

Market Equilibrium

by Sophia Tutorial



WHAT'S COVERED

This tutorial will cover market equilibrium, focusing on the definition of equilibrium and how to determine equilibrium given a supply and demand schedule. We will also discuss why equilibrium results in the best outcome for society, as well as what happens when there is interference with equilibrium.

Our discussion breaks down as follows:

1. What Is Equilibrium?
2. Markets Out of Equilibrium
3. Consumer and Producer Surplus
4. Interference with Equilibrium
5. Market Simplification

1. What Is Equilibrium?

We, as consumers, are always searching for what we want at a price that we are willing to pay.

Producers want to provide us with goods at prices we will pay, because that is the only way they will make money.

Equilibrium, then, is where we, as buyers, converge with sellers, or suppliers, in the marketplace.

We, as consumers, want low prices and producers would love to sell at high prices. So, how do we agree on a price?

Let's use an example to explain the answer to this question.

Here is a chart detailing varying prices of apples, and the respective quantity of apples that producers are willing to supply and the quantity of apples that buyers are willing to demand at each of those prices.

Price of Apple	Quantity of Apples Supplied	Quantity of Apples Demanded
\$2.00	7,000	0

\$1.75	6,000	1,000
\$1.50	5,000	1,500
\$1.25	4,000	2,000
\$1.00	3,000	3,000
\$0.75	2,000	4,000
\$0.50	1,000	5,000
\$0.25	0	6,000

At prices above \$1.00: $Q_s > Q_d$

At prices below \$1.00: $Q_d > Q_s$

At the price of \$1.00: $Q_s = Q_d$

Notice, with the quantity supplied, that at a high price such as \$2 for one apple, suppliers are willing to produce a lot because it is worth their time; they can make a big profit if they are able to sell them at that high price.

Conversely, as the price falls, their willingness to produce the apples drops.

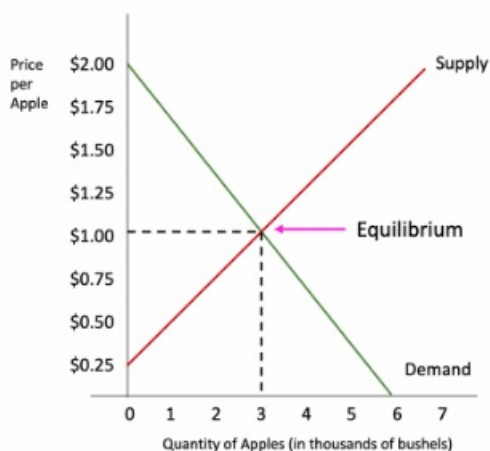
This exemplifies that positive relationship between price and quantity supplied.

On the other hand, there is an opposite relationship with price and quantity demanded. No one is willing to buy when each apple costs \$2, but as the price drops, the quantity demanded continues to rise.

Let's look at the graph, with price on the y-axis and quantity of apples on the x-axis.

Notice that it illustrates the positive relationship between price and quantity supplied and the inverse relationship between price and quantity demanded.

On this graph, then, equilibrium is where supply and demand are equal. It is the same on the chart above--the point at which quantity supplied equals quantity demanded.



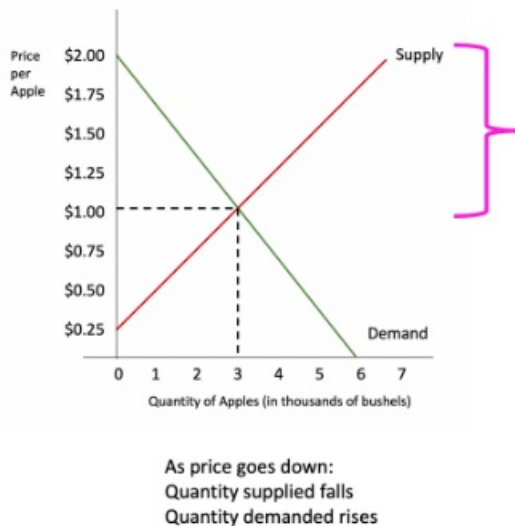
\$1.00 is the equilibrium price.

