

2.4 Critique of the maximising behaviour of consumers and producers (HL)

Rational consumer choice

Theory of Knowledge

This section is a rich source of ideas and examples for TOK essays and presentations. The section deals with economists' assumption of reason (rationality) in models and the criticisms of those assumptions. These criticisms use knowledge from the discipline of psychology about emotion and other drivers of human behaviour.

Thus, the information in this section can be used to discuss models including the assumptions of a discipline, how Ways of Knowing in different disciplines can inform each other, and how knowledge in different disciplines evolves.

Some good sources include:

- *Thinking, Fast and Slow*, Daniel Kahneman
- *Nudge*, Richard Thaler
- *Predictably Irrational*, Dan Ariely
- *Doughnut Economics*, Kate Raworth
- *What Money Can't Buy*, Michael Sandel

Assumptions about consumer behaviour

As was discussed in [section 2.1.3 \(<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/hl-assumptions-underlying-the-law-of-demand-id-29857/>\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/hl-assumptions-underlying-the-law-of-demand-id-29857/), most economic models make some key assumptions about human behaviour. It is important to be aware of them, because if the assumptions are false, then economic theories may not hold true.

Consumer rationality = utility maximisation under perfect information

One of the key assumptions is that consumers exhibit rational behaviour, and rationality in economics has a specific meaning.

- Rational consumers have *clear preferences* for goods and services that are stable over time and transitive. Transitivity is a property in mathematical logic meaning that if a consumer prefers apples to oranges, and oranges to bananas, that the consumer must prefer apples to bananas.
- Rational consumers have *highly developed analytical skills* that enable them to determine which goods they prefer and to effectively compare their possible choices in terms of costs and satisfaction (utility).
- Rational consumers have perfect information. This simplifies economic models because we do not have to think about consumers making incorrect decisions based on false or incomplete information about alternative choices.
- Rational consumers want to maximise personal satisfaction (utility) at all times.

In sum, rational behaviour for an economist means that people know what they want, can weigh up various choices they have effectively, and will always make choices that maximise their satisfaction (utility).

If all these assumptions are true, it means that consumers benefit from more choice. More choice increases the chance that consumers will find a highly satisfactory option. The logic of this probably feels right to you – who wouldn't want more choice? However, as we will see in the following sections, these assumptions have been challenged in recent decades. Making good, rational choices can actually be very difficult for people.

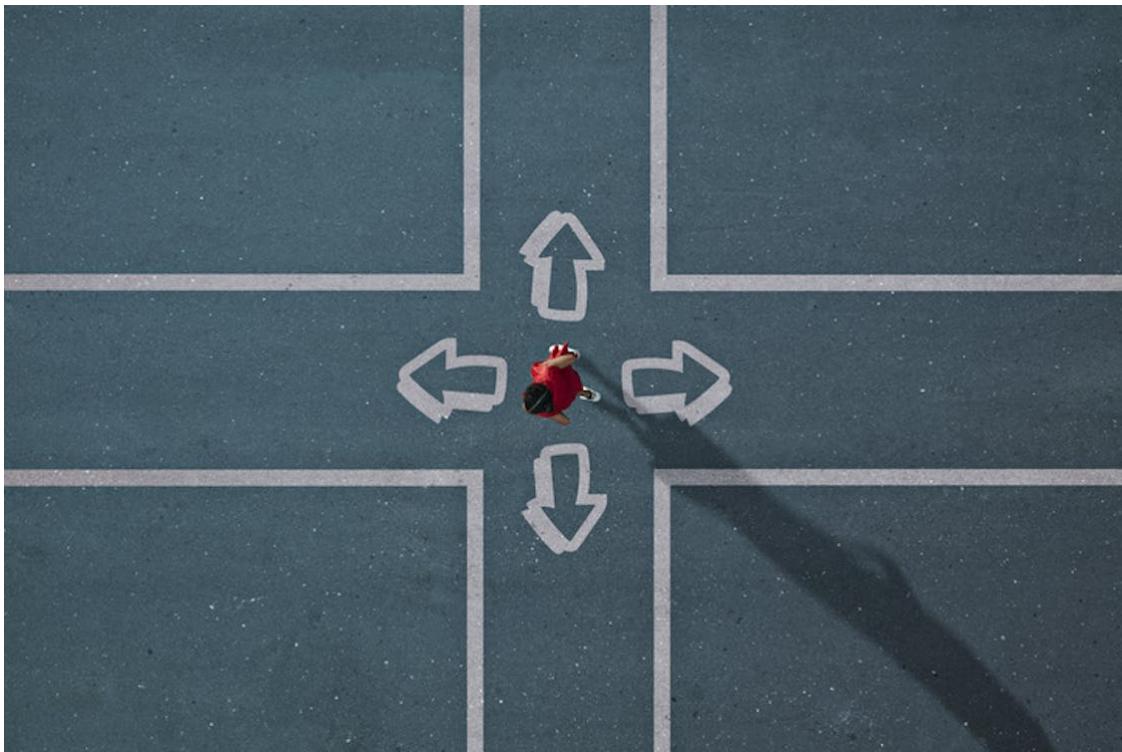


Figure 1. Assumption: rational consumers make choices that maximise their utility.

Credit: Klaus Vedfelt Getty Images

Behavioural economics — the limitations of rational choice

Exam tip

The assessment objective with this material is AO3. This means that you are expected to examine, discuss and/or evaluate using this information.

It is important to understand that the ideas presented below are meant to help define some limitations of the economic models used in this course. So understanding these behavioural economic theories can help you examine or evaluate economic models that assume completely rational human behaviour. It is important that for each of the theories below, you can say how it undermines the assumptions of rational consumer behaviour.

In contrast to economists' assumptions about the singularly rational *Homo economicus*, psychologists have used a dual process model to analyse human thinking for many decades. In this model, it is assumed that people have two broad ways of thinking, often called System 1 and System 2.

System 1 refers to human thinking that comes automatically, with little effort and little or no control. When you react to a sudden, loud noise or feel disgust when shown a picture of rotten food, you are reacting with System 1 thinking. Some of these modes of thinking and reacting are shared with other animals. Others are learned, but still relatively automatic. Most of the time we are awake, System 1 is very active.

System 2 refers to human thinking that is conscious, reasoned and deliberate. For example, when you sit down to solve an IB Mathematics problem, you probably think slowly and carefully, recalling formulas or systems needed to solve it. You reason through it deliberately and it requires mental work. Your System 2 is not always activated. It may be called on in certain occasions when System 1 has no answer, such as for a complex mathematics problem. Economic models assume that human beings are guided mainly by System 2 thinking, but this assumption is not backed up by psychological research.

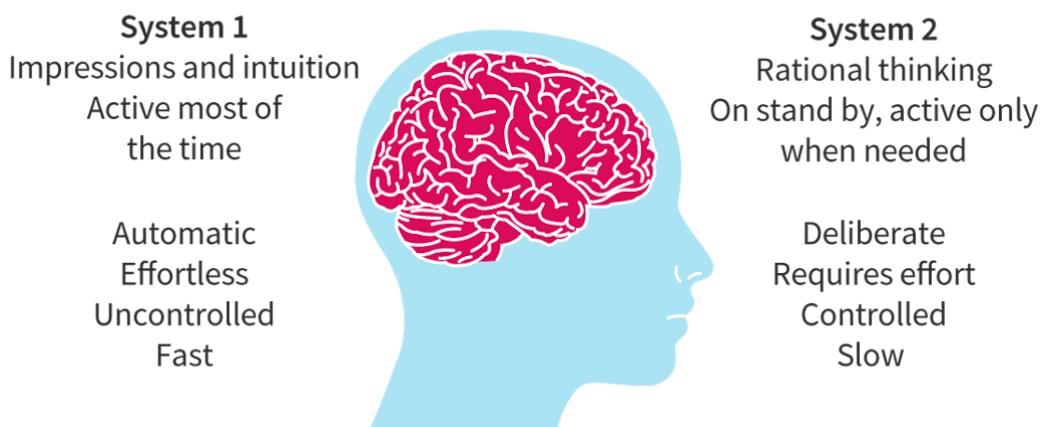


Figure 2. System 1 and System 2 thinking.

[More information for figure 2](#)

The image is an illustration showing a human brain inside the outline of a head. The brain is central, and the head is facing to the right. On the left side of the brain, text labels describe 'System 1' as follows: 'Impressions and intuition', 'Active most of the time', 'Automatic', 'Effortless', 'Uncontrolled', 'Fast.' On the right side, labels explain 'System 2': 'Rational thinking', 'On stand by, active only when needed', 'Deliberate', 'Requires effort', 'Controlled', 'Slow.' This illustration represents dual process theory, where System 1 is fast and automatic, while System 2 is slow and requires effort.

[Generated by AI]

According to psychologists, both of these systems are present in human beings and act together to make human decision-making efficient. Most of the time when we are awake, System 1 is active and System 2 is on stand-by. System 1 reacts to the

environment with impressions, feelings and intuitions. System 2 turns these into beliefs that guide actions. People generally believe their intuitions and make decisions based on them, and this works well most of the time.

However, System 1 has certain biases and System 1 thinking tends to make predictable errors in certain circumstances. When we make these errors, we may behave in a way that conflicts with System 2 thinking, and may seem irrational. The remainder of this section will explain some of this predictably irrational behaviour that undermines the assumptions made by economists about *Homo economicus*.

Cognitive biases

Psychologists have outlined a number of ways that human thinking and decision-making deviates from rationality; these are called cognitive biases. The application of these biases to economics was driven most notably by Amos Tversky and Daniel Kahneman, who won the Nobel Prize in Economics in 2002. Their work with Richard Thaler, who himself won the Nobel Prize in 2017, forms the foundation of behavioural economics.

Rules of thumb

A rule of thumb is a broadly accurate principle that acts as a useful guide even though it may not always be correct. The origin of the phrase is disputed, but likely comes from the many ways that the thumb has been used to make estimates, such as for length.

Psychologists use the term heuristic to mean something similar. A heuristic is an approach to solving a problem that uses a practical method that may not be particularly rational, but is sufficient to reach a goal. It is a mental shortcut that makes it easier to solve a problem or reach a decision.

Anchoring heuristic

One such heuristic, or rule of thumb, is called anchoring. Anchoring is a strategy that people use to make guesses about things they do not know, by thinking about things they do know and then making an adjustment. People often make decisions based on anchors.

Richard Thaler cites an example of anchoring in his book *Nudge*, about population sizes. If you were asked to guess the population of Cape Town, South Africa (and you didn't know it), you might think of the population of your own city

and consider some comparisons between your own city and Cape Town to come up with a guess about Cape Town's population size. For example, if you live in Cairo, you may know that Cairo's population is roughly 9.5 million people. You may also know that Cape Town is significantly smaller than Cairo – so what would your population guess for Cape Town be? (Do a search to find out after you make a guess.)

The problem with anchoring is that most people do not adjust their anchor by enough to come up with an accurate estimate. Cape Town is smaller than Cairo, by a lot, but most people who know the population of Cairo will not adjust their estimate for Cape Town by enough to come close to the correct population. Why does this matter?

