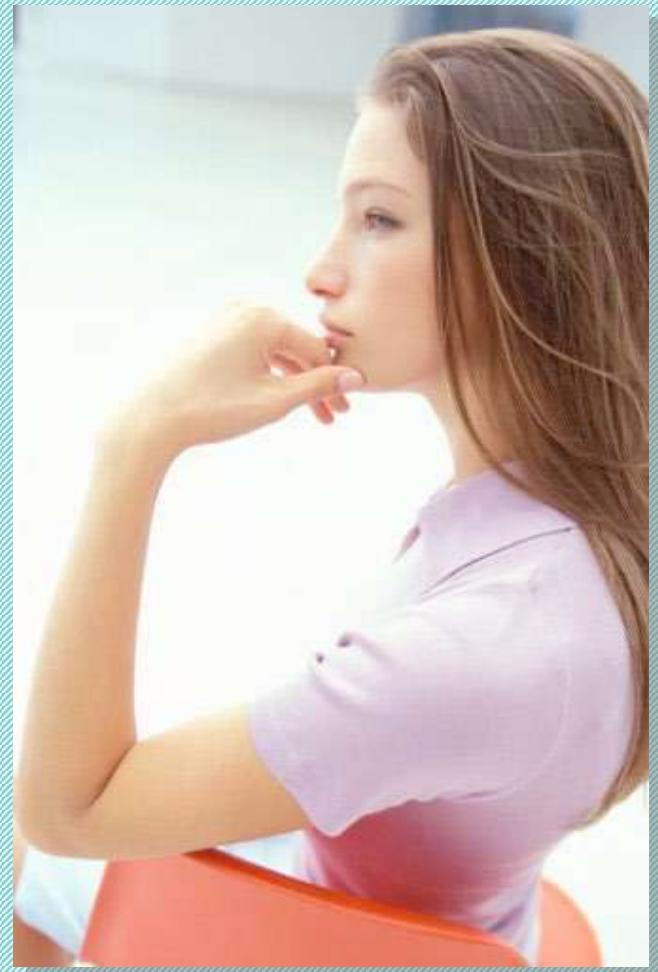
PRINCIPLES OF

# Microeconomics

Shizhe Peng

School of Economics and Management  
Changsha University of Science and Technology

# *Chapter 9: Consumers, Producers, and Market Efficiency*



# **Chapter 9: Consumers, Producers, and Market Efficiency**

- In this chapter, we will examine and analyze the fundamental tools of welfare economics and assess the efficiency of free markets using consumer surplus and producer surplus.
- Furthermore, we will see that when supply and demand forces efficiently allocate resources, even if each buyer and seller in the market is only concerned with their own welfare, they will collectively be guided by an invisible hand to an equilibrium level that maximizes the total benefit of both buyers and sellers.

# Chapter 9: Consumers, Producers, and Market Efficiency

- **Consumer surplus**

- Producer surplus

- Market efficiency

# Welfare Economics

welfare economics

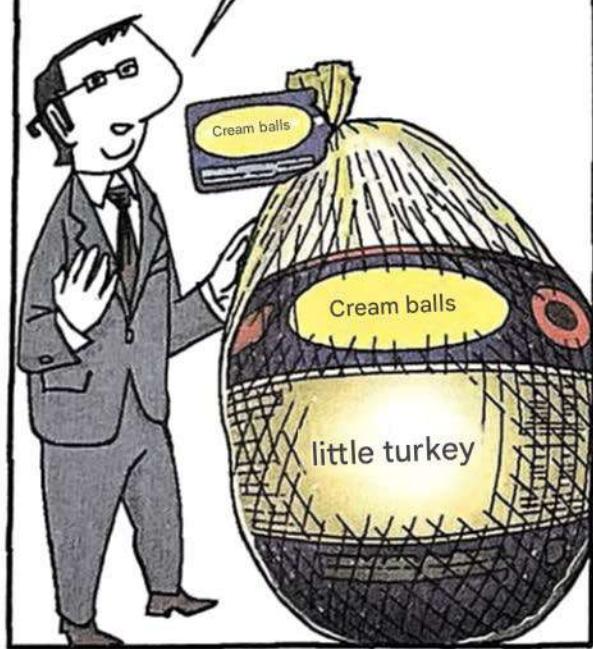


On the one hand, when consumers go to stores to buy turkey for Thanksgiving dinner,

They might be disappointed by the high price of turkeys.

# Welfare Economics

On the other hand, farmers, as suppliers, hope that the price of turkeys can be higher.

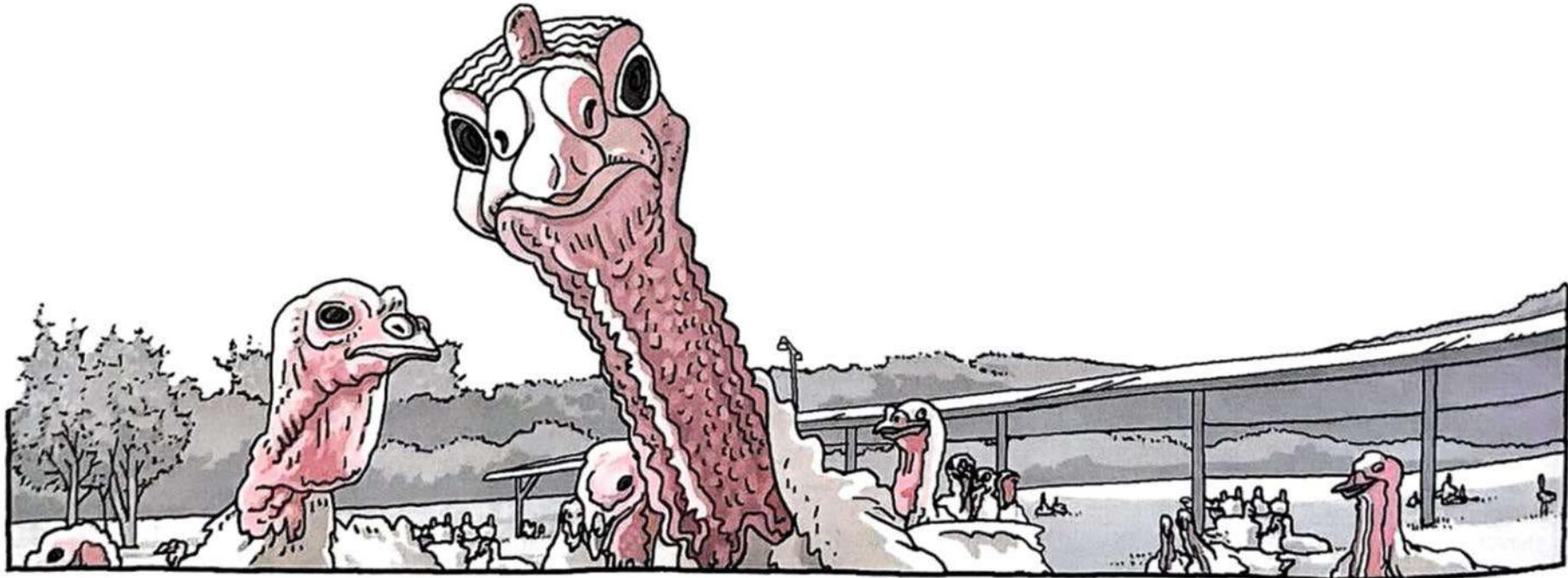


If buyers always want low prices and sellers always want high prices, then what is the appropriate price for a turkey for society as a whole?



# Welfare Economics

In the preceding text, we saw how supply and demand forces determine the prices and sales volumes of goods and services in a market economy. However, we did not explain whether these market configurations are desirable.



# Welfare Economics

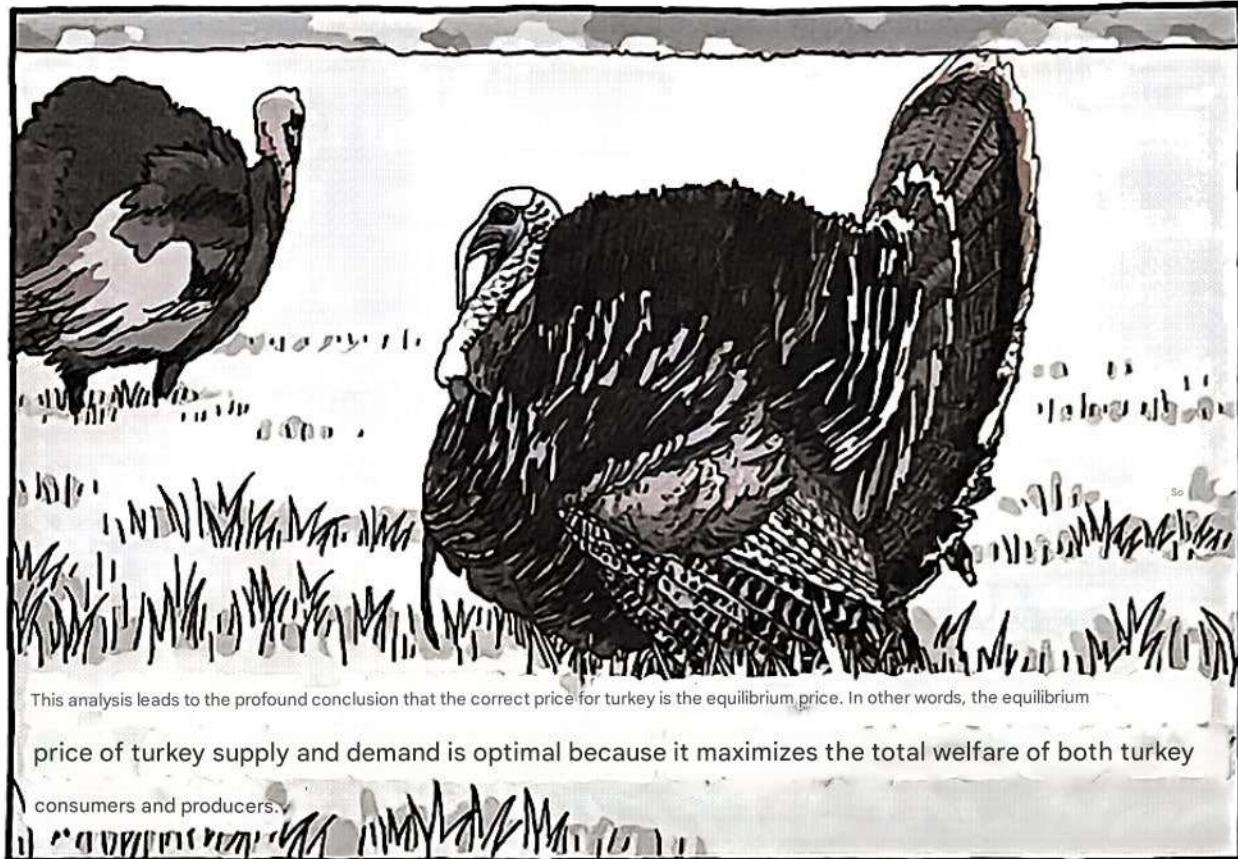


Welfare economics studies how resource allocation affects people's economic welfare (happiness).



# Welfare Economics

A market equilibrium of supply and demand can maximize the total benefit obtained by all buyers and sellers.



This analysis leads to the profound conclusion that the correct price for turkey is the equilibrium price. In other words, the equilibrium price of turkey supply and demand is optimal because it maximizes the total welfare of both turkey consumers and producers.

# Welfare Economics

Surprisingly, none of the turkey consumers or producers aimed to maximize total welfare; they all acted in their own self-interest.

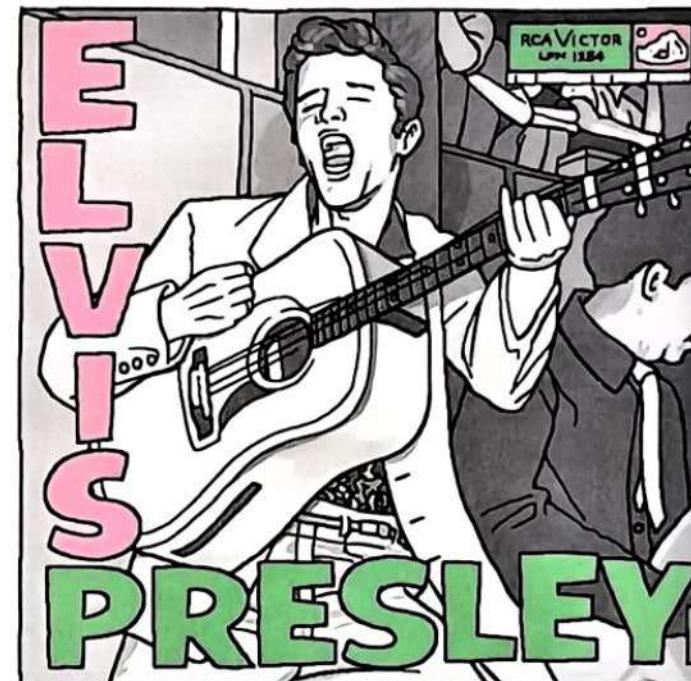


Their collective actions, guided by market prices, lead them toward a welfare-maximizing outcome, as if guided by an invisible hand.

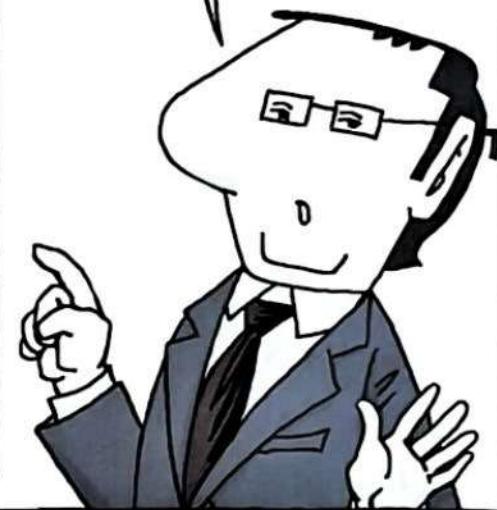
# Consumer surplus

consumer surplus

Imagine someone owns Elvis Presley's first album.

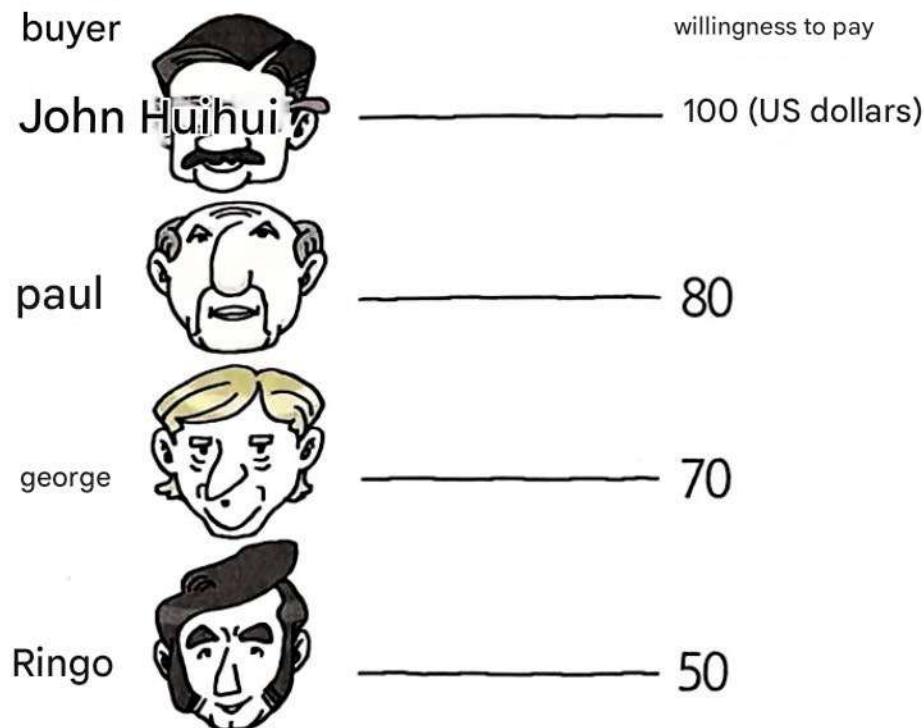


This person decided  
to auction it off.



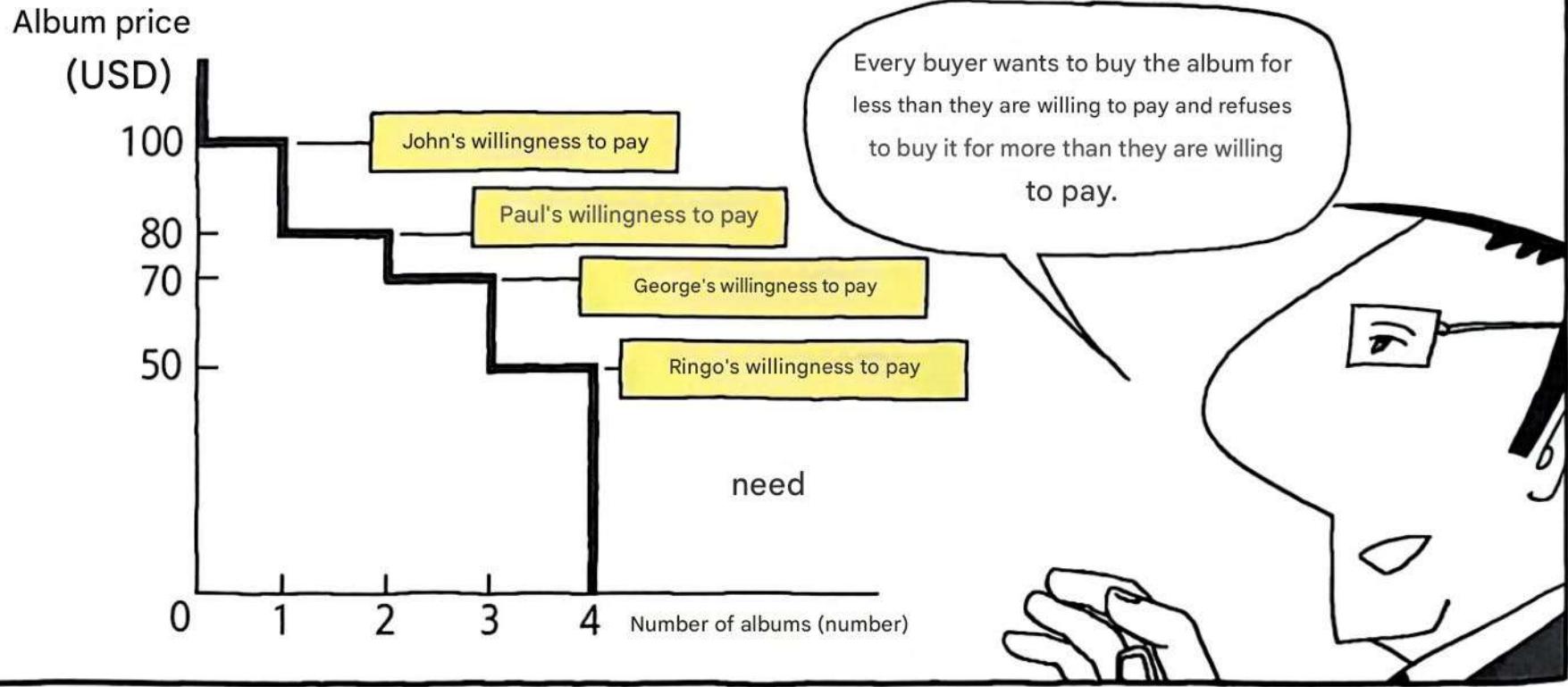
# Consumer surplus

Four Elvis fans, John, Paul, George, and Ringo, attended the auction. Each of them wanted to win the album, but each was willing to pay a limited amount.



# Consumer surplus

Each buyer's preferences are reflected in their willingness to pay. In other words, it measures the buyer's valuation of the item.