2. Markets Out of Equilibrium

Let's briefly discuss what happens when the market is not in equilibrium.

At prices above \$1.00: $Q_s > Q_d$

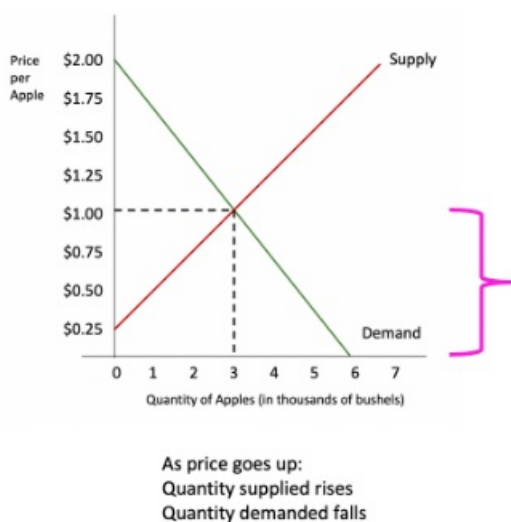
Referencing the chart above, notice that at a price higher than \$1--indicated in red--the quantity supplied is greater than the quantity demanded.



If the price were too high, and producers wanted to sell a lot but no one was buying, they would have an incentive to lower the price.

At prices below \$1.00: $Q_d > Q_s$

In the opposite situation, if price was lowered to under \$1, shown in green, then the quantity demanded exceeds the quantity supplied.



If a lot of people wanted the apples but producers weren't willing to produce them, producers would notice how many people wanted to buy them and would have an incentive to raise price.

In this manner, the market itself can establish equilibrium, and it does so once there is no tendency for price to go up or down any longer.

In our example, \$1 is the equilibrium price because it is the only price where the quantity supplied equals quantity demanded. Therefore, there is no need for price to go up or down any longer.

Now, why is equilibrium such a good thing?

Well, demand represents people's marginal benefits and supply represents the producers' marginal costs.

When we equate the two, that means society is best off, because we are equating marginal benefit with marginal cost to society.

This maximizes both consumer and producer surplus, which we will cover next.

3. Consumer and Producer Surplus

Consumer surplus is the difference between actual price paid for a good and the highest amount the consumer would have been willing to pay for that good.