Kahneman and Tversky found that people's thinking and decisions are affected by anchors all the time, even in cases where the anchors are completely irrelevant. In one study, experienced judges were asked to roll a dice and afterwards asked how long a prison sentence they would give a shoplifter. Those judges who rolled a high number were much more likely to deliver a prison sentence of a high number of months. Those judges who rolled a low number were much more likely to deliver a prison sentence of a low number of months. The numbers they rolled on the dice affected their decisions without them realising it.

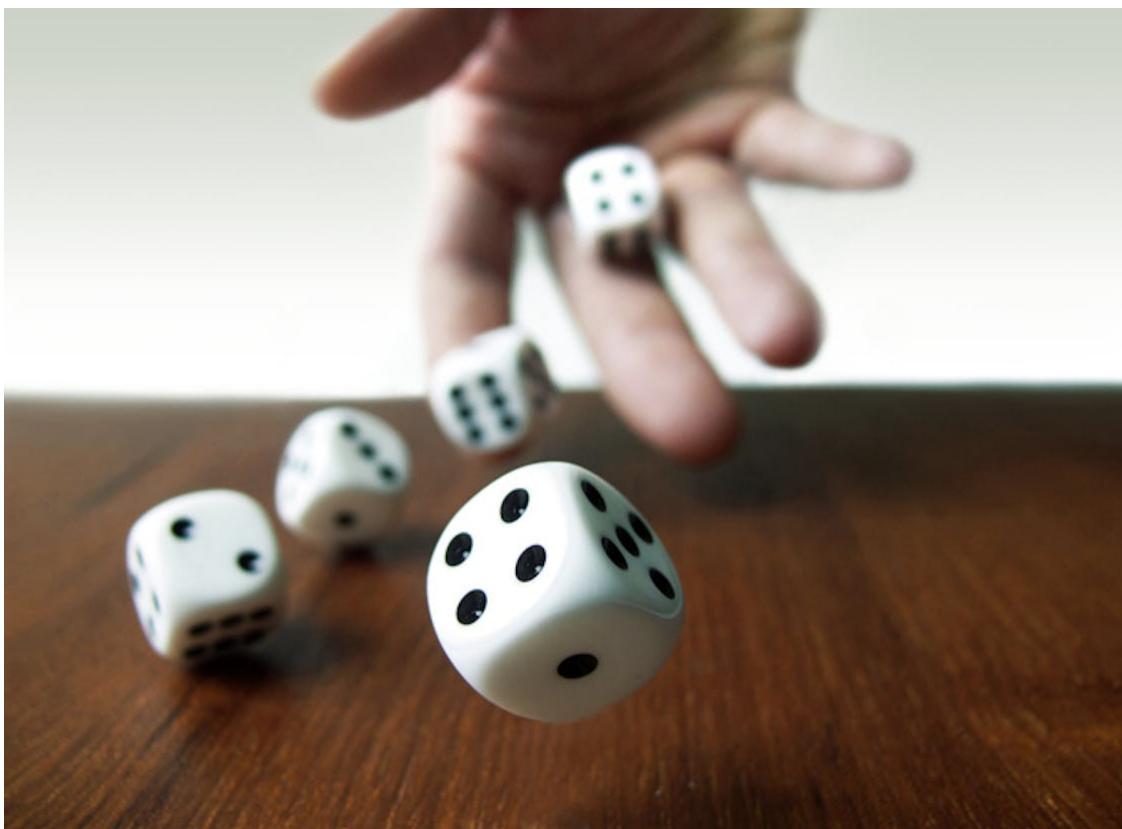


Figure 3. Can a roll of dice affect your decision making without you realising it?

Credit: pixel66 Getty Images

Activity

Anchoring is a potential problem for objective marking of school assessments. If you are in a large school (and in some small schools) the teachers of the same subject should be doing assessment moderation. This means that they get together to compare marks on common student assessments to ensure that the assessments are marked consistently in the same course with different teachers.

To do this well, teachers would have to each mark a piece of student work blindly; that is, without having seen the marks of the other teachers first. This is to avoid the problem of anchoring. If a teacher sees another teacher's marks, he or she is more likely to mark the student's work with similar marks, even without realising it. Thus, blind marking helps to avoid anchoring, and makes the assessment moderation process more rational and objective.

Ask your teacher whether assessment moderation is happening at your school, and if so, whether teachers are marking the work used for moderation blindly. If not, you might suggest a change in process to avoid the cognitive bias of anchoring.

How does all of this relate to economics? Economists assume that consumers behave rationally in reaction to price changes according to the law of demand. However, consumers' willingness and ability to pay for a good can be affected by anchoring. This is particularly true when consumers are in unfamiliar market situations and do not have a pre-existing idea of how much to pay for a product. Businesses can use this cognitive bias to their advantage by setting a high anchor price on a product, which may cause the consumer to pay more than he or she should pay or would pay in a more familiar situation.

In the short video below, Dan Ariely describes an economics experiment that demonstrates the power of anchoring for consumers' willingness and ability to pay the prices of various products.

Human Nature - Anchoring



Framing heuristic

Framing is a form of cognitive bias where human thinking and decision-making is affected by the way in which a problem is stated, or framed. In fact, people often show different preferences when the exact same problem, or choice, is expressed in two different ways.

The classic example of this is the experiment known as the Disease Problem. In this experiment, participants were asked to assess two different proposals for how a disease could be cured. When the cure proposals were framed in terms of the percentage of people who would live, people were more likely to choose it than when the proposal was expressed in terms of the percentage that would die, *even when the probabilities were exactly the same*. Simply expressing the proposal in terms of the probability of positive outcomes, rather than of negative outcomes, changed people's preferences for the proposal. A rational, System 2 thinker would see that the probabilities were the same and the preference for the cure proposal should be the same in each framing of the proposal. But most people do not take the time and mental energy to consider the probabilities associated with choices and so are irrationally affected by how a choice is framed.

This relates to economic models because we assume that consumers are using rational calculations when making choices in their lives. We assume that they know and accurately weigh up the choices they have in order to come to a decision that maximises their utility. In fact, those calculations can be disrupted easily by the way choices are framed.

Availability heuristic

When people are asked about how likely an event is to occur, they often recall examples of similar events from their available memory. What events they are able to recall will affect their thinking. This is called the availability heuristic.

The availability heuristic can have a significant impact on how people assess risk and weigh up choices. Most people assess the likelihood of an event by trying to recall examples. The more easily they can recall examples, the more common they assume an event to be. This can affect the way they make choices, particularly when risks are involved. For example, people are more likely to buy insurance for natural disasters if they can easily remember recent incidents such as floods, earthquakes and storms; they are less likely to purchase insurance if they cannot recall such incidents. They are more likely to get a flu shot if they remember a number of people who came down with the flu last year. They may not book a flight if there have been recent plane crashes, even though the probability of a crash has not changed.

Like the previous cognitive biases, the availability heuristic disrupts human rationality, undermining the assumptions of our economic models. Instead of accurately calculating probabilities to make the best choices to maximise utility, human choices are often guided by the intuition that comes from recalling recent events. Thus, predictions of human behaviour that are based on human rationality may not be accurate.

Making connections

The IB Psychology course has a section on the reliability of cognitive processes. That section refers to the anchoring and availability biases outlined in section 2.4.1. An interesting activity could be to team up with IB Psychology students to carry out a formative investigation on anchoring bias, using the methodology described in Dan Ariely's video above.

Instead of using social security numbers as the anchor, a random number could be given to students instead. Such a collaborative investigation would be a good way to establish connections between the Psychology and Economics disciplines.

Market equilibrium

As was discussed in [subtopics 2.1](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29721/) (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29721/>) and [2.2](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29867/) (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29867/>), the market of a product is composed of all the consumers *willing and able* to purchase a good at different prices and all the producers *willing and able* to supply it. In other words, the market for a good or service is composed of its demand and supply.

Equilibrium

Equilibrium is a state of balance, where two opposing forces are equally matched. There is no tendency to change. In economics, market equilibrium means that the price or quantity of a good does not tend to increase or decrease.

The market equilibrium occurs at the point where the supply curve of a good or service crosses the demand curve. Demand and supply are balanced. The equilibrium price, also called the market-clearing price, is the price at which the quantity demanded of a good is equal to the quantity supplied, so that there are no surpluses or shortages of the good.



Figure 1. Balance between supply and demand.

Credit: siraanamwong Getty Images

Using the example of the demand and supply of individual surfing lessons in Rio de Janeiro, Brazil, we can make a total market schedule of surfing lessons demanded and supplied per week, as shown in **Table 1**.

Table 1. Demand and supply schedule for surfing lessons per week in Rio de Janeiro.

Price of individual surfing lessons (BRL)	Quantity of individual surfing lessons demanded per week (Q_d)	Quantity of individual surfing lessons supplied per week (Q_s)
BRL 180	300	600
BRL 170	400	550
BRL 160	500	500
BRL 150	600	450
BRL 140	700	400

Here we can see that the equilibrium price is 160 Brazilian reals (BRL) per surf lesson, and the equilibrium quantity supplied and demanded is 500 per week. There are no shortages or surpluses of surfing lessons, and therefore the market is cleared.

If we draw both demand and supply curves in the same diagram, we will have the market of surfing lessons, as shown in **Figure 2**.

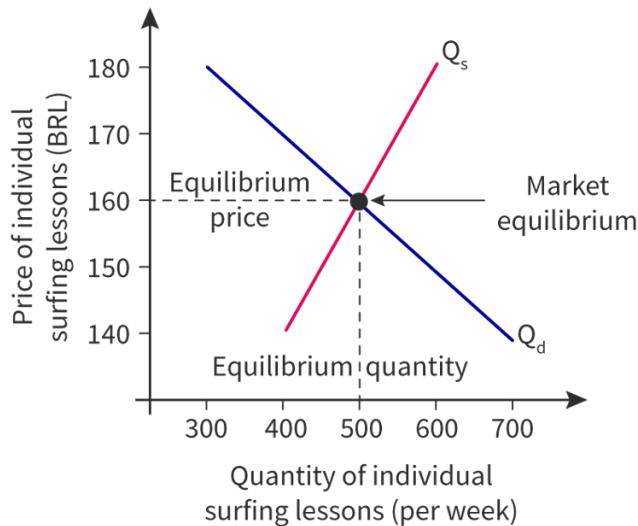


Figure 2. Equilibrium in the market for individual surfing lessons in Rio de Janeiro.

[More information for figure 2](#)

The image is a graph illustrating the market equilibrium for individual surfing lessons in Rio de Janeiro. The horizontal axis represents the quantity of surfing lessons per week, ranging from 300 to 700. The vertical axis shows the price in BRL, ranging from 140 to 180. Two intersecting lines are present: a blue line marking the demand (Q_d) and a pink line representing the supply (Q_s). The point where they intersect is labeled "equilibrium price" at BRL 160 and "equilibrium quantity" at 500 lessons. This intersection signifies the market equilibrium. Labels such as "Market equilibrium" and numerical values are placed around the lines to indicate the supply and demand dynamics. The graph visually conveys that at this price and quantity, the market is balanced, with supply meeting demand effectively.

