Chapter 17
Government Policies: Taxes and Subsidies

In this chapter we begin to analyze the effects of government policies as they affect particular product markets. In this chapter we'll consider the effects of government taxes and production subsidies. In Chapter 18 we'll look at what happens if a country opens to international trade and also the effects of taxes, or tariffs, on imported goods. In Chapters 19, 20, and 21 we'll consider the effects of government price controls, first looking at price ceilings in Chapter 19 including an evaluation pf price gouging laws. In Chapter 20 we'll evaluate the effects of price floors including a look at one on the most prominent such policies, minimum wage laws. In Chapter 21 we'll consider government price supports, often used in the protection of agricultural interests. Chapter 21 will also be used to introduce the issue of political economy where we will discuss business lobbying efforts to influence government policy.

In all of these initial evaluations of government policy, we will maintain the assumption that the market being affected is perfectly competitive. In a practical sense, this means that we will use supply and demand curves and evaluate the effects of government policies in particular product markets. The results we derive are therefore only assured for markets where there are many firms competing to produce a homogeneous product for many potential consumers and where the ethical principles are followed and when perfect information is available for all decision makers. In the subsequent Chapters 22-25, we will consider deviations from the standard assumptions of perfect competition and consider a role for government intervention when markets do not behave so perfectly.

The effects we will consider in these chapters are firstly the effects on the price of products sold and the quantities supplied and demanded. Secondly, we will evaluate the welfare effects of these government actions by measuring the changes in consumer and producer surpluses and the changes in government revenue arising from the policies. Since all of the welfare changes are measured in terms of dollars, or monetary units more generally, we can add up the impacts across all market participants to derive the market welfare effects, also called the market efficiency effects, from the policy.

17.1 The Price and Quantity Effects of a Specific Tax

Learning Objectives

1. Learn the different ways a tax may be assessed by a government.
2. Learn the effects of a tax on the price and quantity traded in a perfectly competitive market
3. Learn the similarity between a tax collected from producers and a tax collected from consumers.

Governments need to raise revenue in order to operate. The source of that revenue is in the form or taxes or fees that must be paid by the residents of the country. There are many different types of taxes governments can and do use. In many modern developed economies, one of the most commonly used taxes are income taxes or payroll taxes. This is the money government collects as a percentage of an individual's wage income. Another type of common tax is a tax on property ownership known as property taxes. These taxes are collected annually usually as a percentage of the recently assessed value of the property. Some governments collect taxes at each stage of the production process, assessing it as a percentage of the extra value added at each intermediate step in production. These are called value-added taxes. One other common tax is collected at the point of sale when the goods are purchased at the retail store. These are called sales taxes. There are many other types of taxes that are collected by governments including taxes on business profits, on capital gains, and on imported goods. Governments also collect registration fees on automobiles, boats, pets and even bicycles. The variety of taxes seems endless and I am sure I have missed a few in this quick list.

In general there are two ways governments can administer a tax; as an ad valorem tax, or, as a specific tax. Ad valorem is a Latin term that means "on value." An *ad valorem tax* is one that is set as a percentage of the value of a good or service traded in the market or on an activity. One example is a 5% annual income tax. A specific tax is often applied to an easily measured commodity such as agricultural goods. A specific tax is one that assesses a dollar (or monetary) charge per unit of the good traded in the market. For example one could levy a tax of 30 cents per bushel of corn traded. Although the magnitudes of the effects will vary slightly between the two types of taxes, the important impacts will be very similar. In this chapter, we'll consider the assessment of a specific tax.

We will also focus on just one simple type of tax, one applied on one particular product traded in a market. One real world example is the US federal gasoline tax currently set at 18.4 cents per gallon. Sales taxes are also near examples because these are taxes applied to most products sold at the retail level. The key difference is that most sales taxes are ad valorem rather than specific taxes. We will not consider taxes applied in other areas such as income taxes or property taxes.

A tax on a particular commodity, such as butter, could be collected in several different ways. One method would be to collect the tax directly from the producers of butter, requiring the butter firms to report how much butter they sell to retailers and having them pay a fixed fee per unit sold. A second method would be to collect the tax at the point of sale, requiring consumers to pay an extra fixed fee per unit purchased. Most producers would probably prefer consumers pay the tax, whereas consumers would prefer the producers pay the tax. As we'll see, in a perfectly competitive market, it will not matter who pays the tax; the effects will be the same either way.

Consider a perfectly competitive market, for say butter, represented in Figure 17.1. The original supply S, and demand curve D, intersect at a market price of P_0 and quantity traded of Q_0. Next suppose the government collects a specific tax, T (measured in $/lb), directly from producers of the product. From the perspective of the butter firms in the industry, the tax will mean an extra production cost of $T per pound, which will shift each representative firm's average cost and marginal cost curves upward by that amount. The aggregate supply curve will also shift upward by that amount, say to S'. As a result the new equilibrium market price will rise to P_{Cons} and the quantity sold will fall to Q_1. As expected, the tax discourages both production and consumption of the good, while the price of the product rises, though by less than the value of the tax itself.