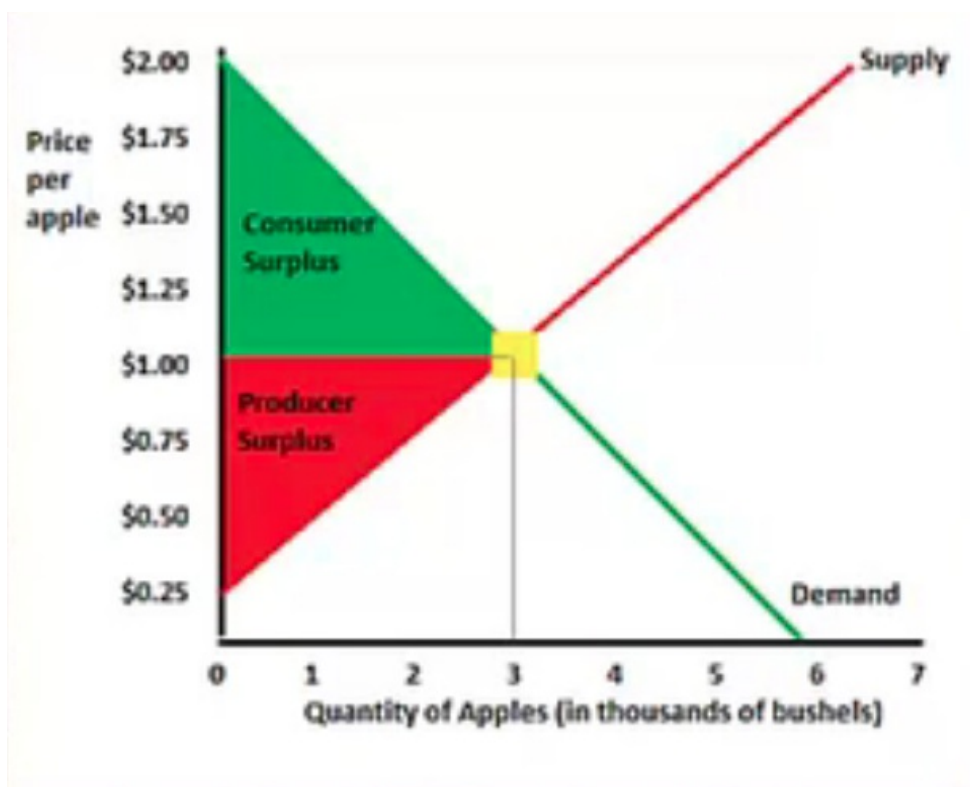
THINK ABOUT IT

Have you ever gotten a better deal on something than you expected? What if you were willing to pay \$100 to see a concert that you really like, but you were able to buy a ticket from someone for \$60. In this case, you would have enjoyed a consumer surplus of \$40.

Producer surplus is the difference between actual payment for a good and the least amount a producer would have agreed to receive for the good.

➞ **EXAMPLE** Suppose you are selling baseball cards on eBay and you decide that you would be willing to accept as little as \$25 for a particular card. Then, someone offers you \$40 for it. In this situation, you would have enjoyed a producer surplus of \$15--the difference between what you were willing to accept for the card, and what you actually received.

Let's look at these concepts shown visually on a graph, referencing our apple data in the chart above.



Consumer surplus represents all of the people above the \$1 price on the demand curve. They are all willing to pay more than \$1, but since \$1 is the market price, they enjoy some consumer surplus.

If we add together all of these people and their consumer surpluses, this gives us the green triangle; it is everything above the price up to the demand curve.

Producer surplus represents all of the producers on the supply curve who are willing to sell apples for less than \$1, so they enjoy some producer surplus.

Again, when we add them all up, we get the red triangle.



BIG IDEA

If we allow the market to establish equilibrium, consumer surplus plus producer surplus represents the overall benefit to society, and that triangle could not get any bigger.

Overall welfare is maximized whenever people can trade freely in the market and equilibrium can be established. The market allows for trade to occur between buyers and sellers, providing opportunities for purchases and sales.

When the market reaches equilibrium, both consumers and producers are better off, and there will be no deadweight loss, which we will discuss in the next section.



TERMS TO KNOW

Consumer Surplus

Determined by the difference between actual price paid for a good and the highest amount the consumer would have paid for the good