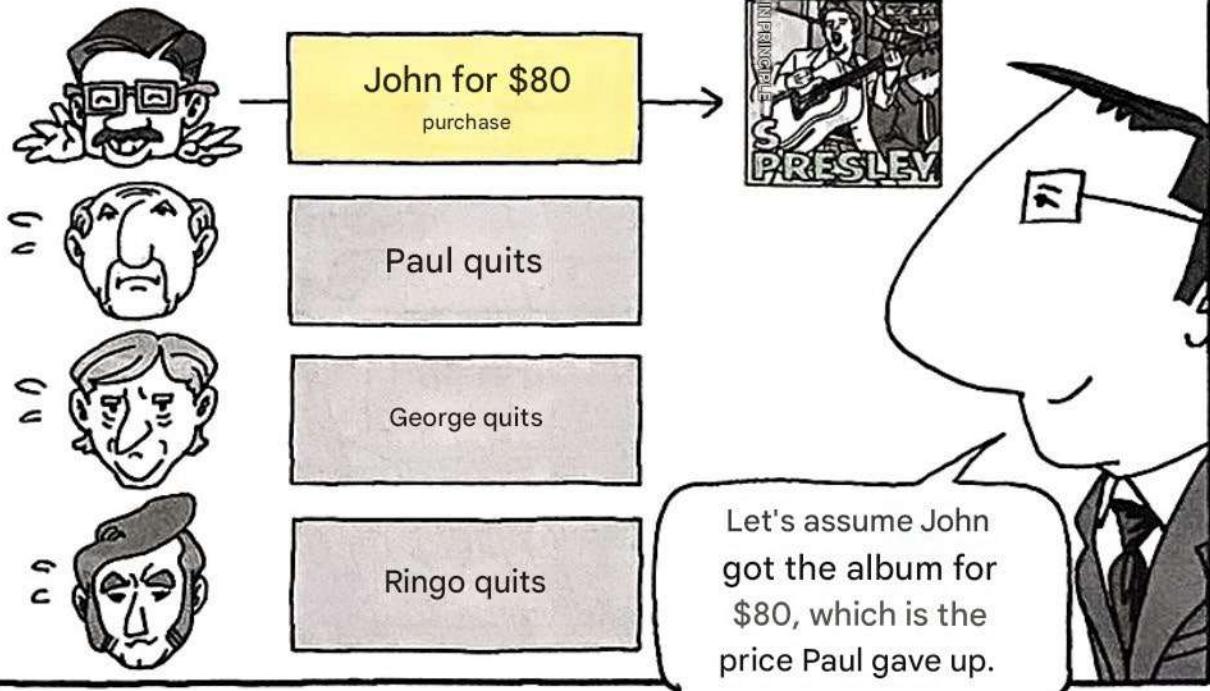
# Consumer surplus

The owner started asking for \$10, which was less than the willingness of four buyers to pay, and the price quickly rose.



# Consumer surplus

Bidding stopped when John offered \$80 or more. Currently, Paul, George, and Ringo have withdrawn from the bidding because they are unwilling to bid anything higher than \$80.

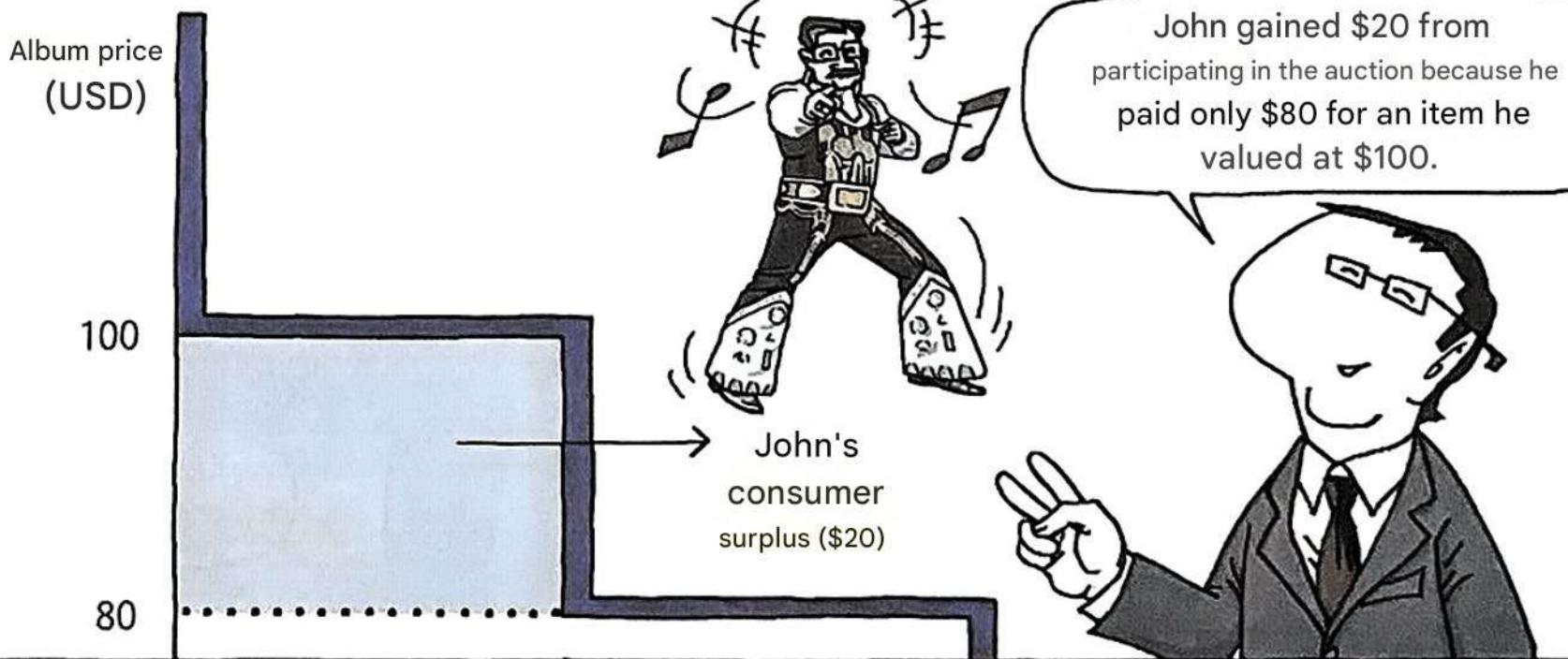


Importantly, this album belongs to the buyer who valued it the highest.



# Consumer surplus

In a sense, John made a really-good-deal; he gained \$20 in consumer surplus. Consumer surplus is the amount paid 者愿意为一 for a good minus the amount actually paid for it.



# Consumer surplus

Paul, George, and Ringo did not receive any consumer surplus from participating in the auction because they did not receive the album and did not spend a penny.



Suppose someone has two identical Elvis Presley albums to sell, and four people participate in the auction.

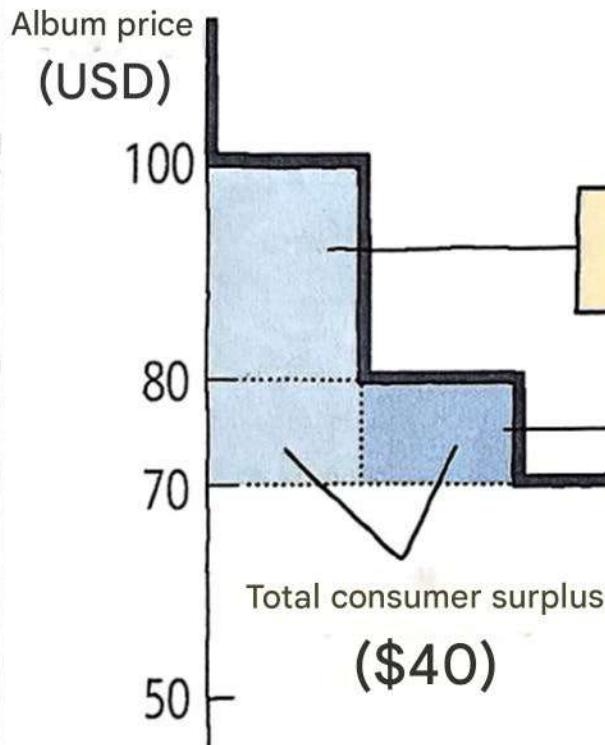
For ease of analysis,  
we assume that the two albums  
are priced the same.

A buyer can only purchase  
one album.

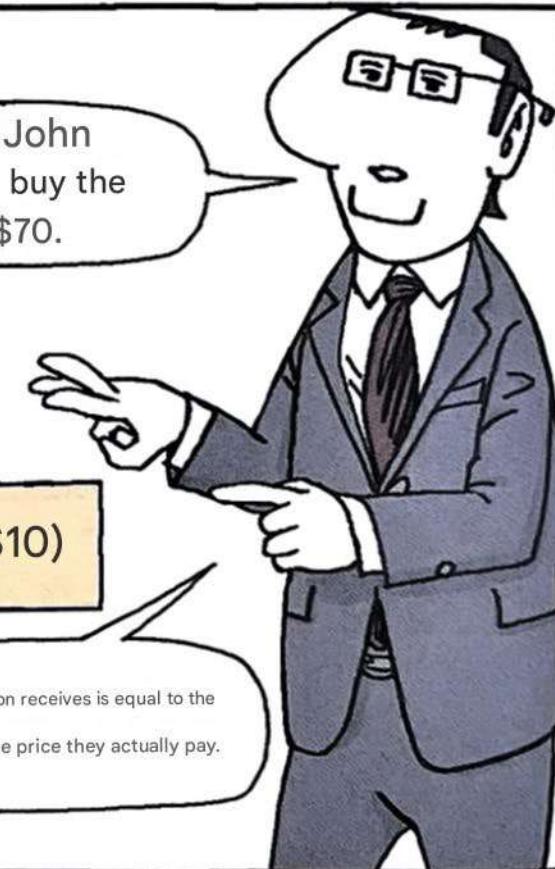


# Consumer surplus

In this scenario, Ringo, who is willing to pay the least amount, will be the first to withdraw, followed by George.



Therefore, John  
and Paul could buy the  
album for \$70.



# Consumer surplus

The purpose of introducing the concept of consumer surplus is to make a judgment on the desirability of market outcomes.

Next, let's examine whether it is a good measure of economic welfare.

At the same time, from the perspective of policymakers, is it always a good thing to lower the price of a good to increase consumer surplus?

And

# Consumer surplus

If policymakers want to respect buyers' preferences, consumer surplus is a good measure of economic welfare.



# Consumer surplus

Despite exceptions, consumer surplus does reflect economic well-being in most markets.



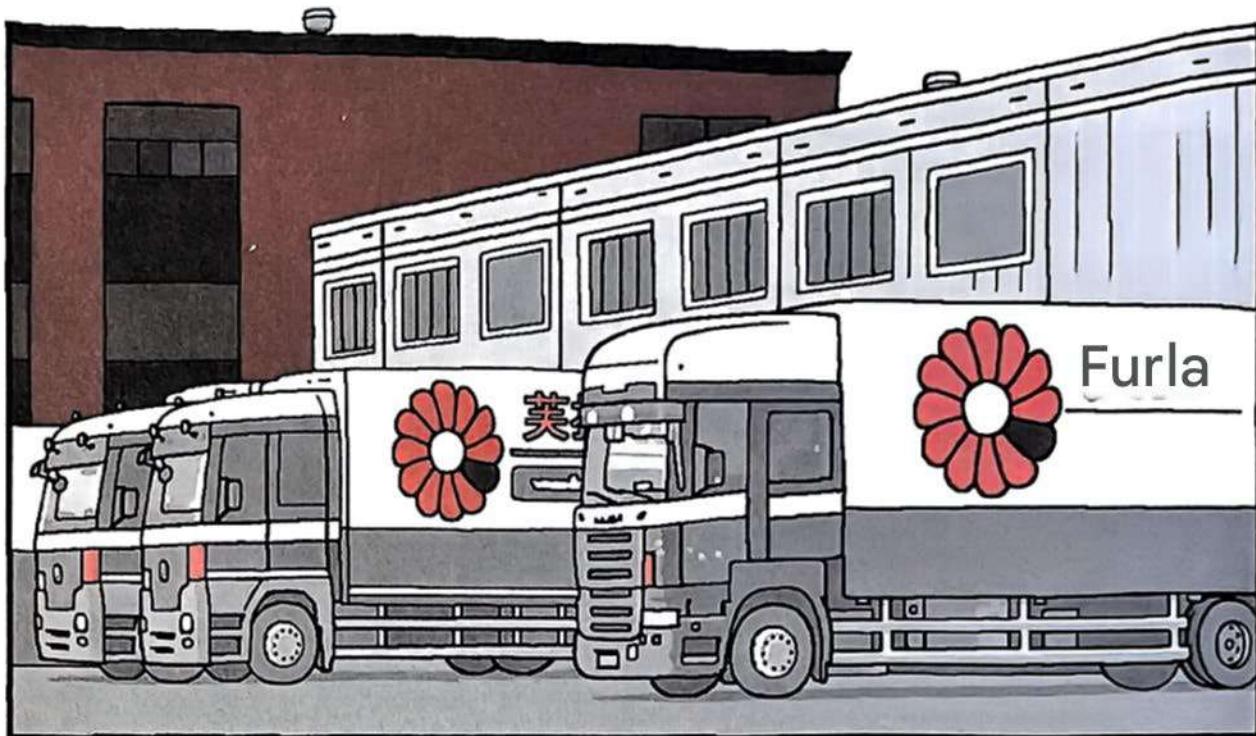
Consumers are the best judges of how much they benefit from the goods they purchase.



# Dutch auction

Dutch auction

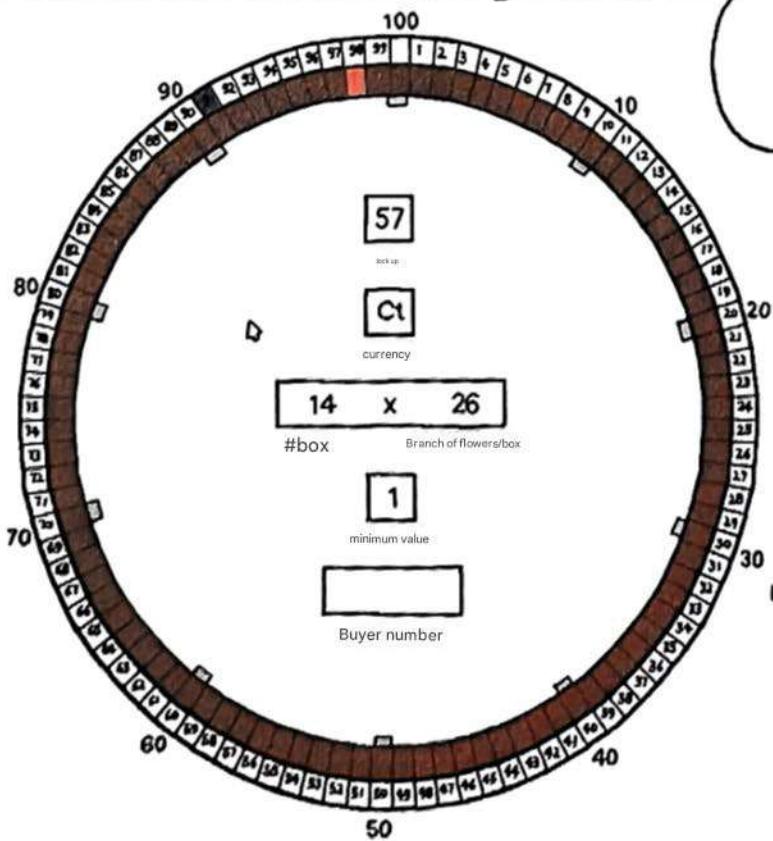
When people hear the word "auction," they think of a "British" auction, which rewards the highest bidder. However, the Dutch flower market uses a completely different auction system.



# Dutch auction



# Dutch auction

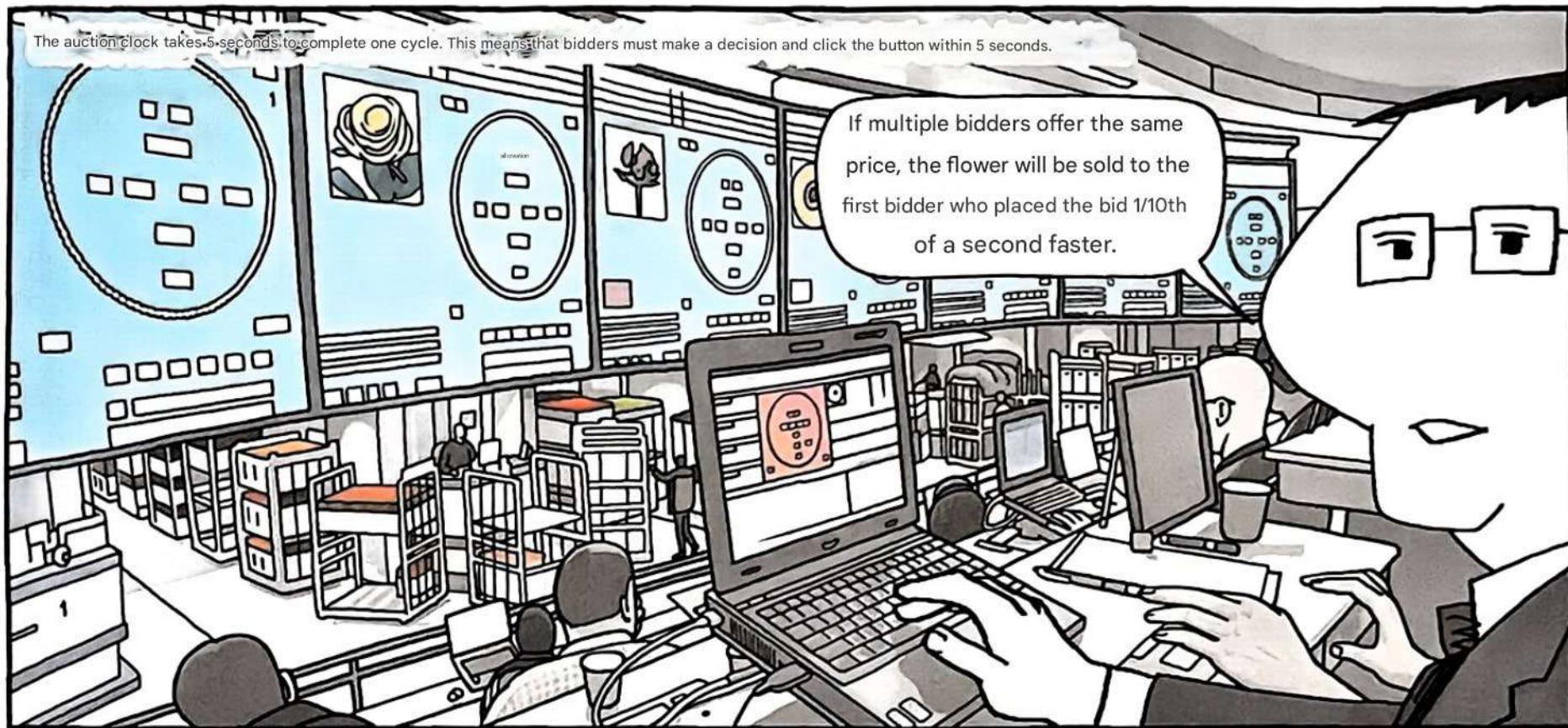


This is the digital auction clock at the Royal Botanic Gardens, Netherlands, used for auctions. It has 100 markings, each representing 1%.