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As you can see, the price at which the quantity supplied is equal to the quantity demanded is BRL 160. At this price, everything that is offered in the market is purchased, therefore BRL 160 per surfing lesson is the equilibrium price. At the equilibrium price, 500 surfing lessons per week are both demanded and supplied. Therefore we say that the equilibrium quantity is 500.

Be aware

From here onwards, you should be drawing complete market diagrams, with both a demand and supply curve, to explain market circumstances. Drawing diagrams with only a demand curve or only a supply curve will not give a

complete picture of the interdependence of consumers and producers in a market.

Disequilibrium

In a free market economy, the prices of many goods and services in markets change frequently. Markets spend most of their time in a state of disequilibrium, where quantity demanded does not exactly equal quantity supplied, due to changes in the external environment (non-price determinants of demand and supply). However, in this economics course, states of disequilibrium are generally assumed to be temporary, as long as prices can change to find a new equilibrium point.

Excess supply (surplus)

At any price above the equilibrium price, for example BRL 170, the quantity of surfing lessons that surf schools are willing and able to supply to the market is greater than the quantity consumers are willing and able to purchase at that price. This is called excess supply or surplus. As shown in **Table 1** and **Figure 2**, at a price of BRL 170 the quantity supplied would be 550 surfing lessons per week, while the quantity demanded would be 400, producing a surplus (excess supply) of 150 surfing lessons in the market. In a free market, we expect that in this situation prices will start to decline until the equilibrium is reached again at BRL 160 and 500 surfing lessons.

Excess demand (shortage)

At any price below the equilibrium price, for example BRL 150, the quantity of surfing lessons that surf schools are willing and able to supply to the market is less than the quantity consumers are willing and able to purchase at that price. This is called excess demand or shortage. At a price of BRL 150, surf schools will supply fewer individual lessons: 450 lessons per week instead of 500. However, consumers will demand more surfing lessons at this lower price because of the law of demand: 600 surfing lessons per week instead of 500. This will produce a shortage (excess demand) of 150 surfing lessons. In a free market, we can expect that prices will start to rise in this situation until the equilibrium is reached again at BRL 160 for 500 surfing lessons.

In **Figure 3** we can see the market equilibrium, the equilibrium price, the equilibrium quantity and the situations of excess demand and excess supply, as described previously.

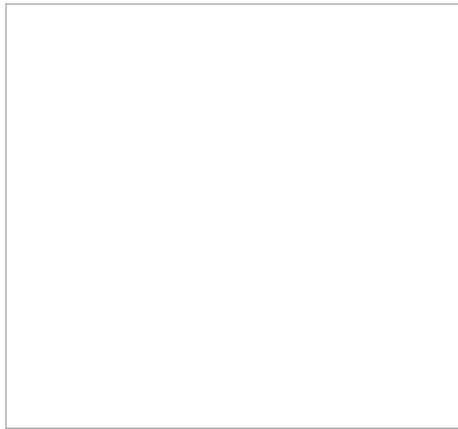


Figure 3. Excess Supply and Excess Demand.

 More information for figure 3

An interactive line graph demonstrates the concepts of excess supply and excess demand, highlighting how deviations from the equilibrium price affect market dynamics. The graph features two curves: the demand curve (Q_d), which slopes downward to represent the inverse relationship between price and quantity demanded, and the supply curve (Q_s), which slopes upward to indicate the direct relationship between price and quantity supplied. The vertical axis represents the price of surfing lessons in Brazilian Reais (BRL), while the horizontal axis displays the quantity of surfing lessons per week.

At the point where the supply and demand curves intersect, the graph identifies the market equilibrium, where the equilibrium price and equilibrium quantity are established. For example, at the equilibrium price of 160 BRL, the quantity demanded equals the quantity supplied at 500 lessons per week, ensuring that there is no excess demand or supply.

Users can interact with the graph by sliding the price P along the vertical axis to observe the changes in market dynamics. If the price is increased above 160 BRL, the graph visually demonstrates excess supply, as the quantity supplied exceeds the quantity demanded. Conversely, when the price is lowered below 160 BRL, it results in excess demand, where the quantity demanded surpasses the quantity supplied. These adjustments allow users to explore how deviations from equilibrium affect the market, providing a hands-on understanding of the interplay between supply, demand, and price.

Figure 3. Excess supply and excess demand.

2.3 Competitive market equilibrium

Changes in demand

When markets are in equilibrium, price and quantity will not change unless an external force disrupts the system. If there is a change in any of the non-price determinants of demand or supply, one of the two curves shifts. The market is temporarily in disequilibrium, until it goes back to a new equilibrium. The move back to equilibrium is caused by changes in the price.

An increase in demand

When the 2018 FIFA World Cup was held in Russia, many football fans from all over the world travelled there to watch the games. This produced an increase in the demand for aeroplane tickets to and within Russia, as shown in **Figure 2**.



Figure 1. Brazil vs. Costa Rica in the 2018 World Cup.

Source: "Brasil - Costa Rica (https://commons.wikimedia.org/wiki/File:Brazil_Costarica_7.jpg)", by Кирилл Венедиктов is under CC BY-SA 3.0 (<https://creativecommons.org/licenses/by-sa/3.0/deed.en>).

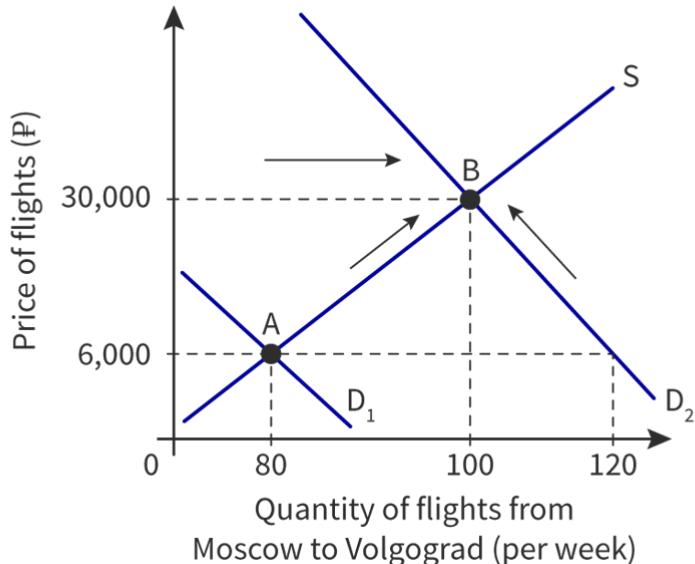


Figure 2. Impact of increased demand for aeroplane tickets from Moscow to Volgograd during the 2018 World Cup (note: not drawn to scale).

🔗 More information for figure 2

The image depicts a supply and demand graph illustrating the impact of increased demand for flights from Moscow to Volgograd during the 2018 World Cup. The graph features two main curves: a supply curve labeled 'S' and two demand curves labeled 'D₁' (initial demand) and 'D₂' (increased demand). The X-axis represents the quantity of flights per week, ranging from 0 to 120, and the Y-axis represents the price of flights (RUB), with values ranging from 0 to 30,000.

Point A represents the initial equilibrium with approximately 80 flights per week at a price of RUB 6,000, corresponding with the initial demand curve 'D₁'. As demand increases, the curve shifts to 'D₂', resulting in a new equilibrium at Point B, with around 100 flights per week and a higher price point. Arrows indicate the movement from demand curve 'D₁' to 'D₂'.

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Before June 2018, there were approximately 80 flights per week from Moscow to Volgograd, one of the venues for the football matches. Prices for these flights averaged about RUB 6000. This is the initial equilibrium point A in **Figure 2**.

Close to match days, demand for flights from Moscow to Volgograd increased from D_1 to D_2 . If prices for the flights had remained the same at RUB 6000, consumers would have demanded 120 flights per week. However, airlines were only willing to supply 80 flights per week at the RUB 6000 price. This would have caused excess demand (shortage) of 40 flights per week.

The price of tickets increased to RUB 30 000 rubles  (<https://www.themoscowtimes.com/2017/12/28/russian-air-ticket-prices-skyrocketed-for-2018-world-cup-a60063>). According to the law of demand, at this new higher price, quantity demanded would decline, in this case from 120 to 100. In addition, due to the law of supply, airlines were willing to increase quantity supplied from 80 to 100. This created a new equilibrium at point B in **Figure 2**, where the quantity demanded again equals the quantity supplied.

Because of the increase in demand caused by the 2018 FIFA World Cup, the quantity of plane tickets bought and sold increased from 80 per week to 100 per week, and the average ticket price increased to RUB 30 000.

Exam tip

When writing for the external exam or for the internal assessment, you should include actual data from the text prompt in the economic diagrams whenever possible. In the case above, actual prices were taken from the linked article and rough numbers were taken from research on flights per week from Moscow to Volgograd. Including actual figures in your diagrams will help to show application of economic theory to the particular case you are discussing.

Figure 3 shows how the market moves to a new equilibrium point in response to an increase in demand.

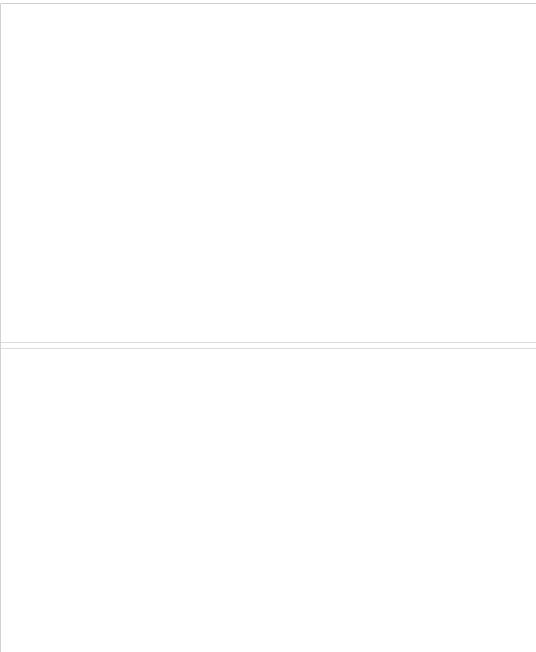


Figure 3. How the market moves to a new equilibrium point in response to an increase in demand.

🔗 More information for figure 3

The interactive graph illustrates the relationship between price, demand, and supply in a market. It features two adjustable sliders, one for demand and one for price, allowing users to observe changes in market equilibrium. The supply curve (S) is fixed, while the demand curve (D) shifts based on user interactions.

In the initial state, the market is in equilibrium at price P_1 and quantity Q_1 , where the quantity supplied equals the quantity demanded. The accompanying text reads: "The market is at equilibrium with equilibrium price P_1 and equilibrium quantity Q_1 . The quantity supplied is equal to the quantity demanded. Use the slider to increase the demand."

