

Applications of Regulatory Intervention

by Sophia Tutorial



WHAT'S COVERED

This tutorial will cover the topic of applications of regulatory intervention, focusing on the effects of taxes and subsidies on consumers and sellers. We will be using welfare analysis to discuss the impact of both taxes and subsidies.

Our discussion breaks down as follows:

1. Consumer Surplus, Producer Surplus, and Deadweight Loss
2. Effect of Tax on Sellers
3. Effect of Tax on Consumer and Producer Surplus
4. Effect of Subsidies
5. Deadweight Loss and Taxes
6. Deadweight Loss and Subsidies
7. Purpose of Taxes

1. Consumer Surplus, Producer Surplus, and Deadweight Loss

In order to use welfare analysis, we need to understand several concepts:

- **Consumer surplus** is the difference between the actual price paid for a good and the highest amount the consumer would have paid for the good.
- **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.
- **Deadweight loss** is a variable, like a tax, that decreases the producer and consumer surplus.



TERMS TO KNOW

Consumer Surplus

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

Producer Surplus

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

Deadweight Loss

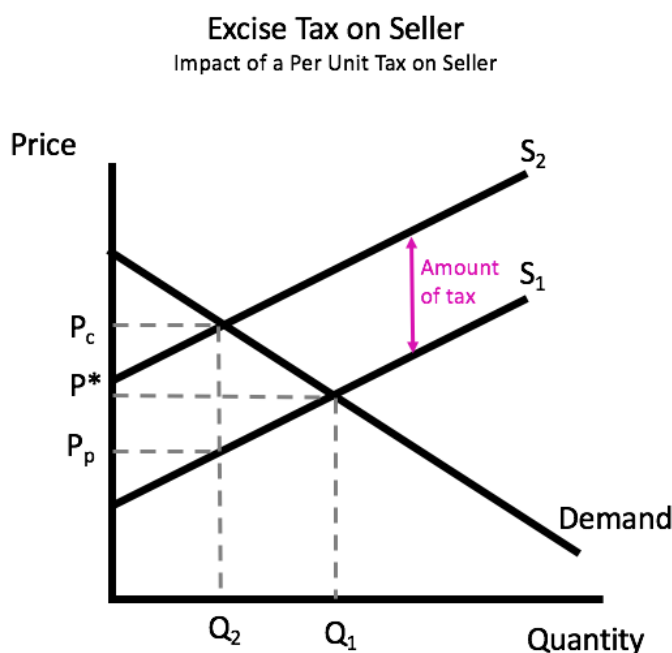
A variable that decreases the producer and consumer surplus due to a section of an incapacitated resource, such as tax

2. Effect of Tax on Sellers

Here is a supply and demand graph for a particular good.

Q_1 and P^* represent the initial equilibrium, quantity, and price.

When we put a tax on a good, this is a per unit tax on sellers, which will shift supply up and to the left, because the producer has to pay an amount of the tax for every unit that they sell.



Now that the supply curve has shifted up and to the left, the vertical distance between the supply curves represents the amount of the tax.

This will increase the price that consumers have to pay to the new market price, P_c .

However, this is not the price that producers receive, because remember, they have to pay per unit--the amount represented by the vertical distance--to the government in taxes.

Therefore, the price they actually receive is denoted as P_p , which will also decrease the quantity that is sold.

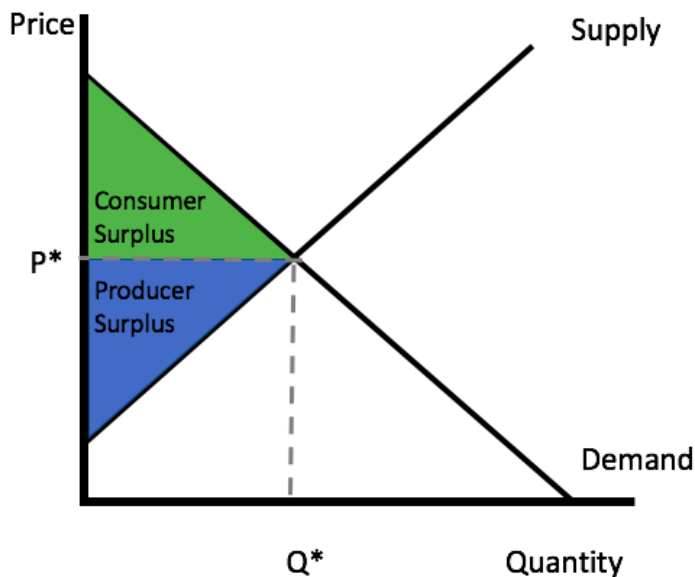
3. Effect of Tax on Consumer and Producer

Surplus

Now, using welfare analysis, we would say that before the tax was implemented, we have consumer surplus (shaded in green).

This area reflects all of the people who are receiving this item for less than they were actually willing to pay for it.