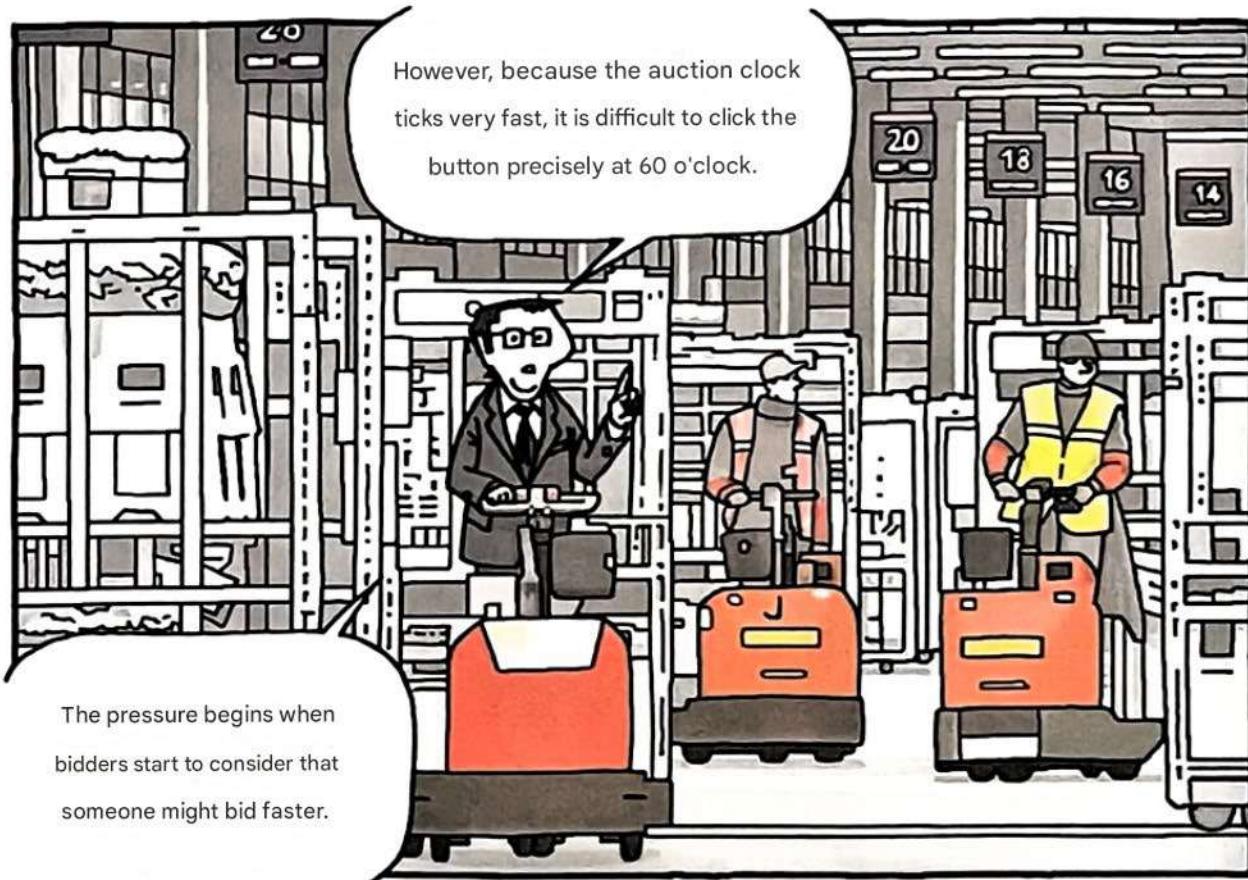
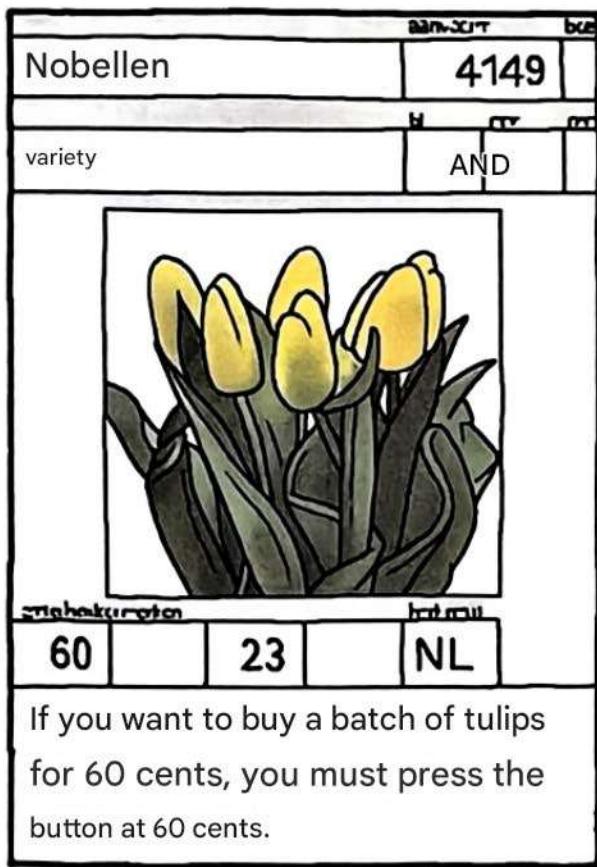


The starting price was 30% higher than the previous day's price, but the price gradually decreased over time.

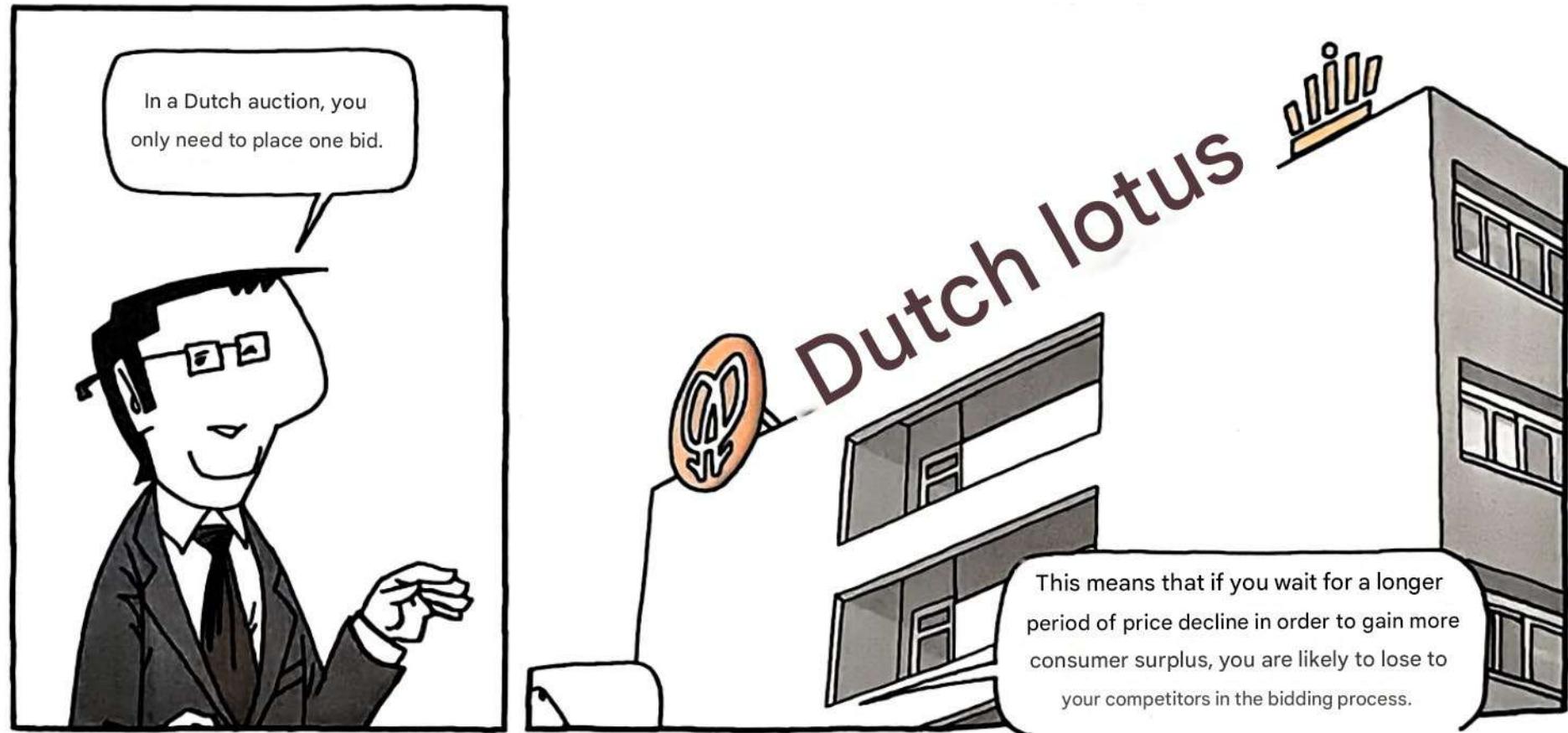
# Dutch auction



# Dutch auction

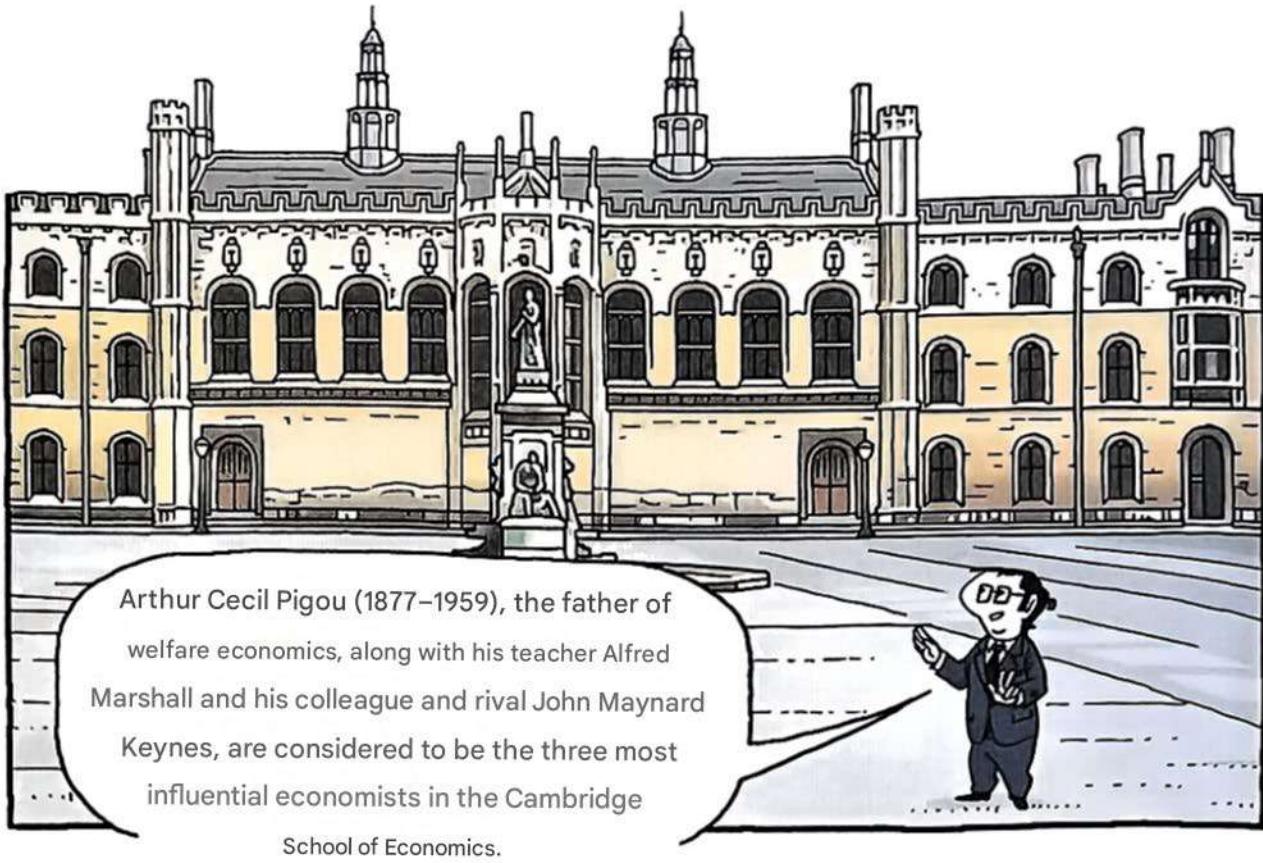


# Dutch auction



# Arthur Cecil Pigou

Arthur Cecil  
Pigou



# Arthur Cecil Pigou

In 19th-century Britain, most economists were keen to develop liberal economics, while Pigou focused on the factors that hindered stable social growth.

To address these issues, he called for government intervention.



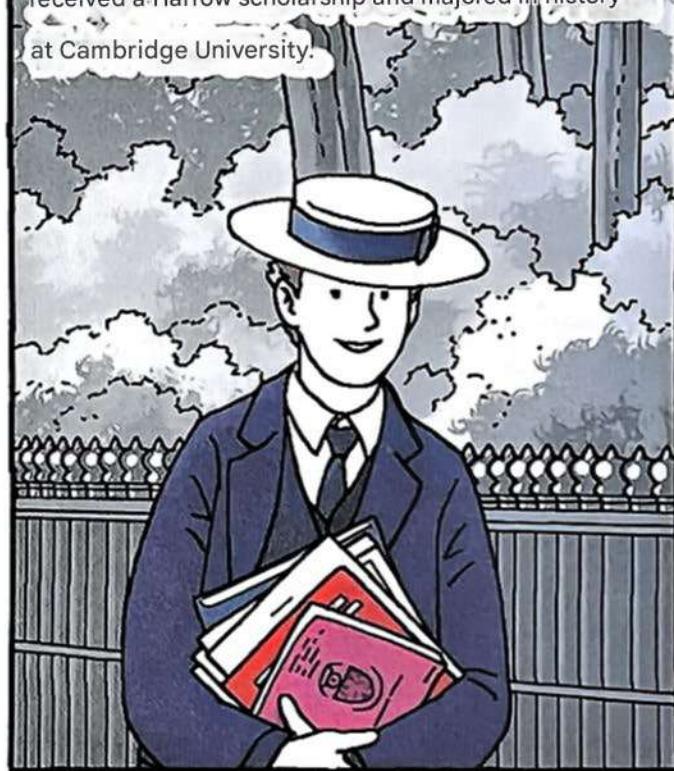
Factories damage the environment

poverty and inequality

labor disputes

resource depletion

He was a promising and ambitious young poet who received a Harrow scholarship and majored in history at Cambridge University.



# Arthur Cecil Pigou



# Arthur Cecil Pigou

In the 20th century, Britain gradually lost its global influence. Due to issues such as wealth concentration, the British people were also dissatisfied with the domestic economy. During this turbulent period, Pigou seriously considered how to make the unfair competitive environment more level.

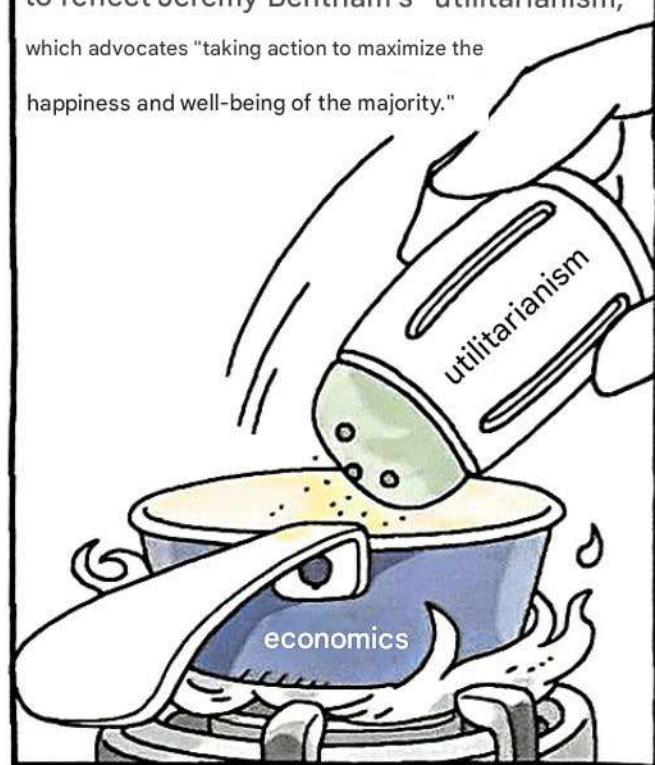
After careful consideration, he proposed the economics of welfare.

welfare  
economics

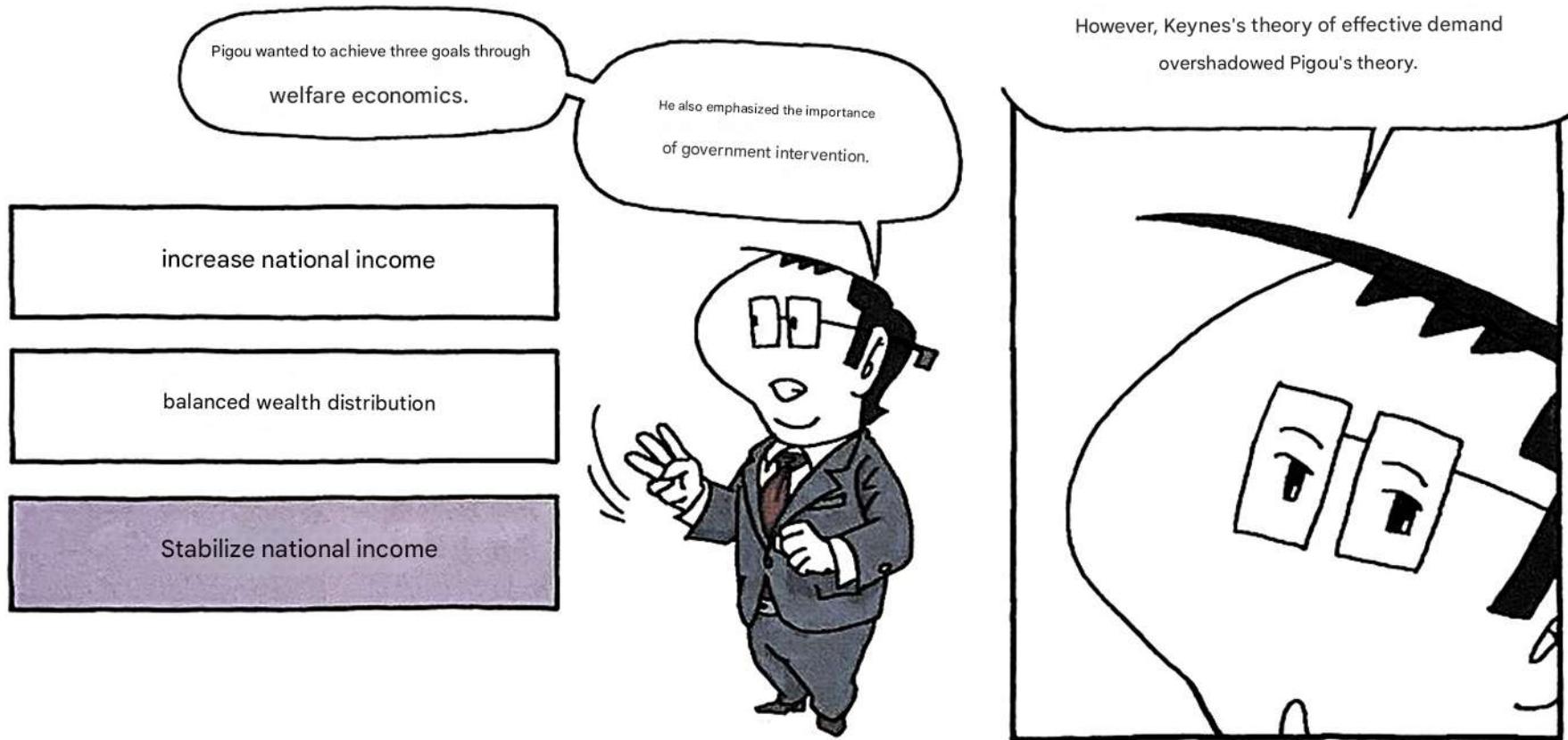
Arthur Cecil Pigou

Note: This is not the actual cover of the book

Welfare economics was the first economic theory to reflect Jeremy Bentham's "utilitarianism," which advocates "taking action to maximize the happiness and well-being of the majority."



# Arthur Cecil Pigou



# Arthur Cecil Pigou

Pigou continued to study Marshall's neoclassical economics at Cambridge University. But shortly after the Great Depression, Keynesian theories became more popular, and after losing to Keynes in debates, Pigou ceded his influence to Keynes.

Your theory is like shooting at the moon (Marshall).

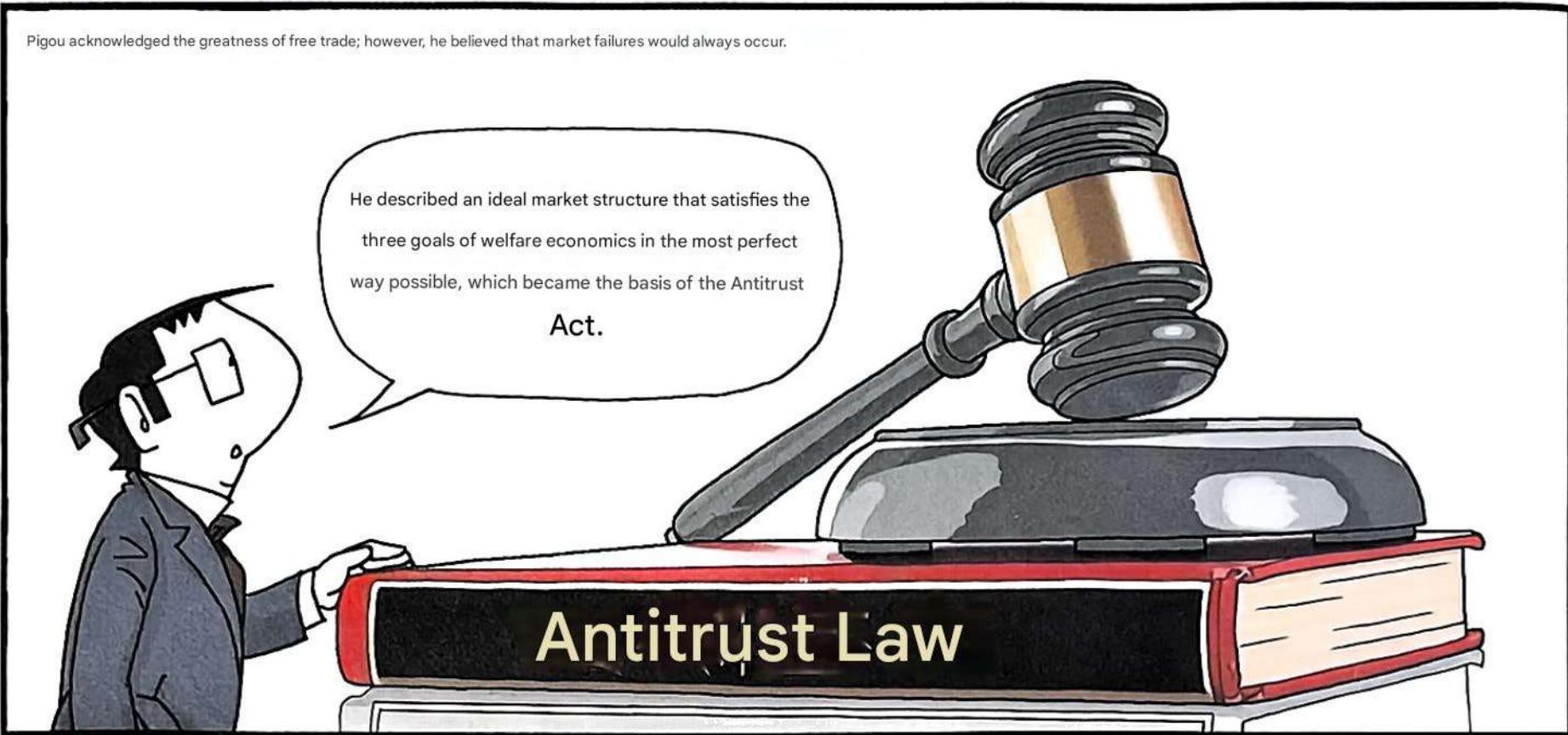


Your theory simply converts utility into welfare.

