



The Instruments of Trade Policy

Previous chapters have answered the question, “Why do nations trade?” by *describing* the causes and effects of international trade and the functioning of a trading world economy. While this question is interesting in itself, its answer is even more interesting if it also helps answer the question, “What should a nation’s trade policy be?” For example, should the United States use a tariff or an import quota to protect its automobile industry against competition from Japan and South Korea? Who will benefit and who will lose from an import quota? Will the benefits outweigh the costs?

This chapter examines the policies that governments adopt toward international trade, policies that involve a number of different actions. These actions include taxes on some international transactions, subsidies for other transactions, legal limits on the value or volume of particular imports, and many other measures. The chapter thus provides a framework for understanding the effects of the most important instruments of trade policy.

LEARNING GOALS

After reading this chapter, you will be able to:

- Evaluate the costs and benefits of tariffs, their welfare effects, and winners and losers of tariff policies.
- Discuss what export subsidies and agricultural subsidies are, and explain how they affect trade in agriculture in the United States and the European Union.
- Recognize the effect of voluntary export restraints (VERs) on both importing and exporting countries, and describe how the welfare effects of these VERs compare with tariff and quota policies.

Basic Tariff Analysis

A tariff, the simplest of trade policies, is a tax levied when a good is imported. **Specific tariffs** are levied as a fixed charge for each unit of goods imported (for example, \$3 per barrel of oil). **Ad valorem tariffs** are taxes that are levied as a fraction of the value of the imported goods (for example, a 25 percent U.S. tariff on imported trucks—see the following box). In either case, the effect of the tariff is to raise the cost of shipping goods to a country.

Tariffs are the oldest form of trade policy and have traditionally been used as a source of government income. Until the introduction of the income tax, for instance, the U.S. government raised most of its revenue from tariffs. Their true purpose, however, has usually been twofold: both to provide revenue and to protect particular domestic sectors. In the early 19th century, for example, the United Kingdom used tariffs (the famous Corn Laws) to protect its agriculture from import competition. In the late 19th century, both Germany and the United States protected their new industrial sectors by imposing tariffs on imports of manufactured goods. The importance of tariffs has declined in modern times because modern governments usually prefer to protect domestic industries through a variety of **nontariff barriers**, such as **import quotas** (limitations on the quantity of imports) and **export restraints** (limitations on the quantity of exports—usually imposed by the exporting country at the importing country's request). Nonetheless, an understanding of the effects of a tariff remains vital for understanding other trade policies.

In developing the theory of trade in Chapters 3 through 8, we adopted a *general equilibrium* perspective. That is, we were keenly aware that events in one part of the economy have repercussions elsewhere. However, in many (though not all) cases, trade policies toward one sector can be reasonably well understood without going into detail about those policies' repercussions on the rest of the economy. For the most part, then, trade policy can be examined in a *partial equilibrium* framework. When the effects on the economy as a whole become crucial, we will refer back to general equilibrium analysis.

Supply, Demand, and Trade in a Single Industry

Let's suppose there are two countries, Home and Foreign, both of which consume and produce wheat, which can be costlessly transported between the countries. In each country, wheat is a simple competitive industry in which the supply and demand curves are functions of the market price. Normally, Home supply and demand will depend on the price in terms of Home currency, and Foreign supply and demand will depend on the price in terms of Foreign currency. However, we assume that the exchange rate between the currencies is not affected by whatever trade policy is undertaken in this market. Thus we quote prices in both markets in terms of Home currency.

Trade will arise in such a market if prices are different in the absence of trade. Suppose that in the absence of trade, the price of wheat is higher in Home than it is in Foreign. Now let's allow foreign trade. Since the price of wheat in Home exceeds the price in Foreign, shippers begin to move wheat from Foreign to Home. The export of wheat raises its price in Foreign and lowers its price in Home until the difference in prices has been eliminated.

To determine the world price and the quantity traded, it is helpful to define two new curves: the Home **import demand curve** and the Foreign **export supply curve**, which are derived from the underlying domestic supply and demand curves. Home import demand is the excess of what Home consumers demand over what Home producers supply; Foreign export supply is the excess of what Foreign producers supply over what Foreign consumers demand.

Figure 9-1 shows how the Home import demand curve is derived. At the price P^1 , Home consumers demand D^1 , while Home producers supply only S^1 . As a result, Home import demand is $D^1 - S^1$. If we raise the price to P^2 , Home consumers demand only D^2 , while Home producers raise the amount they supply to S^2 , so import demand falls to $D^2 - S^2$. These price-quantity combinations are plotted as points 1 and 2 in the right-hand panel of Figure 9-1. The import demand curve MD is downward sloping because as price increases, the quantity of imports demanded declines. At P_A , Home supply and demand are equal in

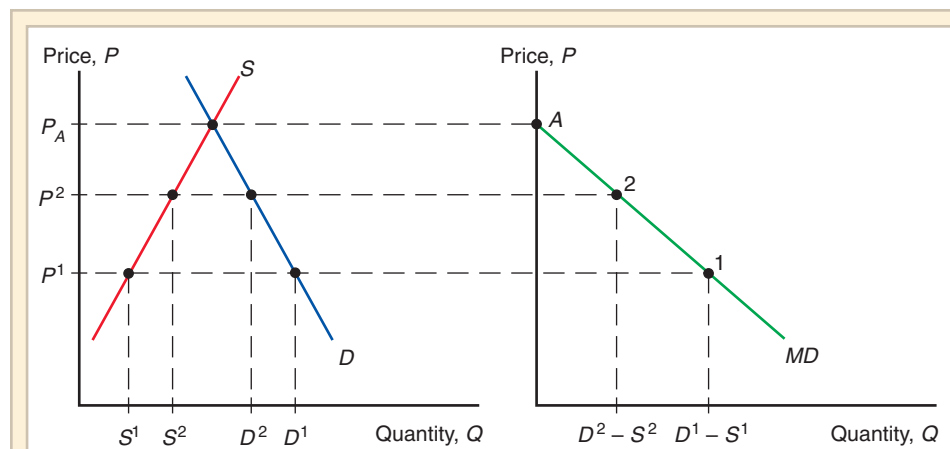


Figure 9-1

Deriving Home's Import Demand Curve

As the price of the good increases, Home consumers demand less, while Home producers supply more, so that the demand for imports declines.

the absence of trade, so the Home import demand curve intercepts the price axis at P_A (import demand = zero at P_A).

Figure 9-2 shows how the Foreign export supply curve XS is derived. At p^1 Foreign producers supply S^{*1} , while Foreign consumers demand only D^{*1} , so the amount of the total supply available for export is $S^{*1} - D^{*1}$. At p^2 Foreign producers raise the quantity they supply to S^{*2} and Foreign consumers lower the amount they demand to D^{*2} , so the quantity of the total supply available to export rises to $S^{*2} - D^{*2}$. Because the supply of goods available for export rises as the price rises, the Foreign export supply curve is

