Deadweight Loss

by Sophia Tutorial

WHAT'S COVERED

This tutorial will cover the topic of deadweight loss, focusing on how consumer and producer surplus are used to see the impact of different government policies.

Our discussion breaks down as follows:

1. Welfare Analysis
2. Consumer Surplus, Producer Surplus, and Deadweight Loss: Price Ceiling
3. Consumer Surplus, Producer Surplus, and Deadweight Loss: Price Floor
4. Imposing a Binding Constraint: Weighing the Benefits

1. Welfare Analysis

We know that in most cases, free markets without government intervention function wonderfully because producers have the profit motive to provide consumers with what they want at prices they are willing to pay.

Usually, unregulated free markets produce the best outcome and overall welfare is maximized because free markets allow for trade to occur between buyers and sellers.

When the market reaches equilibrium, both consumers and producers are in a more advantageous position, and there is nothing called a deadweight loss, which we will discuss later in the tutorial.

Sometimes, though, the government does need to intervene. So, how can we measure the impact on consumers, producers, and society as a whole? This is an important measurement because as you will see throughout this tutorial, these government interventions definitely impact the overall market outcome.

Now, we can measure the impact using what is called welfare analysis, which compares consumer and producer surplus before and after the government intervention, to determine who is positively or negatively affected.

As a reminder, **consumer surplus** is the difference between the actual price paid for a good and the highest amount a consumer would have willingly paid for the good.

On the other hand, **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.

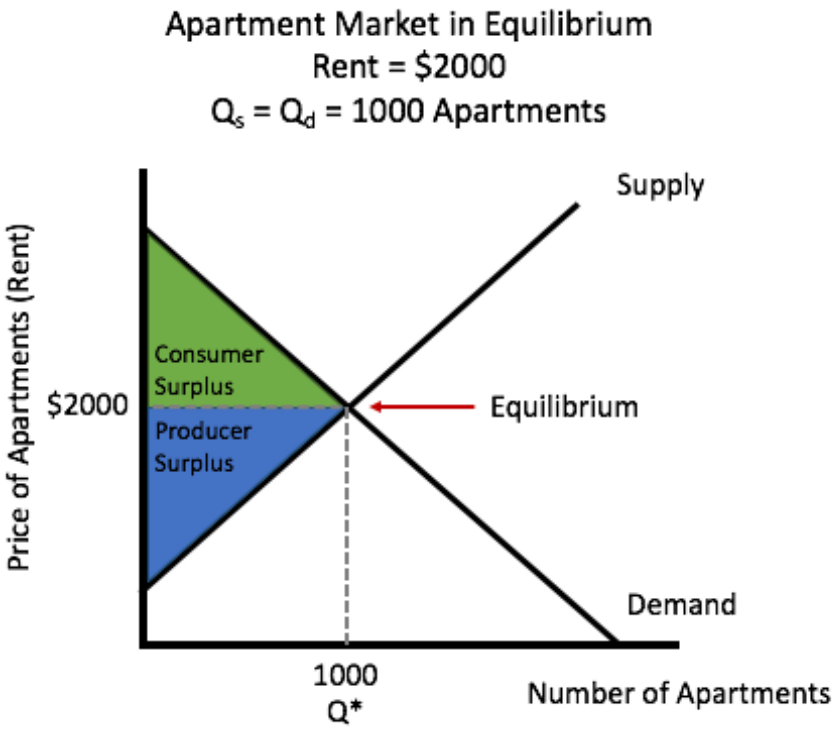
TERMS TO KNOW

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

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

2. Consumer Surplus, Producer Surplus, and Deadweight Loss: Price Ceiling

Let's begin by looking at a market in equilibrium, in this case, the market for apartments in New York City. In this example, we are suggesting that the equilibrium price--the price that would clear the market--would be $2,000 a month to rent. At that price, 1,000 apartments would be rented.



Notice that the consumer surplus is represented by the green triangle. All of these consumers were willing to pay a higher price than the $2,000 rent.

The producer surplus is the blue triangle because all of these sellers or landlords were willing to rent apartments for cheaper than $2,000.