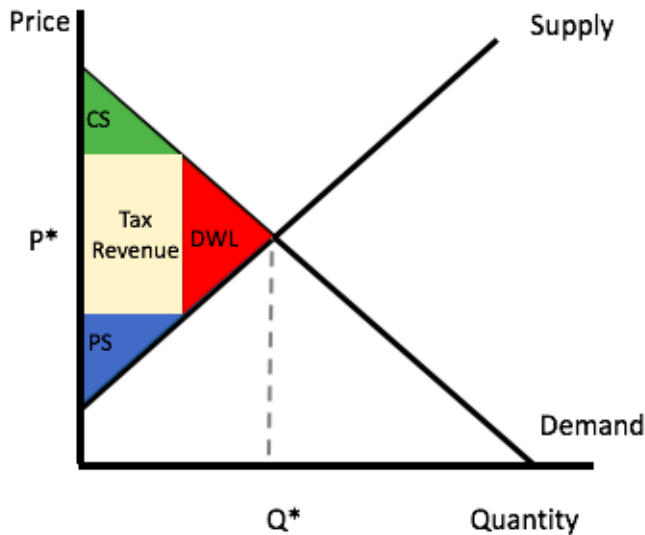
All of the blue area is producer surplus, because all of these producers were willing to supply the item for less than they were able to receive for it.



The area of the consumer and producer surplus combined is as big as it can possibly get when the market is in equilibrium. There is no deadweight loss.

However, now that we have the tax, what is going to happen?

Now, if that was the initial consumer and producer surplus, the graph below represents the new consumer and producer surplus if the supply were to shift to the left by the amount of the tax.



As you can see, both consumer surplus and producer surplus shrink as a result of the tax, while tax revenue is generated. This tax revenue is the quantity being purchased times the amount of the tax.

This area that used to be both consumer and producer surplus is now the tax revenue going to the federal government, which represents a redistribution of income.

Also, the area that used to be realized by consumers and producers is now deadweight loss, due to the lower quantity being purchased from the tax. It represents part of the consumer and producer surplus that is no longer being realized by consumers or producers.



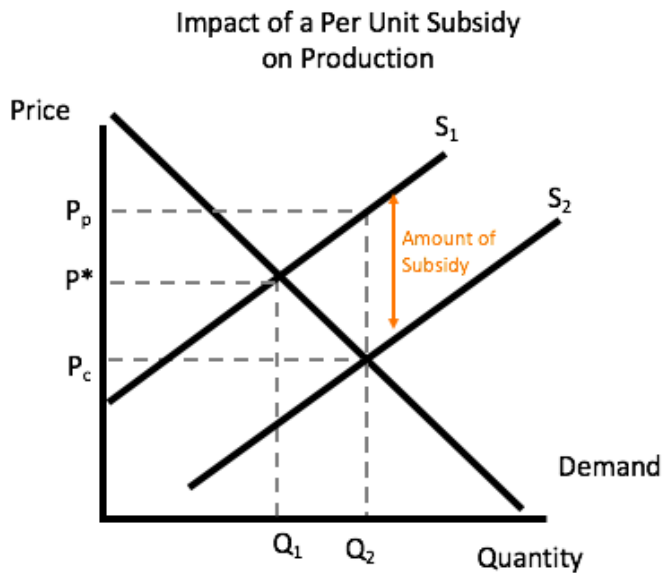
Keep in mind that this tax revenue should not be considered as a surplus or benefit. It is simply a redistribution of income, meaning the government is collecting it and they will then use it in another area.

4. Effect of Subsidies

Now, looking at the impact of a per unit subsidy on production, we see supply shifting to the right.



Remember, a subsidy pays a producer to supply something, which will lower their cost of production or give them money to produce it.



Therefore, they will, in fact, produce more and quantity increases to Q_2 .

If Q_1 and P^* were the initial price and quantity, the price consumers pay is lower; with the increase in supply, price drops.

