

Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

ECON 243 – International Trade

Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

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Questions to Consider

1. Why do governments sometimes apply a tariff on imported goods?
2. Why does the World Trade Organization try to reduce the use of tariffs?
3. If the quantity of imports is restricted by a quota, how is that different from using a tariff?

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Introduction

- During the U.S. presidential campaign of 2016, the Republican candidate Donald Trump said that he would apply a 45% tariff against imports from China.
- President Trump did impose significant import tariffs on China in 2018–19.
- The import tariff is an example of a trade policy, a government action meant to influence the amount of international trade.
- Import tariffs are sometimes used for political and not economic reasons. This is called the political economy of tariffs.
- Because the gains from trade are unevenly spread, industries and labor unions often feel that the government should do something to help limit their losses (or maximize their gains) from international trade.
- That “something” is trade policy, which includes the use of import tariffs (taxes on imports), import quotas (quantity limits on imports), and export subsidies.

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Introduction

- In this chapter, we begin our investigation of trade policies by focusing on the effects of tariffs and quotas in a perfectly competitive industry.
- This chapter examines first the most commonly used trade policy, the tariff. We explain the reasons why countries apply tariffs and the effects of these tariffs on the producers and consumers in the importing and exporting countries.
- The chapter then examines the use of an import quota, which is a limit on the quantity of a good that can be imported from a foreign country. Like a tariff, an import quota often imposes a cost on the importing country, a cost that is sometimes greater than the cost of tariffs.

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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

A Brief History of the World Trade Organization

- After World War II, the Allied countries met to discuss issues such as high trade barriers and unstable exchange rates.
- In 1947 the General Agreement on Tariffs and Trade (GATT) was established to reduce barriers to trade between nations.
- Some of the GATT's main provisions are as follows:
 1. A nation must extend the same tariffs to all trading partners that are GATT members.
 2. Tariffs may be imposed in response to unfair trade practices such as dumping. "Dumping" is defined as the sale of export goods at a price less than that charged at home, or at a price less than costs of production and shipping. We will look at more closely in Chapter 9.

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A Brief History of the World Trade Organization

Some of the GATT's main provisions are as follows:

3. Countries should not limit the quantity of goods and services that they import.
4. Countries should declare export subsidies provided to particular firms, sectors, or industries. Article XVI deals with export subsidies and states that countries should notify each other of the extent of subsidies and discuss the possibility of eliminating them.
5. Countries can temporarily raise tariffs for certain products. Article XIX, called the safeguard provision or the escape clause, is our focus in this chapter.

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A Brief History of the World Trade Organization

Some of the GATT's main provisions are as follows:

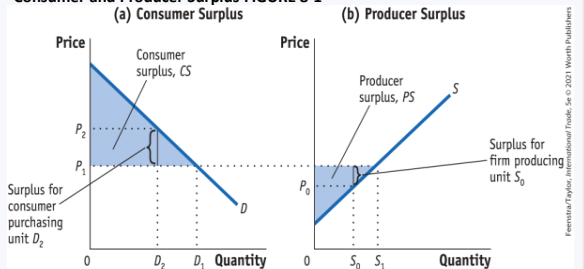
6. Regional trade agreements are permitted under Article XXIV of the GATT. The GATT recognizes the ability of blocs of countries to form two types of regional trade agreements:
 - i. Free-trade areas, in which a group of countries voluntarily agree to remove trade barriers between themselves
 - ii. Customs unions, which are free-trade areas in which the countries also adopt identical tariffs between themselves and the rest of the world

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The Gains from Trade

Consumer and Producer Surplus FIGURE 8-1



In panel (a), the consumer surplus from purchasing quantity D_1 at price P_1 is the area below the demand curve and above that price. The consumer who purchases D_2 is willing to pay price P_2 but has to pay only P_1 . The difference is the consumer surplus and represents the satisfaction of consumers over and above the amount paid.