When the market is unregulated, this combined area of consumer and producer surplus is maximized. This means that consumers and producers, at least as a whole, are in the best possible position.

However, because many people may be unable to afford such high rent in the city, the government will often step in and control rent in a certain area, imposing a maximum price that landlords can charge.

This is known as a binding constraint, which is typically a regulatory constraint that preempts market equilibrium by setting a different price level,

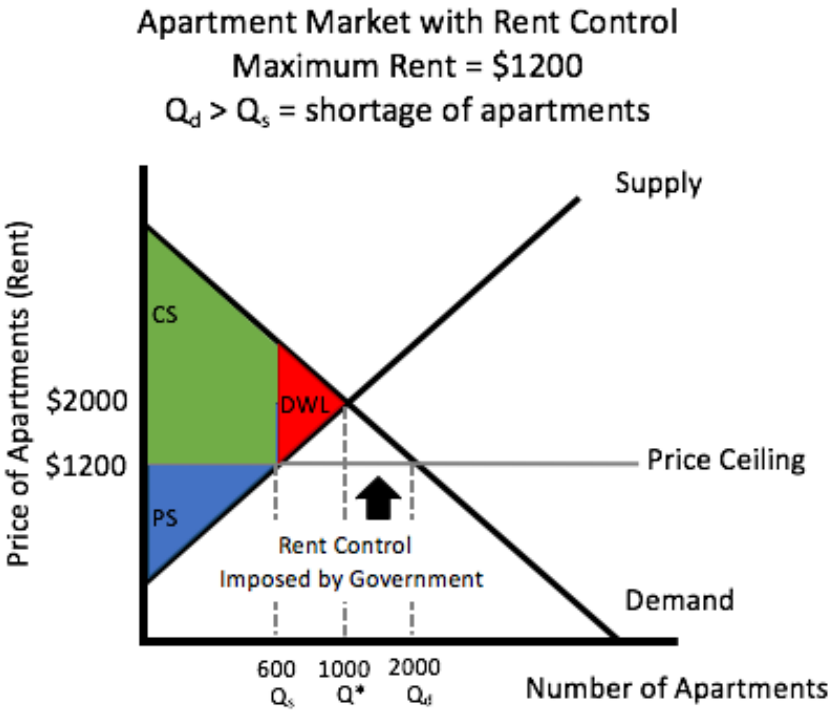
HINT

Note, a binding constraint can be a price ceiling or a price floor--which we will cover shortly--but in this case, if the government sets a maximum price, it is a price ceiling.

Price Ceiling: Rent Control Now, suppose the government sets a price ceiling at $1,200, which dictates that the landlords cannot charge any higher than $1,200 per month for their apartments.

HINT

In order for a price ceiling to be an effective binding constraint, it must be set *below* equilibrium.



What is the impact of this price ceiling? Well, we know that at lower prices, more people want to rent the apartments, so the quantity demanded is increased to 2,000. However, fewer landlords are willing to rent at that price, so the quantity supplied actually falls to 600, resulting in a shortage of apartments.

Notice what happens with consumer surplus and producer surplus on the graph. Producer surplus shrinks significantly, and some of this surplus is transferred from the producers to consumers in the form of lower prices.

So, as mentioned, there was a shift from sellers to buyers, but the red area represents the trades that are no longer taking place between landlords and renters.

Remember, the market used to be in equilibrium, with the full amount of 1,000 apartments being rented, representing an exchange between buyers and sellers. Now, though, buyers and sellers have lost some surplus, and this red triangle where these trades are no longer taking place is known as **deadweight loss**.

Deadweight loss is the change in total surplus, which is the sum of producer and consumer surplus, that results from the imposition of a binding constraint like a price ceiling.