When demand increases, the demand curve shifts to the right (D_1 to D_2), creating excess demand at price P_1 . The new quantity demanded (Q_d) exceeds the quantity supplied (Q_s), leading to market disequilibrium. The text describes this scenario: "An increase in demand causes market disequilibrium. The quantity that consumers are willing and able to purchase at price P_1 is more than the quantity available. In other words, the quantity demanded (Q_d) is more than the quantity supplied (Q_s). As a result, the price will increase. Use the slider to increase the price."

As the price rises in response to excess demand, fewer consumers are willing to buy, and producers are incentivized to supply more. This adjustment continues until a new equilibrium is reached at a higher price (P_2) and quantity (Q_2). The final state is explained as follows:

"The increasing price is an incentive for both consumers and producers to change their behavior. Fewer consumers are willing and able to purchase the good or service, so the quantity demanded (Q_d) decreases. At the same time, the increased price provides an incentive for producers to supply more, so the quantity supplied (Q_s) increases. These changes in the behavior of both consumers and producers result in the market reaching a new equilibrium price (P_2) at which quantity demanded and quantity supplied are equal (Q_2)."

Worked example 1

Use an appropriate diagram to explain what happens to the market for bicycles in Vietnam if the population increases.

An increase in population will mean more consumers of bicycles. Demand for bicycles should increase as shown in **Figure 4**.

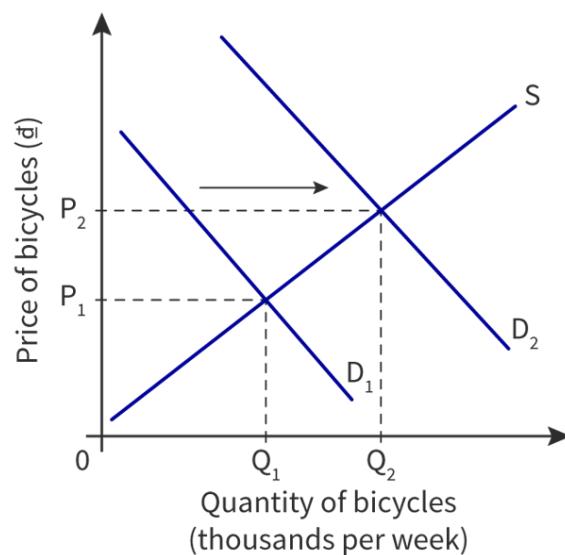


Figure 4. Impact of increased population on the market for bicycles.



Demand of bicycles increases from D_1 to D_2 . The price of bicycles should increase from P_1 to P_2 and the quantity demanded and supplied of bicycles should increase from Q_1 to Q_2 , ceteris paribus.

Exam tip

In most cases, the diagrams you draw for the exam will only need to include the first and second prices and the first and second quantities. The intermediate shortage and resulting movements along the supply and demand curves to a new equilibrium can be left out, unless you are doing a detailed analysis for the internal assessment, or if an exam question asks you specifically about the workings of the price mechanism and resource allocation (see section 2.3.4 (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/functions-of-the-price-mechanism-id-30308/>)).

In the examples below, we will continue to illustrate the entire process to emphasise the functioning of the price mechanism in reaching a new equilibrium.

A decrease in demand

There can also be decreases in demand in markets. One such decline in demand has occurred in the last 20 years in the market for print newspapers in Japan. Younger generations have moved to digital substitutes for news consumption. In 2000, print newspaper circulation was 53.7 million copies per year. In 2019, this had declined to 37.8 million copies per year. This decline can be seen in data in **Figure 5** and in a market graph in **Figure 6**.

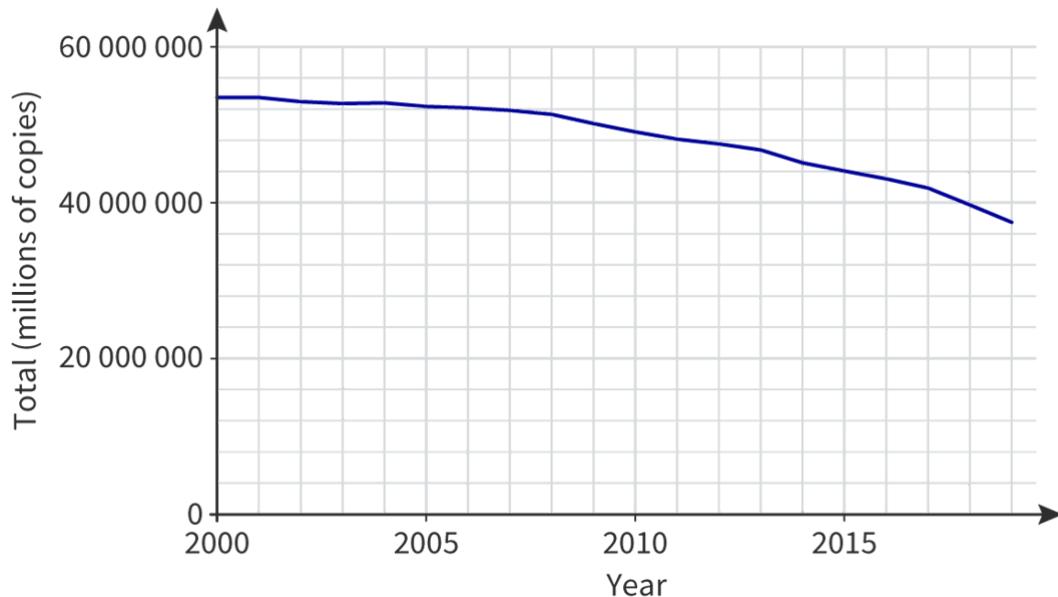


Figure 5. Decline in circulation of print newspapers in Japan.

More information for figure 5

The image is a line graph illustrating the decline in the circulation of print newspapers in Japan from the year 2000 to 2020. The X-axis represents the years, marked from 2000 to 2020. The Y-axis represents the total number of newspaper copies circulated, measured in millions, ranging from 0 to 60 million. The graph shows a clear downward trend, beginning at approximately 53 million copies in 2000 and decreasing to around 37 million copies in 2019. The line is smooth, indicating a consistent decline over the two decades.

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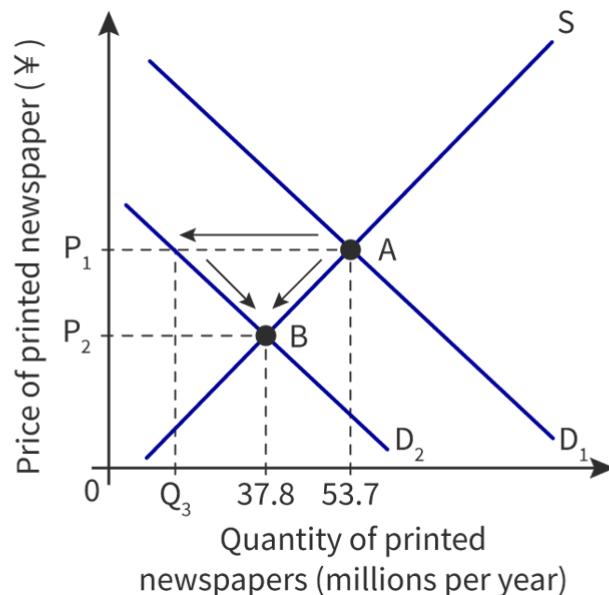


Figure 6. Impact of move to digital news platforms on market for printed newspapers in Japan.

 More information for figure 6

The graph illustrates the impact of digital news platforms on the market for printed newspapers in Japan. The X-axis represents the quantity of printed newspapers (in millions per year), labeled from 0 to 53.7. The Y-axis represents the price of printed newspapers in yen (¥). Two demand curves (D_1 and D_2) and a supply curve (S) are shown.

Initially, the market is in equilibrium at point A on D_1 with a quantity of 53.7 million and price P_1 . As digital news becomes substitutes, demand shifts from D_1 to D_2 , leading to a new equilibrium at point B with a reduced quantity Q_2 and lower price P_2 . Excess supply is marked between points Q_3 and Q_1 , evidencing a surplus.

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In 2000, the market for printed newspapers was in equilibrium at point A, producing a quantity of 53.7 million at a price of P_1 . Because new attractive substitutes for printed newspapers are available, the demand for printed newspapers has declined from D_1 to D_2 . According to economic theory, at the previous price P_1 , the quantity of printed newspapers that consumers were willing and able to purchase declined from 53.7 million to Q_3 . But at that price the quantity that producers were willing and able to offer was still Q_1 . This created an excess supply in the market: a surplus of printed newspapers of $Q_1 - Q_3$. Producers had to reduce the price to P_2 . At this lower price, the quantity demanded increased to Q_2 and a new equilibrium was formed at point B.

The availability of substitutes for print newspapers moved the market equilibrium from A to B, reducing the equilibrium price and from P_1 to P_2 and the quantity from Q_1 to Q_2 .

Case study

Impact of Hong Kong protests on Airbnb bookings



Figure 7. Hong Kong protests have affected tourism and demand for holiday housing in the city.

Source: "Hong Kong anti-extradition bill protest

(<https://www.flickr.com/photos/studiokanu/48230574852/>), by Studio Incendo is under CC BY 2.0

(<https://creativecommons.org/licenses/by/2.0/>)

Political events can have a significant impact on demand. In 2019, protests were triggered in Hong Kong by a new extradition law that would have eroded Hong Kong's separate legal jurisdiction from that of mainland China. The new law was eventually withdrawn, but protests for democratic reform continue.

These protests have caused disruption to city life and many tourists have decided not to visit the city. According to the Quartz article linked to below, occupancy rates at Airbnb rentals declined from 70% in October 2018 to 50% in October 2019. Hotels saw similar declines in occupancy.

Source: Adapted from Hong Kong's Airbnbs started to go vacant as protests intensified ↗ (<http://qz.com/1771469/hong-kongs-airbnb-bookings-declined-after-the-protests-started/app>), Quartz

Worked example 2

Use an appropriate diagram to illustrate the impact of the Hong Kong protests on the market for Airbnb rentals.

Hint: be sure to use data from the article where possible in your diagram. Pay attention to the currencies as they are expressed in US dollars at times and Hong Kong dollars at times. Also include at least one quote in your article to support your response.

Due to the protests, fewer people have chosen to visit Hong Kong. ‘The months-long protests in the city have deterred both leisure and business travelers.’ Demand for holiday accommodation has declined as shown in **Figure 8**.

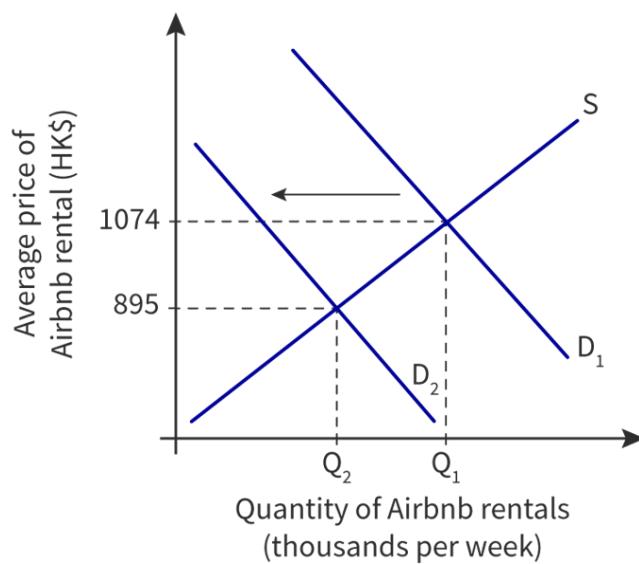


Figure 8. Impact of Hong Kong protests on the market for Airbnb accommodation.