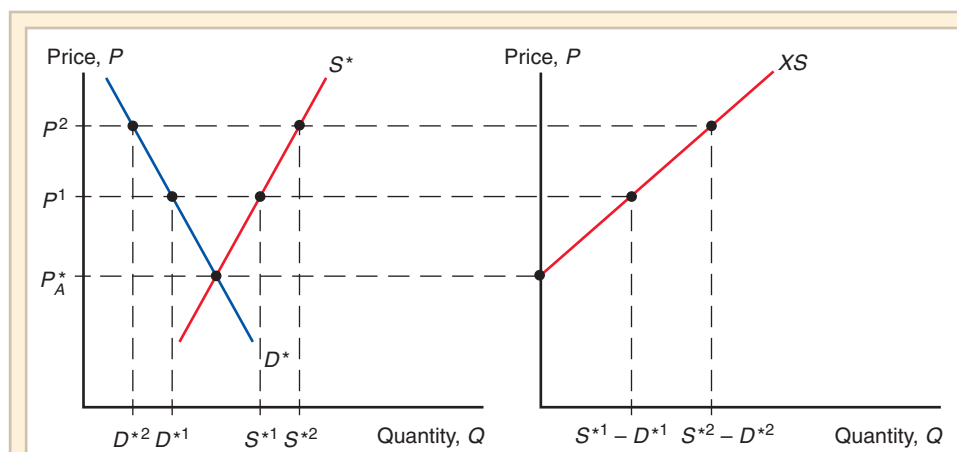


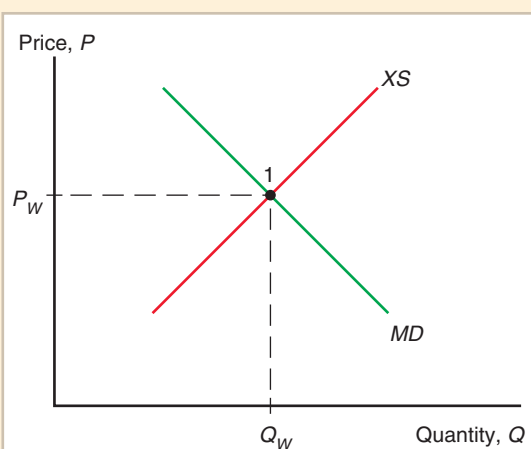
Figure 9-2

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).



upward sloping. At P_A^* , supply and demand would be equal in the absence of trade, so the Foreign export supply curve intersects the price axis at P_A^* (export supply = zero at P_A^*).

World equilibrium occurs when Home import demand equals Foreign export supply (Figure 9-3). At the price P_W where the two curves cross, world supply equals world demand. At the equilibrium point 1 in Figure 9-3,

$$\text{Home demand} - \text{Home supply} = \text{Foreign supply} - \text{Foreign demand}.$$

By adding and subtracting from both sides, this equation can be rearranged to say that

$$\text{Home demand} + \text{Foreign demand} = \text{Home supply} + \text{Foreign supply}$$

or, in other words,

$$\text{World demand} = \text{World supply}.$$

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 $\$t$. 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

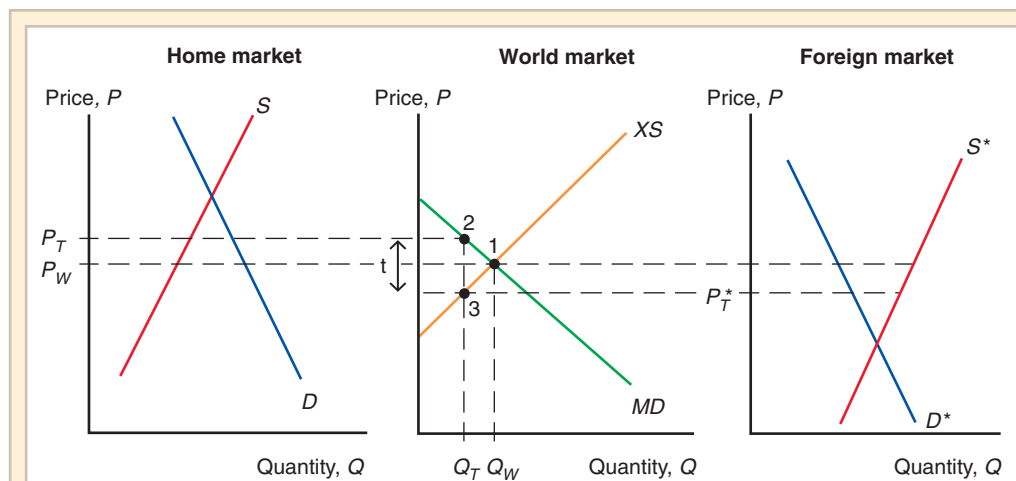


Figure 9-4
Effects of a Tariff

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

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.

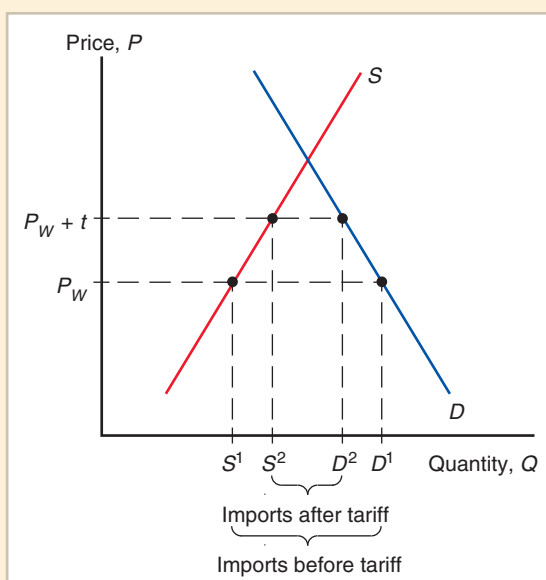
Measuring the Amount of Protection

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 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.

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 P_W to $P_W + t$ and the quantity of imports demanded falls from $D^1 - S^1$ to $D^2 - S^2$.



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 that an automobile sells on the world market for \$8,000 and that 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 that 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

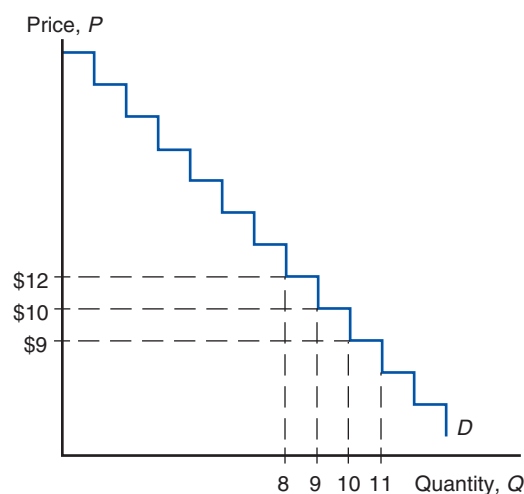
Consumer surplus measures the amount a consumer gains from a purchase by computing the difference between the price he actually pays and the price he would have been willing to pay. If, for example, a consumer would have been willing to pay \$8 for a bushel of wheat but the price is only \$3, the consumer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

Consumer surplus can be derived from the market demand curve (Figure 9-6). For example, suppose that 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.

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.

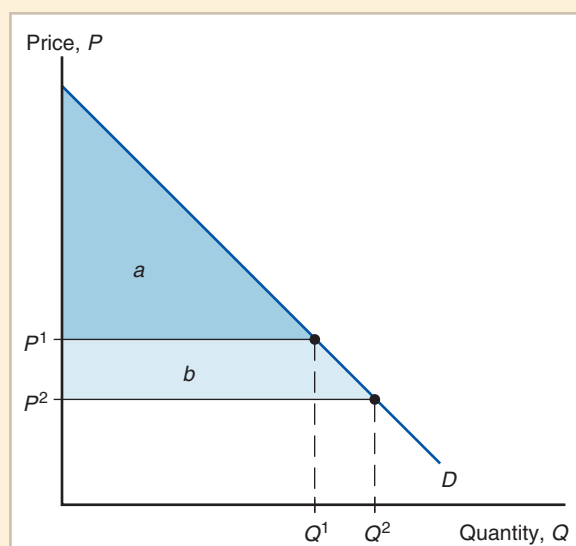


¹The effective rate of protection for a sector is formally defined as $(V_T - V_W)/V_W$, where V_W is value added in the sector at world prices and V_T is value added in the presence of trade policies. In terms of our example, let P_A be the world price of an assembled automobile, P_C the world price 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 9-7**Geometry of Consumer Surplus**

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



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

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 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 Q^1 , and producer surplus is measured by area c . If the price rises to P^2 , the quantity supplied rises to Q^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.