TERM TO KNOW

Deadweight Loss

A situation, often caused by an imposed constraint, that results in either excess demand or supply occurring at the market price due to the inability of the market to adjust to market clearing price and quantity

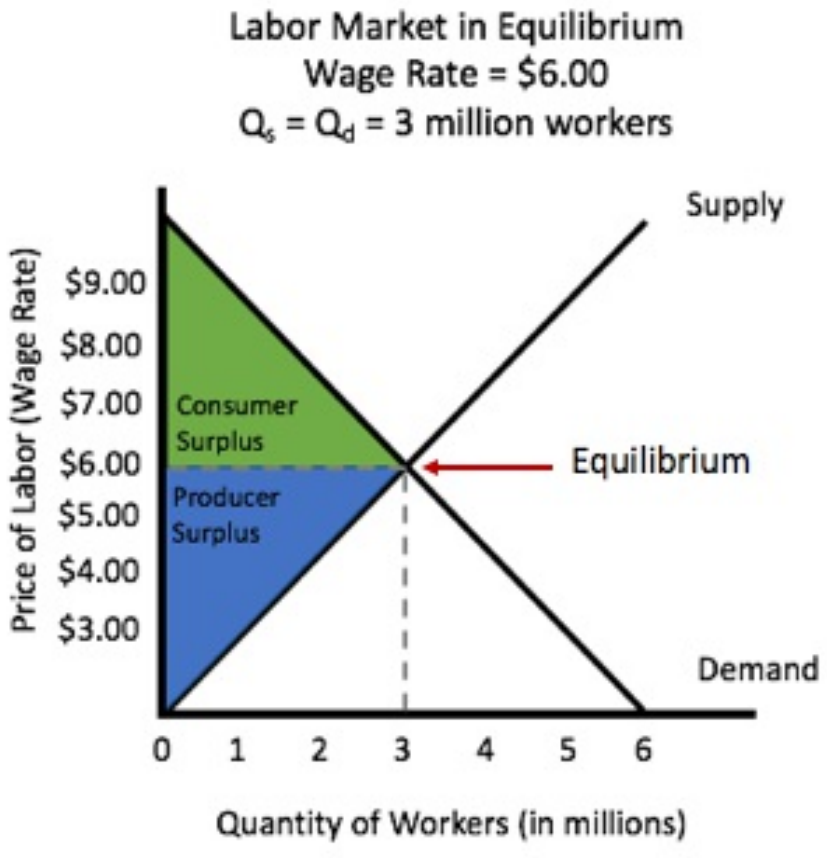
3. Consumer Surplus, Producer Surplus, and Deadweight Loss: Price Floor

Now let's look at a different example featuring a price floor.