We can call P_{Cons} the consumer price since this in the price consumers pay for butter in the

market with the tax in place. In this new equilibrium we can also define a new variable P_{Prod}, which represents the per unit price received by the firms after paying the tax to the government. Notice that because butter producers only receive the lower price P_{Prod} for their good in the new equilibrium, the original supply curve indicates they would be willing to sell butter in the quantity Q_1.

Next let's suppose the government collects the tax, not from butter producers, but from butter consumers at the point of sale. In this case it would cause the market demand curve to shift down by the amount of the tax, T, to D', reflecting the lower demand due to the tax. Note that D' crosses the original supply function at the quantity Q_1 which determines a price P_{Prod}. This is the price producers would have to charge to induce them to produce the quantity of butter Q_1. But since consumers are charged \$T per unit extra due to the tax, which is the vertical distance between D and D', if producers price their product at P_{Prod} then consumers will have to pay P_{Cons}. At the final price $P_{Cons,}$ consumers would demand exactly as much is supplied by producers who receive P_{Prod}.

The conclusion is that it doesn't matter from whom the government collects the tax. A specific tax of \$T will raise the market price paid by consumers to P_{Cons}, will reduce the price received by producers to P_{Prod} and will lower supply and demand to the quantity Q_1. Because it doesn't matter who pays the tax, we can use a different method to illustrate the effects of a tax without using shifting supply or demand curves.

In this method we note that the tax will result in a new price consumers pay P_{Cons}, and a new price producers will receive P_{Prod} such that,

$$P_{Cons} = P_{Prod} + T$$

Second, the quantity demanded by consumers at the price P_{Cons} must equal the quantity supplied by producers at the price P_{Prod}, or in equation form,

$$D(P_{Cons}) = S(P_{Prod}) \text{ in the diagram } = Q_1$$

In other words, a tax, T, will split apart the consumer price and producer price by the amount of the tax, but demand and supply must equal each other at the new split prices.

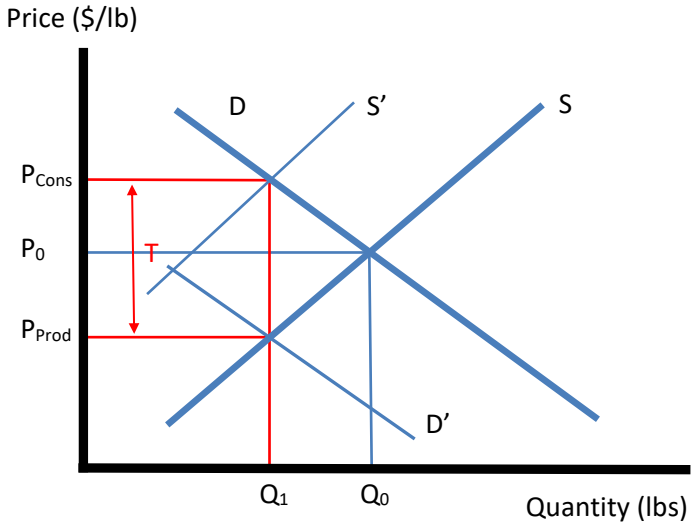
To use this procedure in the diagram, first take a vertical distance equal to the tax rate T, as shown. Next, find a quantity, Q_1, such that the vertical distance between the demand curve and the supply curve is exactly equal to that distance T. The price needed to generate demand at that quantity, Q_1, is the consumer price P_{Cons}, and the price needed to generate supply of the quantity Q_1 is the producer price P_{Prod}. With this method, there is no need to shift the original supply or demand curves.

Side Note: Many introductory economics textbooks analyze taxes by shifting the supply or demand curves to determine the new prices and quantities. That is just one method that can be used to determine the effects. The technique used in this text is another method that generates the same results.

Also note that in Figure 17.1 the consumer price seems to rise by exactly the same amount as the producer price falls. This is not a necessary outcome. It comes about here only because the supply and demand curves have almost equal but opposite slopes. If the slopes of supply or

demand were different, we would get a different result.

Figure 17.1 Price and Quantity Effects of a Specific Tax



Key Takeaways

1. A specific tax is one that assesses a dollar (or monetary) charge per unit of the good traded in the market.
2. An *ad valorem tax* is one that is set as a percentage of the value of a good or service traded in the market or on an activity.
3. A specific tax implemented on sales of a product in a standard perfectly competitive market will cause the market price paid by consumers to rise, the price received by producers to fall, while the quantity trade also falls.
4. In a perfectly competitive market, a tax on a product collected directly from producers will have the same price and quantity effects as a tax collected directly from consumers.