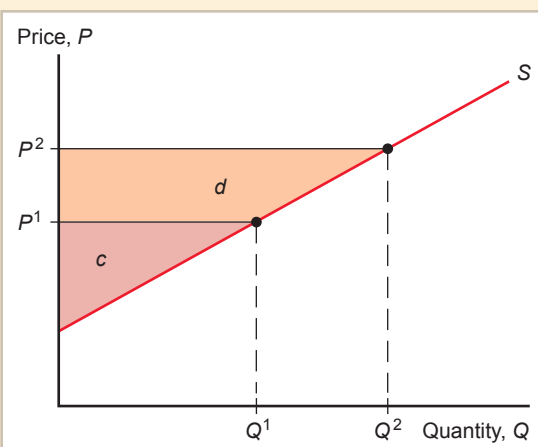
Measuring the Costs and Benefits

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^*

Figure 9-8

Geometry of Producer Surplus

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



(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 .

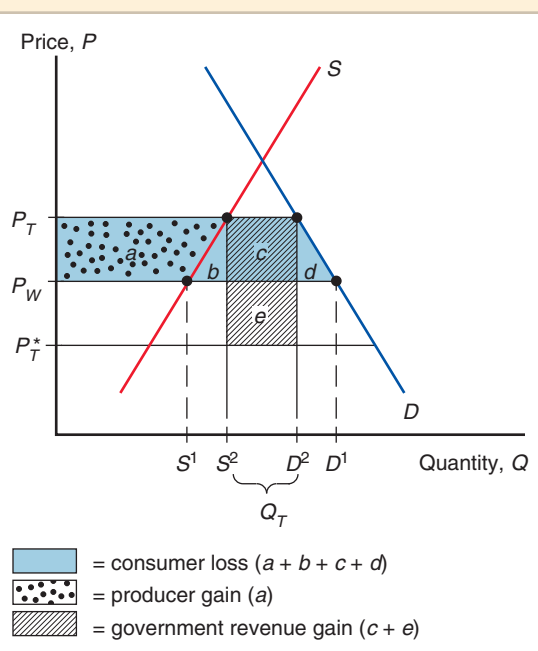
Consider first the gain to domestic producers. They receive a higher price and therefore have higher producer surplus. As we saw in Figure 9-8, producer surplus is equal to the area below the price but above the supply curve. Before the tariff, producer surplus was equal to the area below P_W but above 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

Figure 9-9

Costs and Benefits of a Tariff for the Importing Country

The costs and benefits to different groups can be represented as sums of the five areas $a, b, c, d,$ and e .



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.

There is a third player here as well: the government. The government gains by collecting tariff revenue. This is equal to the tariff rate t times the volume of imports $Q_T = D^2 - S^2$. Since $t = P_T - P_T^*$, the government's revenue is equal to the sum of the two areas c and e .

Since these gains and losses accrue to different people, the overall cost-benefit evaluation of a tariff depends on how much we value a dollar's worth of benefit to each group. If, for example, the producer gain accrues mostly to wealthy owners of resources, while consumers are poorer than average, the tariff will be viewed differently than if the good is a luxury bought by the affluent but produced by low-wage workers. Further ambiguity is introduced by the role of the government: Will it use its revenue to finance vitally needed public services or waste that revenue on \$1,000 toilet seats? Despite these problems, it is common for analysts of trade policy to attempt to compute the net effect of a tariff on national welfare by assuming that at the margin, a dollar's worth of gain or loss to each group is of the same social worth.

Let's look, then, at the net effect of a tariff on welfare. The net cost of a tariff is

$$\text{Consumer loss} - \text{producer gain} - \text{government revenue}, \quad (9-1)$$

or, replacing these concepts by the areas in Figure 9-9,

$$(a + b + c + d) - a - (c + e) = b + d - e. \quad (9-2)$$

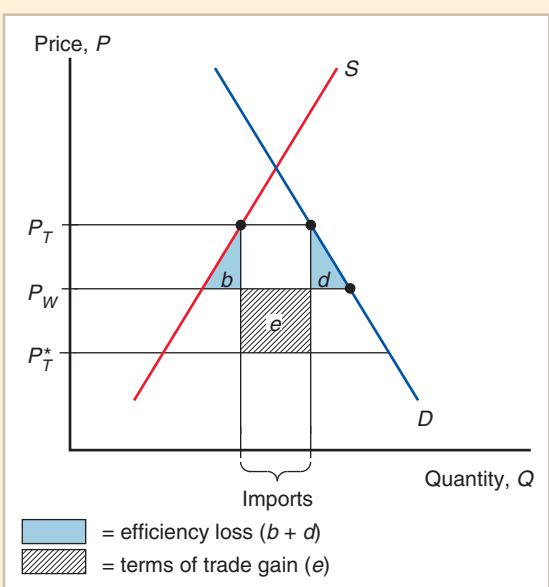
That is, there are two "triangles" whose area measures loss to the nation as a whole and a "rectangle" whose area measures an offsetting gain. A useful way to interpret these gains and losses is the following: The triangles represent the **efficiency loss** that arises because a tariff distorts incentives to consume and produce, while the rectangle represents the **terms of trade gain** that arise because a tariff lowers foreign export prices.

The gain depends on the ability of the tariff-imposing country to drive down foreign export prices. If the country cannot affect world prices (the "small country" case

Figure 9-10

Net Welfare Effects of a Tariff

The colored triangles represent efficiency losses, while the rectangle represents a terms of trade gain.



Tariffs for the Long Haul

We just saw how a tariff can be used to increase producer surplus at the expense of a loss in consumer surplus. There are also many other indirect costs of tariffs: They can lead trading partners to retaliate with their own tariffs (thus hurting exporting producers in the country that first imposed the tariff); they can also be fiendishly hard to remove later on even after economic conditions have completely changed, because they help to politically organize the small group of producers that is protected from foreign competition. (We will discuss this further in Chapter 10.) Finally, large tariffs can induce producers to behave in creative—though ultimately wasteful—ways in order to avoid them.

In the case of the tariff known as the “Chicken Tax,” the tariff lasted for so long (47 years, and counting) that it ended up hurting the same producers that had intensively lobbied to maintain the tariff in the first place! This tariff got its name because it was a retaliation by U.S. President Lyndon Johnson’s administration against a tariff on U.S. chicken exports imposed by Western Europe in the early 1960s. The U.S. retaliation, focusing on Germany (one of the main political forces behind the original chicken tariff), imposed a 25 percent tariff on light commercial truck vehicles. At the time, Volkswagen was a big producer of such vehicles and exported many of them to the United States. As time went by, many

illustrated in Figure 9-5), region e , which represents the terms of trade gain, disappears, and it is clear that the tariff reduces welfare. A tariff distorts the incentives of both producers and consumers by inducing them to act as if imports were more expensive than they actually are. The cost of an additional unit of consumption to the economy is the price of an additional unit of imports, yet because the tariff raises the domestic price above the world price, consumers reduce their consumption to the point at which that marginal unit yields them welfare equal to the tariff-inclusive domestic price. This means that the value of an additional unit of production to the economy is the price of the unit of imports it saves, yet domestic producers expand production to the point at which the marginal cost is equal to the tariff-inclusive price. Thus the economy produces at home additional units of the good that it could purchase more cheaply abroad.

The net welfare effects of a tariff are summarized in Figure 9-10. The negative effects consist of the two triangles b and d . The first triangle is the **production distortion loss** resulting from the fact that the tariff leads domestic producers to produce too much of this good. The second triangle is the domestic **consumption distortion loss** resulting from the fact that a tariff leads consumers to consume too little of the good. Against these losses must be set the terms of trade gain measured by the rectangle e , which results from the decline in the foreign export price caused by a tariff. In the important case of a small country that cannot significantly affect foreign prices, this last effect drops out; thus the costs of a tariff unambiguously exceed its benefits.

Other Instruments of Trade Policy

Tariffs are the simplest trade policies, but in the modern world, most government intervention in international trade takes other forms, such as export subsidies, import quotas, voluntary export restraints, and local content requirements. Fortunately, once we have understood tariffs, it is not too difficult to understand these other trade instruments.

of the original tariffs were dropped, except for the ones on chickens and light commercial trucks. Volkswagen stopped producing those vehicles, but the U.S. “big three” auto and truck producers were then concerned about competition from Japanese truck producers and lobbied to keep the tariff in place.