Pigou's welfare economics seemed to have faded away, but his theories regained support in the mid-20th century.

# Arthur Cecil Pigou

Pigou acknowledged the greatness of free trade; however, he believed that market failures would always occur.



He described an ideal market structure that satisfies the three goals of welfare economics in the most perfect way possible, which became the basis of the Antitrust Act.

# Arthur Cecil Pigou

State Administration

## of Taxation

He not only created the social welfare function,  
but also the mathematical model.

"These are the foundations for studying public  
finance, such as optimal tax structures  
and government spending."

# Arthur Cecil Pigou

The idea that governments need to intervene in economic activities to solve environmental problems can also be attributed to the Pigou effect.

You can imagine the impact these rumors had on the economics community: the carbon tax, a corrective tax, could be a powerful weapon against global warming and was also known as the "Pigouvian tax."



# SUMMARY



- Welfare economics is the study of how resource allocation affects economic welfare.
- First, let's examine the benefits that buyers and sellers derive from participating in market transactions. The maximum benefit each buyer derives is called their willingness to pay, which measures how much they value a good. Buyers want to buy a product at a price lower than their willingness to pay, and they refuse to buy it at a price higher than their willingness to pay.

# SUMMARY



- Consumer surplus is the amount each buyer is willing to pay for a good minus the amount they actually pay for it; it measures the benefit buyers derive from participating in the market.
  - The area under the demand curve and above the price can measure consumer surplus in a market because the height of the demand curve measures a buyer's valuation of the good, i.e., their willingness to pay for it.
- Since buyers always want to pay less for what they buy, lower prices improve their situation.
- This increase in consumer surplus when prices fall consists of two parts:
  - First, the increase in consumer surplus from existing buyers;
  - and second, the increase in consumer surplus resulting from the entry of new buyers into the market, whose willingness to pay generates incremental demand.

# Chapter 9: Consumers, Producers, and Market Efficiency

- Consumer surplus

- Producer surplus

- Market efficiency

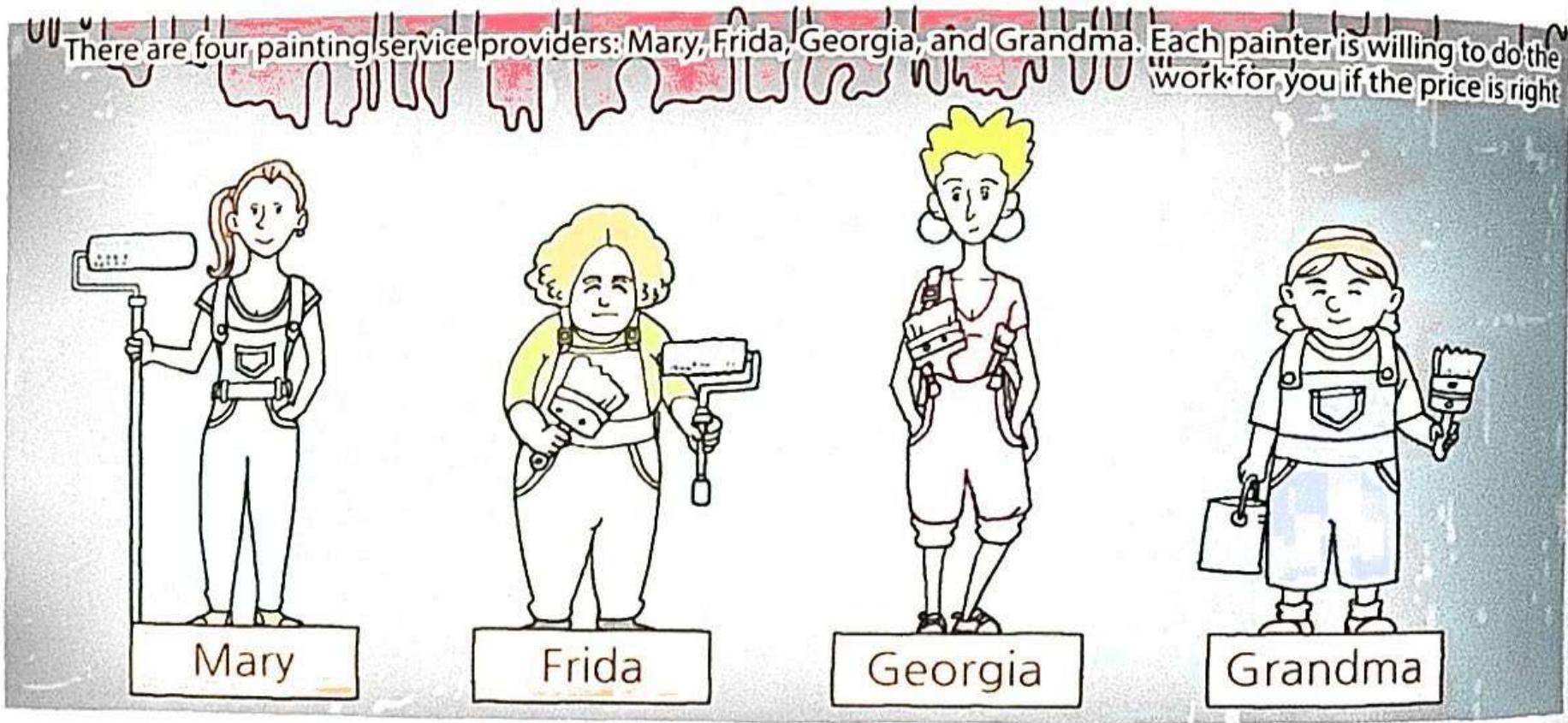
# Producer surplus

producer surplus

Next, we consider the benefits that sellers gain from participating in the market.

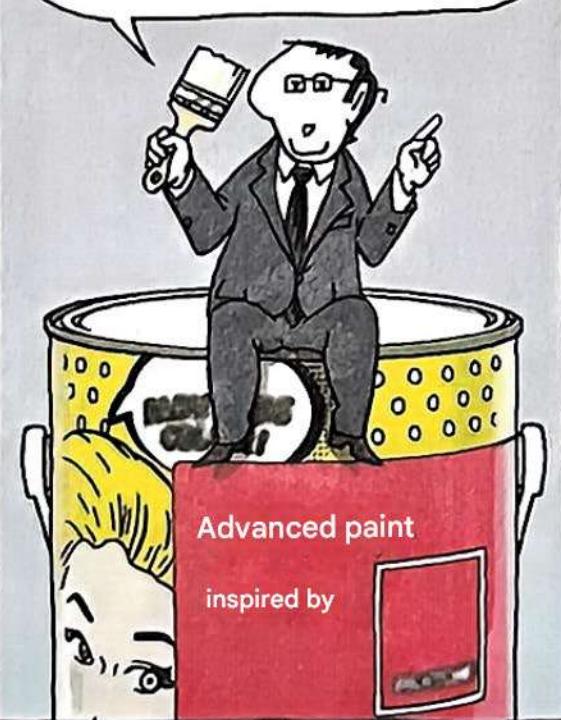


# Producer surplus



# Producer surplus

The homeowner decided to let the painters bid against each other and auction off the job to the painter willing to do it for the lowest price.



If the price offered exceeds the cost of performing the work, then every painter will be willing to take the job. Here, the term "cost" should be interpreted as the painter's opportunity cost.

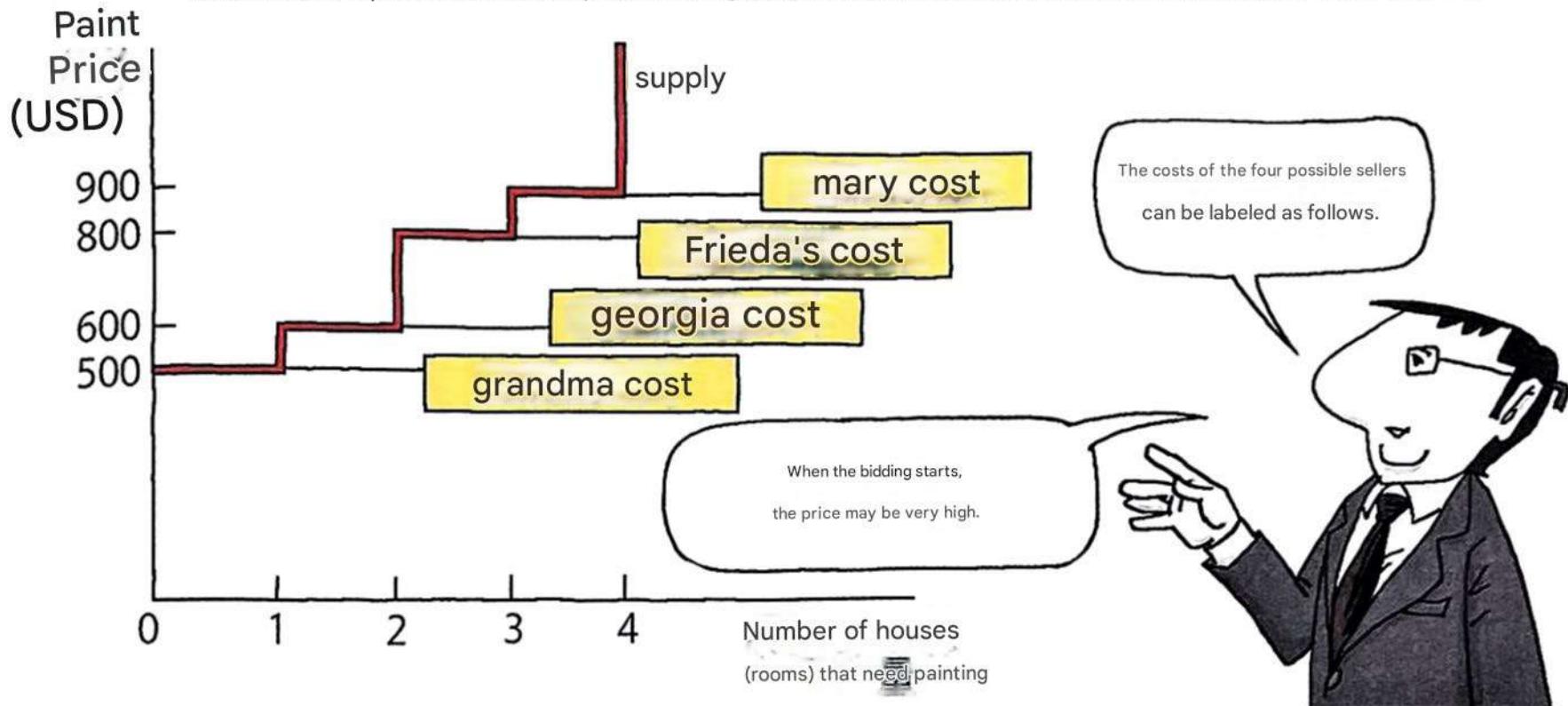
supplier	Cost (USD)
mary	900
Frieda	800
Georgia	600
grandmother	500



It includes the painter's direct expenses, such as paint, brushes, etc., as well as the painter's assessment of their own time.

# Producer surplus

Since the cost of a painter is the minimum price he is willing to pay for the job, cost can be used to measure his willingness to sell his services.



# Producer surplus

However, due to competition among painters, costs will drop rapidly.

Once Grandma bids \$600 or less, she becomes the only remaining bidder.



Grandma was happy to do the job for \$600 because her cost was only \$500.

Mary, Frida, and Georgia were unwilling to do the job for less than \$600.



# Producer surplus

900

300

600

500

Price of  
painting

We should note that the job goes to the painter who can do the work at the lowest cost. Then, what benefit does Grandma receive from getting the job?

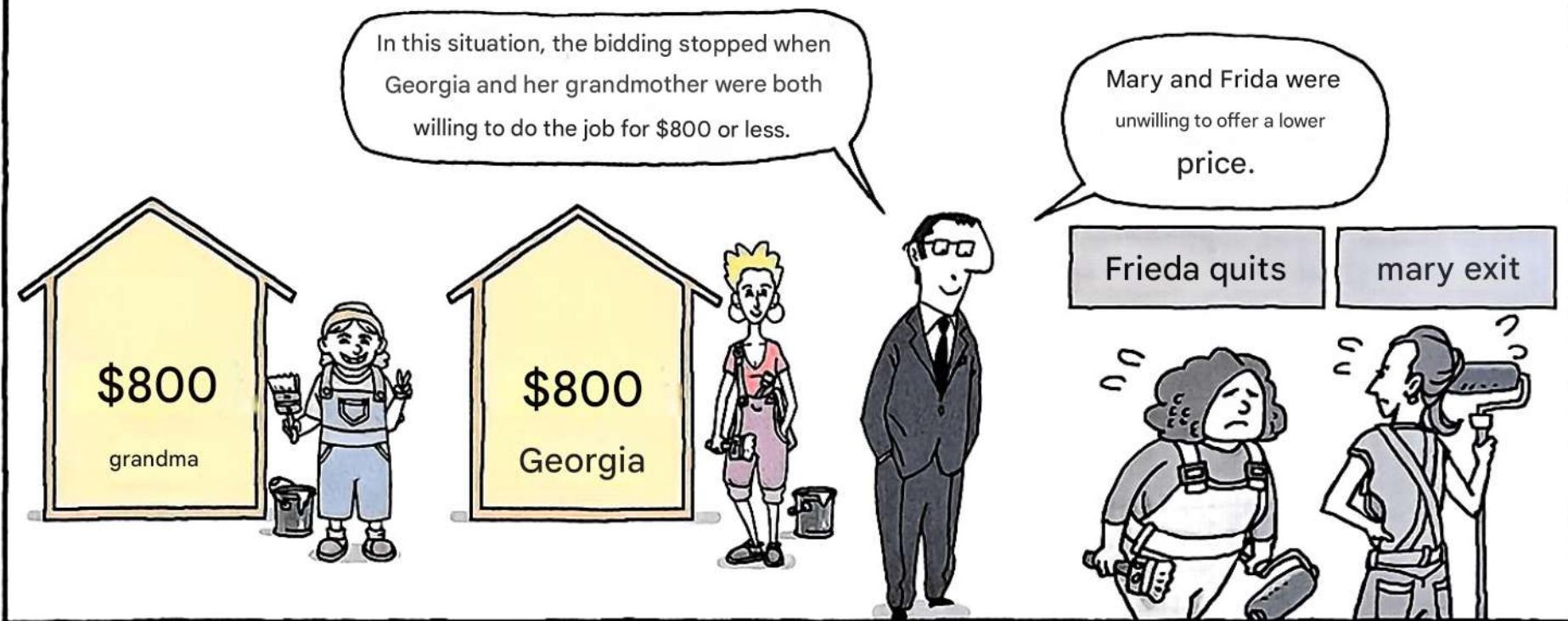
Because she is willing to do the work for \$500 but gets \$600 for doing it, we say that she receives a producer surplus of \$100.

Producer surplus is the amount a seller is paid minus the cost of production.

Grandma's  
producer  
surplus (\$100)

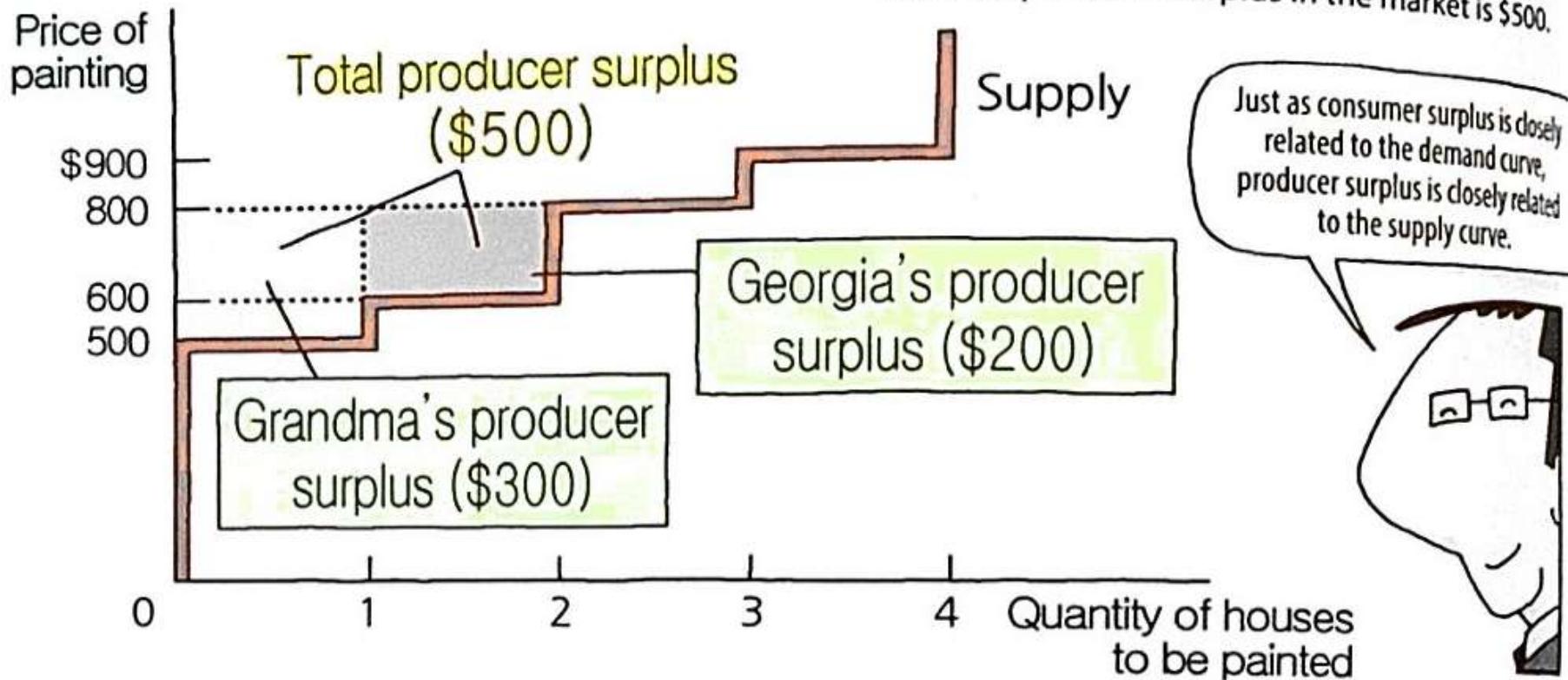
# Producer surplus

Now, let's assume a homeowner has two houses that need painting. The homeowner decides to auction off the job to four painters. For simplicity, let's assume no painter can paint both houses at the same time, and that the homeowner will pay the same price for painting each house.



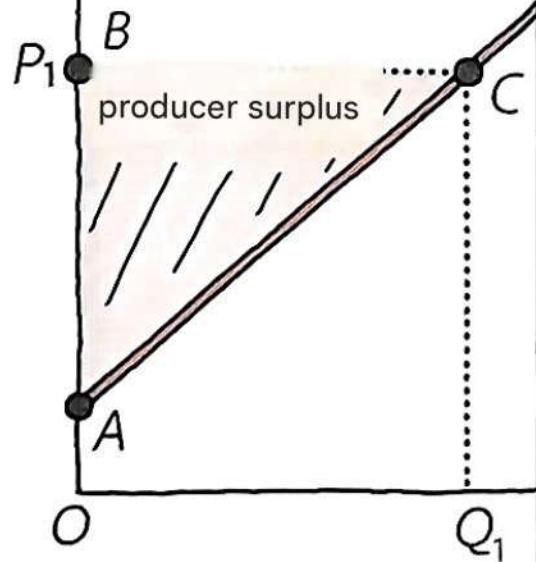
# Producer surplus

At a price of \$800, Grandma receives producer surplus of \$300 and Georgia receives producer surplus of \$200.  
The total producer surplus in the market is \$500.