Demand for Airbnb accommodation has declined from D_1 to D_2 . As a result, the average price for accommodation has declined from HKD 1074 to HKD 895. The quantity demanded and supplied has declined from Q_1 to Q_2 . Occupancy rates have declined from 70 per cent to 50 per cent.

Changes in supply

An increase in supply

Organic fertilisers enable farmers to achieve high crop yields on the same land for many years. Organic fertilisers release nutrients into the soil so that plants have the nutrients they need to grow. They increase the crop yield and improve poor quality land.

Organic fertilisers include woodland litter, compost, green manure and manure from cows, horses, poultry or sheep. Manure improves soil texture, recycles nitrogen and introduces essential bacteria. The advantage of using organic fertilisers in the production of tomatoes is that they are often readily available on or near the farm, therefore costing little to farmers while increasing their productivity.



Figure 1. Production of tomatoes is increased with fertilisers.

Denisfilm Getty Images

Figure 2 shows the effect of using organic fertilisers in the production of tomatoes. Before the use of fertilisers, the supply of tomatoes was at S_1 and the market equilibrium was at point A, selling 100 kilograms of tomatoes per week at a price of GBP 6.30.

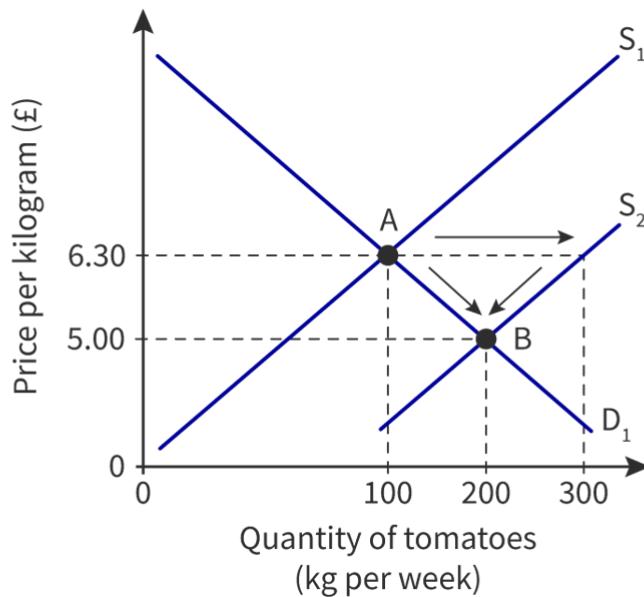


Figure 2. Impact of organic fertiliser use on the market for tomatoes in the UK.

[More information for figure 2](#)

The image shows a graph representing the impact of organic fertilizer use on the supply and demand of tomatoes in the UK. It depicts the price per kilogram on the vertical Y-axis, ranging from 0 to 7 GBP, labeled at intervals of 1.30 GBP. The horizontal X-axis represents the quantity of tomatoes per week in kilograms, labeled at intervals of 100 from 0 to 300 kg.

There are three main lines in the graph: 1. **Supply Curve S_1** : The initial supply line starting from the Y-axis at 0 GBP and 0 kg, moving upwards. 2. **Supply Curve S_2** : The increased supply line starting from the Y-axis at 0 GBP and 0 kg, shifted to the right, indicating higher supply. 3. **Demand Curve D_1** : A downward sloping line from a higher price and lower quantity, moving downwards and to the right.

Equilibrium before using fertilizers is at point A, intersecting S_1 and D_1 , where the price is 6.30 GBP per kg and the quantity is 100 kg. After using organic fertilizers, the supply shifts to S_2 , creating a new intersection point B with D_1 at 5.00 GBP per kg price and 200 kg quantity.

An arrow denotes the shift from S_1 to S_2 , with surplus indicated between 100 kg and 300 kg on the X-axis, showing an excess supply at the original price of 6.30 GBP per kg.

[Generated by AI]

The supply increases from S_1 to S_2 because the fertilisers improve productivity. At the original price of GBP 6.30, producers are now willing and able to supply 300 kilograms of tomatoes. However, at this price, consumers are only willing and able to purchase 100 kilograms. There is now an excess supply (surplus) of tomatoes.

As a direct result the equilibrium, price declines. At lower prices, the quantity supplied declines from 300 to 200 kilograms and the quantity demanded increases from 100 to 200 kilograms. A new equilibrium is formed at point B, at an equilibrium price of GBP 5.00 and an equilibrium quantity of 200 kilograms per week.

A decrease in supply



Figure 3. Cocoa beans and chocolate bars.

fcafotodigital Getty Images

Chocolate comes from the cacao tree, which is scientifically known as *Theobroma cacao*. Cocoa beans are the basic raw material for the production of chocolate.

If the price of cocoa beans increases in the international market, the cost of producing chocolate bars increases. The effect is shown in **Figure 4**.

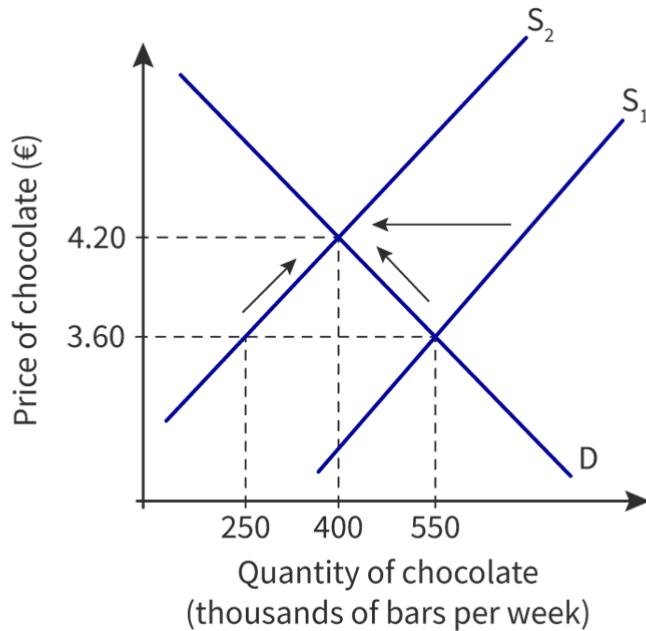


Figure 4. Impact of increased cocoa bean prices on the market for chocolate bars.

[More information for figure 4](#)

The image is a graph showing the market for chocolate bars with cocoa bean price increases.

The X-axis is labeled "Quantity of chocolate (thousands of bars per week)" and ranges from 0 to 550, with major tick marks at 250 and 550.

The Y-axis is labeled "Price of chocolate (€)" with values from 3.60 to 4.20 €.

There are two supply curves on the graph: S1 (initial supply) and S2 (new supply after cocoa price increase), as well as a demand curve labeled D. Initially, 550,000 bars were offered at €3.60 along curve S1. With the upward shift to S2 due to increased cocoa prices, the supply at €3.60 reduces to 250,000 bars.

A point of intersection between the supply curves and demand curve is noticeable, showing the equilibrium shift with the price change.

[Generated by AI]

Before the increase in the price of cocoa beans, 550 000 bars of chocolate were sold per week at a price of EUR 3.60 each. When the cost of cocoa beans increased, the supply curve shifted upwards (leftwards) from S_1 to S_2 . Producers are now only willing and able to offer 250 000 chocolate bars at the price of EUR 3.60.

At a price of EUR 3.60, there is an excess demand (shortage) of 300 000 units ($550\ 000 - 250\ 000$). As a result, the price rises to EUR 4.20 per chocolate bar. Due to the law of demand, the increased price causes quantity demanded to decline from 550 000 to 400 000 bars per week. The quantity supplied increases from 250 000 to 400 000 bars per week. The market reaches equilibrium again at a price of EUR 4.20 and a quantity of 400 000.

Worked example 1

In 2018, the Chinese government increased subsidies for soybeans and reduced subsidies for corn. Use appropriate diagrams to explain the impact on the soybean and corn markets of these changes to subsidies.

A subsidy is a government payment to a producer with the aim of increasing supply or lowering prices in the market. An increase in subsidies for Chinese soybean farmers should increase supply of soybeans. A decrease in subsidies for Chinese corn farmers should decrease the supply of corn. The impact is shown in **Figure 5** and **Figure 6**.

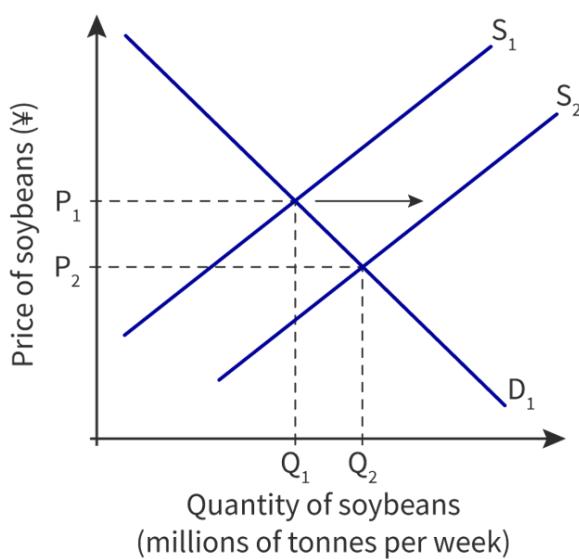


Figure 5. Impact of increased subsidies on the market for soybeans in China.



The supply of soybeans increases from S_1 to S_2 . The price of soybeans decreases from P_1 to P_2 and the quantity demanded and supplied of soybeans increases from Q_1 to Q_2 , ceteris paribus.

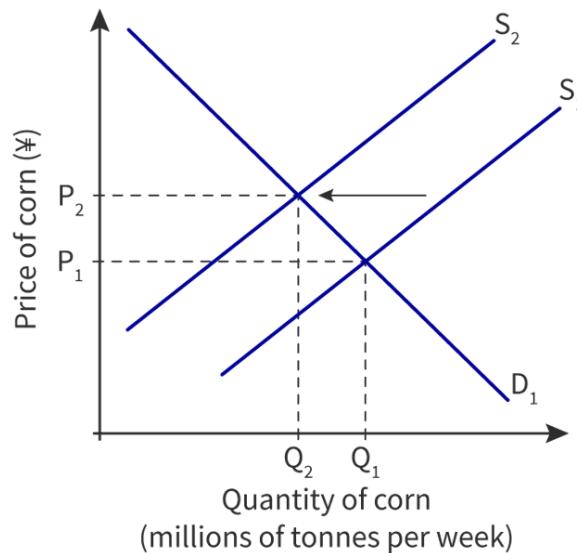


Figure 6. Impact of reduced subsidies on the market for corn in China.