Japanese producers responded by building those light trucks in the United States (see Chapter 8).[†]

As a result, the latest company to be hit by the consequences of the tariff is Ford, one of those “big three” U.S. producers! Ford produces a small commercial van in Europe, the “Transit Connect,” which is designed (with its smaller capacity and

ability to navigate old, narrow streets) for European cities. The recent spike in fuel prices sharply increased demand in some U.S. cities for this truck. In 2009, Ford started selling these vehicles in the United States. To get around the 25 percent tariff, Ford installs rear windows, rear seats, and seat belts prior to shipping the vehicles to the United States. These vehicles are no longer classified as commercial trucks but as passenger vehicles, which are subject to the much lower 2.5 percent tariff. Upon arrival in Baltimore, the rear seats are promptly removed and the rear windows replaced with metal panels—before delivery to the Ford dealers.

*See Matthew Dolan, “To Outfox the Chicken Tax, Ford Strips Its Own Vans,” *Wall Street Journal*, September 23, 2009.

†Before opening production facilities in the United States, Subaru got around the tariff by bolting two plastic seats to the open bed of the pickup truck (Subaru BRAT) that the company exported to the United States, thus evading the light commercial truck classification.

Export Subsidies: Theory

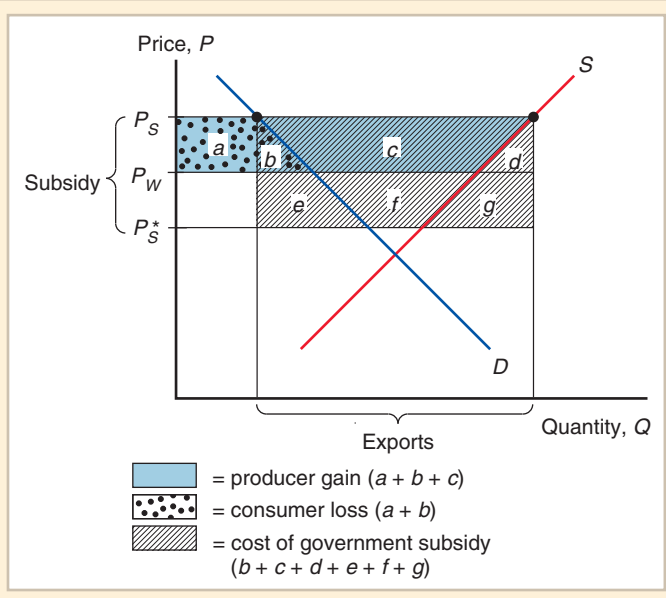
An **export subsidy** is a payment to a firm or individual that ships a good abroad. Like a tariff, an export subsidy can be either specific (a fixed sum per unit) or ad valorem (a proportion of the value exported). When the government offers an export subsidy, shippers will export the good up to the point at which the domestic price exceeds the foreign price by the amount of the subsidy.

The effects of an export subsidy on prices are exactly the reverse of those of a tariff (Figure 9-11). The price in the exporting country rises from P_W to P_S , but because the price in the importing country falls from P_W to P_S^* , the price increase is less than the subsidy.

Figure 9-11

Effects of an Export Subsidy

An export subsidy raises prices in the exporting country while lowering them in the importing country.



In the exporting country, consumers are hurt, producers gain, and the government loses because it must expend money on the subsidy. The consumer loss is the area $a + b$; the producer gain is the area $a + b + c$; the government subsidy (the amount of exports times the amount of the subsidy) is the area $b + c + d + e + f + g$. The net welfare loss is therefore the sum of the areas $b + d + e + f + g$. Of these, b and d represent consumption and production distortion losses of the same kind that a tariff produces. In addition, and in contrast to a tariff, the export subsidy *worsens* the terms of trade because it lowers the price of the export in the foreign market from P_W to P_S^* . This leads to the additional terms of trade loss $e + f + g$, which is equal to $P_W - P_S^*$ times the quantity exported with the subsidy. So an export subsidy unambiguously leads to costs that exceed its benefits.

Case Study

Europe's Common Agricultural Policy

In 1957, six Western European nations—Germany, France, Italy, Belgium, the Netherlands, and Luxembourg—formed the European Economic Community, which has since grown to include most of Europe. Now called the European Union (EU), its two biggest effects are on trade policy. First, the members of the European Union have removed all tariffs with respect to each other, thus creating a customs union (discussed in the next chapter). Second, the agricultural policy of the European Union has developed into a massive export subsidy program.

The European Union's Common Agricultural Policy (CAP) began not as an export subsidy, but as an effort to guarantee high prices to European farmers by having the European Union buy agricultural products whenever the prices fell below specified support levels. To prevent this policy from drawing in large quantities of imports, it was initially backed by tariffs that offset the difference between European and world agricultural prices.

Since the 1970s, however, the support prices set by the European Union have turned out to be so high that Europe—which, under free trade, would be an importer of most agricultural products—was producing more than consumers were willing to buy. As a result, the European Union found itself obliged to buy and store huge quantities of food. At the end of 1985, for example, European nations had stored 780,000 tons of beef, 1.2 million tons of butter, and 12 million tons of wheat. To avoid unlimited growth in these stockpiles, the European Union turned to a policy of subsidizing exports to dispose of surplus production.

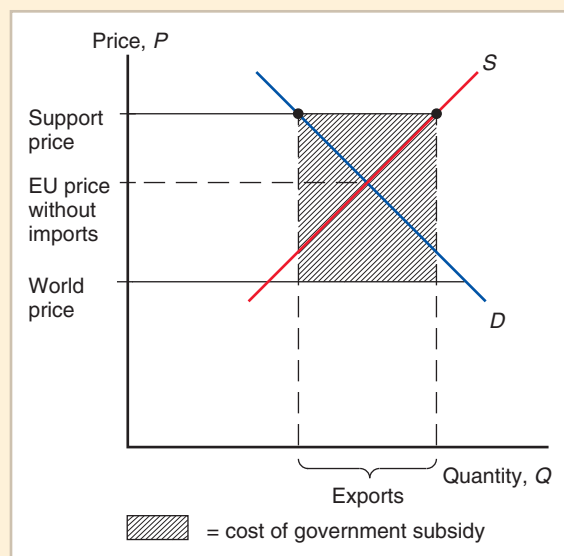
Figure 9-12 shows how the CAP works. It is, of course, exactly like the export subsidy shown in Figure 9-11, except that Europe would actually be an importer under free trade. The support price is set not only above the world price that would prevail in its absence but also above the price that would equate demand and supply even without imports. To export the resulting surplus, an export subsidy is paid that offsets the difference between European and world prices. The subsidized exports themselves tend to depress the world price, increasing the required subsidy. A recent study estimated that the welfare cost to European consumers exceeded the benefits to farm producers by nearly \$30 billion (21.5 billion euros) in 2007.²

Despite the considerable net costs of the CAP to European consumers and taxpayers, the political strength of farmers in the EU has been so strong that the program has

²See Pierre Boulanger and Patrick Jomini, *Of the Benefits to the EU of Removing the Common Agricultural Policy*, Sciences Politique Policy Brief, 2010.

Figure 9-12**Europe's Common Agricultural Policy**

Agricultural prices are fixed not only above world market levels but also above the price that would clear the European market. An export subsidy is used to dispose of the resulting surplus.



been difficult to rein in. One source of pressure has come from the United States and other food-exporting nations, which complain that Europe's export subsidies drive down the price of their own exports. The budgetary consequences of the CAP have also posed concerns: In 2009, the CAP cost European taxpayers \$76 billion (55 billion euros)—and that figure doesn't include the indirect costs to food consumers. Government subsidies to European farmers are equal to about 36 percent of the value of farm output, twice the U.S. figure.

