GLOBAL EDITION

International Economics

Theory and Policy

12th Edition

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THEORY & POLICY

TWELFTH EDITION

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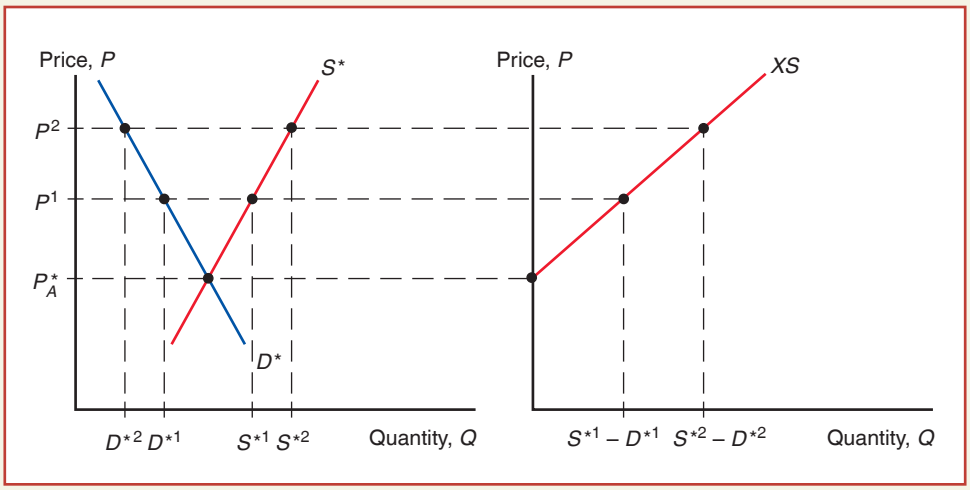


FIGURE 9-2

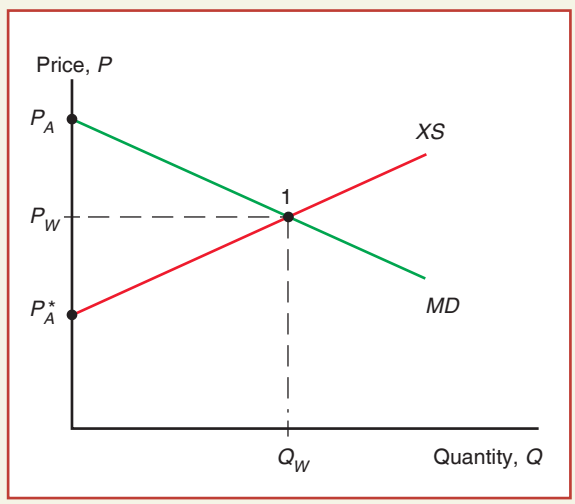
Deriving Foreign's Export Supply Curve

As the price of the good rises, Foreign producers supply more while Foreign consumers demand less, so that the supply available for export rises.

FIGURE 9-3

World Equilibrium

The equilibrium world price is where Home import demand (*MD* curve) equals Foreign export supply (*XS* curve).



Effects of a Tariff

From the point of view of someone shipping goods, a tariff is just like a cost of transportation. If Home imposes a tax of $2 on every bushel of wheat imported, shippers will be unwilling to move the wheat unless the price difference between the two markets is at least $2.

Figure 9-4 illustrates the effects of a specific tariff of t per unit of wheat (shown as t in the figure). In the absence of a tariff, the price of wheat would be equalized at P_W in both Home and Foreign, as seen at point 1 in the middle panel, which illustrates the world market. With the tariff in place, however, shippers are not willing to move wheat from Foreign to Home unless the Home price exceeds the Foreign price by at least t.

