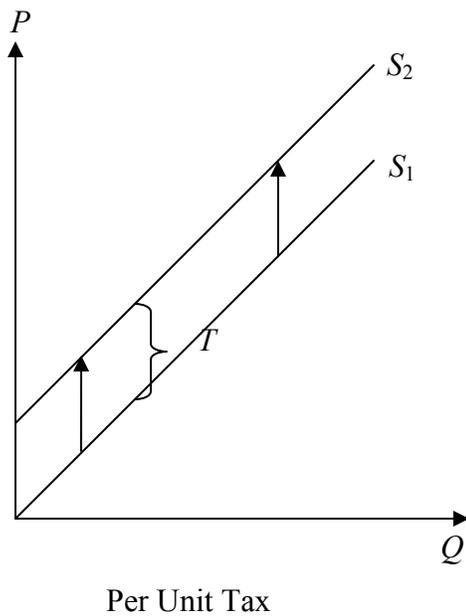


Taxation

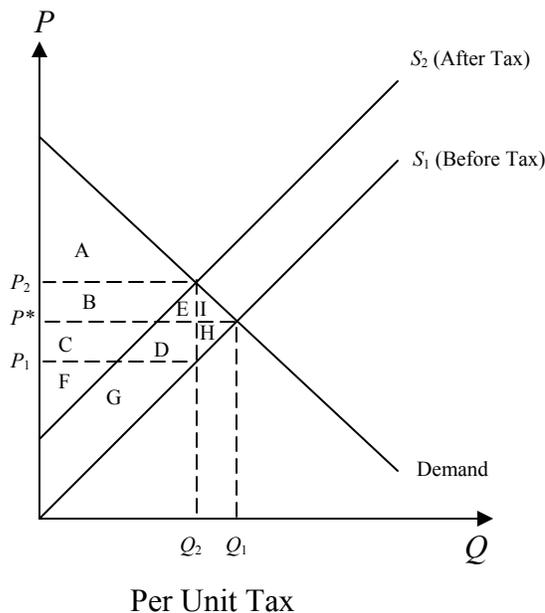
Demand and Supply with Taxation

We have considered the concepts of demand, and supply, and examined how to depict/illustrate those changes in the welfare for consumers, and suppliers in terms of consumer and producer surplus. We will now attempt to understand why different government policies in terms of taxes and subsidies can have different implications, and see how governments generate revenue in terms of taxation.

Recall first our standard supply equation, $P = a + mQ$. Let's focus on a per unit tax, that is the producer pays the same tax rate for every quantity sold. This would then change your supply equation to $P - T = a + mQ$, where T is the per unit tax to be paid. Diagrammatically,



Well then how do we relate the concepts of producer and consumer surplus, and include the idea of taxation? We will now examine this.

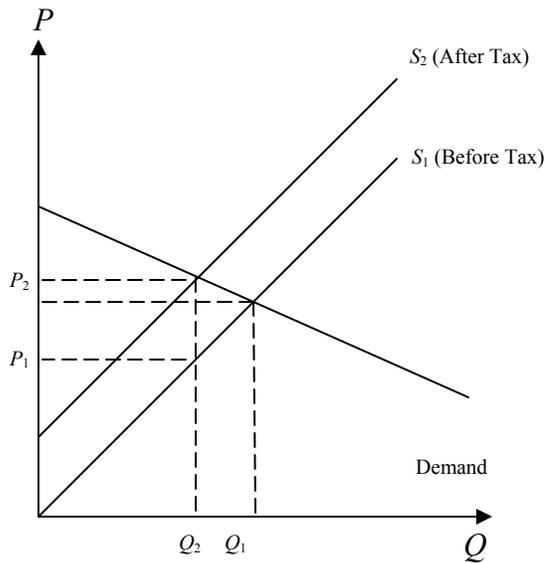


From our previous analysis, we have found that a tax on suppliers would reduce supply, and shift supply back as in the above diagram. This would mean a rise in prices and a fall in quantity demanded. Based on what we have learned, the consumer surplus falls from $A+B+E+I$ to A , and producer surplus changes from $C+D+H+F+G$ to $B+C+F$. It is clear that consumers suffer a loss, while whether producers suffers a loss or gain depends on whether their gain in surplus is greater than or less than their loss in surplus, that is $B > D+H+G$, noting that the deadweight loss is $I+H$.