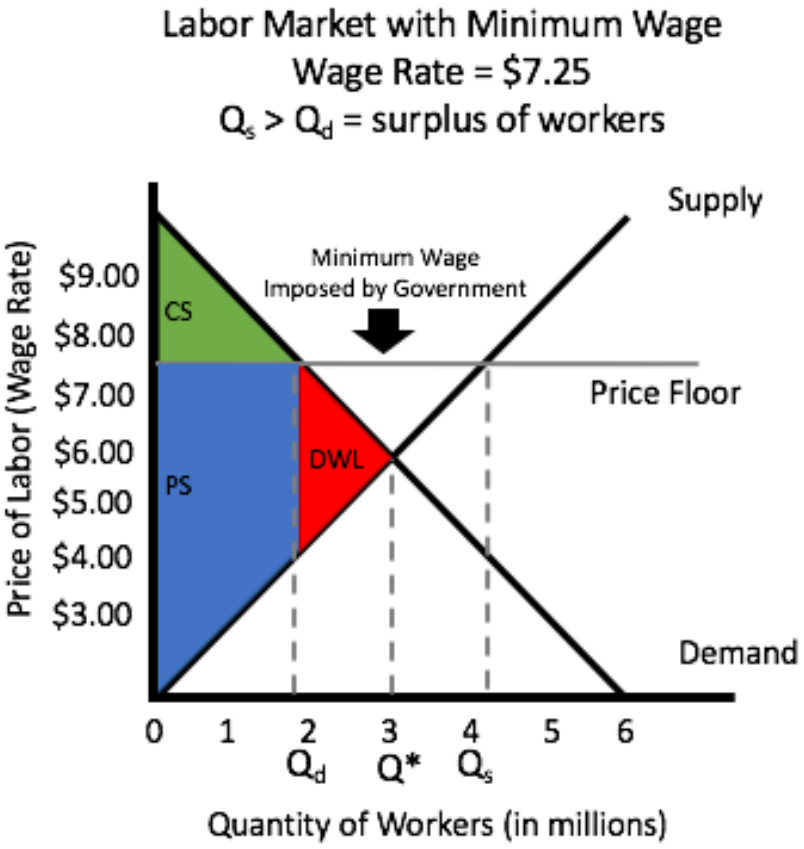
HINT

Keep in mind that in the labor market, supply and demand are slightly different. In the labor market, workers are the suppliers because they are providing or supplying their labor, whereas the employers are on the demand side because they are demanding or hiring labor.

In this graph, there is no binding constraint in the labor market. You can see that when this particular market is in equilibrium, the equilibrium wage rate would be $6 an hour, with 3 million workers working or hired at that wage rate.



However, the government imposes a binding constraint in the form of minimum wage law, which is an example of a price floor, dictating that employers must pay workers a minimum of $7.25 an hour.



When the government imposes that binding constraint, more workers are willing to supply their labor, so the quantity supplied goes up. On the other hand, employers are less willing to hire or demand labor now, so quantity for labor demanded falls. This is known as a surplus of workers.

Remember, there is no deadweight loss at equilibrium. However, minimum wage law prevents the market from establishing equilibrium. As you can see, the consumer surplus certainly has shrunk, and the producer surplus has gotten bigger.

Again, though, we are going to have this area of deadweight loss. There was a shift in the surplus from the employers to the workers, whom you may recall are the suppliers in this situation. However, both workers and employers have lost some surplus, because the only workers who have benefited from this situation are the ones who can actually get the jobs.

The government can force employers to pay workers a minimum wage, but it cannot force them to hire people. Therefore, this area of deadweight loss represents the trades that are no longer taking place between workers and employers.

4. Imposing a Binding Constraint: Weighing the Benefits

The question for government policy now becomes whether or not to impose a binding constraint. As you have

seen, imposing a binding constraint will transfer some surplus from one group to another. However, it will also create a deadweight loss overall, due to trades that are no longer taking place between some buyers and sellers.

Often a regulator is interested in a constraint due to the expected benefit to a targeted group of people.

> EXAMPLE In our previous examples, for instance, renters in New York City who are able to rent apartments at a cheaper price would be the benefited target group of people. Alternatively, workers who are able to get jobs at a higher wage benefit from a minimum wage or price floor.

On the other hand, since not *all* renters or workers will benefit from those trades that no longer take place, and certainly landlords and employers lose out, then what is the best course of action?

The key question becomes, then, will that targeted group benefit more than the overall loss to the group or society? Will the transfer of surplus to the benefiting group be larger than the deadweight loss created?

If policymakers believe that the transfer of surplus to the benefiting group will be larger than the deadweight loss created, then typically they will go forward with the policy. If not, then it is not a good idea--at least from an economic standpoint--to proceed with the policy, because the deadweight loss would be greater to the overall group.

SUMMARY

We began today's lesson by looking at how we can use **welfare analysis** to compare **consumer and producer surplus** before and after government intervention, to determine the impact of these different government policies. We learned about how **price ceilings** transfer surplus from producers to consumers, while **price floors** transfer surplus from consumers to producers. It is important to note that both ceilings and floors, which are **binding constraints**, create a deadweight loss and reduce the overall sum of consumer and producer surplus. Lastly, we discussed how policymakers go about **weighing the benefits of imposing a binding constraint**by evaluating if the transfer of surplus to the benefiting group will be larger than the deadweight loss created.

Source: Adapted from Sophia instructor Kate Eskra.

TERMS TO KNOW

Consumer Surplus
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Deadweight Loss
A situation, often caused by an imposed constraint, that results in either excess demand or supply occurring at the market price due to the inability of the market to adjust to market clearing price and quantity.

Producer Surplus
The difference between actual payment for a good and the least amount a producer would have willingly

agreed to receive for the good.