# Producer surplus

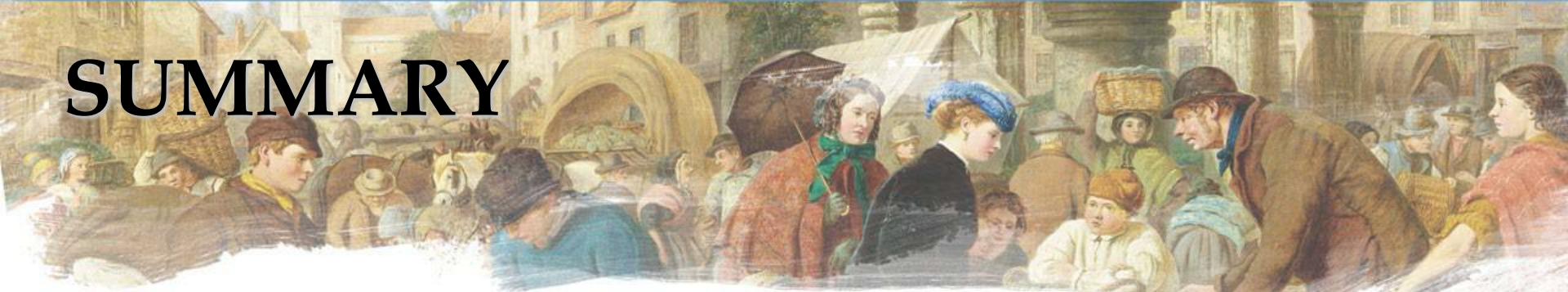
The area below the price curve and above the supply curve measures producer surplus in a market.



Since the height of the supply curve measures the seller's costs, the difference between the price and the cost of production is the producer surplus for each seller.



# SUMMARY



- Now we turn to the other side of the market to examine the benefits sellers receive from participating in the market. Cost is everything of value that a seller must give up to produce a good. Producer surplus is the amount a seller receives for selling a good minus the cost of providing that good. Producer surplus measures the benefit sellers receive from participating in the market.
- The area below the price and above the supply curve measures the producer surplus in a market. Because the height of the supply curve measures the seller's cost, the difference between the price and the cost of production is the producer surplus for each seller.

# SUMMARY



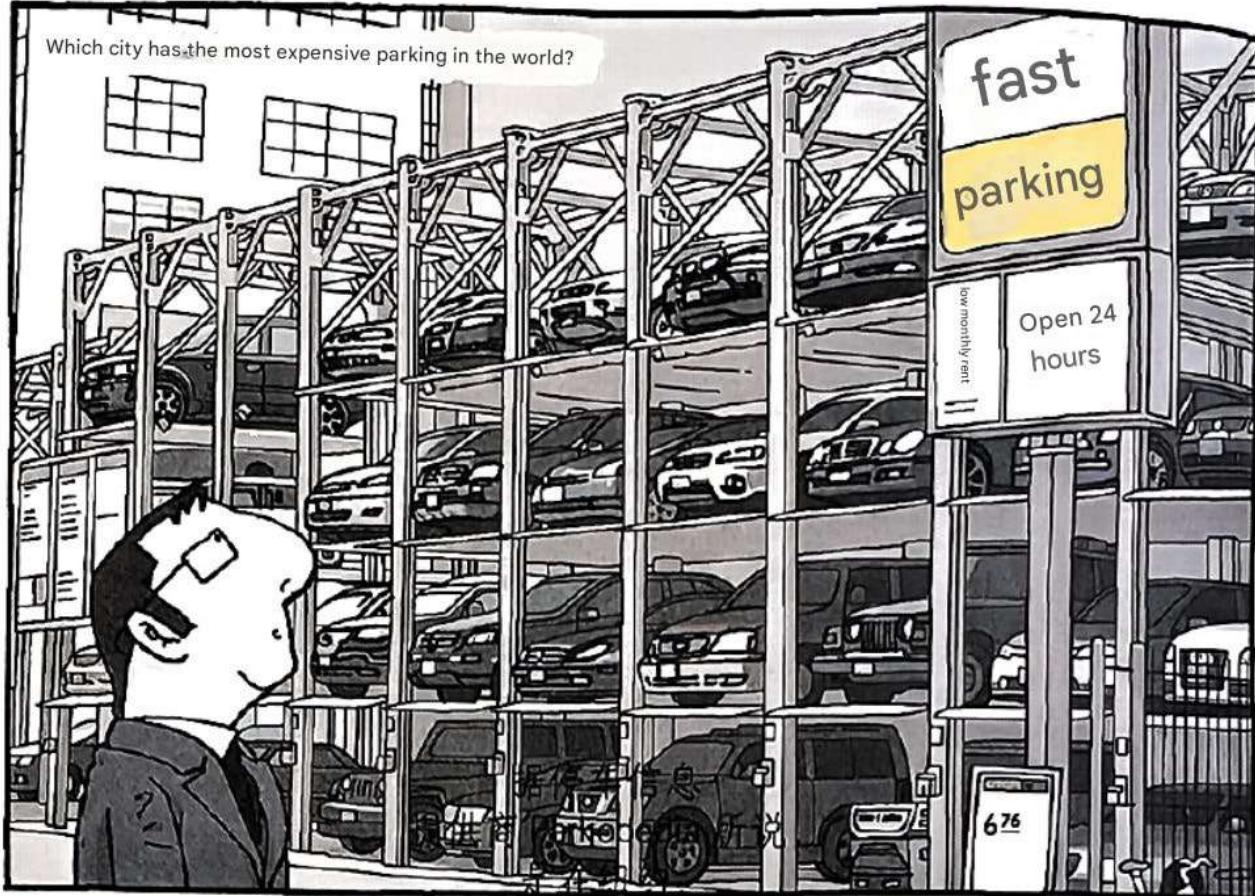
- You won't be surprised to hear that sellers always hope to receive a higher price for the goods they sell. When the price rises, the increase in producer surplus includes two parts: first, the increase in producer surplus from existing sellers; and second, the increase in producer surplus from new sellers entering the market, encouraged by the higher price, leading to an increase in the quantity supplied.

# Chapter 9: Consumers, Producers, and Market Efficiency

- Consumer surplus
- Producer surplus
- **Market efficiency**

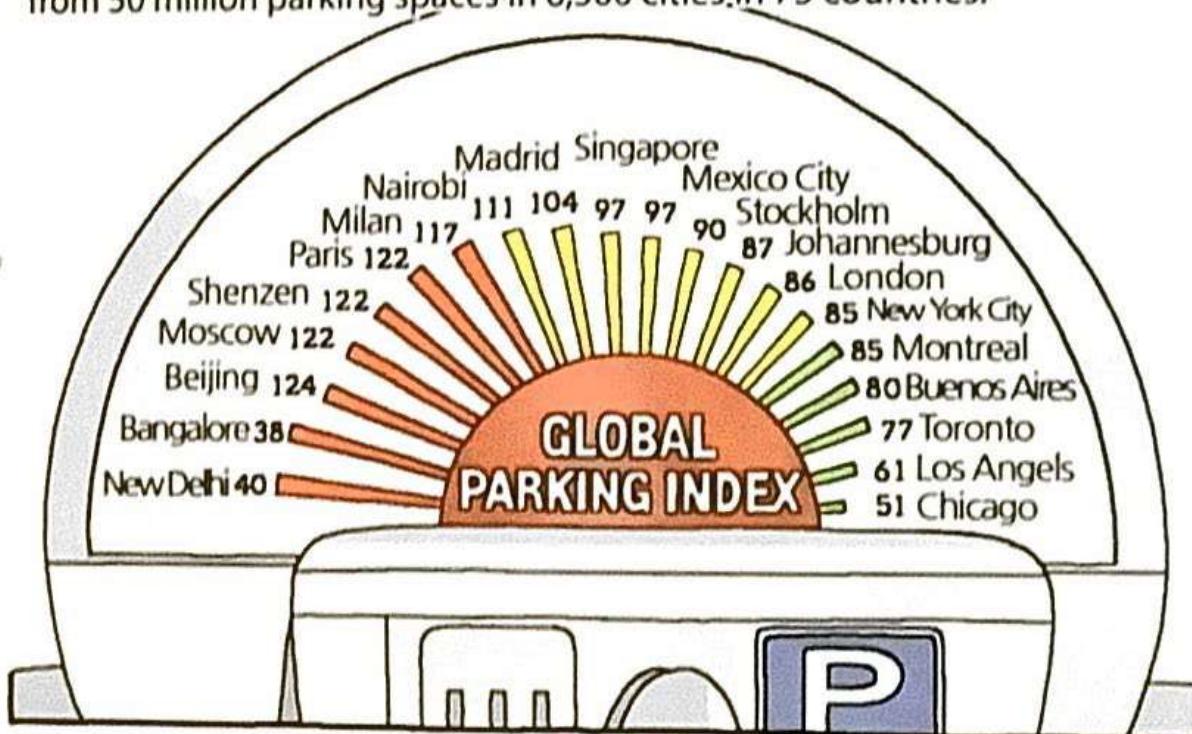
# The invisible hand can solve the parking problem

invisible hand  
can be solved  
parking problem



# The invisible hand can solve the parking problem

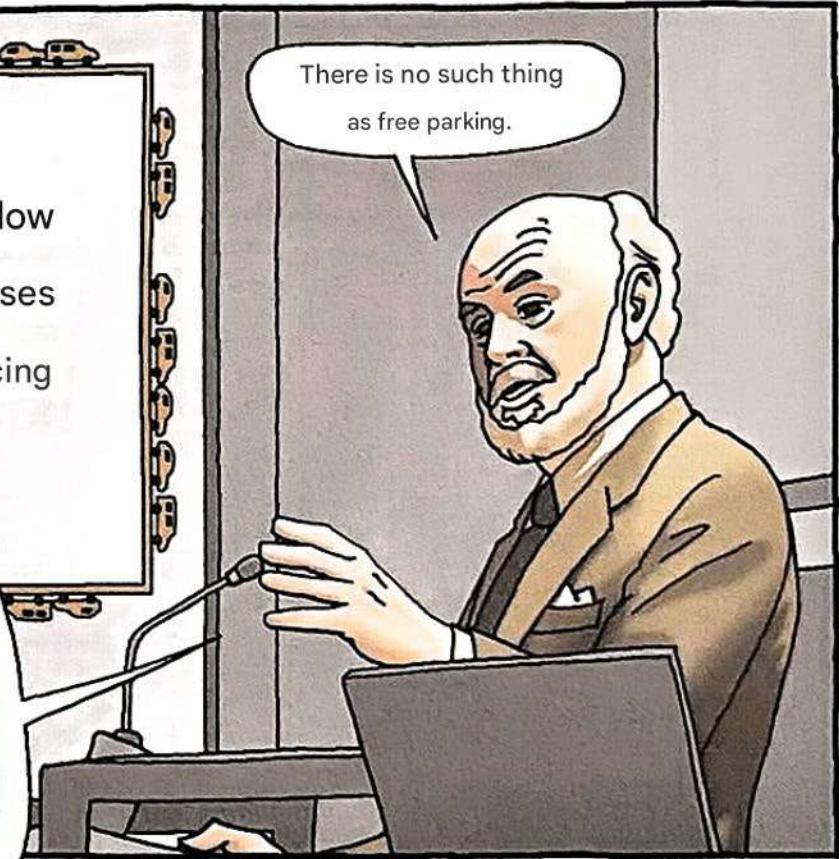
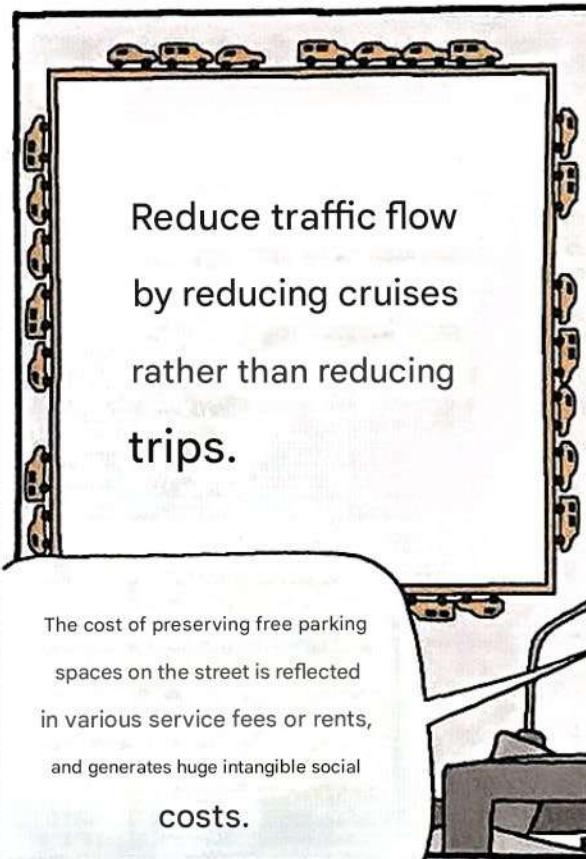
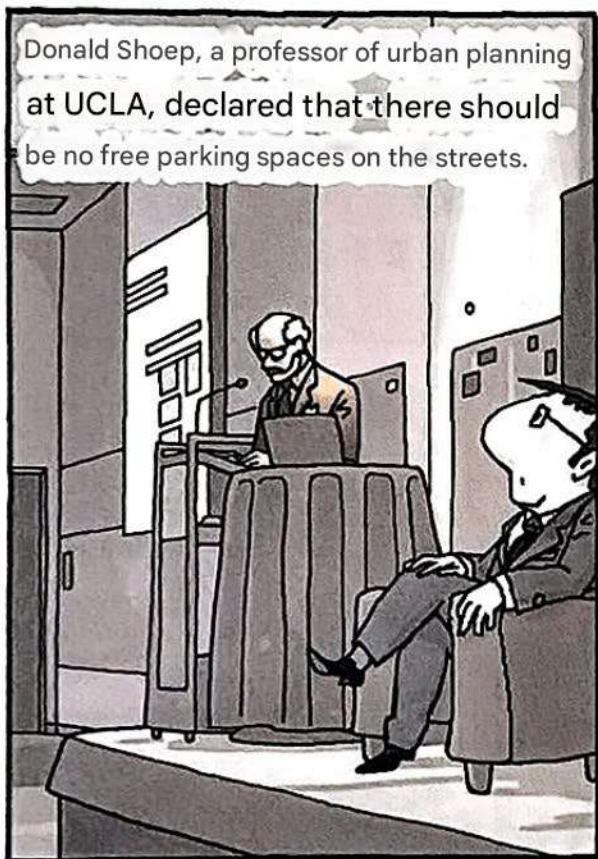
Every year, "Parkopedia" releases the Global Parking Index based on data from 50 million parking spaces in 6,500 cities in 75 countries.



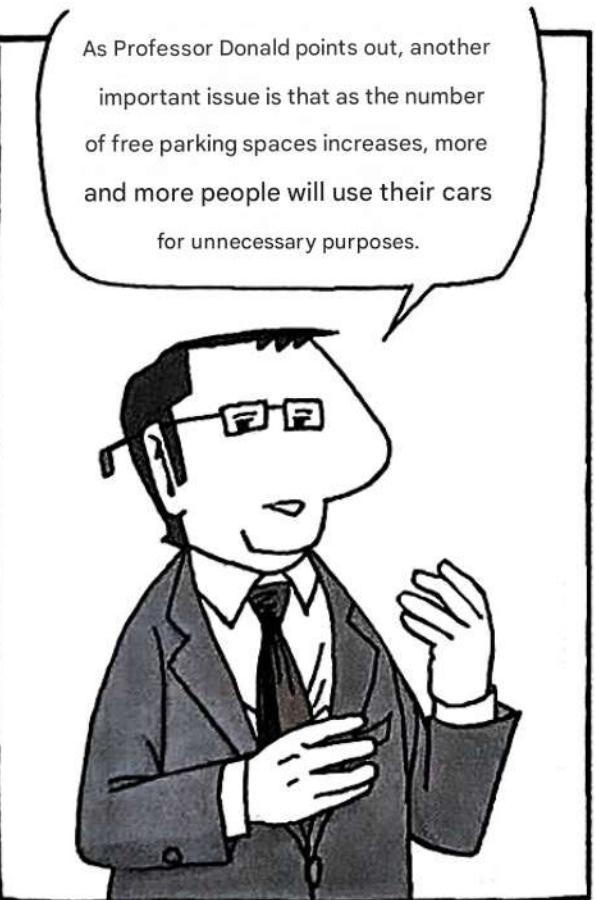
# The invisible hand can solve the parking problem



# The invisible hand can solve the parking problem



# The invisible hand can solve the parking problem



As Professor Donald points out, another important issue is that as the number of free parking spaces increases, more and more people will use their cars for unnecessary purposes.

He proposed the "85% theory," which proposes charging differentiated parking fees based on occupancy rates. This ratio is based on his research finding that public parking is most effectively utilized when the occupancy rate of roadside parking spaces reaches 85%.

What advice does Professor Donald have?

Optimal rules for setting street parking prices: Occupancy  
rate

Occupancy surveys or monitoring

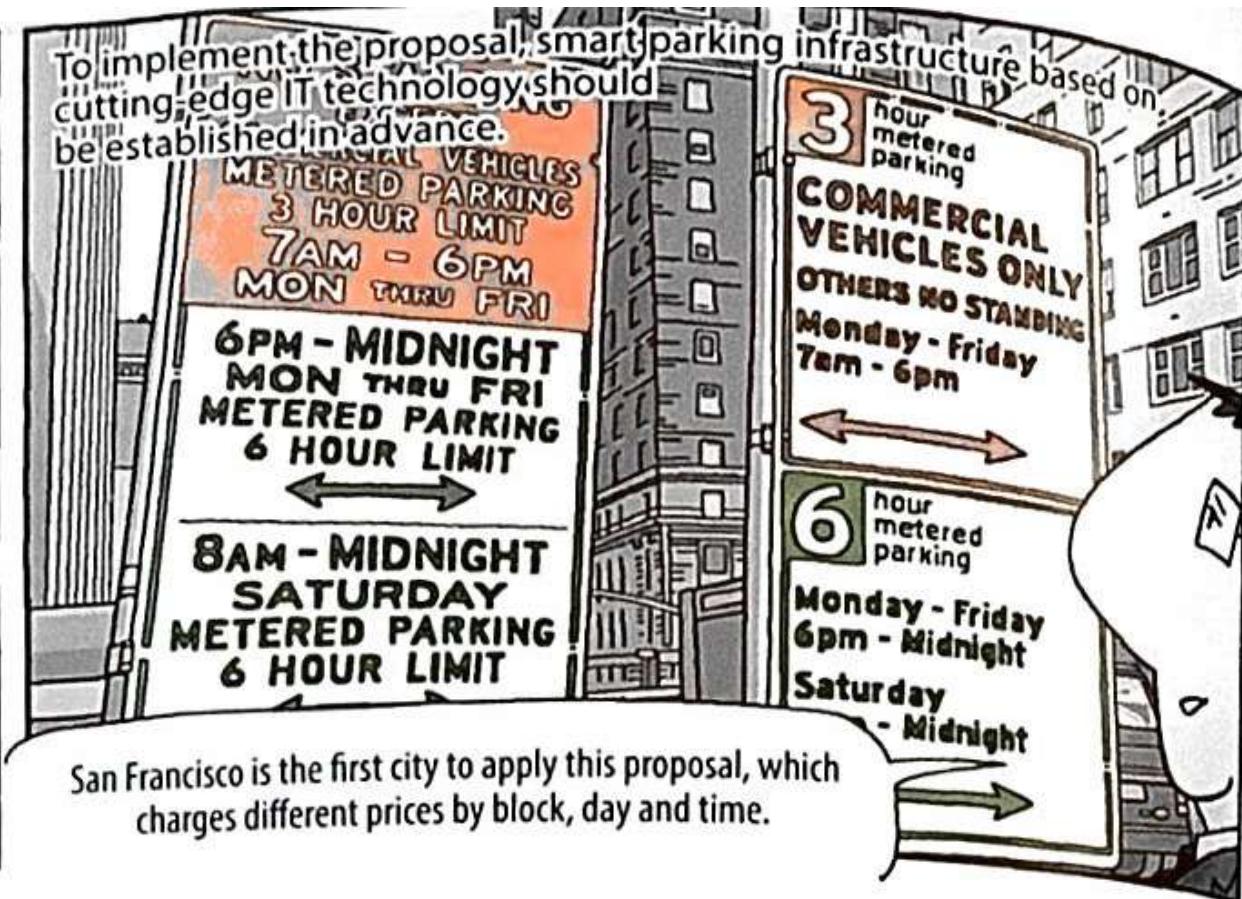
If occupancy is >85%, then increase the price.

If occupancy is less than 85%, lower the price.

If the occupancy rate reaches 85%, the price remains unchanged.