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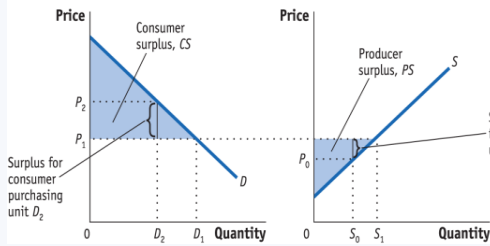
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The Gains from Trade

Consumer and Producer Surplus FIGURE 8-1

(a) Consumer Surplus

(b) Producer Surplus



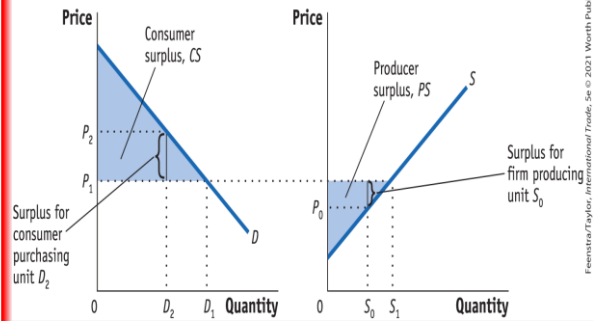
In panel (b), the producer surplus from supplying the quantity S_1 at the price P_1 is the area above the supply curve and below that price. The supplier who supplies unit S_0 has marginal costs of P_0 but sells it for P_1 . The difference is the producer surplus and represents the return to fixed factors of production in the industry

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A Closer Look

(a) Consumer Surplus

(b) Producer Surplus



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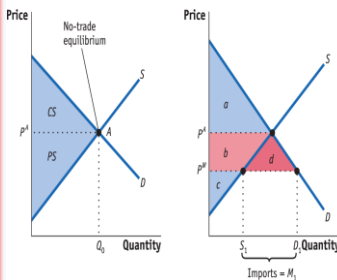
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The Gains from Trade

Home Welfare - No Trade, Free Trade for a Small Country, Gains from Trade FIGURE 8-2

(a) No Trade

(b) Free Trade



The Gains from Free Trade in Home With Home demand of D and supply of S , the no-trade equilibrium is at point A, at the price P^A producing Q_0 .

With trade, the world price is P^W , so quantity demanded increases to D_1 and quantity supplied falls to S_1 . Since quantity demanded exceeds quantity supplied, Home imports $D_1 - S_1$.

Consumer surplus increases by the area $(b + d)$, and producer surplus falls by area b .

The gains from trade are measured by area d .

Rise in consumer surplus: $+(b + d)$
Fall in producer surplus: $-b$
Net effect on Home welfare: $+d$

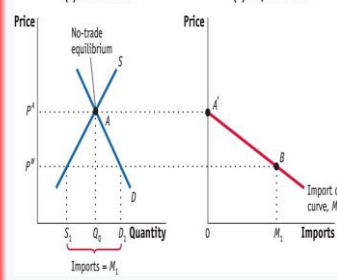
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The Gains from Trade

Home Import Demand Curve - FIGURE 8-3

(a) Home Market

(b) Import Market



Home Import Demand
With Home demand of D and supply of S , the no-trade equilibrium is at point A, with the price P^A and import quantity Q_0 .

Import demand at this price is zero, as shown by the point A' in panel (b).

At a lower world price of P^W , import demand is $M_1 = D_1 - S_1$, as shown by point B.

Joining up all points between A' and B, we obtain the import demand curve, M .

The import demand curve shows the relationship between the world price of a good and the quantity of imports demanded by Home consumers.

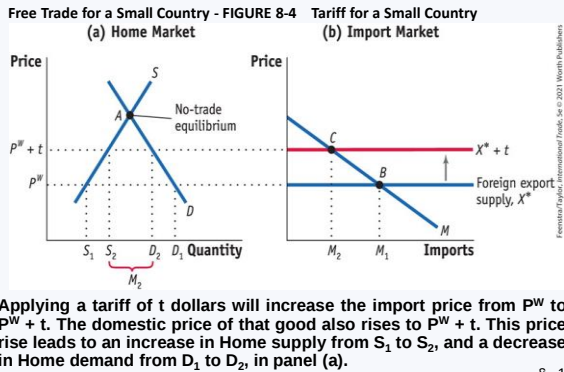
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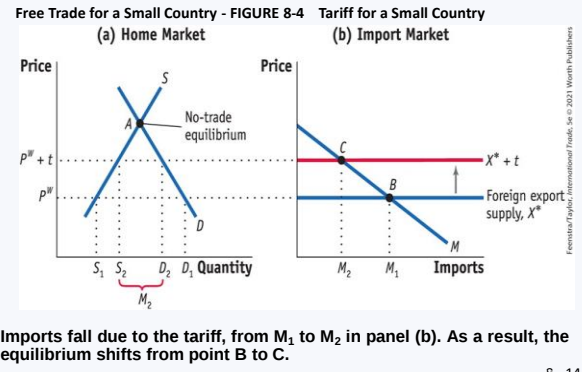
Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