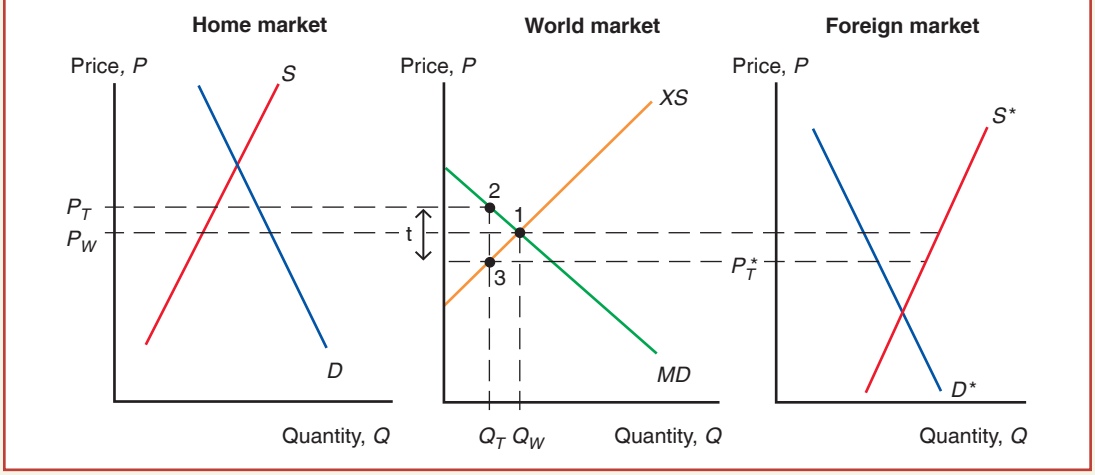


FIGURE 9-4

Effects of a Tariff

A tariff raises the price in Home while lowering the price in Foreign. The volume traded thus declines.

If no wheat is being shipped, however, there will be an excess demand for wheat in Home and an excess supply in Foreign. Thus, the price in Home will rise and that in Foreign will fall until the price difference is t.

Introducing a tariff, then, drives a wedge between the prices in the two markets. The tariff raises the price in Home to P_T and lowers the price in Foreign to $P_T^* = P_T - t$. In Home, producers supply more at the higher price, while consumers demand less, so that fewer imports are demanded (as you can see in the move from point 1 to point 2 on the MD curve). In Foreign, the lower price leads to reduced supply and increased demand, and thus a smaller export supply (as seen in the move from point 1 to point 3 on the XS curve). Thus, the volume of wheat traded declines from Q_W, the free trade volume, to Q_T, the volume with a tariff. At the trade volume Q_T, Home import demand equals Foreign export supply when $P_T - P_T^* = t$.

The increase in the price in Home, from P_W to P_T, is less than the amount of the tariff because part of the tariff is reflected in a decline in Foreign's export price and thus is not passed on to Home consumers. This is the normal result of a tariff and of any trade policy that limits imports. The size of this effect on the exporters' price, however, is often very small in practice. When a small country imposes a tariff, its share of the world market for the goods it imports is usually minor to begin with, so that its import reduction has very little effect on the world (foreign export) price.

The effects of a tariff in the "small country" case where a country cannot affect foreign export prices are illustrated in Figure 9-5. In this case, a tariff raises the price of the imported good in the country imposing the tariff by the full amount of the tariff, from P_W to $P_W + t$. Production of the imported good rises from S^1 to S^2, while consumption of the good falls from D^1 to D^2. As a result of the tariff, then, imports fall in the country imposing the tariff.

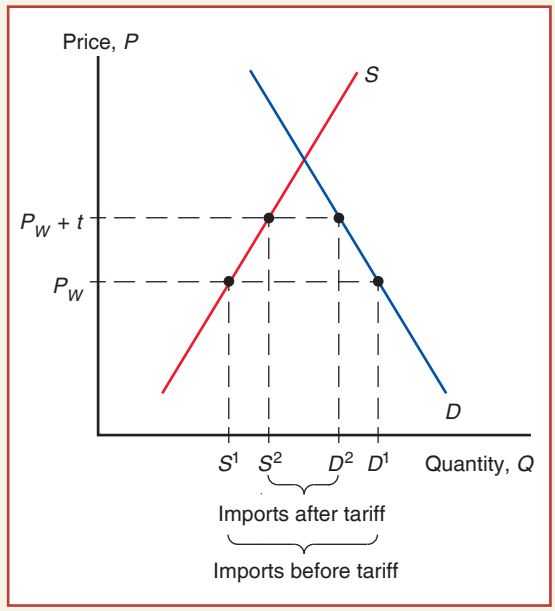
Measuring the Amount of Protection

A tariff on an imported good raises the price received by domestic producers of that good. This effect is often the tariff's principal objective—to *protect* domestic producers from the low prices that would result from import competition. In analyzing trade

FIGURE 9-5

A Tariff in a Small Country

When a country is small, a tariff it imposes cannot lower the foreign price of the good it imports. As a result, the price of the import rises from PW to $PW + t$ and the quantity of imports demanded falls from $D_1 - S_1$ to $D_2 - S_2$.



policy in practice, it is important to ask how much protection a tariff or other trade policy actually provides. The answer is usually expressed as a percentage of the price that would prevail under free trade. An import quota on sugar could, for example, raise the price received by U.S. sugar producers by 35 percent.

Measuring protection would seem to be straightforward in the case of a tariff: If the tariff is an ad valorem tax proportional to the value of the imports, the tariff rate itself should measure the amount of protection; if the tariff is specific, dividing the tariff by the price net of the tariff gives us the ad valorem equivalent.