The supply of corn decreases from S_1 to S_2 . The price of corn increases from P_1 to P_2 and the quantity demanded and supplied of corn decreases from Q_1 to Q_2 , ceteris paribus.

The change in subsidy policy by the Chinese government should result in a greater supply of soybeans and a reduced supply of corn.

Activity

You learned in [section 2.3.2](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/) (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/>) that demand for print newspapers has declined in the last 20 years. [Figure 6 in section 2.3.2](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/) (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/>) showed this demand decline, and implied that the price of print newspapers has gone down in response. However, this has not happened. In fact, the price of print newspapers has increased a lot over the same period.

How can this be explained in economic terms?

Hint

After you read the quote below, think about the fact that the market for newspapers and the market for newspaper advertising are related to one another. How did that connection influence the prices for newspapers and the pricing decisions of newspaper firms when print advertising collapsed?

This quote may give you some ideas:

... these price hikes weren't accidents — they were part of a conscious strategy on the part of newspapers. Newspapers had always been priced more cheaply than they cost to produce, because advertisers were the ones really paying the bills. (A typical American newspaper pre-web made about 80 percent of its revenue from advertisers, 20 percent from readers.) Advertisers wanted to get their messages in front of lots of people, so newspapers priced themselves low to maintain a mass audience.

When print advertising collapsed — and remember, that's what happened first — publishers realized (a) they would need to get relatively more money from readers and (b) that those people who were still subscribing to a daily newspaper in the digital era were actually pretty devoted to it.

Source: *Nieman Journalism Lab* ↗

(<https://www.niemanlab.org/2019/01/newspapers-cost-more-than-twice-as-much-today-as-they-did-a-decade-ago-and-that-was-a-smart-move-by-publishers/>), Harvard University

Functions of the price mechanism

As we have learned, scarcity of resources forces individuals and groups to make choices. We must decide what to produce, how to produce and for whom to produce.

In a free market economy, changes in price, or the price mechanism, determine how these scarce resources are allocated in an economy. The price mechanism is the way in which changes in price affect the quantity demanded and the quantity supplied.

Changes in price are a powerful force for guiding decisions about what, how and for whom to produce.

- The rising price of a product will result in more producers allocating resources to make that product. Prices tell them **WHAT** to make.
- Rising labour costs (price of labour) relative to capital costs, which is happening in China at the moment, would tell producers to make their products with less labour and more capital, or to move production to places with lower labour costs, like Vietnam. Prices tell producers **HOW** to produce.
- Rising prices will mean that some consumers are no longer willing and/or able to buy the product. It tells producers **FOR WHOM** to produce, rationing the product.



Figure 1. What to produce? How to produce? For whom to produce?

Credit: Rawpixel Getty Images

Price changes and feedback loops

Making connections

Feedback loops are discussed in the Environmental Systems and Societies book in subtopic 1.3. Negative and positive feedback loops are powerful concepts that originated in the sciences, but can help explain interactions and interdependence in complex systems in many disciplines.

A feedback loop refers to interdependency between two or more components of a system, where the change in state of one component affects the other. In turn, this effect then feeds back to alter the original component. Negative feedback loops are a key element of the economic theory of market equilibrium.

Be aware

When learning about negative and positive feedback loops, you may think that 'positive' means something good and 'negative' means something bad. This is not the case with feedback loops. The terms are not value judgements about how good or bad a process is.

Negative feedback loops help to stabilise systems after a disturbance. When there is a change in the system, they act to bring back equilibrium. An example of a negative feedback loop in biology is temperature regulation. As your body's temperature increases, you sweat. The evaporation of sweat takes heat away from your body so that you cool down. On the other hand, if your body's temperature drops, you will shiver. Shivering generates heat so that you warm up again.

We saw in the previous sections how changes in external conditions cause shifts in supply and demand. These shifts in supply and demand move markets into disequilibrium and trigger price changes. Price changes then create negative feedback loops, which help markets to return to equilibrium, as described in [sections 2.3.2 \(<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/>\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-demand-id-30307/) and [2.3.3 \(<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-supply-id-30309/>\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/changes-in-supply-id-30309/).

Price changes create negative feedback in the market in two ways: signals and incentives.

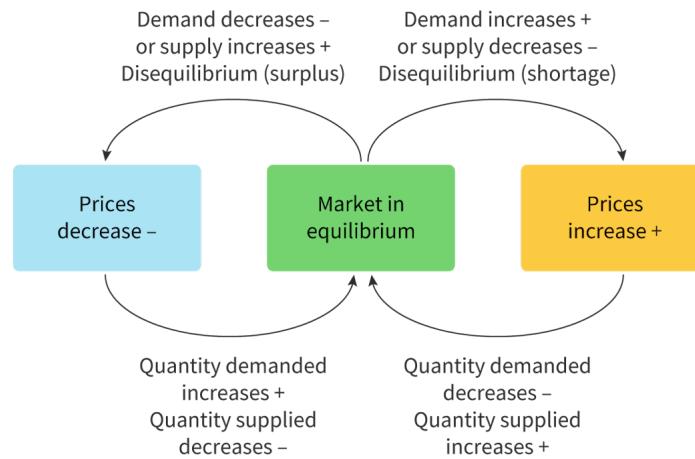


Figure 2. Negative feedback loops in markets.

[More information for figure 2](#)

The diagram is a flowchart depicting negative feedback loops in market equilibrium. It consists of three main components:

1. "Prices decrease -" (highlighted in blue)
2. Leads to: "Quantity demanded increases + Quantity supplied decreases -"
3. Linked by an arrow to "Market in equilibrium" (highlighted in green)
4. "Market in equilibrium"
5. From here, two arrows diverge:
 - One leads to "Demand increases + or supply decreases - Disequilibrium (shortage)" and further to "Prices increase +" (highlighted in yellow)
 - The other goes to "Demand decreases - or supply increases + Disequilibrium (surplus)" and back to "Prices decrease -"
6. "Prices increase +"
7. Leads to: "Quantity demanded decreases - Quantity supplied increases +"
8. Directs back to "Market in equilibrium"

Arrows indicate the flow of changes and their effects on prices, demand, supply, and market equilibration, showing how changes in one area feed back to stabilize market conditions.

[Generated by AI]

Signals to consumers and producers

When there is an increase in demand, or a decrease in supply, excess demand (shortage) occurs and prices start to rise. Rising prices communicate information to both consumers and producers about the state of the market. Rising prices signal to consumers that they should consume less of a product, and they signal to producers that they should make more of a product. On the other hand, declining prices that come after a decline in demand or an increase in supply communicate to consumers that they should consume more of a product and signal to producers that they should make less of a product.

Thus, the signalling function of prices introduces negative feedback into the market system by communicating WHAT consumers and producers should do. The feedback causes stakeholders to respond in a way that brings the market back into equilibrium, stabilising the system.



Figure 3. Price changes are a signal to consumers and producers that they should reallocate resources in a market.

Credit: Skogas Getty Images

Incentives for consumers and producers

In addition to acting as a signal to consumers and producers, rising prices are also an incentive to reallocate resources. We assume in this course that consumers and producers are rational and that they will behave according to the laws of demand and supply.

According to these assumptions, consumers want to maximise utility and producers want to maximise profits. Thus, if the price of a product rises, rational consumers would buy less of it, and reallocate resources to other products. At the same time rational producers would produce more of a product if its price rises, reallocating resources towards the product with rising prices and away from other products the producer could make. If prices were declining, the opposite would be true.

Thus, the incentive function of prices introduces negative feedback into the market system by providing financial MOTIVATION to consumers and producers to react in a way that brings the market back into equilibrium, stabilising the system.



Figure 4. Price changes provide incentives to consumers and producers to make different choices in a market.

Credit: xiangyan meng Getty Images

Important

The assumption that consumers and producers are rational and focused on maximising utility/profits is vital for the economic models you are learning about in this section.

However, consumers and producers are not always rational in the way economists assume in these models. Higher level students explore the limits of human rationality in [subtopic 2.4 \(https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-30262/\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-30262/). If you are curious to explore the ways that human beings are irrational in their economic decisions, you may want to read:

- *Thinking, Fast and Slow*, Daniel Kahneman
- *Nudge*, Richard Thaler
- *Predictably Irrational*, Dan Ariely

Dan Ariely also has an engaging website devoted to all things irrational — <http://danariely.com/> (<http://danariely.com/>) — which includes links to TED Talks.

Rationing function

Rationing refers to the controlled distribution of resources. Rationing is necessary at any time when goods and resources are scarce.

In times of extreme scarcity, governments may have to ration goods to ensure some kind of fair distribution. For example, during World War II, when imports were disrupted, the UK government rationed many goods in the British economy. Petrol (gasoline) was the first, but later almost all foods were rationed, apart from vegetables and bread.



Source: [Tray containing a ration book](#)

(<https://commons.wikimedia.org/wiki/File:TrayContainingARationBookAndTheWeeklyRationOfSugar.jpg>,

by Ministry of Information Photo Division Photographer is under Public Domain

(https://en.wikipedia.org/wiki/Crown_copyright)

Figure 5. Government rationing of food during World War II.

In a free market economy, during times of normal levels of scarcity, prices offer a rationing function. It is useful to recall the law of demand to understand how this works. The law of demand says that as prices rise, the quantity demanded declines. This is because there are fewer consumers willing and *able* to buy the products. The ability to buy products is critical here. As prices rise, the market will determine who gets available goods; not everyone will be able to buy them, even if they are willing. Only those both willing AND *able* to purchase the goods will have access to them. Thus, in a market system, products are rationed by prices.

This helps us to understand why governments may intervene in markets, as the UK did during World War II. When products are extremely scarce, we can expect their prices to rise very high. Though the price mechanism might be an efficient (see section 2.3.5 (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/social-community-surplus-id-30311/>)) way to ration goods and resources, it is not necessarily equitable, or fair. In times of scarcity, it may be necessary to use a rationing system other than prices.

In subtopic 2.12 (<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-30310/>), Higher level students will learn about why it can be difficult for market systems to achieve equity.

Theory of Knowledge

The assumption that all markets lead to equilibrium is central to free market economic theory. Many economists believe that the price mechanism leading to equilibrium applies to every market, including the financial market — which is

famous for its volatility. This belief in the market system assumes that as more participants enter the financial market, and the larger it becomes, the more stable it will be — just like other goods markets. [This article ↗](http://stanfordpress.typepad.com/blog/2015/08/the-end-of-an-illusion.html) (<http://stanfordpress.typepad.com/blog/2015/08/the-end-of-an-illusion.html>) describes this phenomenon as 'oikodicy', which they define as the belief that all catastrophes can be reconciled within the system. Read the article and consider its claims.

Knowledge question: In what ways is the belief in the market system more reliant on hope (emotion) than realism(reason)?

To help answer this question consider Keynes "animal spirits" ↗ (<https://www.bizjournals.com/albany/stories/2001/11/19/editorial1.html>).

Social/community surplus

In this section we will study the role of competitive markets in achieving efficiency.