Producer Surplus

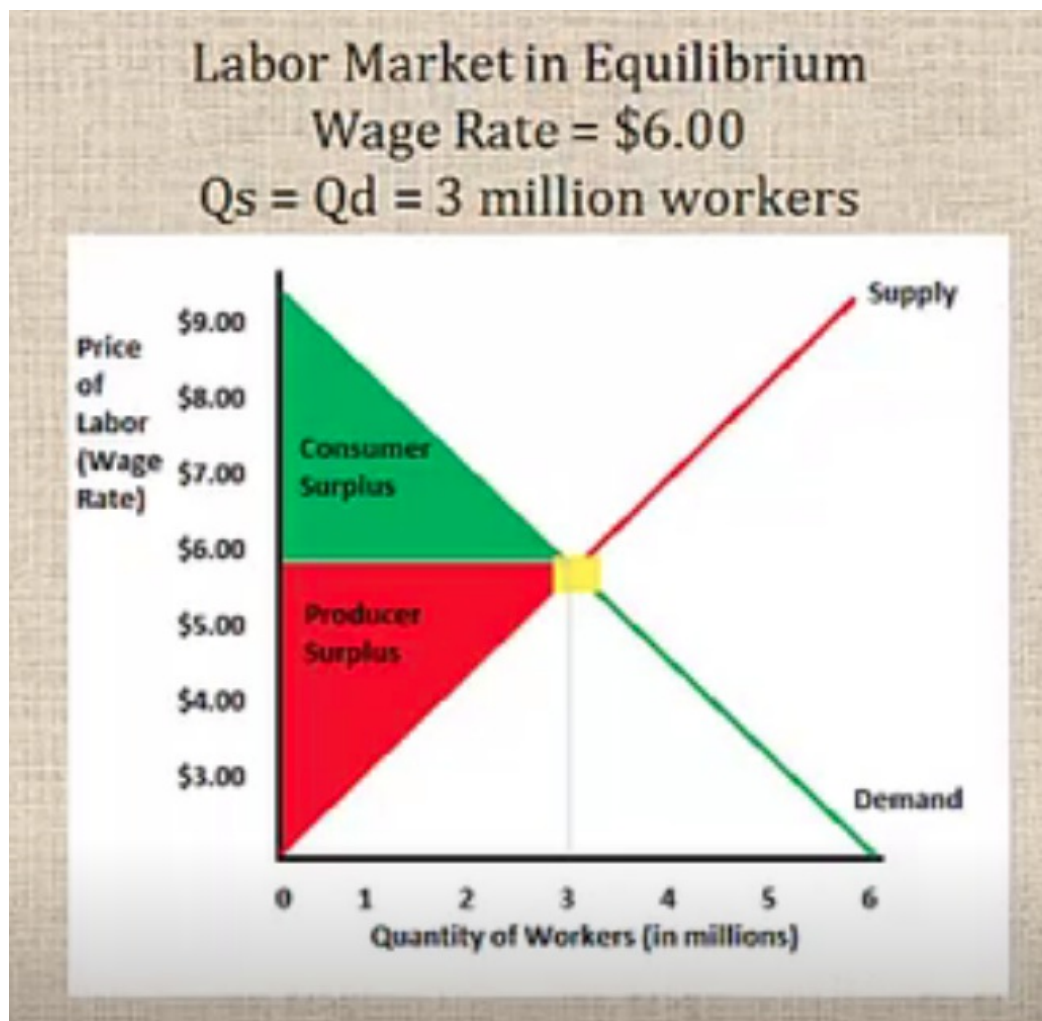
The difference between actual payment for a good and the least amount a producer would have agreed to receive for the good

4. Interference with Equilibrium

Now, what happens when the market cannot establish equilibrium? Let's look at the labor market, which provides a good example of this.

This graph shows the supply of labor, or people willing to supply their labor, and employers who are demanding this labor.

If we let the market come to equilibrium, there would be as many people who want jobs as will be hired for those jobs, which occurs at a market wage rate of \$6.