# The invisible hand can solve the parking problem

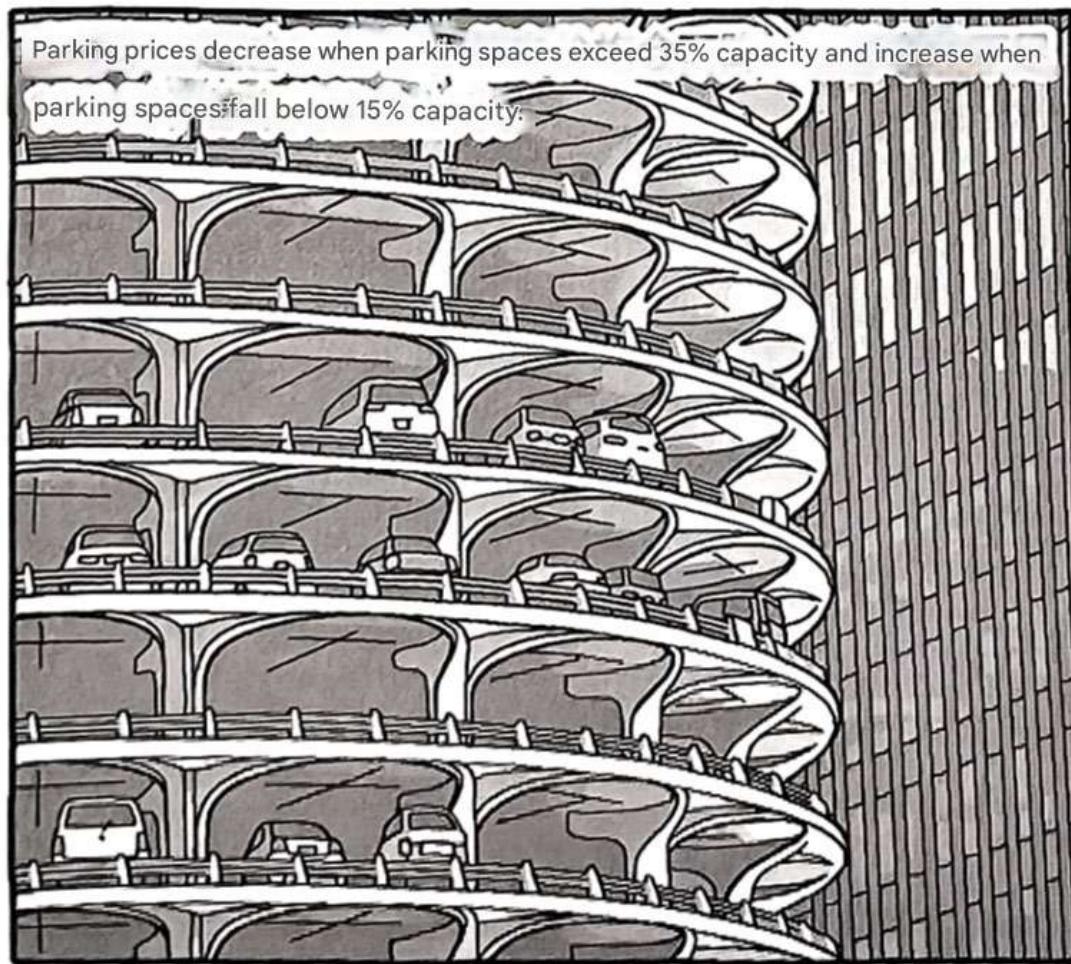
He argues that to increase consumer surplus, parking fees should rise when cars occupy more than 85% of the parking spaces, so people with more urgent matters can park first.



# The invisible hand can solve the parking problem

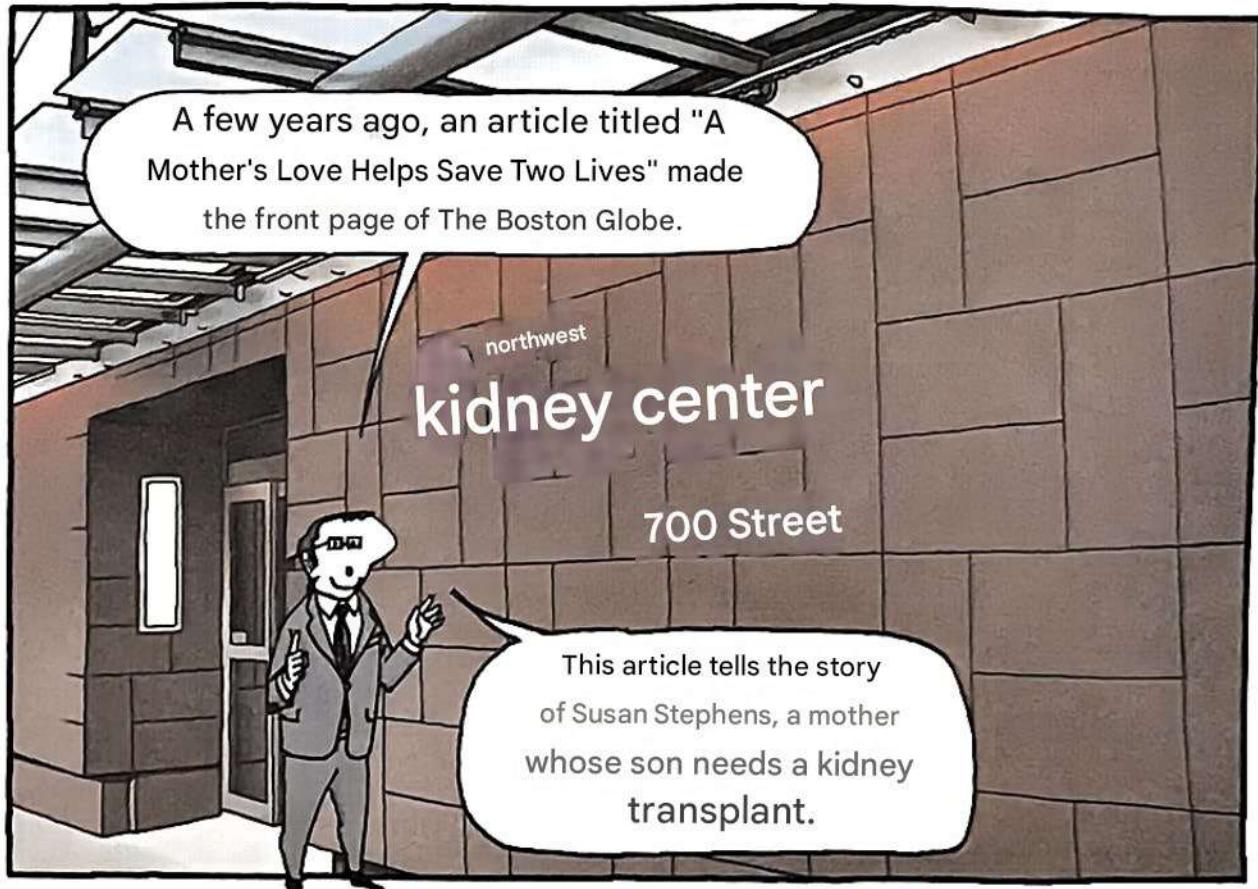


# The invisible hand can solve the parking problem



# Should a market for human organs exist?

Should a market for  
human organs exist?

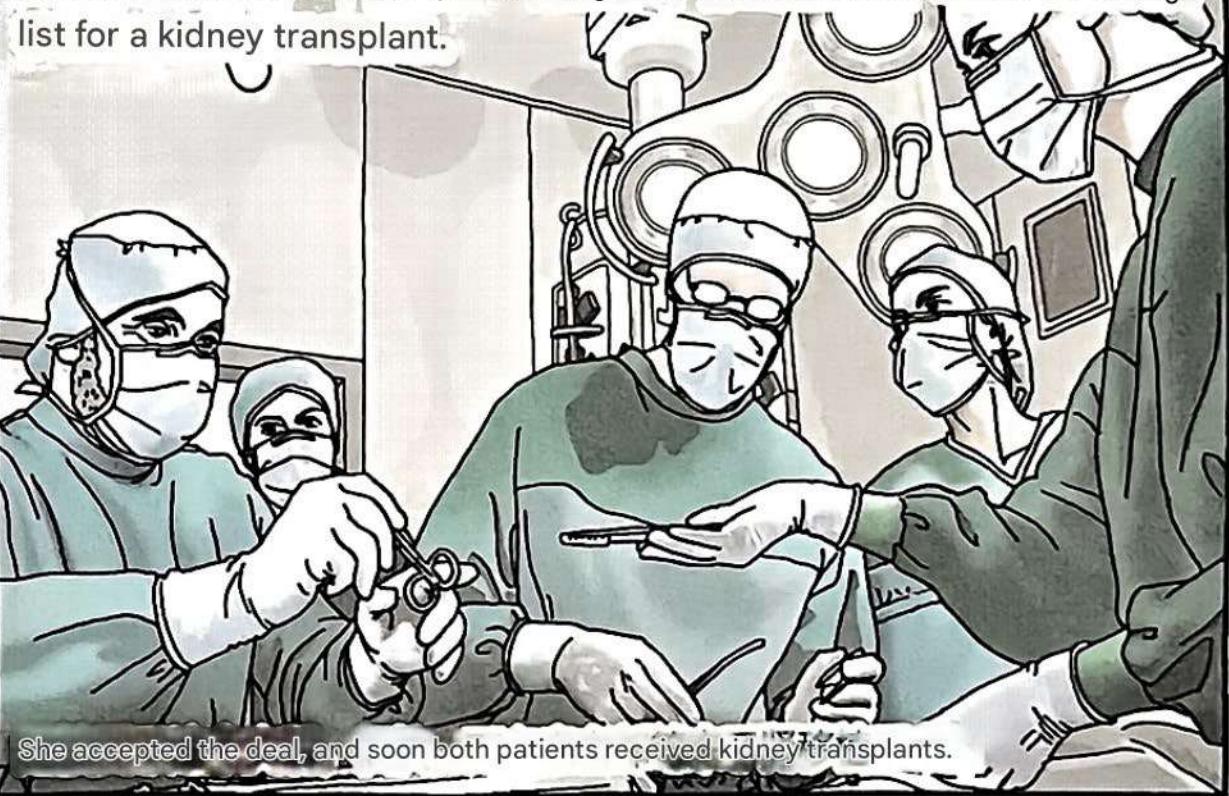


# Should a market for human organs exist?

When the doctor learned that the mother's kidney was not suitable, he proposed the following solution.

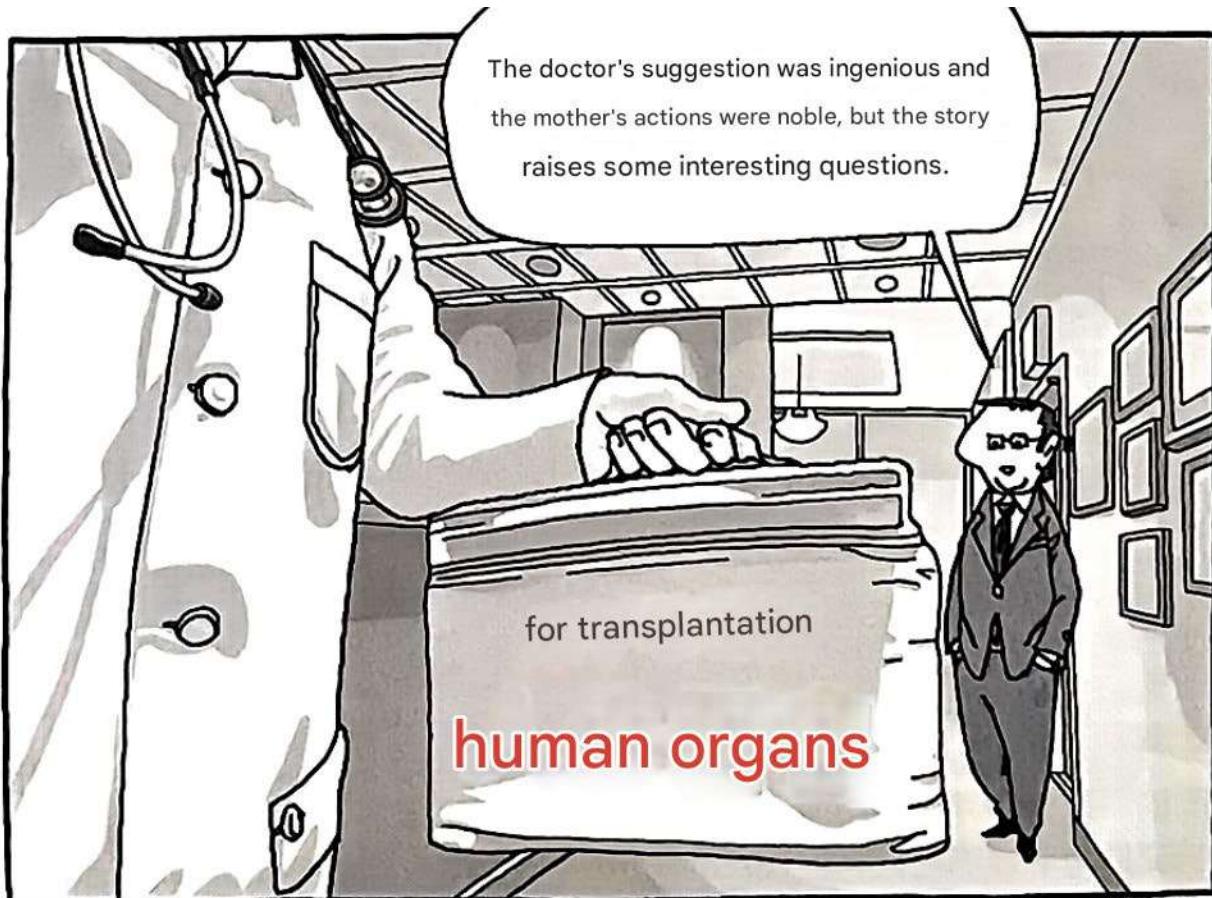


If Susan donates one of her kidneys to a stranger, her son could be at the front of the waiting list for a kidney transplant.

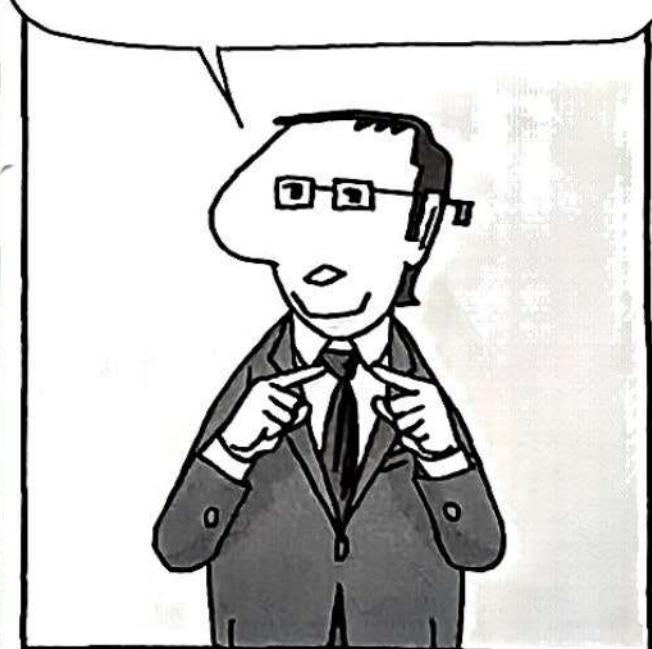


She accepted the deal, and soon both patients received kidney transplants.

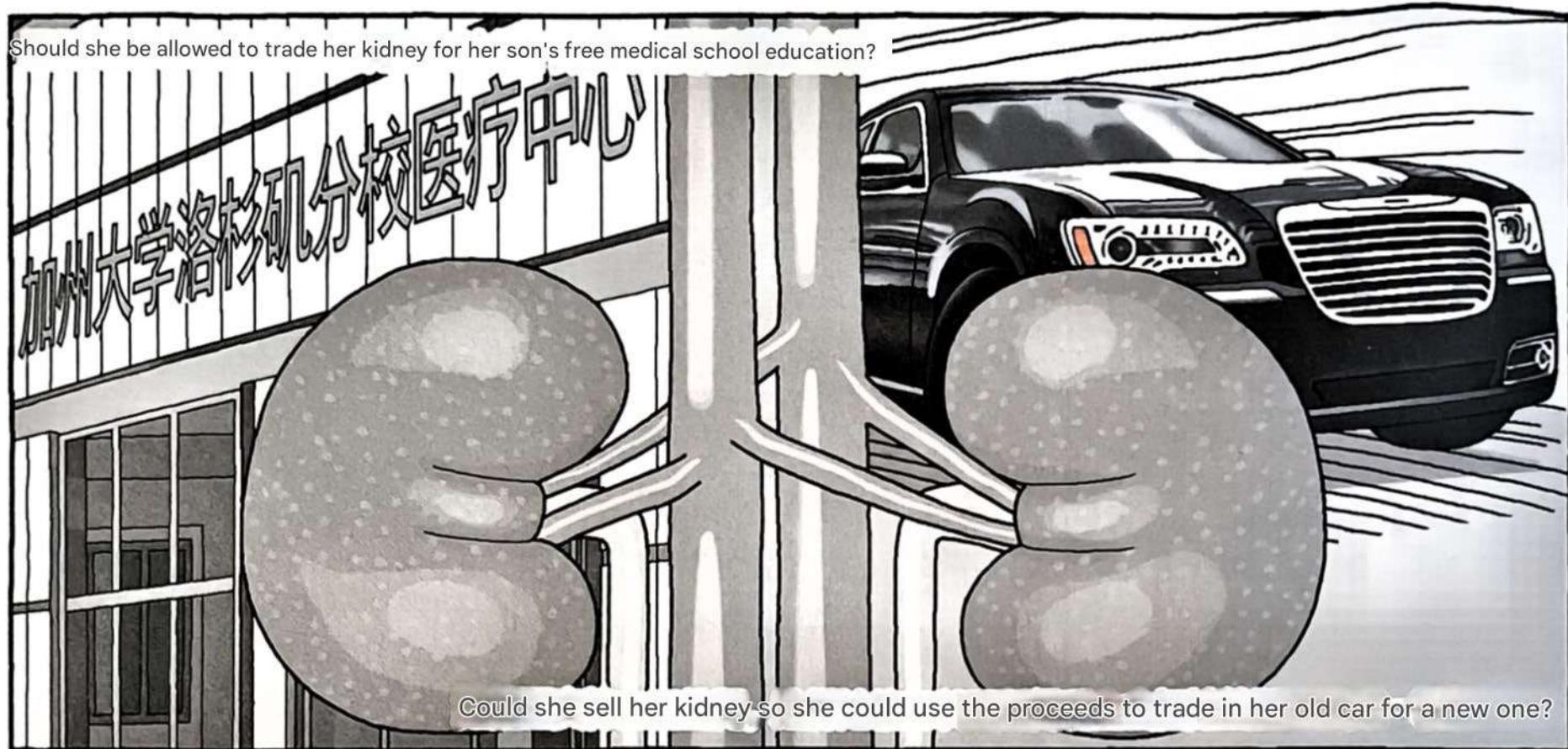
# Should a market for human organs exist?



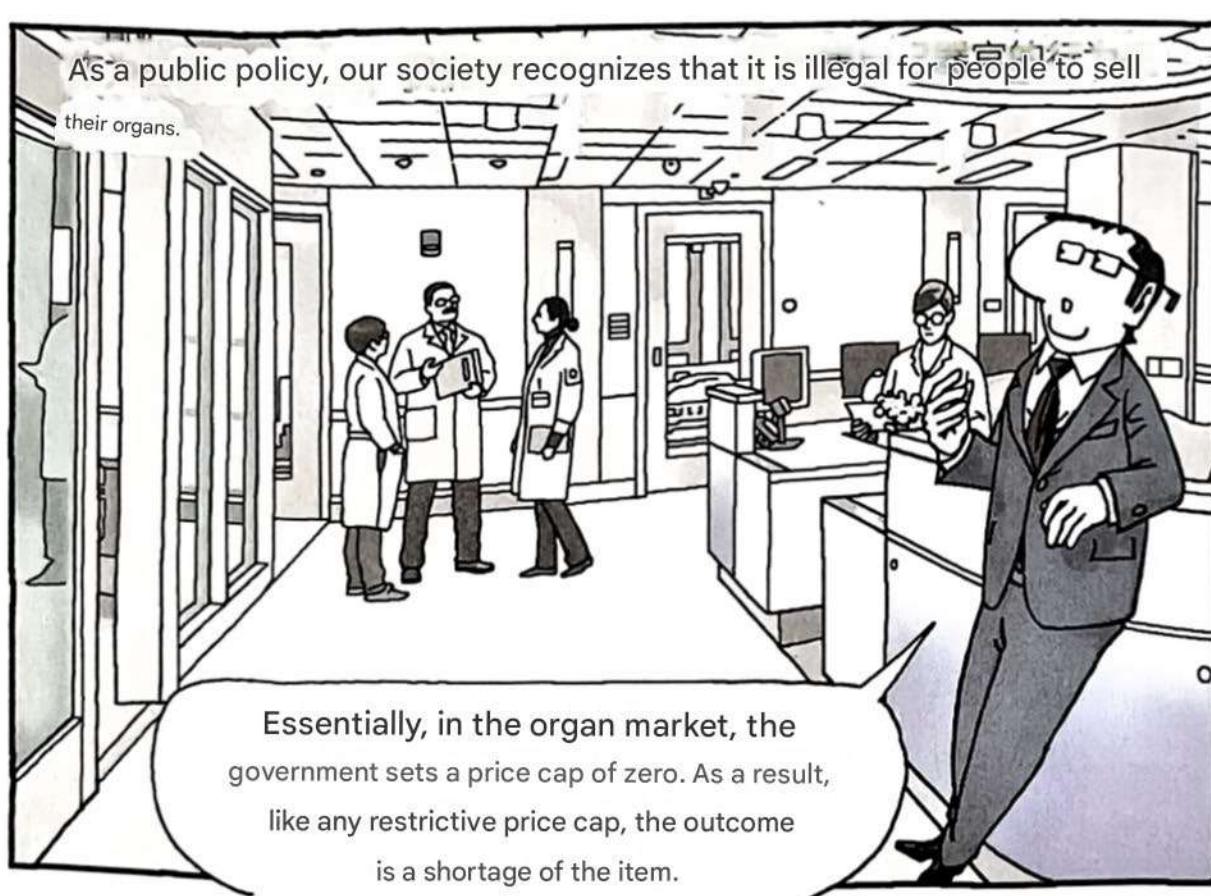
If a mother can donate one kidney to another, should the hospital allow her to exchange one kidney for experimental, expensive cancer treatments that she cannot afford?