Concept

Efficiency

Efficiency is a quantifiable concept, determined by the ratio of useful output to total input. Allocative efficiency refers to making the best possible use of scarce resources to produce the combinations of goods and services that are optimal for society, thus minimising resource waste. Productive efficiency refers to producing products at the lowest possible average costs.

In this section, we explore the role of the price mechanism and market equilibrium in achieving allocative efficiency. This occurs by maximising the social/community surplus, which focuses on achieving the greatest possible difference between the market equilibrium price and the price that consumers actually have to pay and maximising the difference between the price that producers are willing and able to accept and what they actually receive through the market equilibrium price.

Why is achieving allocative efficiency so important under the condition of scarcity?

Efficiency

Efficiency, in a broad economic interpretation of the word, means 'making the best possible use of resources'. To start with, we need to distinguish between productive efficiency and allocative efficiency.

Productive efficiency refers to producing goods by using the fewest possible resources, which implies producing at the lowest possible cost. If firms are producing at the productively efficient level of output, then we can assume they are combining their resources as efficiently as possible. Resources are not being wasted and average production costs are as low as possible.

Allocative efficiency refers to producing the optimal combination of goods from society's point of view. Allocative efficiency is achieved when the economy is allocating resources in such a way that no one can be better off without making somebody else worse off. In other words, the benefits of consuming these goods are maximised for the whole society. Reaching this situation is also called Pareto optimality.

Productive efficiency is a necessary condition for allocative efficiency to occur, but it is not enough in itself. Firms must not only be producing at their lowest possible average cost, they also need to be producing the correct combination of goods that the society prefers – in other words, the best combination of goods from the society's point of view.

Achieving allocative efficiency involves maximising social/community surplus, which is explained in this section.

Be aware

Allocative efficiency concerns producing the goods that are most wanted by consumers, therefore it relates to the 'What to produce' basic economic question.

Productive efficiency concerns producing at the lowest possible cost, therefore it relates to the 'How to produce' question.

A competitive market results in allocative efficiency and productive efficiency in the long run. Higher level students will learn more about these efficiency concepts in [subtopic 2.11 \(https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29858/\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29858/).

Consumer surplus

Have you ever had the experience of paying less for a product than you were willing and able to? For example, perhaps you wanted to buy a T-shirt and were willing and able to pay USD 20 for it and instead found that you only had to pay USD 15.

Economists have a name for this: consumer surplus. Consumer surplus is the difference between the highest price consumers are willing and able to pay for a good and the actual price they pay. It is the extra benefit consumers receive for paying a lower price than the one they were prepared to pay.

In **Figure 1**, the triangle abc indicates the consumer surplus gained when this market is in equilibrium at point B. The equilibrium price is USD 10 per unit and the equilibrium quantity is 10 000 units.

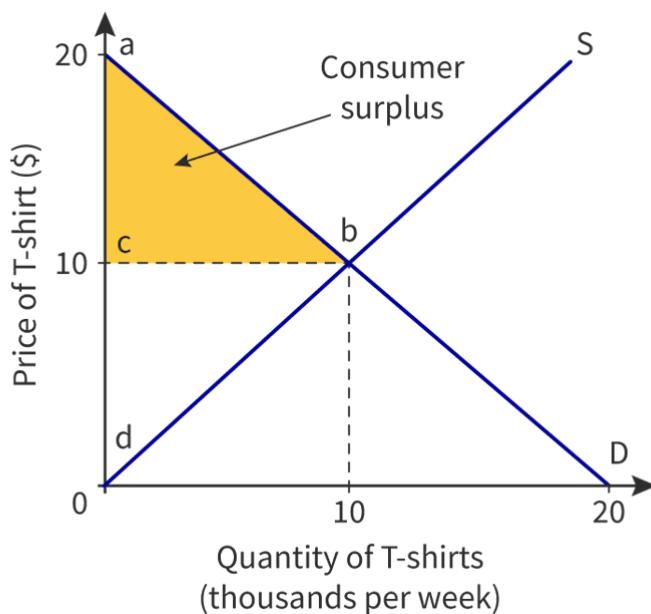


Figure 1. Consumer surplus.

[More information for figure 1](#)

The graph illustrates the supply and demand curves for T-shirts to highlight consumer surplus. The x-axis represents the quantity of T-shirts in thousands per week, ranging from 0 to 20 thousand. The y-axis indicates the price of T-shirts in dollars, ranging from \$0 to \$20.

Two lines form the graph. The demand curve (D) slopes downward from the upper left corner (point A) at \$20 and 0 units to the lower right corner (point D) at \$0 and 20,000 units. The supply curve (S) slopes upward from the lower left corner (point D) at \$0 and 0 units to the upper right corner (point S) at \$20 and 20,000 units.

The equilibrium point (B) is at \$10 and 10,000 units, where the supply and demand curves intersect.

A triangle (abc) shows the consumer surplus, shaded in yellow. The points form from A (\$20), B (equilibrium price \$10 at 10,000 units), and C on the y-axis at \$10. The yellow shaded area represents the advantage consumers gain when willing to pay prices at or above the equilibrium price of \$10, outlined by the demand curve above the equilibrium price level.

[Generated by AI]

For the first 10 000 units, consumers were willing to pay prices at or above USD 10 each, as indicated by the demand curve and the yellow shaded area. Therefore they gain a consumer surplus, which is the area below the demand curve and above the USD 10 price level.

Consumer surplus is an important benefit for many consumers in an economy. It is why price competition in free markets is considered an advantage. The lower the prices are in a market, the greater the consumer surplus.

Case study

Using big data to estimate consumer surplus: the case of Uber



Figure 2. How much consumer surplus is generated by the price mechanism used in Uber's platform?

Source: "Uber

(<https://www.flickr.com/photos/stockcatalog/40834812504/>), by Stock Catalog is under CC BY 2.0

(<https://creativecommons.org/licenses/by/2.0/>).

Uber is a service that connects people who need transportation with drivers. It uses 'surge' pricing (<https://www.uber.com/us/en/drive/partner-app/how-surge-works/>), where prices can change quickly in response to supply and demand. When demand rises for its services, for example when a big concert finishes and many people are looking for a ride in a particular area of a city, prices will rise. This means that some consumers will choose not to use the service (the quantity

demanded declines) and more Uber drivers will go to the area where consumers need rides (the quantity supplied increases). The market finds equilibrium, because shortages should be quickly resolved.

Researchers used Uber's pricing and ride data to estimate consumer surplus. They determined that the UberX service resulted in about USD 2.9 billion in consumer surplus in the four US cities they analysed and that 'for each dollar spent by consumers, about USD 1.60 of consumer surplus is generated.' Their research suggests 'that the overall consumer surplus generated by the UberX service in the United States in 2015 was USD 6.8 billion.'

Source: Adapted from Using Big Data to Estimate Consumer Surplus: The Case of Uber ↗ (<https://www.nber.org/papers/w22627.pdf>), The National Bureau of Economic Research

Consider this question:

- Why might it be useful for us to know how much consumer surplus exists in particular markets?

This interesting Freakonomics podcast (about 40 minutes long) explains the research:

Why Uber Is an Economist's Dream (Ep. 258)
(<http://freakonomics.com/podcast/uber-economists-dream/>).

If you are interested in reading the entire research paper, you can find it through this link:

Using Big Data to Estimate Consumer Surplus: The Case of Uber ↗
(<https://www.nber.org/papers/w22627.pdf>)

Producer surplus

Consumers are not the only stakeholder that experiences a surplus in a market; producers also experience surpluses.

Producer surplus is the difference between the lowest price producers are willing and able to offer the good and the actual price that they receive for it. It is the extra benefit that producers receive from selling an amount of output at a higher price than the one at which they were prepared to sell it. The producer surplus is represented in **Figure 3**.

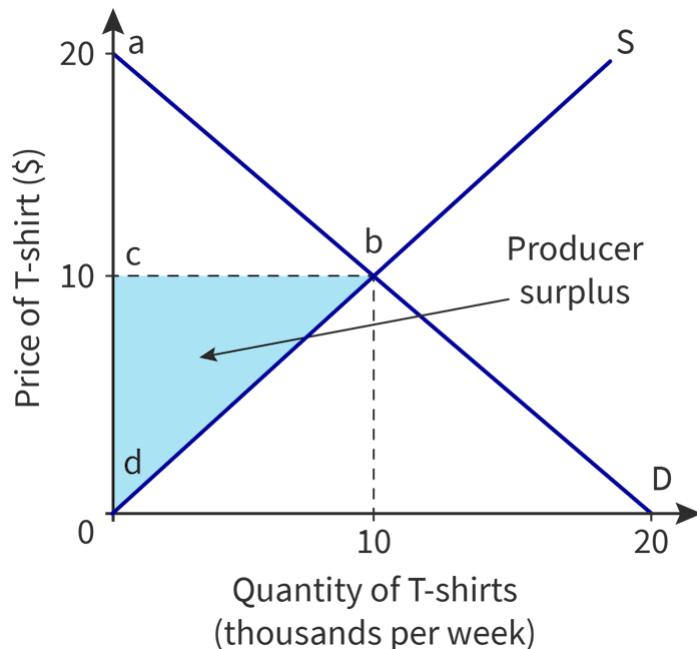


Figure 3. Producer surplus.

[More information for figure 3](#)

This image is a graph depicting the concept of producer surplus in a supply and demand model. The X-axis represents the quantity of T-shirts in thousands per week, ranging from 0 to 20. The Y-axis indicates the price of T-shirts in dollars, ranging from 0 to 20.

The graph includes two intersecting lines: the supply curve (S) sloping upwards from the origin and the demand curve (D) sloping downwards. These curves intersect at point 'b' where the quantity is 10,000 units and the price is \$10, forming the equilibrium point.

The area above the supply curve and below the price level of \$10, labeled as triangles 'cbd', represents the producer surplus. This area shows the extra benefit producers earn by receiving a higher price for their product than the minimum price they were willing to accept.

Point 'a' on the price axis is at \$20, indicating the highest price, while point 'd' on the quantity axis is at 0, marking the start of the supply curve. An arrow labeled 'Producer surplus' points towards the shaded area 'cbd,' emphasizing the concept depicted.

[Generated by AI]

In **Figure 3**, the producer surplus is shown by triangle cbd. For the 10 000 units sold they receive a price of USD 10 each, even though they were prepared to accept a lower price for the first 9999 units, as shown by the supply curve. Therefore,

they earn an extra benefit (producer surplus) which is the area above the supply curve and below the price level of USD 10.

Social/community surplus

Social/community surplus is the sum of the consumer surplus and producer surplus. It is the total benefit gained by society when the market is at equilibrium.

When a market is in equilibrium, with no external disturbances, it is said to be in a state of allocative efficiency. As stated before, this means that the resources are allocated in the most efficient way from a society's point of view.