17.2 The Welfare Effects of a Specific Tax

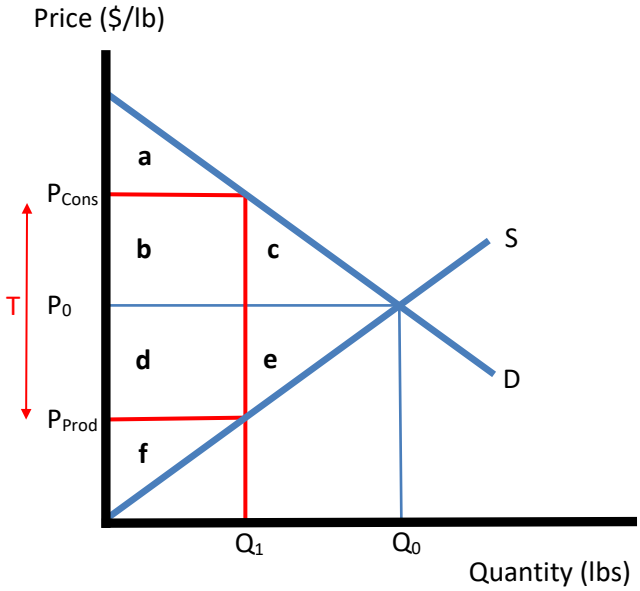
Learning Objectives

1. Learn how to measure the welfare effects of a tax.
2. Learn the changes in consumer and producer surplus and government tax revenue as a result of a tax
3. Learn the effect on economic (or market) efficiency as a result of a tax.
4. Learn how a tax causes a redistribution of income among participants in a market.

The next objective is to evaluate the gains and losses that arise when a tax is implemented. We call these the welfare effects of the tax and use changes in producer and consumer surplus to measure the effects on these two market participant groups. There is also one other group affected. A tax will generate tax revenues for the government. Indeed, this is one of the reasons

taxes are implemented, so the government has money to finance its operations and provide for its citizens. Although we could say that the government gains from the tax revenues, it is better to recognize that governments are generally there to provide for the people of the country. Hence, when more tax revenues are collected, the beneficiary is ultimately the citizens of the country. Which citizens benefit from which taxes is rarely known because taxes are usually collected from a variety of sources and used for a variety of different expenditures. Therefore, it is best to say that every citizen shares in the benefits of the extra government spending financed by higher tax revenues.

Figure 17.2 Welfare Effects of a Specific Tax



Consider a market for butter depicted in Figure 17.2. The equilibrium before the tax is imposed is determined where supply and demand intersect at price P_0 and quantity Q_0. We use the letters <a, …, f> in the diagram to represent the areas of the respective triangles or rectangles. The level of market welfare before the tax is imposed is summarized in Table 17.1 Consumer surplus is the area given by the sum of areas a, b and c. Producer surplus is the area given by the sum of areas d, e, and f.

Table 17.1 Welfare in a Free Market Equilibrium
CS = a + b + c
PS = d + e + f
MW_E = a + b + c + d + e + f

Next suppose a specific tax, T, is implemented by the government. The tax will cause the consumer price to rise to P_{Cons}, the producer price to fall to P_{Prod}, and the quantity traded to fall

to Q_1. In Table 17.2 we show the welfare effects of the tax in two ways. In the first column are shown the levels of surplus and government revenue that accrue to the market participants after the tax is imposed. In the second column we show the changes in welfare that occur when the tax is implemented.

The tax causes an increase in the consumer price to P_{Cons} and so the new consumer surplus level is given by area a. The change in surplus is found by taking the new level and subtracting the old level to get $\Delta CS = (a) - (a + b + c) = -(b + c)$. Consumers of butter are worse off because the price they must pay rises and therefore they reduce their purchases to Q_1.

The tax causes a decrease in the producer price to P_{Prod} and so the new producer surplus level is given by area f. The change in surplus is found by taking the new level and subtracting the old level to get $\Delta PS = (f) - (d + e + f) = -(d + e)$. Producers of butter are worse off because the price they receive falls and they reduce their sales to Q_1.

The government collects revenue equal to the specific tax rate T times the quantity that is traded in the market with the tax in place, Q_1, so that, $GR = T \times Q_1$, or, $GR = (b + d)$. The change in government revenue is found by taking the new level and subtracting the old level to get $\Delta GR = (b + d) - (0) = +(b + d)$. The government receives more revenue with the tax and therefore citizens will receive benefits in that that total amount.

Table 17.2

Welfare Effects of a Specific Tax

Surplus Levels after Tax	**Surplus Changes**
$CS = a$	$\Delta CS = -(b + c)$
$PS = f$	$\Delta PS = -(d + e)$
$GR = b + d$	$\Delta GR = + b + d$
$MW_E = a + b + d + f$	$\Delta MW = -(c + e)$

It is worth highlighting that the tax causes a redistribution of income with some market participants benefiting, namely citizens or taxpayer, while others in the economy suffer real income losses, namely butter consumers and butter producers.