# Should a market for human organs exist?



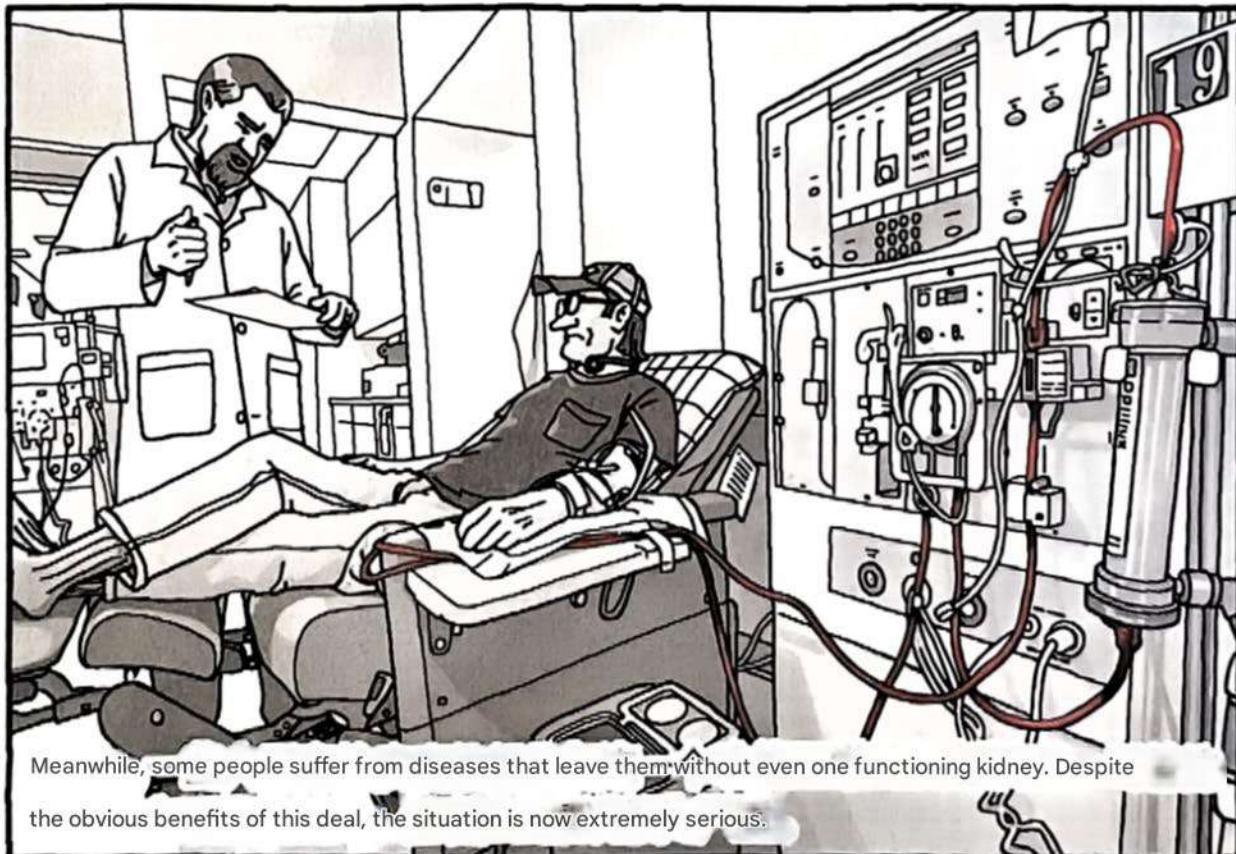
# Should a market for human organs exist?



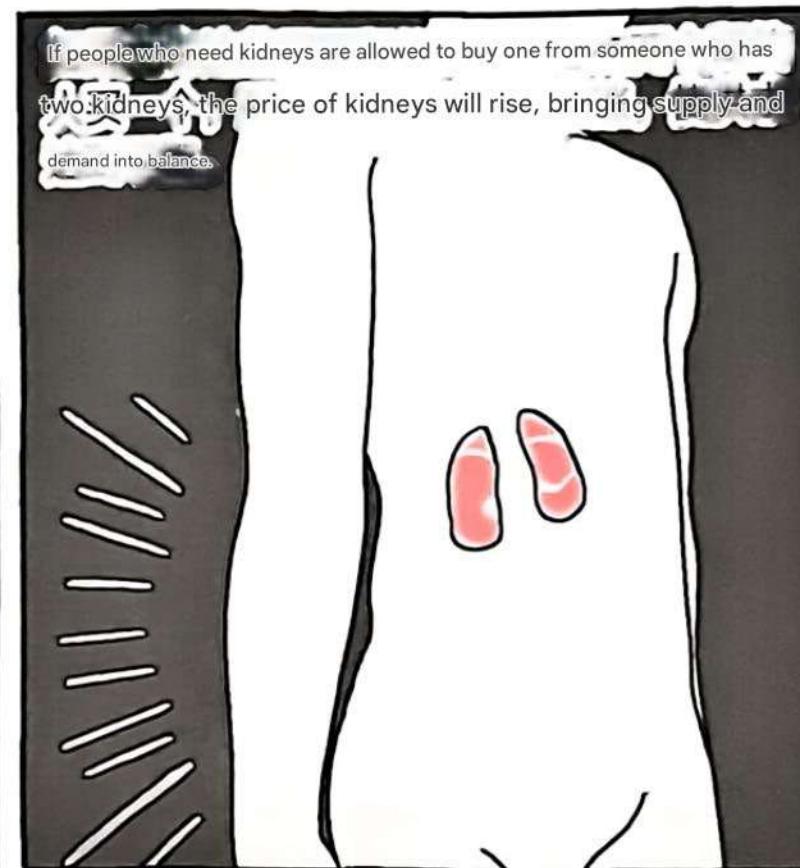
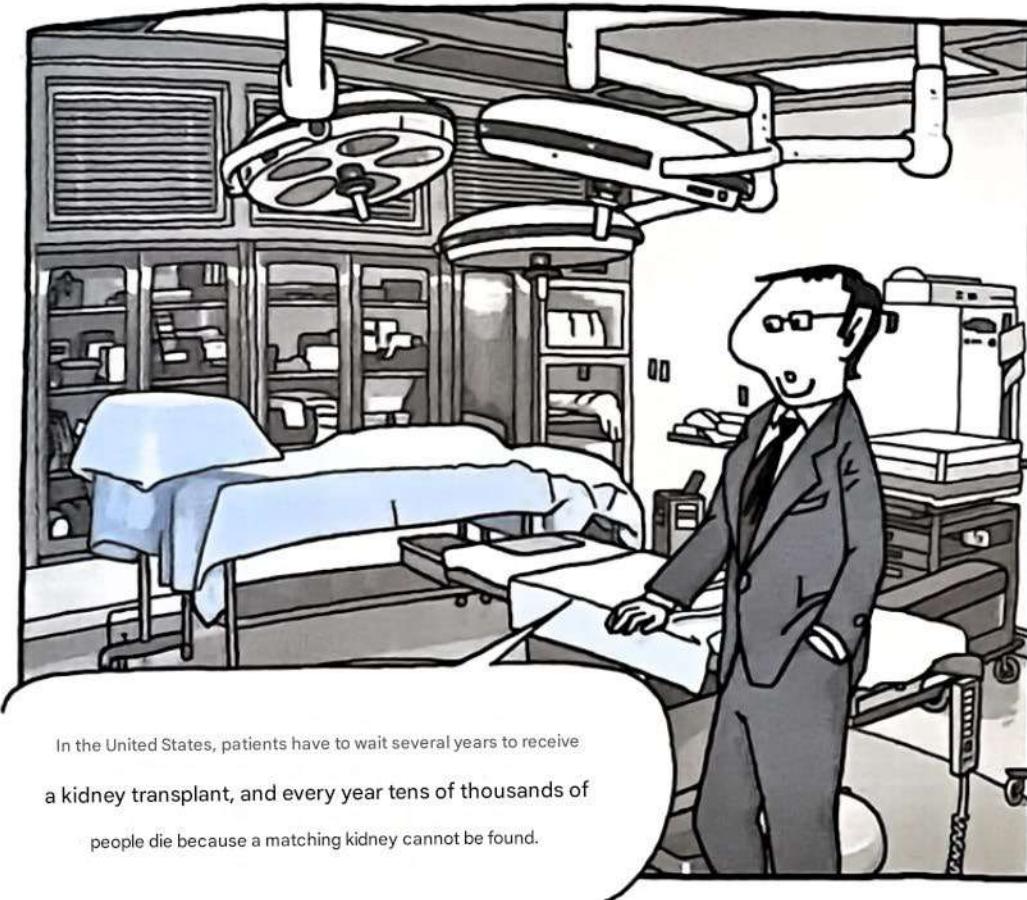
# Should a market for human organs exist?

Many economists believe that allowing a free market for human organs would generate enormous benefits.

Because humans are born with two kidneys, but people usually only need one.



# Should a market for human organs exist?



# Should a market for human organs exist?

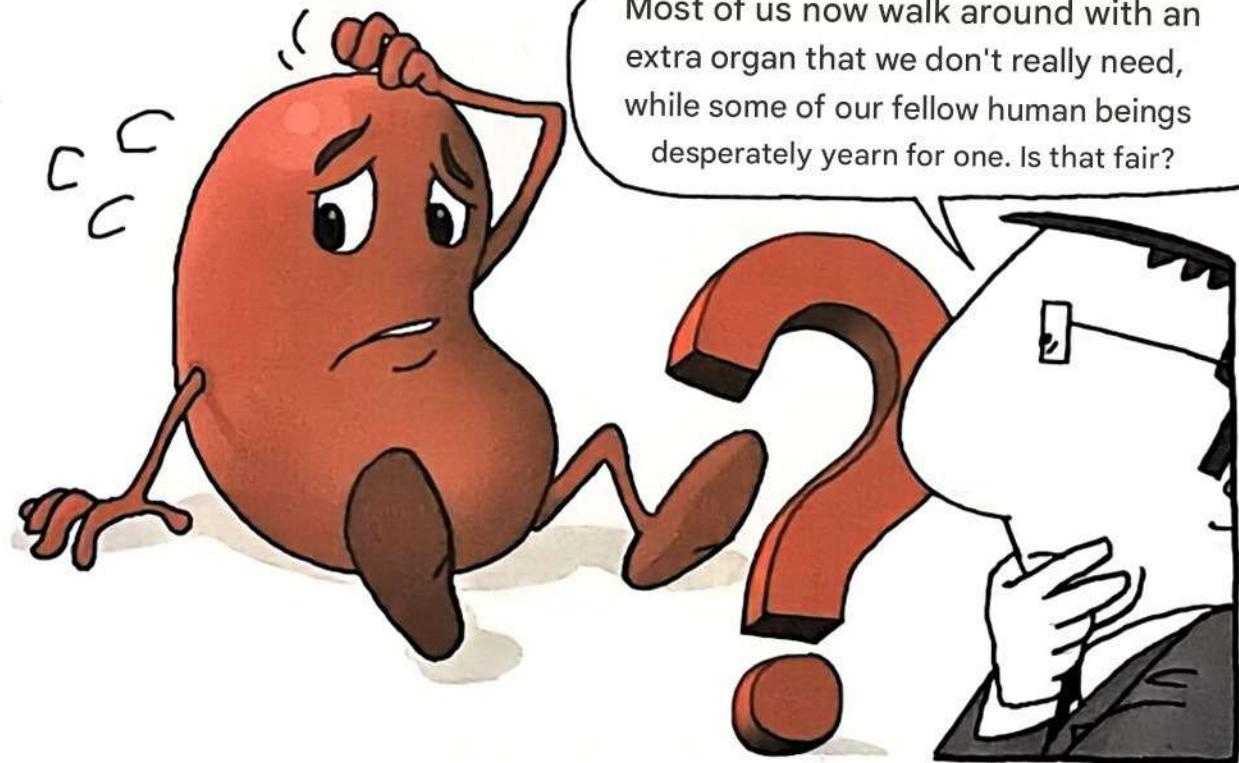
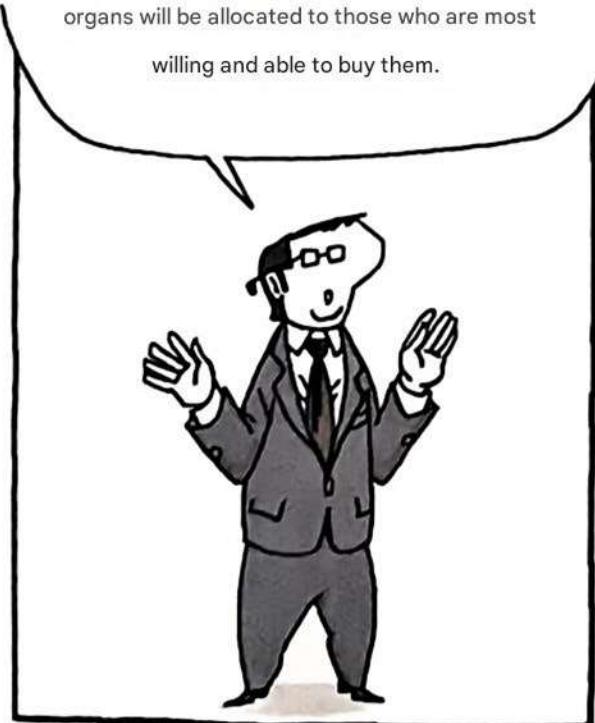


# Should a market for human organs exist?

They believe that the organ market will benefit the rich at the expense of the poor, because organs will be allocated to those who are most willing and able to buy them.

However, the fairness of the current system is also questionable.

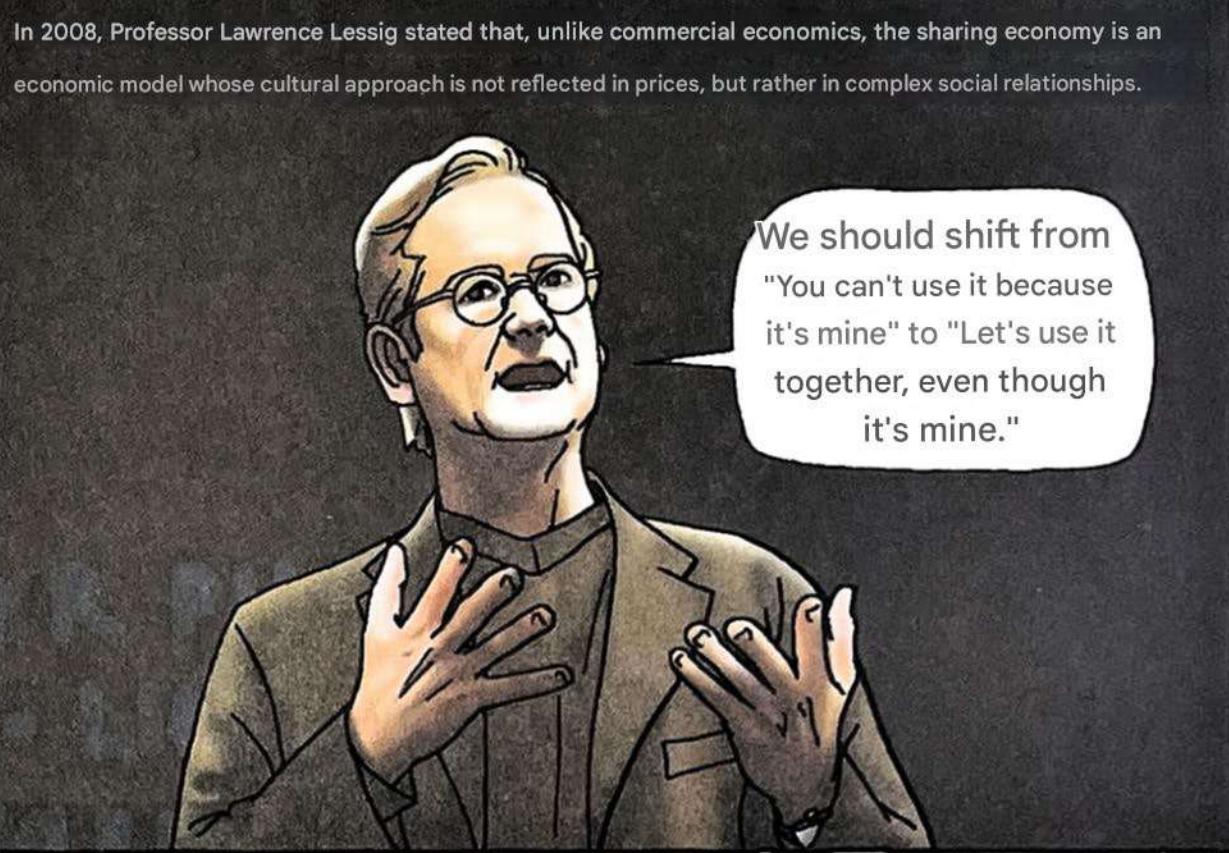
Most of us now walk around with an extra organ that we don't really need, while some of our fellow human beings desperately yearn for one. Is that fair?



# Who benefits from Airbnb?

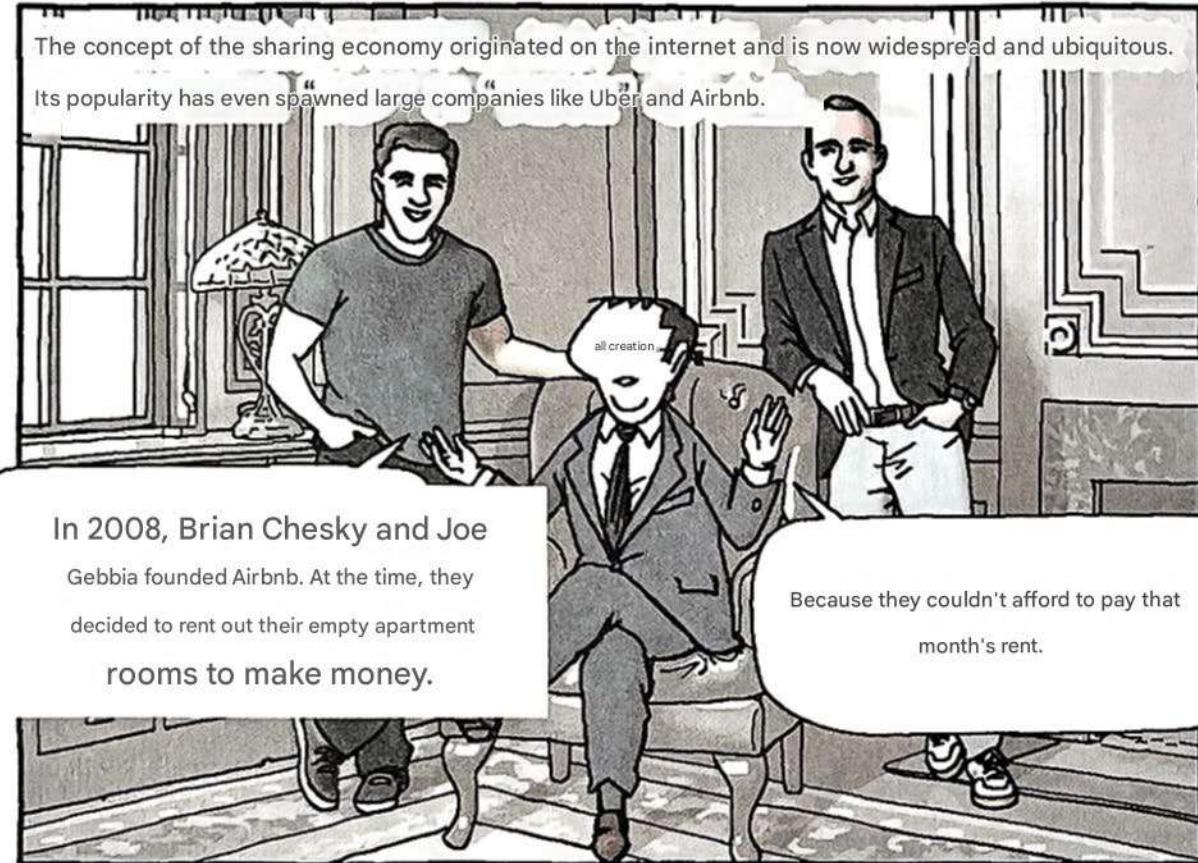
Who benefits from  
Airbnb?