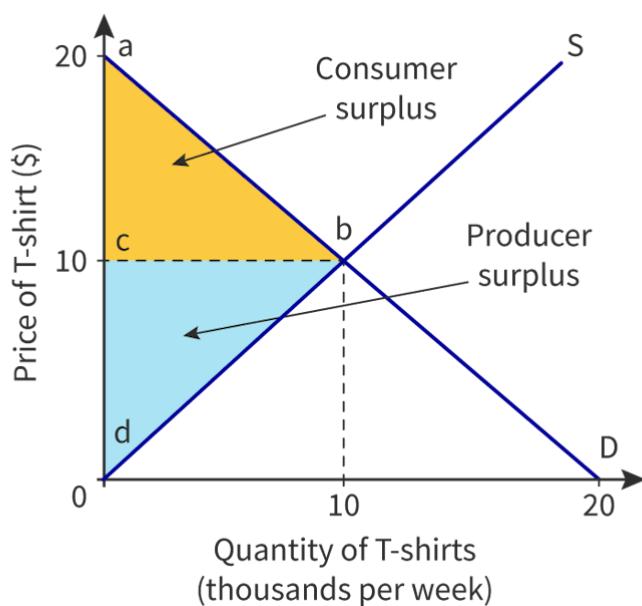


Figure 4. Consumer surplus + producer surplus = social/community surplus.

[More information for figure 4](#)

The graph represents the consumer and producer surplus in the context of a market for T-shirts, with the X-axis labeled as "Quantity of T-shirts (thousands per week)" and the Y-axis labeled as "Price of T-shirt (\$). The supply curve (S) and demand curve (D) intersect at point b, indicating market equilibrium. The quantity at equilibrium is 10,000 T-shirts per week, and the price is \$10 per T-shirt. The area above the equilibrium price and below the demand curve (triangle abc) is labeled as "Consumer surplus," while the area below the equilibrium price and above the supply curve (triangle bcd) is labeled as "Producer surplus." The Y-axis extends from 0 to \$20, and the X-axis extends from 0 to 20,000 T-shirts per week. The graph illustrates how consumer and producer surpluses contribute to the total surplus in the market.

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In the absence of external influences, the costs of production for the industry or firm are equal to the costs to society when producing a specific good or service. In this case, the supply curve represents the social cost curve and is called the marginal social cost (MSC) curve. You will learn more about the concept of marginal social cost in [subtopic 2.8 \(https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/). We just introduce the terminology here.

Again, in the absence of external disturbances and effects, the benefit that consumers get from consuming a specific good or service in a free market is equivalent to the benefit or satisfaction gained by society in the consumption of such goods. In this case, the demand curve represents the social benefit curve or the marginal social benefit (MSB) curve. You will learn more about the concept of marginal social benefit in [subtopic 2.8 \(https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/\)](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/); we just introduce the terminology here.

From **Figure 4**, we can confirm that there is no point other than point B that would result in a greater community surplus. This is the optimum allocation of resources from the society's point of view, and it occurs when demand is equal to supply, or where the marginal social benefit of consuming a good is equal to the marginal social cost of producing it.

Important

The optimal allocation of resources from the society's point of view occurs when demand is equal to supply, or where the marginal social benefit is equal to the marginal social cost.

Allocative efficiency: $D \text{ (MSB)} = S \text{ (MSC)}$

This idea of 'optimal allocation' assumes that we are only focused on consumer and producer surplus as opposed to some other way of judging what is optimal for consumers or producers (or any other stakeholder). 'Optimal' in this context refers to getting the largest difference between the price and what consumers are willing and able to pay, or producers willing and able to accept to produce their goods.

There could be many other ways of judging what is an optimal allocation: maximising fairness, happiness, environmental protection or other criteria.

Allocative efficiency simply refers to maximising the community surplus, which is focused on price.

Be aware

The idea that markets achieve allocative efficiency at market equilibrium rests on the assumption that both consumers and producers are making perfectly rational choices and have perfect information about their own utility and costs.

In reality, the prices we see in markets are not always determined under these perfect conditions. Consumers and producers can be irrational. They also often do not have perfect information or understanding about their own utility or costs of production. There might be costs or benefits that they are unaware of, or not willing or able to account for in their decisions. Thus, markets often 'fail' to achieve allocative efficiency in reality. You will learn more about market failures in [subtopic 2.8 \(<https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/>\).](https://app.kognity.com/study/app/pp/sid-186-cid-754025/book/the-big-picture-id-29875/)

2.3 Competitive market equilibrium

Calculations of social/community surplus (HL)

Higher level students are expected to calculate consumer surplus, producer surplus and social/community surplus from a diagram and data. This involves finding the area of the relevant triangles formed in a demand and supply diagram by the boundaries of the demand curve, supply curve, and market equilibrium price and quantity.

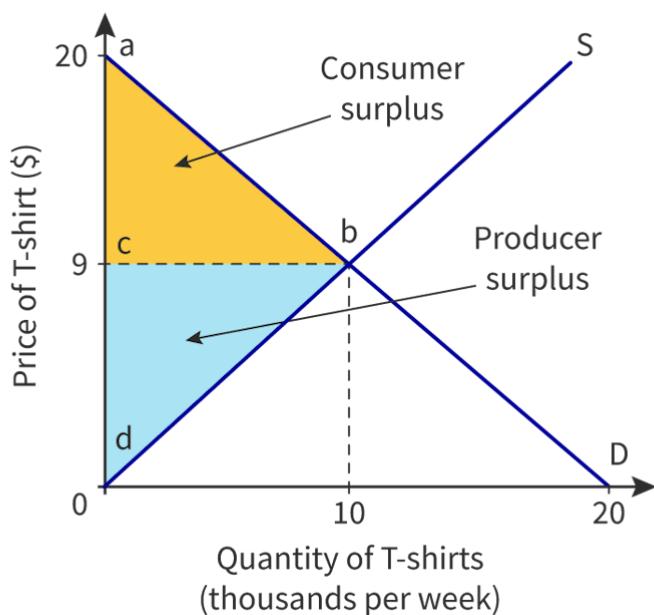


Figure 1. Social/community surplus.

 [More information for figure 1](#)

The image is a diagram depicting supply and demand for T-shirts, illustrating consumer and producer surplus. The X-axis is labeled "Quantity of T-shirts (thousands per week)" ranging from 0 to 20, while the Y-axis is labeled "Price of T-shirt (\$)" ranging from 0 to 20. The demand curve (D) slopes downward from point (20, 0) to (0, 20), and the supply curve (S) slopes upward from point (0, 0) to (20, 20). These curves intersect at the equilibrium point (b) where the price is \$9 and the quantity is 10,000 T-shirts. The area between the price level at equilibrium and the demand curve, colored yellow, represents the consumer surplus. The area between the price level at equilibrium and the supply curve, colored blue, represents the producer surplus. The points marked on the Y-axis are 'a' at price 20, 'c' at price 9, and 'd' at price 0. The consumer surplus is the triangular area below the demand curve and above the equilibrium price, while the producer surplus is the triangular area above the supply curve and below the equilibrium price. The sum of these areas represents the social/community surplus.

[Generated by AI]

In **Figure 1**, you can see the triangle in yellow represents the consumer surplus: the area below the demand curve and above the market equilibrium price. The triangle in blue represents the producer surplus: the area above the supply curve and below the equilibrium price. The social/community surplus simply adds the areas of the two triangles together.

To find the values of these areas, simply apply the formula for calculating the area of a triangle, using the values in the diagram for the lengths of the sides, as shown in the examples below.

Consumer surplus

Area of a triangle = $0.5 \times \text{base} \times \text{height}$

Area of consumer surplus =
 $0.5 \times \text{quantity} \times (\text{price when quantity demanded is zero} - \text{equilibrium price})$

Area of consumer surplus = $0.5 \times 10\,000 \times (\text{USD } 20 - \text{USD } 9) = \text{USD } 55\,000$

Producer surplus

Area of a triangle = $0.5 \times \text{base} \times \text{height}$

Area of producer surplus =
 $0.5 \times \text{quantity} \times (\text{equilibrium price} - \text{price when quantity supplied is zero})$

Area of producer surplus = $0.5 \times 10\,000 \times (\text{USD } 9 - \text{USD } 0) = \text{USD } 45\,000$

Community surplus = consumer surplus + producer surplus

= USD 55 000 + USD 45 000 = USD 100 000

Worked example 1

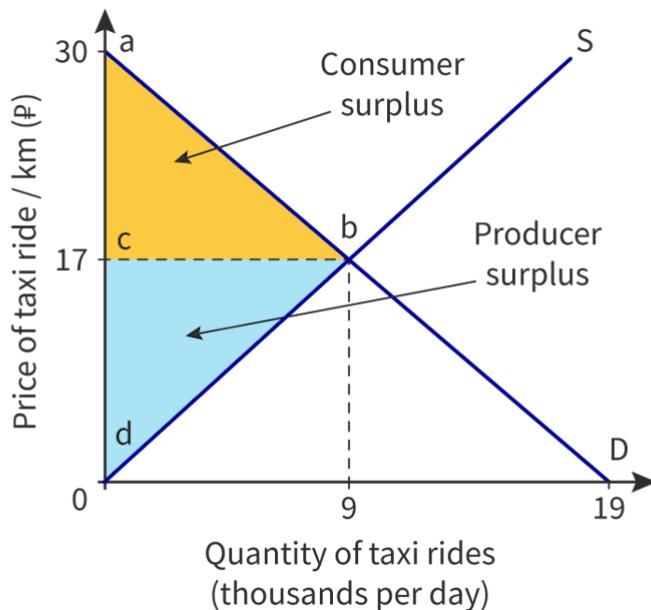


Figure 2. Market for taxi rides in Moscow.

[More information for figure 2](#)

The image is a graph depicting the supply and demand for taxi rides in Moscow. The X-axis represents the quantity of taxi rides in thousands per day, ranging from 0 to 19. The Y-axis measures the price of taxi rides per kilometer in rubles (₽), ranging from 0 to 30. The demand curve (D) slopes downward from point 'a' (30,0) to point 'b' (9,17) and onward to 'd' (0,0). The supply curve (S) starts at 'd' (0,0), passes through 'b' (9,17), and continues to 'c' (19,30). The area labeled as 'Consumer surplus' is a yellow triangle above the price level of 17, between the Y-axis and point 'b'. The area labeled as 'Producer surplus' is a blue area under the price level of 17 and above the supply curve, also extending to point 'b'.

[Generated by AI]

Figure 2 shows the market for taxis in Moscow, Russia. Use the information from the diagram to calculate:

1. Consumer surplus
2. Producer surplus
3. Social/community surplus

1. Consumer surplus

$$0.5 \times \text{base} \times \text{height}$$

$$0.5 \times 9\,000 \times (\text{RUB } 30 - \text{RUB } 17)$$

$$0.5 \times 9\,000 \times \text{RUB } 13$$

$$\text{RUB } 58\,500$$

2. Producer surplus

$$0.5 \times \text{base} \times \text{height}$$

$$0.5 \times 9\,000 \times \text{RUB } 17$$

$$\text{RUB } 76\,500$$

3. Social/community surplus

$$\text{RUB } 58\,500 + \text{RUB } 76\,500$$

$$\text{RUB } 135\,000$$