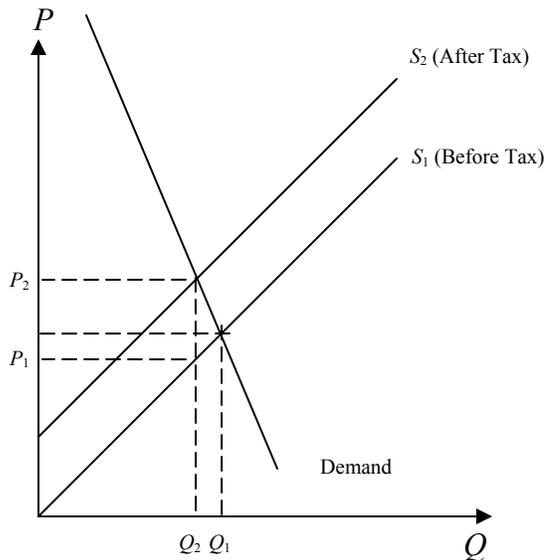
A pertinent question to ask is if $I+H$ is the deadweight loss, where is the tax? Since the difference in the two supply is due to taxes, the area of $E+D+G$ must be the amount paid in taxes to the government. However, using the definition of a per unit tax, it may be represented by the area $B+C+D+E$, which is just the product of the difference in price that would have been charged at Q_2 on the old supply and that on the new post tax supply, $P_2 - P_1 = T$, and total quantity at equilibrium after tax. This then implies that the area of $B+C+D+E = E+D+G$ or that is $B+C = G$. In this depiction, the producer surplus is just $F+G$, which then means that $F+G = B+C+F$.

The next question to ask is whether the tax is paid for by the producers alone, or the consumers. Using the same diagram above, the consumers share of the tax is just $B+E$, while the portion of the tax paid for by the producers is $C+D$. In our diagram above, the share of taxes then is roughly equally shared. That is the portion of the governments revenue above the pre-tax equilibrium price is paid for by consumer, while that below is paid for by the producers, both due to the fall in surplus. However, who bears the burden of a tax is dependent on the relative elasticity between demand and supply. Let us consider some examples:

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Elastic Demand



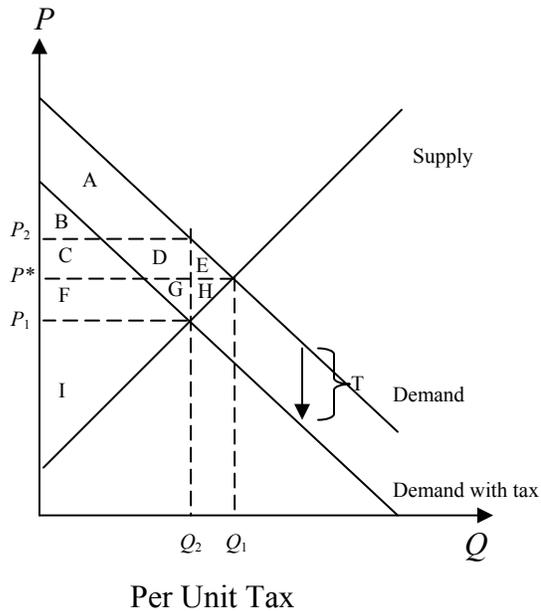
Inelastic Demand

Taxation on Consumers

We have focused on taxation on the supply side. However, it is just as common that consumers are taxed, such as a gasoline tax, revenue of which is used towards maintenance of roads, or personal income taxes used in the provision of public goods, such as Nature Reserves, city parks, and social welfare programs such as unemployment

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insurance, and public health systems. The analysis is similar to what we have done above, and similarly, the share of the burden of taxation is dependent on relative elasticity of demand and supply. The demand equation is now $P + T = a - mQ$, that is the consumer demands less of a good at every price. Diagrammatically,



With this tax then, the consumer surplus changes from $A+B+C+D+E$ to $B+C+F$, while for the producer, its surplus changes from $F+G+H+I$ to I . As before the deadweight loss is $E+H$. It is plain to see that consumers suffers a loss equal to the area of $A+D+E$, but gains F , while the producer loses $F+G+H$. So whether the consumers gain from the taxation is dependent on whether F is greater than $A+D+E$. As before, the revenue drawn by the government is the area of $C+D+F+G$, which must be equal to $A+D+G$.

It should be noted that taxes or tariffs, has a distinct difference with government interventions, such as price floors and ceilings, and quotas. The latter measures do not involve direct payment to the government.

Two Principles of Taxation

This refers to the considerations about taxation;

1. **The Benefit Principle:** The individuals who receive the benefit of a good or service should pay the cost (opportunity cost) of the resources used to produce the good.
2. **The Ability-to-Pay Principle:** Taxes should be applied to individuals according to their ability to pay for the collective set of goods and services society desires. Income tax systems that are progressive (more income an individual has, the greater is the individual's tax paid) are devised on the basis of this principle.

Read “Applying the tools” on page 168 of your text.