However, there are two problems with trying to calculate the rate of protection this simply. First, if the small-country assumption is not a good approximation, part of the effect of a tariff will be to lower foreign export prices rather than to raise domestic prices. This effect of trade policies on foreign export prices is sometimes significant.

The second problem is that tariffs may have very different effects on different stages of production of a good. A simple example illustrates this point.

Suppose an automobile sells on the world market for $8,000, and the parts out of which that automobile is made sell for $6,000. Let's compare two countries: one that wants to develop an auto assembly industry and one that already has an assembly industry and wants to develop a parts industry.

To encourage a domestic auto industry, the first country places a 25 percent tariff on imported autos, allowing domestic assemblers to charge $10,000 instead of $8,000. In this case, it would be wrong to say that the assemblers receive only 25 percent protection. Before the tariff, domestic assembly would take place only if it could be done for $2,000 (the difference between the $8,000 price of a completed automobile and the $6,000 cost of parts) or less; now it will take place even if it costs as much as $4,000 (the difference between the $10,000 price and the cost of parts). That is, the 25 percent tariff rate provides assemblers with an **effective rate of protection** of 100 percent.

Now suppose the second country, to encourage domestic production of parts, imposes a 10 percent tariff on imported parts, raising the cost of parts of domestic assemblers from $6,000 to $6,600. Even though there is no change in the tariff on

assembled automobiles, this policy makes it less advantageous to assemble domestically. Before the tariff, it would have been worth assembling a car locally if it could be done for $2,000 ($8,000 − $6,000); after the tariff, local assembly takes place only if it can be done for $1,400 ($8,000 − $6,600). The tariff on parts, then, while providing positive protection to parts manufacturers, provides negative effective protection to assembly at the rate of −30 percent (−600/2,000).

Reasoning similar to that seen in this example has led economists to make elaborate calculations to measure the degree of effective protection actually provided to particular industries by tariffs and other trade policies. Trade policies aimed at promoting economic development, for example (Chapter 11), often lead to rates of effective protection much higher than the tariff rates themselves.[1]

Costs and Benefits of a Tariff

A tariff raises the price of a good in the importing country and lowers it in the exporting country. As a result of these price changes, consumers lose in the importing country and gain in the exporting country. Producers gain in the importing country and lose in the exporting country. In addition, the government imposing the tariff gains revenue. To compare these costs and benefits, it is necessary to quantify them. The method for measuring costs and benefits of a tariff depends on two concepts common to much microeconomic analysis: consumer and producer surplus.

Consumer and Producer Surplus

Consumer surplus measures the amount a consumer gains from a purchase by computing the difference between the price he actually pays and the price he would have been willing to pay. If, for example, a consumer would have been willing to pay $8 for a bushel of wheat but the price is only $3, the consumer surplus gained by the purchase is $5.

Consumer surplus can be derived from the market demand curve (Figure 9-6). For example, suppose the maximum price at which consumers will buy 10 units of a good is $10. Then the 10th unit of the good purchased must be worth $10 to consumers. If it were worth less, they would not purchase it; if it were worth more, they would have been willing to purchase it even if the price were higher. Now suppose that in order to get consumers to buy 11 units, the price must be cut to $9. Then the 11th unit must be worth only $9 to consumers.

Suppose the price is $9. Then consumers are willing to purchase only the 11th unit of the good and thus receive no consumer surplus from their purchase of that unit. They would have been willing to pay $10 for the 10th unit, however, and thus receive $1 in consumer surplus from that unit. They would also have been willing to pay $12 for the 9th unit; in that case, they would have received $3 of consumer surplus on that unit, and so on.

Generalizing from this example, if P is the price of a good and Q the quantity demanded at that price, then consumer surplus is calculated by subtracting P times

[1]The effective rate of protection for a sector is formally defined as $(V_T - V_W)/V_W$, where V_W is value added in the sector at world prices and V_T is value added in the presence of trade policies. In terms of our example, let P_A be the world price of an assembled automobile, P_C the world price of its components, t_A the ad valorem tariff rate on imported autos, and t_C the ad valorem tariff rate on components. You can check that if the tariffs don't affect world prices, they provide assemblers with an effective protection rate of