Import Tariffs for a Small Country



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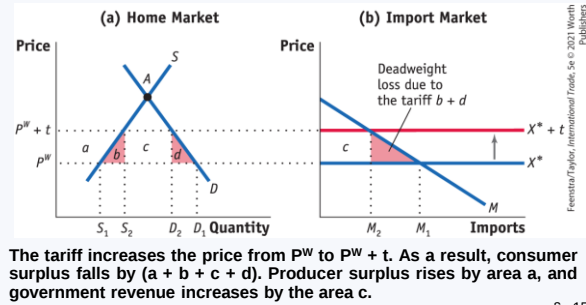
Import Tariffs for a Small Country



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Import Tariffs for a Small Country

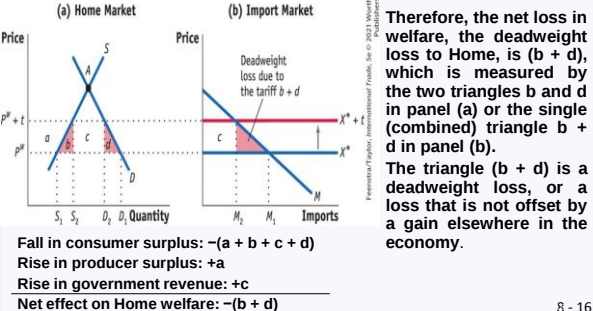
Effect of the Tariff on Consumer Surplus, Producer Surplus, Government Revenue; Overall Effect of the Tariff on Welfare; Production Loss; Consumption Loss - FIGURE 8-5



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Import Tariffs for a Small Country

Effect of the Tariff on Consumer Surplus, Producer Surplus, Government Revenue; Overall Effect of the Tariff on Welfare; Production Loss; Consumption Loss - FIGURE 8-5



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Import Tariffs for a Small Country

Effect of the Tariff on Consumer Surplus, Producer Surplus, Government Revenue; Overall Effect of the Tariff on Welfare; Production Loss; Consumption Loss

The deadweight loss, triangles (b + d), has the following interpretation:

- The triangle b equals the increase in marginal costs for the extra units produced and can be interpreted as the production loss (or the efficiency loss) due to producing at marginal cost above the world price.

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Import Tariffs for a Small Country

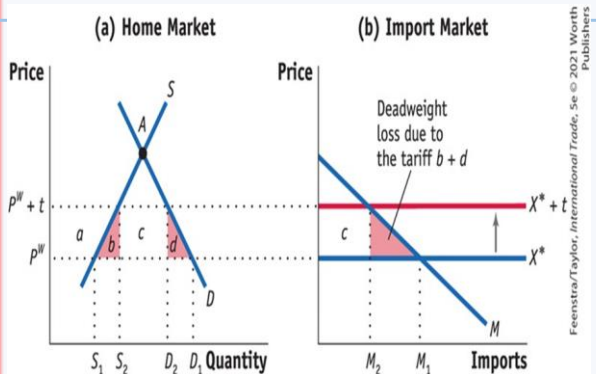
Effect of the Tariff on Consumer Surplus, Producer Surplus, Government Revenue; Overall Effect of the Tariff on Welfare; Production Loss; Consumption Loss

- The triangle d can be interpreted as the drop in consumer surplus for those individuals who are no longer able to consume the units between D_1 and D_2 because of the higher price. We refer to this drop in consumer surplus as the consumption loss for the economy.
- The area c is the tax revenue collected by the government.

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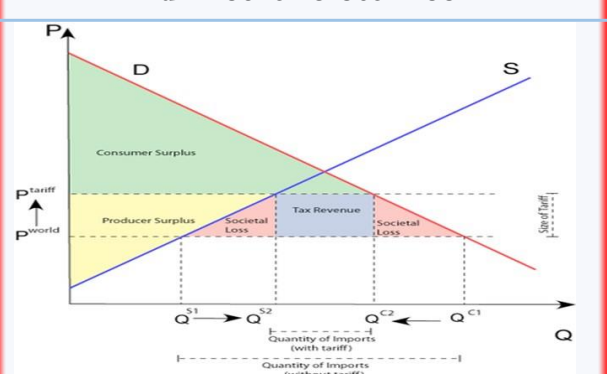
A Closer Look



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And Another Closer Look



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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

APPLICATION: U.S. Tariffs on Steel, 2002-03

TABLE 8-1
U.S. Recommended and Actual Tariffs for Steel Shown here are the tariffs recommended by the U.S. International Trade Commission for steel imports in 2002, and the actual tariffs that were applied in 2002.