The change in market welfare is calculated as the sum of the effects across all market participants. This also referred to as the effect on market efficiency. The market welfare level after the tax is the sum of consumer surplus, producer surplus and the government revenue or $MW = a + b + d + f$. The change in market welfare is found by taking the new level and subtracting the old level to get $\Delta MW = (a + b + d + f) - (a + b + c + d + e + f) = -(c + e)$. Since the effect is negative, market welfare falls because of the tax. We can also say that market efficiency is reduced when a tax is implemented.

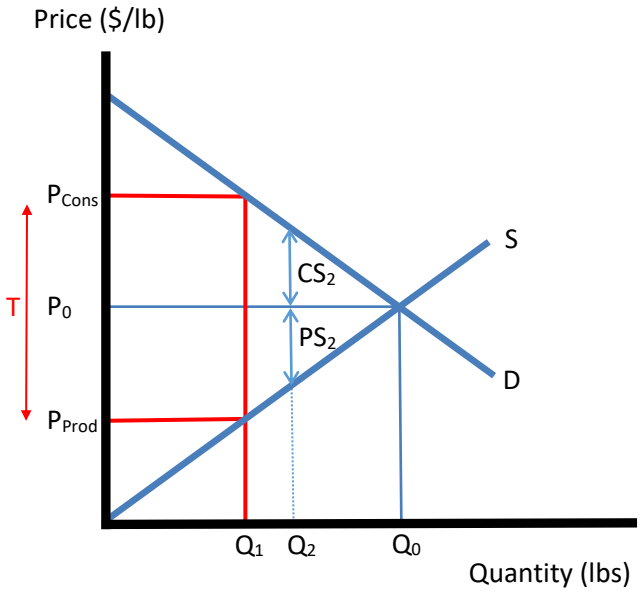
The main reason market efficiency is reduced is because the tax eliminates some mutually advantageous trades from taking place. The distance $Q_0 - Q_1$ represents the amount of butter that is no longer bought or sold because of the tax.

Consider the trade shown in Figure 17.3 that would have occurred at the quantity Q_2 in the absence of the tax. But consider only not the total quantity Q_2, but instead the single pound of butter that would raise the total by one unit to the level Q_2. We would call this the marginal unit of butter. The consumer purchasing that marginal unit would receive consumer surplus given by the distance from the free market price P_0 to the demand curve, namely CS_2. The producer selling that marginal unit would receive producer surplus given by the distance from the free market price P_0 to the supply curve, PS_2.

However, when the tax is imposed, these trades stop and the welfare that would have accrued to these traders disappears. This loss occurs with all of the mutually advantageous butter trades between Q_1 and Q_0, whose prevention generates the total consumer surplus loss given by area c and total producer surplus loss given by area e. The drop in market efficiency means there is a smaller total amount of extra surplus or welfare arising due to activity in this market.

Negative effects such as area (c + e) arise so frequently in tax analysis that economists have given a name to them. The net welfare losses are called deadweight losses. We can break down these losses further into constituent parts by naming the triangular are beneath the demand curve (area c), a consumption efficiency loss and the triangular area beneath the supply curve (area e), a production efficiency loss. By referring to the deadweight losses in this way we highlight the fact that because of the tax, consumers are not able to consume their most preferred bundle of goods (hence causing a consumption efficiency loss, a.k.a a consumption distortion) and producers are not able to produce the optimal set of goods consistent with comparative advantage (hence causing the production efficiency loss, a.k.a the production distortion).

Figure 17.3 Efficiency Losses Due to the Tax



This result suggests that taxes are bad for a market and bad for the overall economy. If so, one might wonder what is the economic rationale for government, especially when the revenues needed to run it cause a drag on the market. The reason for this outcome is that we have restricted ourselves to the assumptions of perfect competition and have not yet incorporated

some of the other reasons for government, especially the provision of public goods. We will introduce public goods in Chapter 22 and other types of market imperfections afterwards and will demonstrate that there can be some extra benefits for society that can compensate for the efficiency losses from the tax and make government intervention efficiency improving. For now, it is best to interpret these implications as the pure market effects of the tax before any extenuating circumstances are incorporated.