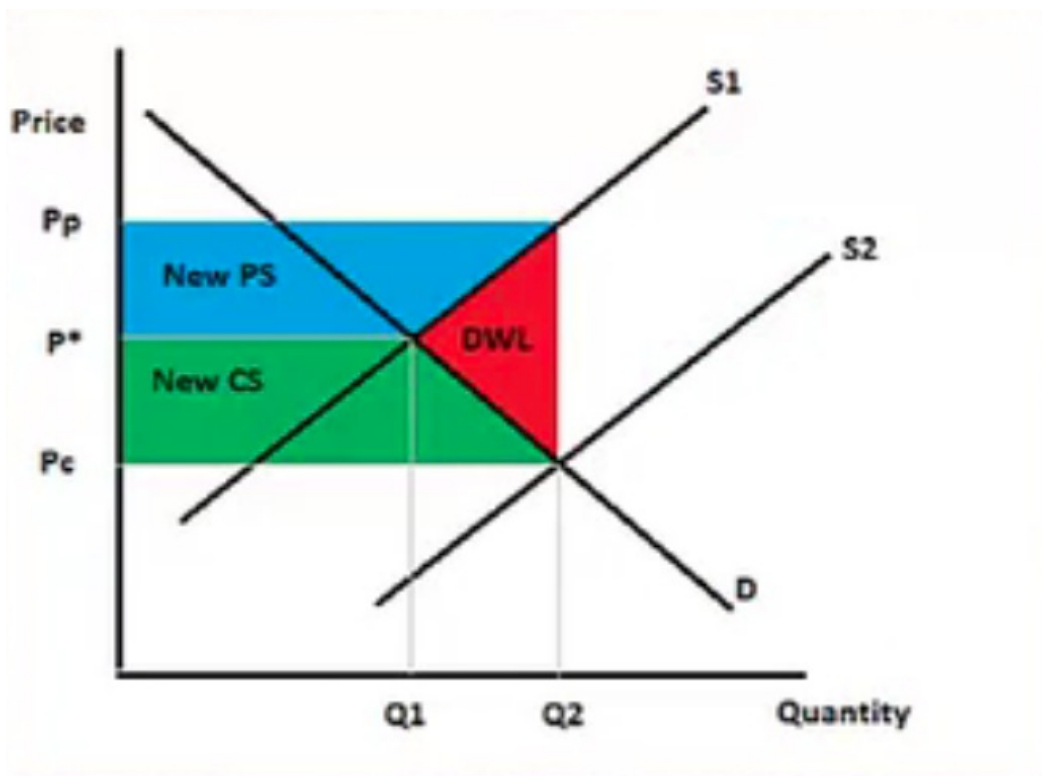
The price that producers receive increases, because the vertical distance between supply is now the amount of the subsidy.

Even though consumers pay a lower price, the producers are actually receiving a much higher price.



Keep in mind that the subsidy being paid represents tax revenue that had to be collected somewhere else.

Again, looking at the welfare analysis, you can see the new consumer surplus and producer surplus that is gained.



Consumers are paying that lower price, so they actually gained the area shown in consumer surplus.

Producers are receiving a higher price, so they now picked up the area that they didn't have before, in new producer surplus.

However, there is essentially negative tax revenue. There is a cost to providing this subsidy, which is represented by the area of deadweight loss.

This cost that is not going to either the producer or the consumer is the resulting deadweight loss to society.



Again, keep in mind that the tax revenue required to pay out the subsidy has to be collected in some other market.

5. Deadweight Loss and Taxes

Now, simply because there is a deadweight loss does not necessarily mean that all taxes are "bad."

The impact in one market can certainly have impacts in other markets.

IN CONTEXT

Let's discuss the deadweight loss that results in the cigarette market when we tax them.

Certainly, there is that deadweight loss in the cigarette market when we tax them, but now that we are taxing cigarettes, the decrease in cigarette smoke will result in an increase in clean air.

Performing a cost/benefit analysis, we can say that the cost impacts a relatively small number of people--the smokers--but the benefits impact a much larger group of people, in terms of clean air.

Therefore, the tax on cigarettes might not necessarily be "bad," even though there is a deadweight loss in the cigarette market.

Similarly, when we tax things like alcohol and gambling, we see a reduction in those activities. It will have an impact on drinkers and gamblers, but it can create a much more pleasant environment for people living in an area, due to a reduction in crime, less traffic, and less public drunkenness, for example.

Again, performing a cost/benefit analysis, we might actually see that the benefits outweigh the costs for the people engaging in these activities.

Also, the taxes may be used to benefit others, such as being diverted to public education, for instance.

Now, we cannot see all of this on a graph. It is hard to quantify or measure in terms of consumer and producer surplus and deadweight loss, which is important to note as we are going through this analysis.

6. Deadweight Loss and Subsidies

Likewise, all subsidies are not necessarily "good," simply because consumers and producers gain all of that surplus.

There is an opportunity cost of subsidies.

➦ **EXAMPLE** For example, if we subsidize dairy farmers, there may be higher prices for other crops.

There might be higher taxes, because the tax revenue is needed to provide the subsidy. As consumers, we are going to pay for this in some manner.

If we do a cost/benefit analysis, it may only benefit a small number of farmers, compared to a large cost to society overall.

7. Purpose of Taxes

Let's briefly discuss the purpose of taxes.

One purpose is to collect revenue for the government, which most people would argue is the main purpose of taxes.

However, some people say that another purpose is to modify consumer behavior, especially with items like cigarettes and alcohol.

Taxes on cigarettes and alcohol can be used to discourage the consumption of these items.

However, this is only effective initially. At first, it might be effective in discouraging drinking or smoking for

people who are not truly addicted.

Eventually, though, higher taxes will only cause consumers to alter their spending behavior to continue purchasing, because people who are truly addicted will continue purchasing anyway.



SUMMARY

Today we learned about the **effect of a tax on sellers**, as well as the **effect of a tax on consumer and producer surplus**. We also learned about the **effect of subsidies** on consumers and sellers. We learned how to use welfare analysis to discuss the impact of **deadweight loss on taxes and subsidies**, exploring what happens to **consumer surplus, producer surplus, and deadweight loss**. Finally, we briefly discussed the **purpose of taxes**, which can be to collect revenue for the government as well as to modify consumer behavior.

Source: Adapted from Sophia instructor Kate Eskra.



TERMS TO KNOW

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