Product Category	Tariff Recommended by the U.S. ITC (for 2002, %)	Actual U.S. Tariff (used in 2002, %)
Carbon and Alloy Flat Products		
Slab	20	30
Flat products	20	30
Carbon and Alloy Long Products		
Hot-rolled bar	20	30
Cold-finished bar	20	30
Rebar	10	15
Alloy fittings and flanges	13	13
Stainless and Tool Steel Products		
Stainless steel bar	15	15

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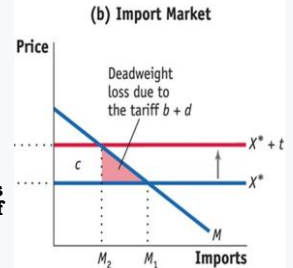
APPLICATION: U.S. Tariffs on Steel, 2002-03

Deadweight Loss Due to the Steel Tariff

$$DWL = \frac{1}{2} \cdot t \cdot \Delta M$$

The deadweight loss relative to the value of imports equals:

$$\frac{DWL}{P^W \cdot M} = \frac{1}{2} \cdot \frac{t}{P^W \cdot M} = \frac{1}{2} \cdot \left(\frac{t}{P^W} \right) \cdot \% \Delta M$$



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APPLICATION: U.S. and Foreign Tariffs Under President Trump, 2018-19

TABLE 8-3
Welfare Impact of 2018 and 2019 U.S. Tariffs Panel (a) shows the welfare impact of the 2018 U.S. tariffs, and the initial 10% tariffs applied to \$200 billion of U.S. imports from China in September 2018. Panel (b) extends those results to include the increase in the U.S. tariffs on China during 2019.

	(1)	(2)	(3)
	Consumer Loss from Higher Import Prices	Tariff Revenue	Deadweight Loss
Annual cost (\$ billions)	52.8	36.0	16.8
Annual cost per household (\$)	414	282	132

	(1)	(2)	(3)
	Consumer Loss from Higher Import Prices	Tariff Revenue	Deadweight Loss
Annual cost (\$ billions)	106	26.9	79.1
Annual cost per household (\$)	831	211	620

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APPLICATION: The Political Economy of Tariffs

- If a tariff always leads to a deadweight loss of a small importing country, why then do the United States and many other countries use tariffs as part of their trade policies?
- **Politics.** The tariff benefits Home producers, so if the government cares more about the producer surplus than consumer surplus, it might decide to use the tariff despite the deadweight loss and consumer costs.
- Because benefits are concentrated and costs are spread more thinly and widely across the country, the industry has the greater political power to persuade the government to use the tariffs.

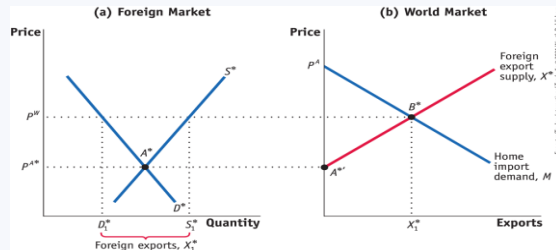
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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

Import Tariffs for a Large Country

Foreign Export Supply - FIGURE 8-6



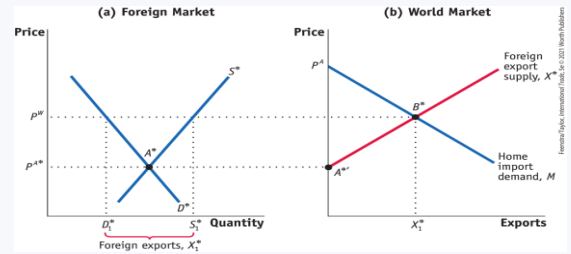
In panel (a), with Foreign demand of D^* and Foreign supply of S^* , the no-trade equilibrium in Foreign is at point A^* , with the price of P^{A^*} . At this price, the Foreign market is in equilibrium and Foreign exports are zero—point A^* in panel (a) and point A'' in panel (b), respectively.