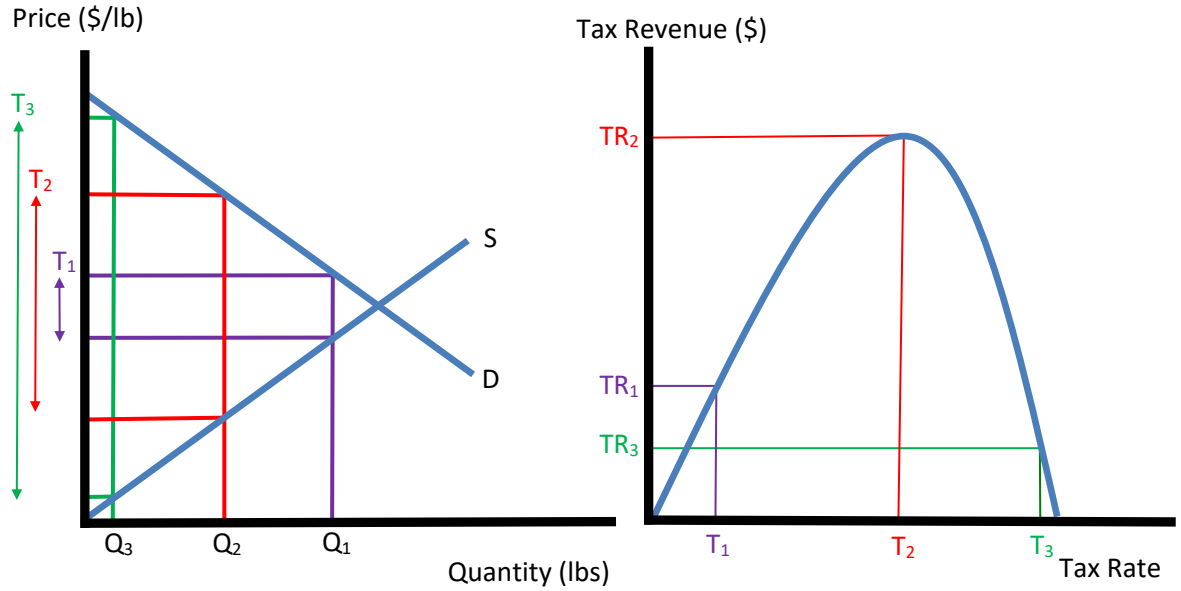
Government Revenue Effects of a Tax

As shown above, a tax assessed on a product will generate government revenues. The value of these revenues will change as the tax is changed and it is important to recognize the pattern of these changes. A naïve view of the issue will lead to the presumption that an increase in the tax will lead to an increase in revenue collected. However, this is true only up to a certain level of the tax. This is because tax revenue is the product of the tax rate and the quantity traded, TR = T x Q, and as the tax is increased the quantity traded falls.

Consider different tax rates applied to the market in the left-side diagram in Figure 17.4. On the diagram to the right we plot the tax revenue. First consider the tax rate of zero, or no tax. In this case the tax revenue would also be zero. When the tax rate becomes positive, as at T_1, the quantity traded falls to Q_1, and tax revenue would be determined as the area of the purple rectangle on the left-side diagram. Plot the tax revenue for the tax T_1 as the value TR_1 measure along the vertical axis in the diagram on the right. Next imagine a larger tax rate such as T_2. At T_2 the quantity trade falls to Q_2 and tax revenue is the red rectangular area given by $T_2 \times Q_2$. Suppose that value is TR_2 plotted on the right-side diagram. Visually, one can see that the red rectangle is larger than the purple rectangle which means that $TR_2 > TR_1$. Finally, imagine an even larger tax rate such as T_3 generating an even lower quantity traded of Q_3. Tax revenue is given by the green rectangular area which we'll imagine gives a value of TR_3, plotted on the right. Again, visually the green area is smaller than the purple are and so $TR_3 < TR_1$. If by chance the tax were raised even further, so that its value were equal to, or greater than, the vertical distance between the demand curve vertical intercept and the supply curve intercept, then the quantity trade would fall to zero in which case tax revenue would also be zero. We call any tax that eliminates trade in the product a prohibitive tax.

The lesson here is that tax revenue will be zero with a zero tax and will be zero with a prohibitive tax. In between these two extremes, as the tax rate is increased, tax revenue will at first rise, then reach a peak such as at Q_2, and then will ultimately fall back to zero. The tax rate that gives the maximum tax revenue, T_2 in the Figure, is called the maximum revenue tax. If the tax rate is raised when the tax is less than T_2, then tax revenues will rise. But, if the tax rate is raised when the tax is greater the T_2, such as at T_3, then tax revenue will fall.

Figure 17.4 Government Revenue Effects of a Tax



Key Takeaways

1. The welfare effects of a tax measures changes in producer and consumer surplus and changes in government tax revenue.
2. A tax causes a decrease in consumer and producer surplus and an increase in government tax revenues
3. The net market welfare effect of a tax is negative, which is equivalent to saying, economic (or market) efficiency is reduced as a result of a tax.
4. The gains to some market participants and losses to others due to the tax is often described as a redistribution of income

17.3 The Effects of a Specific Subsidy

Learning Objectives

1. Learn how and why a government subsidy is implemented.
2. Learn the effects on prices and quantities when a subsidy is implemented in a perfectly competitive market.
3. Learn the effects on consumer and producer surplus and government revenues, or expenditures, due to a subsidy
4. Learn the effects on net market welfare, or market efficiency, because of a subsidy.

