In this chapter, look for the answers to these questions:

- What is consumer surplus? How is it related to the demand curve?
- What is producer surplus? How is it related to the supply curve?
- Do markets produce a desirable allocation of resources? Or could the market outcome be improved upon?

Welfare Economics

Recall, the allocation of resources refers to:
- how much of each good is produced
- which producers produce it
- which consumers consume it

Welfare economics

First, we look at the well-being of consumers.
Willingness to Pay (WTP)

A buyer’s willingness to pay for a good

WTP measures

<table>
<thead>
<tr>
<th>name</th>
<th>WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthony</td>
<td>$250</td>
</tr>
<tr>
<td>Chad</td>
<td>175</td>
</tr>
<tr>
<td>Flea</td>
<td>300</td>
</tr>
<tr>
<td>John</td>
<td>125</td>
</tr>
</tbody>
</table>

Example: 4 buyers’ WTP for an iPod

WTP and the Demand Curve

Derive the demand schedule:

<table>
<thead>
<tr>
<th>$P$ (price of iPod)</th>
<th>who buys</th>
<th>$Q^d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$301 &amp; up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>251 – 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>176 – 250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>126 – 175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WTP and the Demand Curve

<table>
<thead>
<tr>
<th>$P$</th>
<th>$Q^d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$350$</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>$250$</td>
<td></td>
</tr>
<tr>
<td>$200$</td>
<td></td>
</tr>
<tr>
<td>$150$</td>
<td></td>
</tr>
<tr>
<td>$100$</td>
<td></td>
</tr>
<tr>
<td>$50$</td>
<td></td>
</tr>
<tr>
<td>$0$</td>
<td></td>
</tr>
</tbody>
</table>
About the Staircase Shape...

This D curve looks like a staircase with 4 steps – one per buyer. If there were a huge # of buyers, as in a competitive market, there would be a huge # of very tiny steps, and it would look more like a smooth curve.

WTP and the Demand Curve

At any Q, the height of the D curve is the WTP of the marginal buyer.

Consumer Surplus (CS)

Consumer surplus

<table>
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<td>Flea</td>
<td>300</td>
</tr>
<tr>
<td>John</td>
<td>125</td>
</tr>
</tbody>
</table>

Suppose P = $260. Flea’s CS =
CONSUMERS, PRODUCERS, AND THE EFFICIENCY OF MARKETS

**CS and the Demand Curve**

\[ P = 260 \]

Flea's WTP = $260

Flea's CS =

Total CS =

**CS and the Demand Curve**

Instead, suppose \( P = 220 \)

Flea's WTP = $260

Flea's CS =

Anthony's WTP =

Anthony's CS =

Total CS =

**CS and the Demand Curve**

_The lesson:_

...
The demand for shoes $D$ at $Q = 5$ (thousand), the marginal buyer is willing to pay $\$\underline{____}$ for pair of shoes.

Suppose $P = \$30$.

Then his consumer surplus = $\$\underline{____}$.

Recall: area of a triangle equals $\frac{1}{2} \times$ base $\times$ height.

How a Higher Price Reduces CS

If $P$ rises to $\$40$, CS =

Two reasons for the fall in CS.
A. Find marginal buyer’s WTP at $Q = 10$.
B. Find CS for $P = $30.
Suppose $P$ falls to $20$. How much will CS increase due to…
C. buyers entering the market
D. existing buyers paying lower price

Cost and the Supply Curve

Example: Costs of 3 sellers in the lawn-cutting business.

<table>
<thead>
<tr>
<th>name</th>
<th>cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack</td>
<td>$10</td>
</tr>
<tr>
<td>Janet</td>
<td>20</td>
</tr>
<tr>
<td>Chrissy</td>
<td>35</td>
</tr>
</tbody>
</table>

A seller will produce and sell the good/service only if
**Cost and the Supply Curve**

Derive the supply schedule from the cost data:

<table>
<thead>
<tr>
<th>name</th>
<th>cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack</td>
<td>$10</td>
</tr>
<tr>
<td>Janet</td>
<td>20</td>
</tr>
<tr>
<td>Chrissy</td>
<td>35</td>
</tr>
</tbody>
</table>