In 2008, Professor Lawrence Lessig stated that, unlike commercial economics, the sharing economy is an economic model whose cultural approach is not reflected in prices, but rather in complex social relationships.

A cartoon illustration of Professor Lawrence Lessig, an older man with glasses and a white beard, wearing a suit and tie. He is gesturing with his hands while speaking. A speech bubble to his right contains his quote.

We should shift from  
"You can't use it because  
it's mine" to "Let's use it  
together, even though  
it's mine."

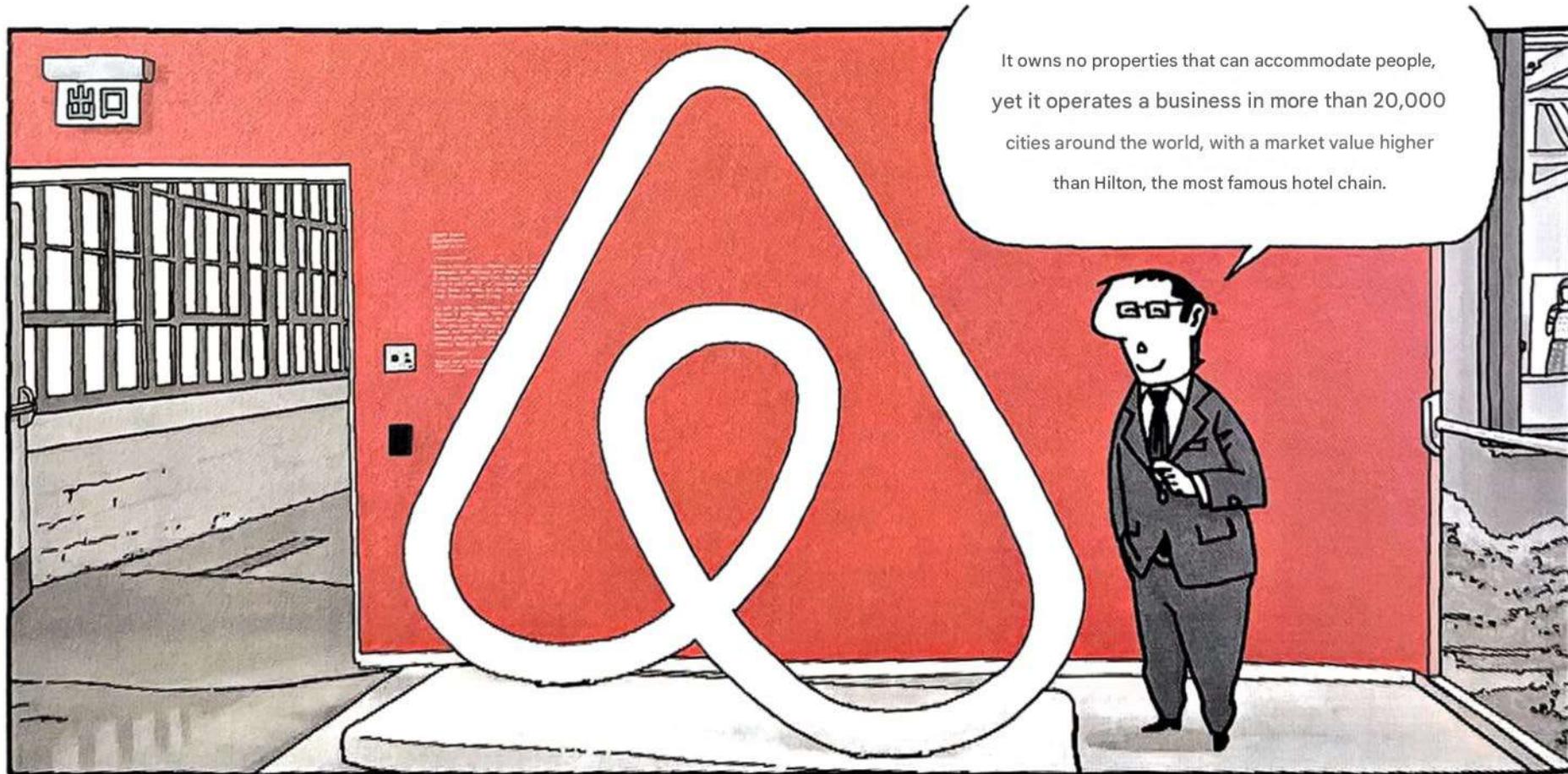
# Who benefits from Airbnb?



Airbnb provides a service that connects people looking for vacant rooms with vacant room providers worldwide, a service delivered via the internet and mobile applications.



# Who benefits from Airbnb?



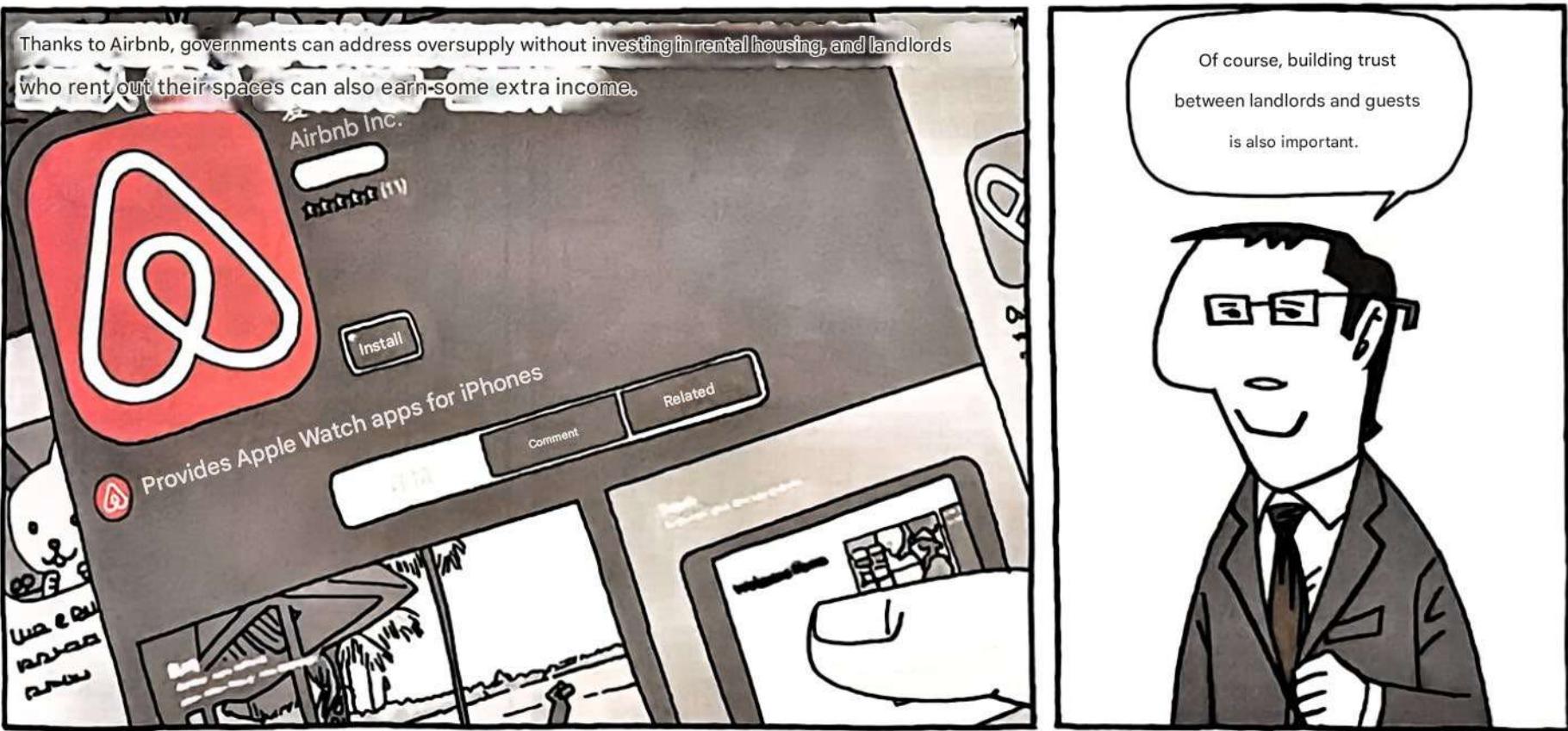
# Who benefits from Airbnb?

People rent out their houses because they need to travel for work, or some people rent out spare rooms to pay rent, or some people rent out extra houses.

Using Airbnb is both economical and beneficial for hosts, as they can easily list their available rental properties through Airbnb instead of building new accommodations for travelers!

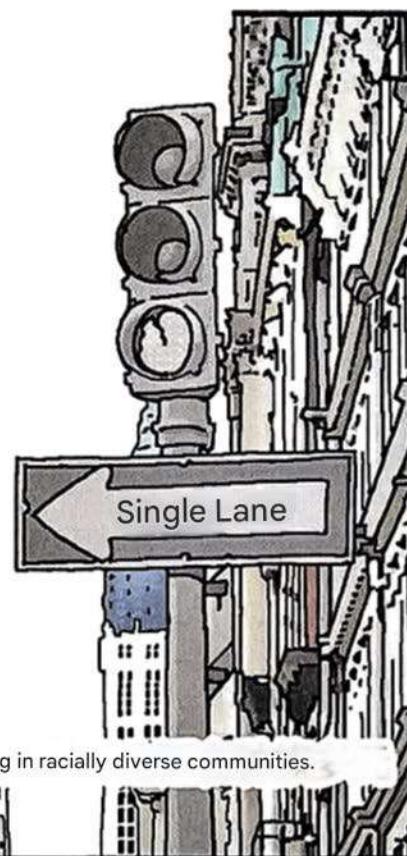


# Who benefits from Airbnb?

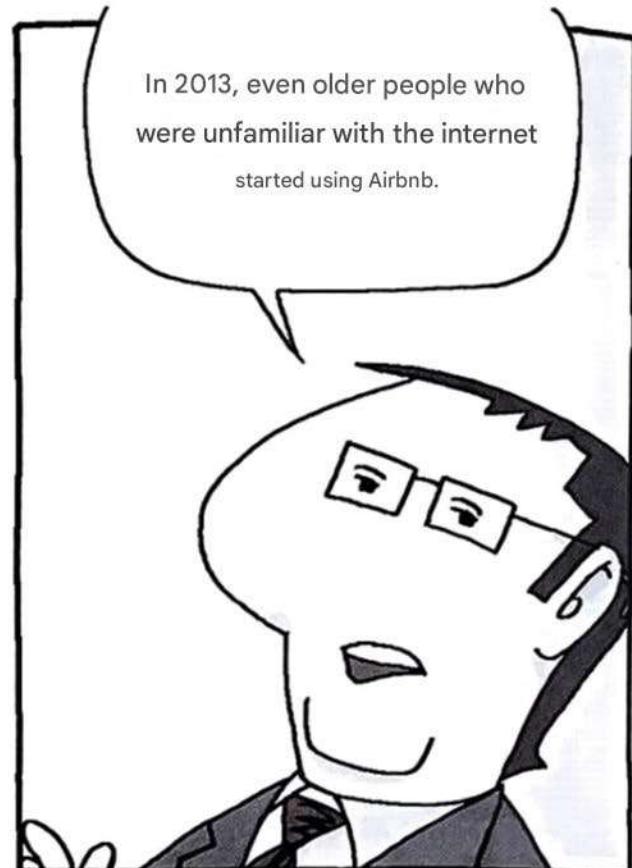


# Who benefits from Airbnb?

In 2012, Airbnb started in city centers.



In 2013, even older people who were unfamiliar with the internet started using Airbnb.



# Who benefits from Airbnb?

In 2014-2015, the trend of 2013 continued, but more people identified themselves as landlords, with relatively lower incomes and living in rental areas.

for our home  
make room

Support  
house  
sharing

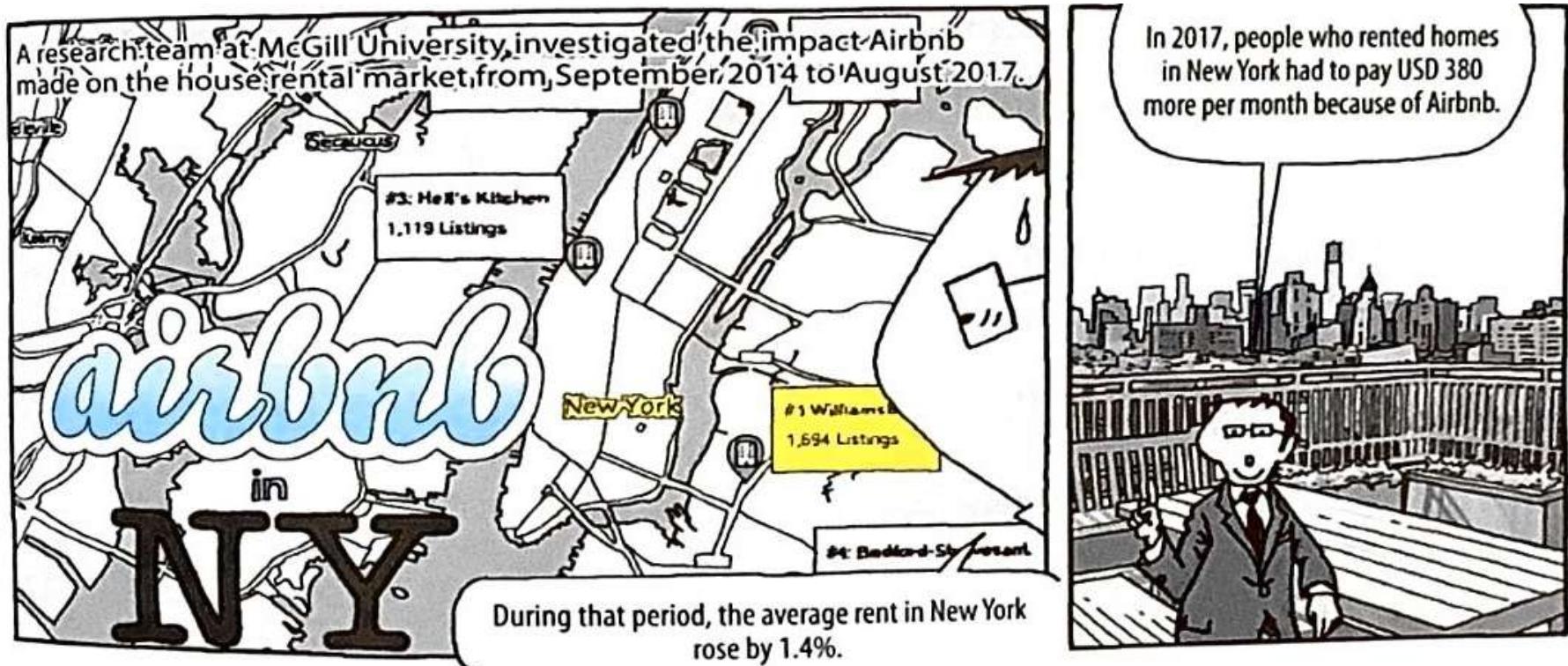


By increasing consumer surplus and producer surplus, Airbnb increases total surplus, thus contributing to improving the overall efficiency of society.

However, in this case, Airbnb's sharing economy model is short-term rentals.

A study suggests this has led to a surge in rental prices in New York City.

# Who benefits from Airbnb?

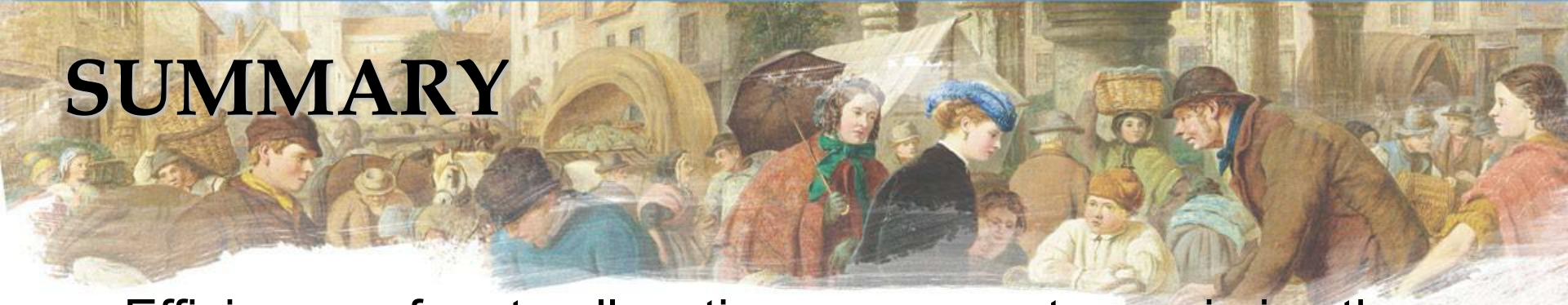


# SUMMARY



- One possible indicator of socioeconomic welfare is the sum of consumer surplus and producer surplus, which we call total surplus. Since the amount paid by buyers equals the amount received by sellers, we can express total surplus as follows:
  - Consumer surplus = Buyer's valuation - Amount paid by buyers
  - Producer surplus = Amount received by sellers - Seller's cost
  - Total surplus = Consumer surplus + Producer surplus = Buyer's valuation - Seller's cost

# SUMMARY



- Efficiency refers to allocating resources to maximize the total surplus received by all members of society, while equality refers to the even distribution of economic prosperity among members of society. The efficiency problem focuses on whether the "cake" is made as large as possible, while the equality problem focuses on how to cut this cake into smaller pieces and whether these pieces are distributed equally among members of society.

# SUMMARY



- The demand curve reflects buyers' valuations, and the supply curve reflects sellers' costs. At any quantity below the equilibrium level, buyers' valuations exceed sellers' costs. Therefore, increasing production and consumption increases total surplus. This continues until the quantity reaches the equilibrium level.
- Similarly, at any quantity above the equilibrium level, buyers' valuations are less than sellers' costs. In this case, reducing the quantity increases total surplus, and this continues until the quantity falls to the equilibrium level. Therefore, to maximize total surplus, a social planner would choose the quantity where the supply and demand curves intersect.

# SUMMARY



- Supply and demand equilibrium maximizes the sum of consumer surplus and producer surplus. In other words, the invisible hand of the market guides buyers and sellers to allocate resources efficiently. In cases of market failure (such as due to market power or externalities), the market fails to allocate resources efficiently.

## 思考题

---

1. Jane values her time at \$60 per hour. She spent 2 hours giving Colleen a massage. Colleen was willing to pay \$300 for the massage, but they agreed on a price of \$200. In this transaction,
  - a. Consumer surplus is \$20 more than producer surplus.
  - b. Consumer surplus is \$40 more than producer surplus.
  - c. Producer surplus is \$20 more than consumer surplus.
  - d. Producer surplus is \$40 more than consumer surplus.

## 思考题

---

2. The demand curve for cookies is downward sloping. When the price of cookies is \$2, the quantity demanded is 100. If the price of cookies rises to \$3, how will consumer surplus change?
- a. Decrease by less than \$100
  - b. Decrease by more than \$100
  - c. Increase by less than \$100
  - d. Increase by more than \$100

## 思考题

---

3. John has been working as a tutor, earning \$300 per semester. When the university increased the payment to tutors to \$400, Emily entered the market and started tutoring. By how much did the producer surplus increase due to the price increase?
- a. Less than \$100
  - b. \$100-\$200
  - c. \$200-\$300
  - d. More than \$300

## 思考题

4. The efficient allocation of resources maximizes \_\_\_\_\_.
- a. Consumer surplus
  - b. Producer surplus
  - c. Consumer surplus plus producer surplus
  - d. Consumer surplus minus producer surplus

## 思考题

---

5. When the market is in equilibrium, the buyers are those with the \_\_\_\_\_ willingness to pay, and the sellers are those with the \_\_\_\_\_ costs.
- a. highest, highest
  - b. highest, lowest
  - c. lowest, highest
  - d. lowest, lowest

## 思考题

---

6. Producing a quantity greater than the supply-demand equilibrium is inefficient because the marginal buyer's willingness to pay is:
- a. Negative
  - b. Zero
  - c. Positive, but less than the marginal seller's cost
  - d. Positive, and greater than the marginal seller's cost