The next objective is to evaluate the effects that arise when a subsidy is implemented. A subsidy is a payment made to businesses or consumers and is generally used to encourage the activity being subsidized. Sometimes these are applied to support agricultural production for food necessities or to encourage production of something that is likely to have positive effects in some

other way. An example might be a subsidy on solar panels or wind turbines to produce clean energy.

As with the tax, we'll first we'll look at the pure market price and quantity effects of a subsidy, and then evaluate the welfare effects without considering the value of any external motivations for the policy. All evaluations presume the market in question is perfectly competitive.

A specific subsidy of $S is either a payment made per unit to producers of the good or it could be a rebate offered to consumers of a good at the point of purchase. As with the tax, it doesn't matter who receives the subsidy, the effects will be the same.

The subsidy is the opposite of a tax and so it could be evaluated exactly as a tax but with S = -T. The relationship that must hold after a tax is imposed is $P_{Cons} = P_{Prod} + T$, so if we plug in –S for T we'll get

$$P_{Cons} = P_{Prod} - S \quad \text{or,}$$

$$P_{Prod} = P_{Cons} + S$$

This means that a subsidy will raise the market price received by producers to P_{Prod}, will reduce the price paid by consumers to P_{Cons} and will raise supply and demand to a higher quantity.

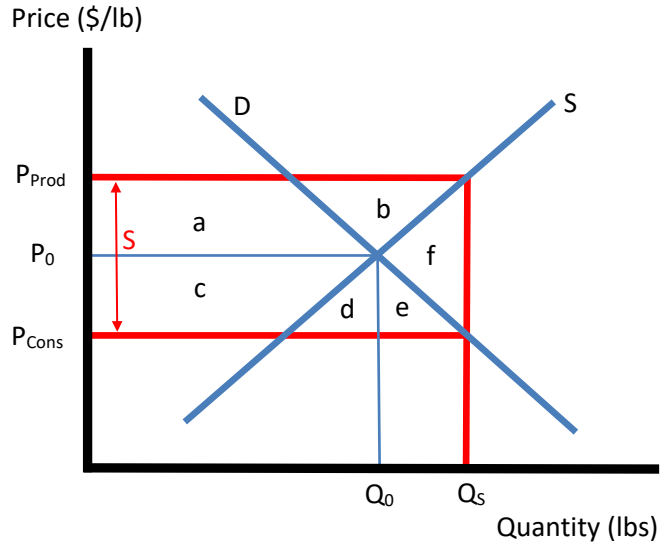
Next, the quantity demanded by consumers at the price P_{Cons} must equal the quantity supplied by producers at the price P_{Prod}. In equation form this becomes,

$$D(P_{Cons}) = S(P_{Prod})$$

In other words, a subsidy, S, will split apart the consumer price and producer price by the amount of the subsidy, but demand and supply must equal each other at the new split prices.

The outcome is depicted in the butter market in Figure 17.5. The vertical distance between the supply curve and the demand curve at the quantity Q_S is exactly equal to the subsidy value measured as a distance S along the vertical axis. The price needed to generate demand at that quantity, Q_S, is the consumer price P_{Cons}, and the price needed to generate supply of the quantity Q_S is the producer price P_{Prod}. Thus a subsidy causes the producer's price to rise and the consumer's price to fall. The subsidy also encourages greater supply and demand of the product in the market, as originally intended.

Figure 17.5 Market Effects of a Specific Subsidy



The welfare effects of the subsidy can be evaluated using the areas a, … , f in Figure 17.5. First, the subsidy causes a decrease in the price consumers pay for butter to P_{Cons}. The change in consumer surplus is given by the area between the original price P_o, the new price P_{Cons}, the demand curve and the vertical axis, or area (c + d + e). Consumers of butter are better-off because the price they pay falls and they increase their purchases to Q_S.

The subsidy causes an increase in the producer price to P_{Prod}. The change in producer surplus is given by the area between the original price P_o, the new price P_{Prod}, the supply curve and the vertical axis, or area (a + b). Producers of butter are also better-off because the price they receive increases and they increase their sales to Q_S.

Of course, these benefits come at a cost to the taxpayers who must pay for the subsidies distributed by the government. Either more tax revenue will need to be collected from somewhere else, or some government services will need to be reduced. In this case, we will maintain the same terminology and determine the change in government revenue, but will let expenditures be represented as negative revenue.

The government revenue from the subsidy payments are given by the negative of the subsidy rate per unit, S, times the quantity supplied with the subsidy in place, Q_S, or, $\Delta GR = - S \times Q_S$, = - (a + b + c + d + e + f) in the diagram. These three changes are summarized in Table 17.3.

It is worth highlighting that the subsidy causes a redistribution of income with some market participant earning greater real income, butter producers and butter consumers, while others in the economy suffer real income losses, namely taxpayers or citizens.