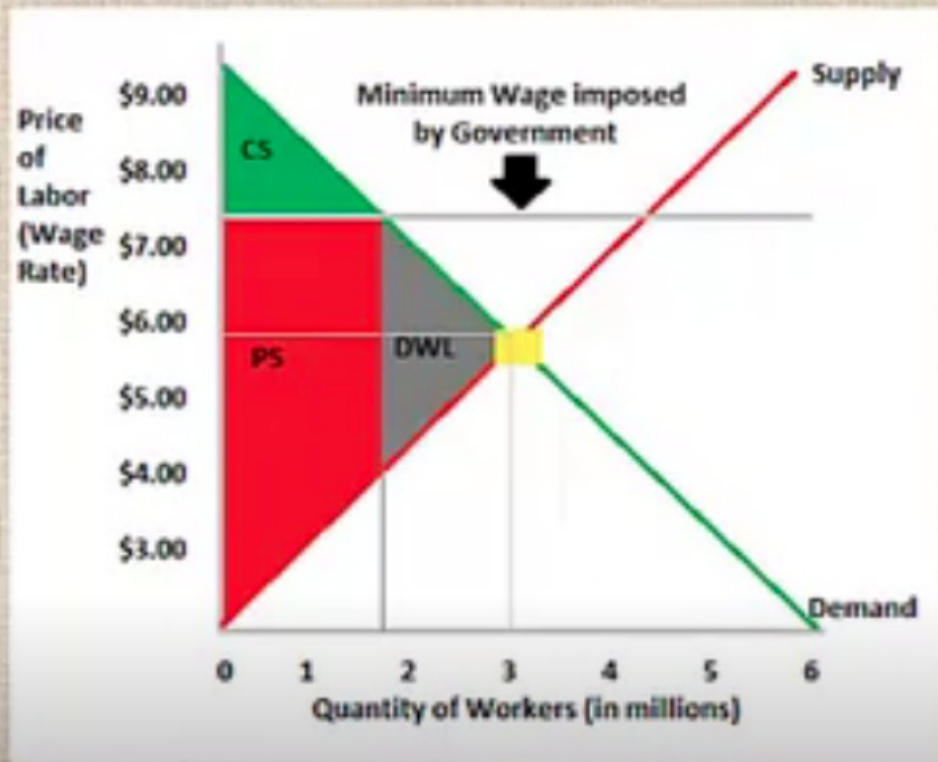
In this scenario, three million workers would want jobs and would get jobs, if \$6 was the wage rate.

However, the government does not allow companies to pay workers \$6 per hour. There is a minimum wage law in place that prevents the market from establishing equilibrium. Instead, the graph looks like this:

Labor Market with Minimum Wage

Wage rate = \$7.25

$Q_s > Q_d$ = surplus of workers



You can see the minimum wage that is imposed, up above where the market would clear. At the minimum wage, now the quantity supplied of workers is greater because more people are willing to supply their labor as wages go up.

However, do all those people get hired?

Well, according to the graph, there are about four million or more workers willing to work at minimum wage. However, notice where it hits the demand curve.

Under two million employers are willing to hire people at that wage. Therefore, there is a gap between the quantity supplied and the quantity demanded.

This will reduce our consumer surplus, while producer surplus will grow slightly.

The grey area is what we call **deadweight loss**. Before the minimum wage was imposed, the entire triangle was realized. Now, we lose out on the area that used to be both consumer and producer surplus.

A deadweight loss, then, is when we see this decrease in producer and consumer surplus.



TERM TO KNOW

Deadweight Loss

A variable that decreases the producer and consumer surplus due to a section of incapacitated resource, such as tax

5. Market Simplification

When analyzing supply, demand, and equilibrium, we are essentially simplifying things.

Obviously, many factors can change. In our apples example, there are potentially many variables that could impact our demand and supply of apples.

However, we use a concept known as **ceteris paribus**, which means to hold all other variables constant, to isolate outside factors so that we can just look at one situation at a time--in this case, only the supply of apples and the demand for apples.

We will take into account that other things can change, but we will look at those changes one change at a time.



TERM TO KNOW

Ceteris Paribus

Holding all other variables constant



SUMMARY

Today we learned that **equilibrium** is where supply and demand meet, and there is an equilibrium price that clears the market. We learned that equilibrium results in the best outcome because **consumer and producer surplus** are maximized. We learned that **markets out of equilibrium** result in a deadweight loss, when there is **interference with equilibrium**. Lastly, we learned that **market simplification** requires a concept called ceteris paribus, which holds all other variables constant, allowing us to isolate outside factors and focus on one situation at a time.

Source: Adapted from Sophia instructor Kate Eskra.



TERMS TO KNOW

Ceteris Paribus

Holding all other variables constant.

Consumer Surplus

Determined by the difference between actual price paid for a good and the highest amount the consumer would have paid for the good.

Deadweight Loss

A variable that decreases the producer and consumer surplus due to a section of incapacitated resource, such as tax.

Producer Surplus

The difference between actual payment for a good and the least amount a producer would have agreed to receive for the good.