Recent reforms in Europe's agricultural policy represent an effort to reduce the distortion of incentives caused by price support while continuing to provide aid to farmers. If politicians go through with their plans, farmers will increasingly receive direct payments that aren't tied to how much they produce; this should lower agricultural prices and reduce production.

Import Quotas: Theory

An import quota is a direct restriction on the quantity of some good that may be imported. The restriction is usually enforced by issuing licenses to some group of individuals or firms. For example, the United States has a quota on imports of foreign cheese. The only firms allowed to import cheese are certain trading companies, each of which is allocated the right to import a maximum number of pounds of cheese each year; the size of each firm's quota is based on the amount of cheese it imported in the past. In some important cases, notably sugar and apparel, the right to sell in the United States is given directly to the governments of exporting countries.

It is important to avoid having the misconception that import quotas somehow limit imports without raising domestic prices. The truth is that *an import quota always raises the domestic price of the imported good*. When imports are limited, the immediate result is

that at the initial price, the demand for the good exceeds domestic supply plus imports. This causes the price to be bid up until the market clears. In the end, an import quota will raise domestic prices by the same amount as a tariff that limits imports to the same level (except in the case of domestic monopoly, in which the quota raises prices more than this; see the appendix to this chapter).

The difference between a quota and a tariff is that with a quota, the government receives no revenue. When a quota instead of a tariff is used to restrict imports, the sum of money that would have appeared with a tariff as government revenue is collected by whoever receives the import licenses. License holders are thus able to buy imports and resell them at a higher price in the domestic market. The profits received by the holders of import licenses are known as **quota rents**. In assessing the costs and benefits of an import quota, it is crucial to determine who gets the rents. When the rights to sell in the domestic market are assigned to governments of exporting countries, as is often the case, the transfer of rents abroad makes the costs of a quota substantially higher than the equivalent tariff.

Case Study

An Import Quota in Practice: U.S. Sugar

The U.S. sugar problem is similar in its origins to the European agricultural problem: A domestic price guarantee by the federal government has led to U.S. prices above world market levels. Unlike the European Union, however, the domestic supply in the United States does not exceed domestic demand. Thus the United States has been able to keep domestic prices at the target level with an import quota on sugar.

A special feature of the import quota is that the rights to sell sugar in the United States are allocated to foreign governments, which then allocate these rights to their own residents. As a result, rents generated by the sugar quota accrue to foreigners. The quotas restrict the imports of both raw sugar (almost exclusively, sugar cane) as well as refined sugar. We now describe the most recent forecast for the effects of the import restrictions on raw sugar cane (the effects on the sugar refining industry are more complicated, as raw sugar is a key input of production for that industry).³

Figure 9-13 shows those forecasted effects for 2013. The quota would restrict imports to approximately 3 million tons; as a result, the price of raw sugar in the United States would be 35 percent above the price in the outside world. The figure is drawn with the assumption that the United States is “small” in the world market for raw sugar; that is, removing the quota would not have a significant effect on the world price. According to this estimate, free trade would increase sugar imports by 66 percent.

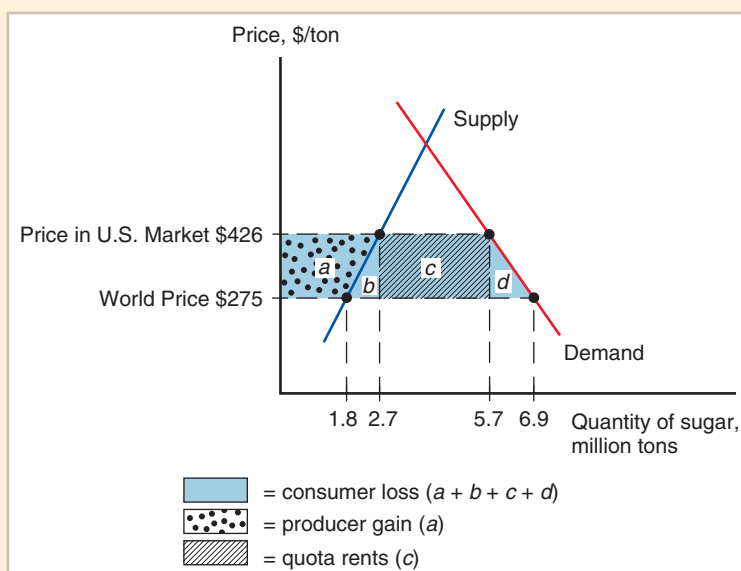
The welfare effects of the import quota are indicated by the areas *a*, *b*, *c*, and *d*. Consumers lose the surplus $a + b + c + d$, with a total value of \$884 million. Part of this consumer loss represents a transfer to U.S. sugar producers, who gain the producer surplus *a* equal to \$272 million. Part of the loss represents the production distortion *b* (\$68 million) and the consumption distortion *d* (\$91 million). The rents to the foreign governments that receive import rights are summarized by area *c*, equal to \$453 million.

The net loss to the United States is equal to the distortions ($b + d$) plus the quota rents (*c*), a total of \$612 million per year. Notice that much of this net loss comes from the fact that foreigners get the import rights.

³These estimates are based on a reports by the U.S. International Trade Commission (2009) cited in Further Readings.

Figure 9-13**Effects of the U.S. Import Quota on Sugar**

The quota limits imports of raw sugar to 3 million tons. Without the quota, imports of sugar would be 66 percent higher, or 5.1 million tons. The result of the quota is that the price of sugar is \$426 per ton, versus the \$275 price on world markets. This produces a gain for U.S. sugar producers, but a much larger loss for U.S. consumers. There is no offsetting gain in revenue because the quota rents are collected by foreign governments.



The sugar quota illustrates in an extreme way the tendency of protection to provide benefits to a small group of producers, each of whom receives a large benefit, at the expense of a large number of consumers, each of whom bears only a small cost. In this case, the yearly consumer loss amounts to only about \$3 per capita, or a little more than \$11 for a typical family. Not surprisingly, the average American voter is unaware that the sugar quota exists, and so there is little effective opposition.

From the point of view of the raw sugar producers (farmers and processors), however, the quota is a life-or-death issue. These producers employ only about 6,500 workers, so the producer gains from the quota represent an implicit subsidy of about \$42,000 per employee. It should be no surprise that these sugar producers are very effectively mobilized in defense of their protection.

Opponents of protection often try to frame their criticism not in terms of consumer and producer surplus but in terms of the cost to consumers of every job “saved” by an import restriction. Clearly, the loss of the \$42,000 subsidy per employee indirectly provided by the quota would force raw sugar producers to drastically reduce their employment. Without the quota, it is forecasted that 32 percent of the 6,500 jobs would be lost. This would result in a cost to the U.S. consumer of \$432,000 per job saved.

When one also considers that raw sugar is a key input of refined sugar (which is then used to produce a vast variety of confectionery consumer goods), the costs escalate even higher. In Chapter 4 we briefly mentioned these costs, which were roughly double the ones we have summarized here for raw sugar only. When one further considers that the high cost of sugar reduces employment in those sugar-using industries, the issue is no longer that the consumer cost per job saved is astronomically high; rather, it is plainly that jobs are being *lost*, not saved, by the sugar quota. The U.S. Department of Commerce has estimated that, for every farming/processing job saved by high sugar prices, three jobs are lost in the confectionery manufacturing industries.⁴

⁴See U.S. Department of Commerce, International Trade Administration, *Employment Changes in U.S. Food Manufacturing: The Impact of Sugar Prices*, 2006.

Voluntary Export Restraints

A variant on the import quota is the **voluntary export restraint (VER)**, also known as a voluntary restraint agreement (VRA). (Welcome to the bureaucratic world of trade policy, where everything has a three-letter symbol!) A VER is a quota on trade imposed from the exporting country's side instead of the importer's. The most famous example is the limitation on auto exports to the United States enforced by Japan after 1981.