**Cost and the Supply Curve**

<table>
<thead>
<tr>
<th>$P$</th>
<th>$Q^s$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0-9$</td>
<td></td>
</tr>
<tr>
<td>$10-19$</td>
<td></td>
</tr>
<tr>
<td>$20-34$</td>
<td></td>
</tr>
<tr>
<td>$35 &amp; up$</td>
<td></td>
</tr>
</tbody>
</table>

**Cost and the Supply Curve**

- Chrissy's cost
- Janet's cost
- Jack's cost
**Producers Surplus**

Producer surplus (PS): $\text{PS} = P - \text{cost}$

Suppose $P = $25.
- Jack's PS =
- Janet's PS =
- Chrissy's PS =
- Total PS =

Total PS equals $\text{PS with Lots of Sellers & a Smooth S Curve}$

Suppose $P = $40.

At $Q = 15$ (thousand), the marginal seller's cost is $\_\_\_\_\_$

and her producer surplus is $\_\_\_$
CONSUMERS, PRODUCERS, AND THE EFFICIENCY OF MARKETS

PS with Lots of Sellers & a Smooth S Curve

PS is the area b/w

The supply of shoes

The height of this triangle is

So,

PS = \( \frac{1}{2} \times b \times h \)

How a Lower Price Reduces PS

If \( P \) falls to $30,

PS =

Two reasons for the fall in PS.

ACTIVE LEARNING

Producer surplus

A. Find marginal seller's cost at \( Q = 10 \).
B. Find total PS for \( P = $20 \).
Suppose \( P \) rises to $30. Find the increase in PS due to...
C. selling 5 additional units
D. getting a higher price on the initial 10 units
CS, PS, and Total Surplus

CS = buyers' gains from participating in the market
PS = (amount received by sellers) – (cost to sellers)

Total surplus =

The Market's Allocation of Resources

In a market economy, the allocation of resources is decentralized, determined by the interactions of many self-interested buyers and sellers.

Is the market's allocation of resources desirable? Or would a different allocation of resources make society better off?

To answer this,

(Policymakers also care about equality, though are focus here is on efficiency.)
Efficiency

An allocation of resources is **efficient**

Efficiency means:

\[
\text{Total surplus} = (\text{value to buyers}) - (\text{cost to sellers})
\]

Evaluating the Market Equilibrium

Market eq'm:

- \( P = \$30 \)
- \( Q = 15,000 \)

Is the market eq'm efficient?

Which Buyers Consume the Good?

Every buyer whose WTP is

Every buyer whose WTP is

So,
Which Sellers Produce the Good?

Every seller whose

Every seller whose

So,

Does Eq’m Q Maximize Total Surplus?

At Q = 20,

value to consumers of the marginal unit is $____

Hence, can increase total surplus by _______________

This is true at any Q greater than 15.

At Q = 10,

value to consumers of the marginal unit is $____

Hence, can increase total surplus by _______________

This is true at any Q less than 15.
Adam Smith and the Invisible Hand

"Man has almost constant occasion for the help of his brethren, and it is vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favor, and show them that it is for their own advantage to do for him what he requires of them… It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest….

Adam Smith, 1723-1790

Passages from The Wealth of Nations, 1776

"Every individual…neither intends to promote the public interest, nor knows how much he is promoting it….
He intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it."

Adam Smith, 1723-1790

Passages from The Wealth of Nations, 1776
**The Free Market vs. Govt Intervention**

- The market equilibrium is efficient. No other outcome achieves higher total surplus.
- Govt cannot raise total surplus by changing the market's allocation of resources.
- (French for “allow them to do”): the notion that

**The free market vs. central planning**

- Suppose resources were allocated not by the market, but by a central planner who cares about society’s well-being.
- To allocate resources efficiently and maximize total surplus, the planner would need to know

- This is impossible, and why centrally-planned economies are never very efficient.

**CONCLUSION**

- This chapter used welfare economics to demonstrate one of the Ten Principles: Market are usually a good way to organize economic activity.
- Important note: We derived these lessons assuming perfectly competitive markets.
- In other conditions we will study in later chapters, the market may fail to allocate resources efficiently…
CONCLUSION

Such market failures occur when:

We’ll use welfare economics to see how public policy may improve on the market outcome in such cases.

Despite the possibility of market failure, the analysis in this chapter applies in many markets, and the invisible hand remains extremely important.