Table 17.3 Welfare Effects of a Specific Subsidy
$\Delta CS = + (c + d + e)$
$\Delta PS = + (a + b)$
$\Delta GR = - (a + b + c + d + e + f)$
$\Delta MW = - f$

The change in market welfare is calculated as the sum of the effects across all market participants. This also referred to as the effect on market efficiency. The change in market welfare is found by summing the changes that occur to consumers, producers and the government, or $\Delta MW = -+ (c + d + e) + (a + b) – (a + b + c + d + e + f) = - (f)$. Since the effect is negative, market welfare falls because of the subsidy. We can also say that market efficiency is reduced when a subsidy is implemented.

The main reason market efficiency is reduced is because the subsidy causes more trades to occur than would normally be mutually advantageous. The distance $Q_S – Q_o$ represents the amount of extra butter whose trade is being induced by the subsidy payments from taxpayers. Area (c + d + e) represents a transfer from taxpayers to consumers. Area (a + b) is a transfer from taxpayers to the producers. The remaining transfer f comes out of taxpayer's pockets but disappears or is wasted. Economists refer to this area as a deadweight loss. It can be broken down into two constituent parts by bisecting the triangle with an extension of the price line P_o (not shown). The smaller triangle above P_o would be called a production efficiency loss and the smaller triangle below P_o, would be called a consumption efficiency loss. Notice that even though both consumers and producers experience increases in surplus from the subsidy there are still efficiency losses in consumption and production. These losses reflect the drop in market efficiency, or equivalently, a smaller total amount of extra surplus, or welfare, arising out of activity in the market than before the subsidy.

Key Takeaways

1. A subsidy is a payment made by a government to producers or consumers, to encourage more of an activity.
2. A subsidy causes an increase in production and consumption because the consumer price falls while the producer price rises.
3. A subsidy causes an increase in consumer and producer surplus and a decrease in government revenues (an increase in government expenditures)
4. The net market welfare effect of a subsidy is negative, which is equivalent to saying, economic (or market) efficiency is reduced when a subsidy is implemented.

17.4 Tax Incidence

Learning Objectives

1. Learn what tax incidence is and why it is important
2. Learn how tax incidence is affected by elasticities of demand and supply

One of the common questions whenever the government charges a tax is who pays for it. The usual expectation is that whoever the tax is assessed upon is the one who pays it. Thus, if the government taxes producers, then the producers pay the tax. Although this is formally correct, this answer does not account for the fact that the tax will change prices which will then change the behavior of the market participants.

We noted above that a tax on producers will have the same final effect as a tax assessed on consumers. Both will cause the market price to rise and the producer price to fall as the quantity traded falls. The difference between the final consumer price and the producer price is equal to the value of the tax. Notice though that while the consumer price rises, it rises by less than the value of the tax itself. This means the tax is not paid for entirely by the consumers. Also, while the producer price falls, it falls by less that the value of the tax. This means the tax is not paid for entirely by the producers. In fact, part of the tax, $P_{Cons} - P_o$, or area b in Figure 17.2, is paid for by consumers and the remaining part of the tax, $P_o - P_{Prod}$, or area d in Figure 17.2, is paid for by producers.

The share of the tax paid for by different groups is called the *tax incidence*. Notice that tax incidence is not based on who the tax is collected from directly. It is important to recognize this because governments will sometimes try to reduce citizen concerns about higher taxes by suggesting that they won't be the one paying it. For example, if the government proposes to raise revenue using a tax on imported goods, many people may incorrectly believe that the foreign companies will pay the tax since that is who pays the tax directly. But, as we'll see in Chapter 18, foreign companies may not pay any of the tax, since the incidence often falls completely on the domestic consumer.

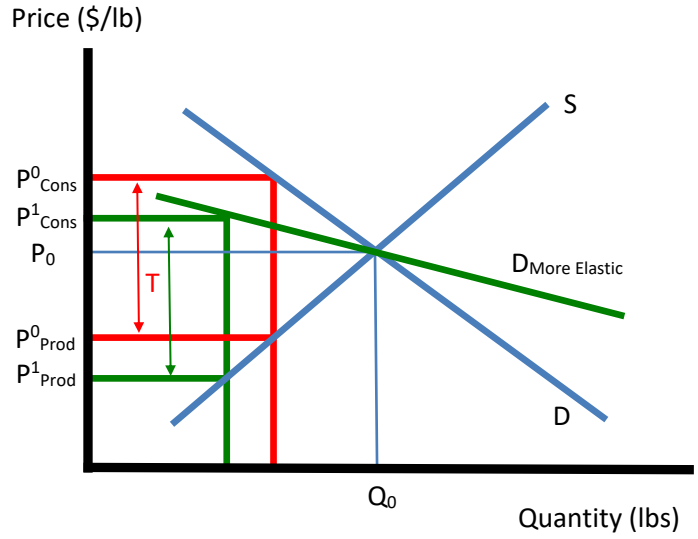
A similar situation arises when the government implements profit taxes on businesses. Citizens often accept higher taxes on businesses believing that this is an effective way to force wealthy businesses to contribute a fairer share towards government services. However this perception is based on the assumption that the profit tax incidence will fall completely on the firms. Typically this is not the case however, as the higher taxes are likely to cause an increase in prices of their products, thereby indirectly taxing the consumers of the products.