Voluntary export restraints are generally imposed at the request of the importer and are agreed to by the exporter to forestall other trade restrictions. As we will see in Chapter 10, certain political and legal advantages have made VERs preferred instruments of trade policy in some cases. From an economic point of view, however, a voluntary export restraint is exactly like an import quota where the licenses are assigned to foreign governments and is therefore very costly to the importing country.

A VER is always more costly to the importing country than a tariff that limits imports by the same amount. The difference is that what would have been revenue under a tariff becomes rents earned by foreigners under the VER, so that the VER clearly produces a loss for the importing country.

A study of the effects of the three major U.S. voluntary export restraints of the 1980s—in textiles and apparel, steel, and automobiles—found that about two-thirds of the cost to consumers of these restraints was accounted for by the rents earned by foreigners.⁵

In other words, the bulk of the cost represents a transfer of income rather than a loss of efficiency. This calculation also emphasizes that, from a national point of view, VERs are much more costly than tariffs. Given this fact, the widespread preference of governments for VERs over other trade policy measures requires some careful analysis.

Some voluntary export agreements cover more than one country. The most famous multilateral agreement is the Multi-Fiber Arrangement, which limited textile exports from 22 countries until the beginning of 2005. Such multilateral voluntary restraint agreements are known by yet another three-letter abbreviation: OMA, for “orderly marketing agreement.”



Case Study

A Voluntary Export Restraint in Practice: Japanese Autos

For much of the 1960s and 1970s, the U.S. auto industry was largely insulated from import competition by the difference in the kinds of cars bought by U.S. and foreign consumers. U.S. buyers, living in a large country with low gasoline taxes, preferred much larger cars than Europeans and Japanese, and, by and large, foreign firms had chosen not to challenge the United States in the large-car market.

In 1979, however, sharp oil price increases and temporary gasoline shortages caused the U.S. market to shift abruptly toward smaller cars. Japanese producers, whose costs had been falling relative to those of their U.S. competitors in any case, moved in to fill the new demand. As the Japanese market share soared and U.S. output fell, strong political forces in the United States demanded protection for the U.S. industry. Rather than act unilaterally and risk creating a trade war, the U.S. government asked the Japanese government to limit its exports. The Japanese, fearing unilateral

⁵See David G. Tarr, *A General Equilibrium Analysis of the Welfare and Employment Effects of U.S. Quotas in Textiles, Autos, and Steel* (Washington, D.C.: Federal Trade Commission, 1989).

U.S. protectionist measures if they did not do so, agreed to limit their sales. The first agreement, in 1981, limited Japanese exports to the United States to 1.68 million automobiles. A revision raised that total to 1.85 million in 1984. In 1985, the agreement was allowed to lapse.

The effects of this voluntary export restraint were complicated by several factors. First, Japanese and U.S. cars were clearly not perfect substitutes. Second, the Japanese industry to some extent responded to the quota by upgrading its quality and selling larger autos with more features. Third, the auto industry is clearly not perfectly competitive. Nonetheless, the basic results were what the discussion of voluntary export restraints earlier would have predicted: The price of Japanese cars in the United States rose, with the rent captured by Japanese firms. The U.S. government estimates the total costs to the United States to be \$3.2 billion in 1984, primarily in transfers to Japan rather than efficiency losses.

Local Content Requirements

A **local content requirement** is a regulation that requires some specified fraction of a final good to be produced domestically. In some cases this fraction is specified in physical units, like the U.S. oil import quota in the 1960s. In other cases the requirement is stated in value terms, by requiring that some minimum share of the price of a good represent domestic value added. Local content laws have been widely used by developing countries trying to shift their manufacturing base from assembly back into intermediate goods. In the United States, a local content bill for automobiles was proposed in 1982 but was never acted on.

From the point of view of the domestic producers of parts, a local content regulation provides protection in the same way an import quota does. From the point of view of the firms that must buy locally, however, the effects are somewhat different. Local content does not place a strict limit on imports. Instead, it allows firms to import more, provided that they also buy more domestically. This means that the effective price of inputs to the firm is an average of the price of imported and domestically produced inputs.

Consider, for instance, the earlier automobile example in which the cost of imported parts is \$6,000. Suppose that purchasing the same parts domestically would cost \$10,000 but that assembly firms are required to use 50 percent domestic parts. Then they will face an average cost of parts of \$8,000 ($0.5 \times \$6,000 + 0.5 \times \$10,000$), which will be reflected in the final price of the car.

The important point is that a local content requirement does not produce either government revenue or quota rents. Instead, the difference between the prices of imports and domestic goods in effect gets averaged in the final price and is passed on to consumers.

An interesting innovation in local content regulations has been to allow firms to satisfy their local content requirement by exporting instead of using parts domestically. This is sometimes important. For example, U.S. auto firms operating in Mexico have chosen to export some components from Mexico to the United States, even though those components could be produced in the United States more cheaply, because doing so allows them to use less Mexican content in producing cars in Mexico for Mexico's market.

American Buses, Made in Hungary

In 1995, sleek new buses began rolling onto the streets of Miami and Baltimore. Probably very few riders were aware that these buses had been made in Hungary, of all places.

Why Hungary? Well, before the fall of communism in Eastern Europe, Hungary had in fact manufactured buses for export to other Eastern bloc nations. However, because these buses were poorly designed and badly made, few people thought the industry could start exporting to Western countries any time soon.

What changed the situation was some clever Hungarian investors' realization that there is a loophole in a little-known but important U.S. law, the Buy American Act, originally passed in 1933. This law in effect imposes local content requirements on a significant range of products.

The Buy American Act affects procurement (purchases by government agencies, including state and local governments) by requiring that American firms be given preference in all such purchases. A bid by a foreign company can be accepted only if it is a specified percentage below the lowest bid by a domestic firm. In the case of buses and other transportation equipment, the foreign bid must be at least

25 percent below the domestic bid, effectively shutting out foreign producers in most cases. Nor can an American company simply act as a sales agent for foreigners: While "American" products can contain some foreign parts, 51 percent of the materials must be domestic.

What the Hungarians realized was that they could set up a production chain that just barely met this criterion. They set up operations in two locations: one in Hungary, producing the shells of buses (the bodies, without anything else), and an assembly operation in Georgia. American axles and tires were shipped to Hungary, where they were put onto the bus shells; these were then shipped back to the United States, where American-made engines and transmissions were installed. The whole product was slightly more than 51 percent American, and thus these buses were legally "American" buses that city transit authorities were allowed to buy. The advantage of the whole scheme was the opportunity to use inexpensive Hungarian labor: Although Hungarian workers took about 1,500 hours to assemble a bus (compared with less than 900 hours in the United States), their \$4 per-hour wage rate made all the transshipments worthwhile.

Other Trade Policy Instruments

There are many other ways in which governments influence trade. We list some of them briefly.

1. *Export credit subsidies.* This is like an export subsidy except that it takes the form of a subsidized loan to the buyer. The United States, like most other countries, has a government institution, the Export-Import Bank, that is devoted to providing at least slightly subsidized loans to aid exports.
2. *National procurement.* Purchases by the government or strongly regulated firms can be directed toward domestically produced goods even when these goods are more expensive than imports. The classic example is the European telecommunications industry. The nations of the European Union in principle have free trade with each other. The main purchasers of telecommunications equipment, however, are phone companies—and in Europe, these companies have until recently all been government-owned. These government-owned telephone companies buy from domestic suppliers even when the suppliers charge higher prices than suppliers in other countries. The result is that there is very little trade in telecommunications equipment within Europe.

TABLE 9-1 Effects of Alternative Trade Policies

	Tariff	Export Subsidy	Import Quota	Voluntary Export Restraint
Producer surplus	Increases	Increases	Increases	Increases
Consumer surplus	Falls	Falls	Falls	Falls
Government revenue	Increases	Falls (government spending rises)	No change (rents to license holders)	No change (rents to foreigners)
Overall national welfare	Ambiguous (falls for small country)	Falls	Ambiguous (falls for small country)	Falls

3. *Red-tape barriers.* Sometimes a government wants to restrict imports without doing so formally. Fortunately or unfortunately, it is easy to twist normal health, safety, and customs procedures in order to place substantial obstacles in the way of trade. The classic example is the French decree in 1982 that all Japanese videocassette recorders had to pass through the tiny customs house at Poitiers—effectively limiting the actual imports to a handful.