$$\frac{V_T - V_W}{V_W} = t_A + P_C\left(\frac{t_A - t_C}{P_A - P_C}\right).$$

FIGURE 9-6

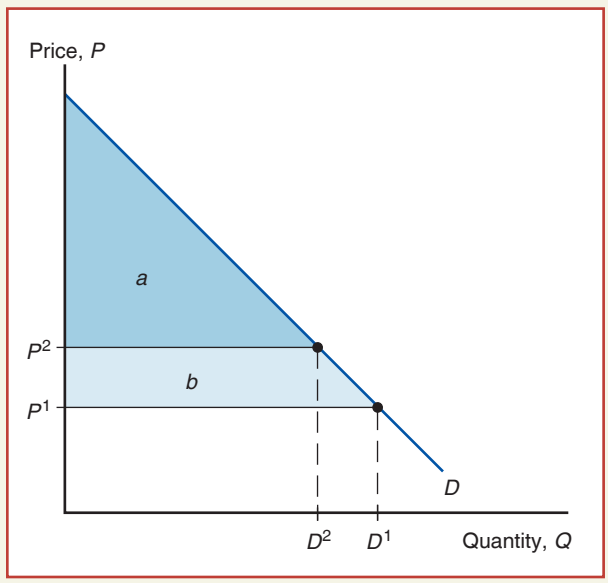
Deriving Consumer Surplus from the Demand Curve

Consumer surplus on each unit sold is the difference between the actual price and what consumers would have been willing to pay.

FIGURE 9-7

Geometry of Consumer Surplus

Consumer surplus is equal to the area under the demand curve and above the price.



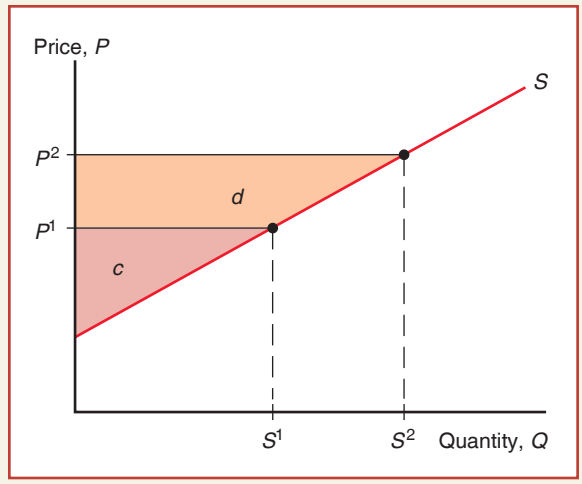
Q from the area under the demand curve up to Q (Figure 9-7). If the price is P^1, the quantity demanded is D^1 and the consumer surplus is measured by the areas labeled *a* plus *b*. If the price rises to P^2, the quantity demanded falls to D^2 and consumer surplus falls by *b* to equal just *a*.

Producer surplus is an analogous concept. A producer willing to sell a good for $2 but receiving a price of $5 gains a producer surplus of $3. The same procedure used to derive consumer surplus from the demand curve can be used to derive producer surplus

FIGURE 9-8

Geometry of Producer Surplus

Producer surplus is equal to the area above the supply curve and below the price.



from the supply curve. If P is the price and Q the quantity supplied at that price, then producer surplus is P times Q minus the area under the supply curve up to Q (Figure 9-8). If the price is P^1, the quantity supplied will be S^1, and producer surplus is measured by area *c*. If the price rises to P^2, the quantity supplied rises to S^2, and producer surplus rises to equal *c* plus the additional area *d*.

Some of the difficulties related to the concepts of consumer and producer surplus are technical issues of calculation that we can safely disregard. More important is the question of whether the direct gains to producers and consumers in a given market accurately measure the *social* gains. Additional benefits and costs not captured by consumer and producer surplus are at the core of the case for trade policy activism discussed in Chapter 10. For now, however, we will focus on costs and benefits as measured by consumer and producer surplus.

Measuring the Costs and Benefits

Figure 9-9 illustrates the costs and benefits of a tariff for the importing country. The tariff raises the domestic price from P_W to P_T but lowers the foreign export price from P_W to P_T^* (refer back to Figure 9-4). Domestic production rises from S^1 to S^2 while domestic consumption falls from D^1 to D^2. The costs and benefits to different groups can be expressed as sums of the areas of five regions, labeled *a*, *b*, *c*, *d*, *e*.

Consider first the gain to domestic producers. They receive a higher price and therefore have higher producer surplus. As we saw in Figure 9-8, producer surplus is equal to the area below the price but above the supply curve. Before the tariff, producer surplus was equal to the area below P_W but above the supply curve; with the price rising to P_T, this surplus rises by the area labeled *a*. That is, producers gain from the tariff.

Domestic consumers also face a higher price, which makes them worse off. As we saw in Figure 9-7, consumer surplus is equal to the area above the price but below the demand curve. Since the price consumers face rises from P_W to P_T, the consumer surplus falls by the area indicated by $a + b + c + d$. So consumers are hurt by the tariff.