Economists recognize that tax incidence is strongly related to the sensitivity to price changes among the market participants. In previous chapters we developed measures of price sensitivity and called them demand and supply elasticities. Below we offer two examples of how variations in demand and supply elasticities can affect the incidence of a specific tax applied on sales in a product market.

Recall that the price elasticity of demand is related to the slope of a demand curve. In general, the flatter the demand curve is in a market, the more elastic demand is for that product. In the extreme, a horizontal demand curve is one that is perfectly elastic. Consider the market for a product in Figure 17.6. There is an original supply and demand curve drawn in blue, with an equilibrium free market price and quantity of P_o and Q_o. Also shown is another equilibrium

with a tax T (in red) implemented by the government, generating a higher consumer price P^{o}_{Cons} and a lower producer price P^{o}_{Prod}. One can see in the diagram the tax incidence for the consumer ($P^{o}_{Cons} - P_o$) appears to be slightly smaller than the incidence on producers ($P_o - P^{o}_{Prod}$).

Figure 17.6 Tax Incidence with Varying Demand Elasticity

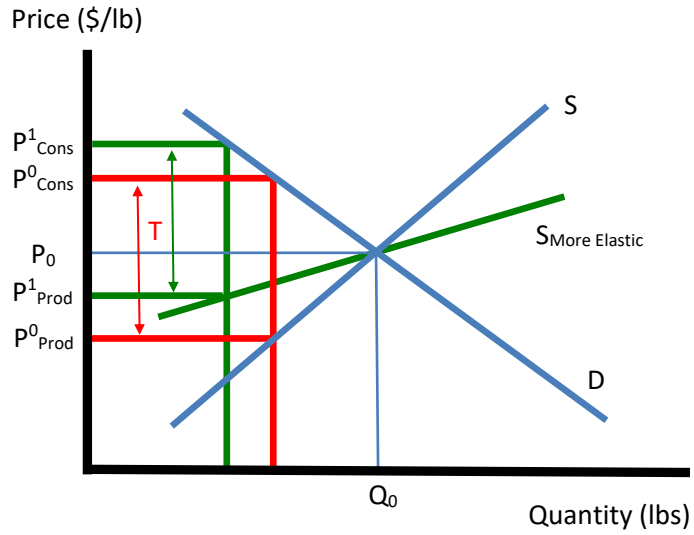


But now imagine that the same tax is applied to a market with the same original equilibrium price and quantity but with a much flatter, or more elastic, demand for the product than originally. The same size tax, T, applied to this market, generates a consumer price of P^{1}_{Cons} and a producer price of P^{1}_{Prod}. The tax incidence on consumers is now much smaller than before, ($P^{1}_{Cons} - P_o$) < ($P^{o}_{Cons} - P_o$) while the tax incidence on producers has grown, ($P_o - P^{1}_{Prod}$) > ($P_o - P^{o}_{Prod}$).

This example yields the following conclusion: as demand becomes more elastic, ceteris paribus, tax incidence is shifted from consumers to producers. Stated differently, consumers pay less of a tax, the more sensitive they are to changes in the price of the good.

A similar conclusion can be reached vis-à-vis supply. Recall that the flatter the supply curve is in a market, the more elastic supply is for that product. In the extreme, a horizontal supply is said to be perfectly elastic. Consider the market for a product in Figure 17.7 with the original supply and demand curve drawn in blue, and an equilibrium free market price and quantity of P_o and Q_o. As before, the original tax of T (in red) generate a consumer price P^{o}_{Cons} and a producer price of P^{o}_{Prod}.

Figure 17.7 Tax Incidence with Varying Supply Elasticity



But now, suppose the same tax is applied to a market with a much flatter, or more elastic, supply for the product than originally. The same size tax, T, applied to this market, generates a consumer price of P^1_{Cons} and a producer price of P^1_{Prod}. Notice that the tax incidence on consumers is now much larger than before, $(P^1_{Cons} - P_0) > (P^o_{Cons} - P_0)$ while the tax incidence on producers has fallen, $(P_o - P^1_{Prod}) < (P_o - P^o_{Prod})$.

This example yields the following conclusion: as supply becomes more elastic, ceteris paribus, tax incidence is shifted from producers to consumers. Stated differently, producers pay a smaller share of a tax when they are more sensitive to changes in the price of the good.

Key Takeaways

1. Tax incidence measures who ultimately pays for a tax after all market adjustments are incorporated.
2. Tax incidence is important because who pays for a tax can be different from who is charged for a tax ant that can lead to the deception of citizens by governments
3. As demand (supply) becomes more elastic, more of the tax incidence falls on producers (consumers).