The Effects of Trade Policy: A Summary

The effects of the major instruments of trade policy are usefully summarized by Table 9-1, which compares the effect of four major kinds of trade policy on the welfare of consumers.

This table certainly does not look like an advertisement for interventionist trade policy. All four trade policies benefit producers and hurt consumers. The effects of the policies on economic welfare are at best ambiguous; two of the policies definitely hurt the nation as a whole, while tariffs and import quotas are potentially beneficial only for large countries that can drive down world prices.

Why, then, do governments so often act to limit imports or promote exports? We turn to this question in Chapter 10.

SUMMARY

1. In contrast to our earlier analysis, which stressed the general equilibrium interaction of markets, for analysis of trade policy it is usually sufficient to use a partial equilibrium approach.
2. A tariff drives a wedge between foreign and domestic prices, raising the domestic price but by less than the tariff rate. An important and relevant special case, however, is that of a “small” country that cannot have any substantial influence on foreign prices. In the small country case, a tariff is fully reflected in domestic prices.
3. The costs and benefits of a tariff or other trade policy may be measured using the concepts of consumer surplus and producer surplus. Using these concepts, we can show that the domestic producers of a good gain because a tariff raises the price they receive; the domestic consumers lose, for the same reason. There is also a gain in government revenue.

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4. If we add together the gains and losses from a tariff, we find that the net effect on national welfare can be separated into two parts: On one hand is an efficiency loss, which results from the distortion in the incentives facing domestic producers and consumers. On the other hand is a terms of trade gain, reflecting the tendency of a tariff to drive down foreign export prices. In the case of a small country that cannot affect foreign prices, the second effect is zero, so that there is an unambiguous loss.
5. The analysis of a tariff can be readily adapted to analyze other trade policy measures, such as export subsidies, import quotas, and voluntary export restraints. An export subsidy causes efficiency losses similar to those of a tariff but compounds these losses by causing a deterioration of the terms of trade. Import quotas and voluntary export restraints differ from tariffs in that the government gets no revenue. Instead, what would have been government revenue accrues as rents to the recipients of import licenses (in the case of a quota) and to foreigners (in the case of a voluntary export restraint).

KEY TERMS

ad valorem tariff, p. 192	export subsidy, p. 203	production distortion loss, p. 201
consumer surplus, p. 198	export supply curve, p. 193	quota rent, p. 206
consumption distortion loss, p. 201	import demand curve, p. 193	specific tariff, p. 192
effective rate of protection, p. 197	import quota, p. 193	terms of trade gain, p. 201
efficiency loss, p. 201	local content requirement, p. 209	voluntary export restraint (VER), p. 208
export restraint, p. 193	nontariff barriers, p. 193	
	producer surplus, p. 199	

PROBLEMS



1. Home's demand curve for wheat is

$$D = 100 - 20P.$$

Its supply curve is

$$S = 20 + 20P.$$

Derive and graph Home's *import* demand schedule. What would the price of wheat be in the absence of trade?

2. Now add Foreign, which has a demand curve

$$D^* = 80 - 20P$$

and a supply curve

$$S^* = 40 + 20P.$$

- a. Derive and graph Foreign's export supply curve and find the price of wheat that would prevail in Foreign in the absence of trade.
- b. Now allow Foreign and Home to trade with each other, at zero transportation cost. Find and graph the equilibrium under free trade. What is the world price? What is the volume of trade?

3. Home imposes a specific tariff of 0.5 on wheat imports.
 - a. Determine and graph the effects of the tariff on the following: (1) the price of wheat in each country; (2) the quantity of wheat supplied and demanded in each country; (3) the volume of trade.
 - b. Determine the effect of the tariff on the welfare of each of the following groups: (1) Home import-competing producers; (2) Home consumers; (3) the Home government.
 - c. Show graphically and calculate the terms of trade gain, the efficiency loss, and the total effect on welfare of the tariff.
4. Suppose that Foreign had been a much larger country, with domestic demand

$$D^* = 800 - 200P, S^* = 400 + 200P.$$

(Notice that this implies that the Foreign price of wheat in the absence of trade would have been the same as in problem 2.)

Recalculate the free trade equilibrium and the effects of a 0.5 specific tariff by Home. Relate the difference in results to the discussion of the small country case in the text.

5. What would be the effective rate of protection on bicycles in China if China places a 50 percent tariff on bicycles, which have a world price of \$200, and no tariff on bike components, which together have a world price of \$100?
6. The United States simultaneously limits imports of ethanol for fuel purposes and provides incentives for the use of ethanol in gasoline, which raise the price of ethanol by about 15 percent relative to what it would be otherwise. We do, however, have free trade in corn, which is fermented and distilled to make ethanol, and accounts for approximately 55 percent of its cost. What is the effective rate of protection on the process of turning corn into ethanol?
7. Return to the example of problem 2. Starting from free trade, assume that Foreign offers exporters a subsidy of 0.5 per unit. Calculate the effects on the price in each country and on welfare, both of individual groups and of the economy as a whole, in both countries.
8. Use your knowledge about trade policy to evaluate each of the following statements:
 - a. "An excellent way to reduce unemployment is to enact tariffs on imported goods."
 - b. "Tariffs have a more negative effect on welfare in large countries than in small countries."
 - c. "Automobile manufacturing jobs are heading to Mexico because wages are so much lower there than they are in the United States. As a result, we should implement tariffs on automobiles equal to the difference between U.S. and Mexican wage rates."
9. The nation of Acirema is "small" and unable to affect world prices. It imports peanuts at the price of \$10 per bag. The demand curve is

$$D = 400 - 10P.$$

The supply curve is

$$S = 50 + 5P.$$

Determine the free trade equilibrium. Then calculate and graph the following effects of an import quota that limits imports to 50 bags.

- a. The increase in the domestic price.
- b. The quota rents.
- c. The consumption distortion loss.
- d. The production distortion loss.

10. If tariffs, quotas, and subsidies each cause net welfare losses, why are they so common, especially in agriculture, among the industrialized countries such as the United States and the members of the European Union?
11. Suppose that workers involved in manufacturing are paid less than all other workers in the economy. What would be the effect on the real income *distribution* within the economy if there were a substantial tariff levied on manufactured goods?

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APPENDIX TO CHAPTER 9



Tariffs and Import Quotas in the Presence of Monopoly

The trade policy analysis in this chapter assumed that markets are perfectly competitive, so that all firms take prices as given. As we argued in Chapter 8, however, many markets for internationally traded goods are imperfectly competitive. The effects of international trade policies can be affected by the nature of the competition in a market.

When we analyze the effects of trade policy in imperfectly competitive markets, a new consideration appears: International trade limits monopoly power, and policies that limit trade may therefore increase monopoly power. Even if a firm is the only producer of a good in a country, it will have little ability to raise prices if there are many foreign suppliers and free trade. If imports are limited by a quota, however, the same firm will be free to raise prices without fear of competition.

The link between trade policy and monopoly power may be understood by examining a model in which a country imports a good and its import-competing production is controlled by only one firm. The country is small on world markets, so the price of the import is unaffected by its trade policy. For this model, we examine and compare the effects of free trade, a tariff, and an import quota.

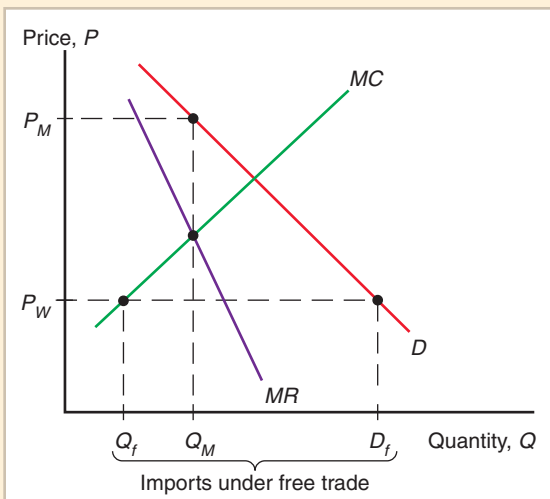
The Model with Free Trade

Figure 9A-1 shows free trade in a market where a domestic monopolist faces competition from imports. D is the domestic demand curve: demand for the product by domestic residents. P_W is the world price of the good; imports are available in unlimited quantities at that price. The domestic industry is assumed to consist of only a single firm, whose marginal cost curve is MC .

Figure 9A-1

A Monopolist Under Free Trade

The threat of import competition forces the monopolist to behave like a perfectly competitive industry.



If there were no trade in this market, the domestic firm would behave as an ordinary profit-maximizing monopolist. Corresponding to D is a marginal revenue curve MR , and the firm would choose the monopoly profit-maximizing level of output Q_M and price P_M .

With free trade, however, this monopoly behavior is not possible. If the firm tried to charge P_M , or indeed any price above P_W , nobody would buy its product, because cheaper imports would be available. Thus international trade puts a lid on the monopolist's price at P_W .

Given this limit on its price, the best the monopolist can do is produce up to the point where marginal cost is equal to the world price, at Q_f . At the price P_W , domestic consumers will demand D_f units of the good, so imports will be $D_f - Q_f$. This outcome, however, is exactly what would have happened if the domestic industry had been perfectly competitive. With free trade, then, the fact that the domestic industry is a monopoly does not make any difference in the outcome.

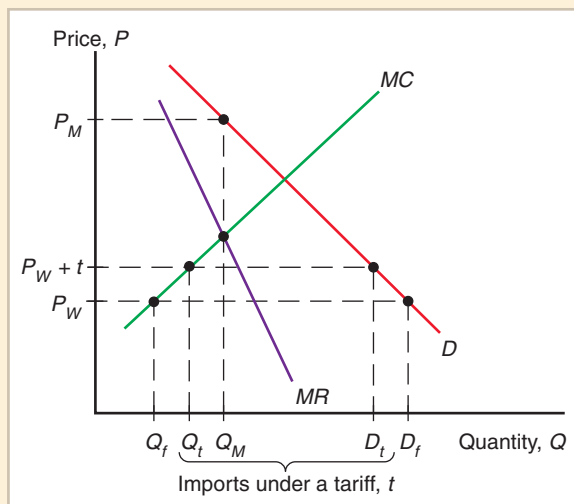
The Model with a Tariff

The effect of a tariff is to raise the maximum price the domestic industry can charge. If a specific tariff t is charged on imports, the domestic industry can now charge $P_W + t$ (Figure 9A-2). The industry still is not free to raise its price all the way to the monopoly price, however, because consumers will still turn to imports if the price rises above the world price plus the tariff. Thus the best the monopolist can do is to set price equal to marginal cost, at Q_t . The tariff raises the domestic price as well as the output of the domestic industry, while demand falls to D_t and thus imports fall. However, the domestic industry still produces the same quantity as if it were perfectly competitive.⁶

Figure 9A-2

A Monopolist Protected by a Tariff

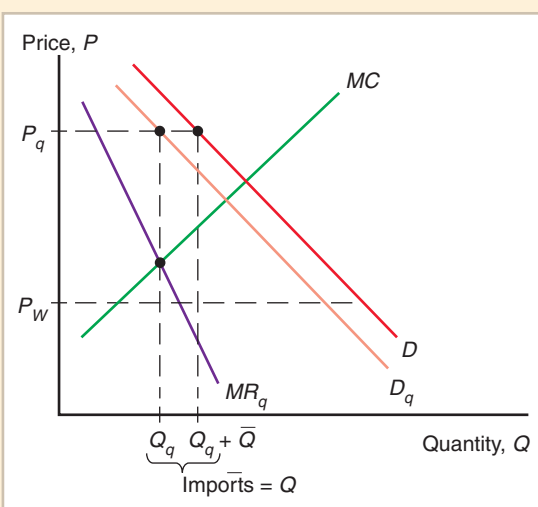
The tariff allows the monopolist to raise its price, but the price is still limited by the threat of imports.



⁶There is one case in which a tariff will have different effects on a monopolistic industry than on a perfectly competitive one. This is the case where a tariff is so high that imports are completely eliminated (a prohibitive tariff). For a competitive industry, once imports have been eliminated, any further increase in the tariff has no effect. A monopolist, however, will be forced to limit its price by the *threat* of imports even if actual imports are zero. Thus an increase in a prohibitive tariff will allow a monopolist to raise its price closer to the profit-maximizing price P_M .

Figure 9A-3**A Monopolist Protected by an Import Quota**

The monopolist is now free to raise prices, knowing that the domestic price of imports will rise too.

**The Model with an Import Quota**

Suppose the government imposes a limit on imports, restricting their quantity to a fixed level \bar{Q} . Then the monopolist knows that when it charges a price above P_W , it will not lose all its sales. Instead, it will sell whatever domestic demand is at that price, minus the allowed imports \bar{Q} . Thus the demand facing the monopolist will be domestic demand less allowed imports. We define the post-quota demand curve as D_q ; it is parallel to the domestic demand curve D but shifted \bar{Q} units to the left (Figure 9A-3).

Corresponding to D_q is a new marginal revenue curve MR_q . The firm protected by an import quota maximizes profit by setting marginal cost equal to this new marginal revenue, producing Q_q and charging the price P_q . (The license to import one unit of the good will therefore yield a rent of $P_q - P_W$)

Comparing a Tariff and a Quota

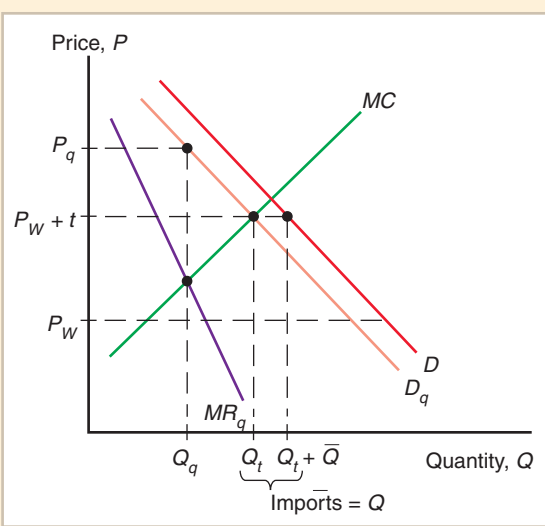
We now ask how the effects of a tariff and a quota compare. To do this, we compare a tariff and a quota that lead to the same level of imports (Figure 9A-4). The tariff level t leads to a level of imports \bar{Q} ; we therefore ask what would happen if instead of a tariff, the government simply limited imports to \bar{Q} .

We see from the figure that the results are not the same. The tariff leads to domestic production of Q_t and a domestic price of $P_W + t$. The quota leads to a lower level of domestic production, Q_q , and a higher price, P_q . When protected by a tariff, the monopolistic domestic industry behaves as if it were perfectly competitive; when protected by a quota, it clearly does not.

The reason for this difference is that an import quota creates more monopoly power than a tariff. When monopolistic industries are protected by tariffs, domestic firms know that if they raise their prices too high, they will still be undercut by imports. An import quota, on the other hand, provides absolute protection: No matter how high the domestic price, imports cannot exceed the quota level.

Figure 9A-4**Comparing a Tariff and a Quota**

A quota leads to lower domestic output and a higher price than a tariff that yields the same level of imports.



This comparison seems to say that if governments are concerned about domestic monopoly power, they should prefer tariffs to quotas as instruments of trade policy. In fact, however, protection has increasingly drifted away from tariffs toward nontariff barriers, including import quotas. To explain this, we need to look at considerations other than economic efficiency that motivate governments.