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Import Tariffs for a Large Country

Foreign Export Supply - FIGURE 8-6



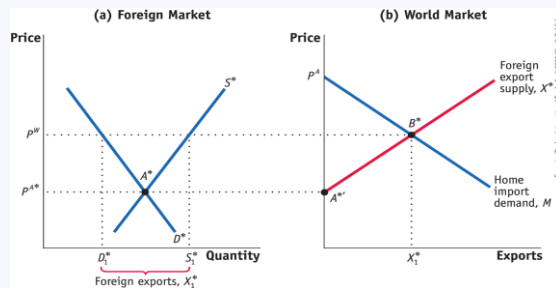
When the world price, P^W , is higher than Foreign's no-trade price, the quantity supplied by Foreign, S_1^* , exceeds the quantity demanded by Foreign, D_1^* , and Foreign exports $X_1^* = S_1^* - D_1^*$. In panel (b), joining up points A'' and B^* , we obtain the upward-sloping export supply curve X^* .

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Import Tariffs for a Large Country

Foreign Export Supply - FIGURE 8-6



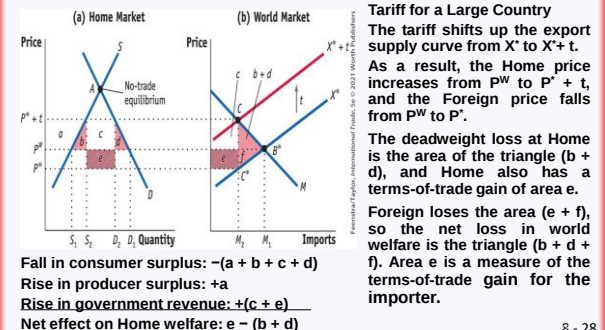
With the Home import demand of M , the world equilibrium is at point B^* , with the price P^W .

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Import Tariffs for a Large Country

Effect of the Tariff on Terms of Trade, Home's Welfare, Foreign and World Welfare - FIGURE 8-7

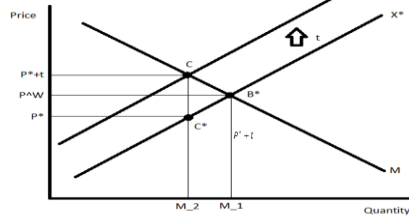


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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

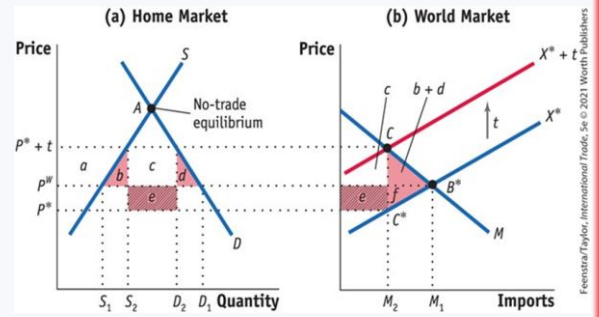
A Closer Look



- Note that the increase in the price due to the tariff (the vertical distance between $P^* + t$ and P^W) is less than the amount of the tariff.
- This implies that the burden of the tariff is incurred not only by consumers at Home but also by Foreign exporters.
- The price received by the Foreign exporters, P^* , is obtained by subtracting the tariff from the new Home price.
- Because P^* is less than P the price Foreign exporters receive has fallen due to the tariff.

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And Another Closer Look



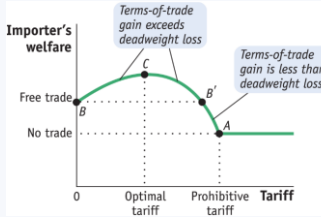
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Import Tariffs for a Large Country

Foreign Export Supply - Optimal Tariff for a Large Importing Country

FIGURE 8-8



Optimal Tariff Formula The formula depends on the elasticity of Foreign export supply, which we call E_X^* :

Tariffs and Welfare for a Large Country For a large importing country, a tariff initially increases the importer's welfare because the terms-of-trade gain exceeds the deadweight loss. So the importer's welfare rises from point B. Welfare continues to rise until the tariff is at its optimal level (point C). After that, welfare falls. If the tariff is too large (greater than at B'), then welfare will fall below the free-trade level. For a prohibitive tariff, with no imports at all, the importer's welfare will be at the no-trade level, at point A.

$$\text{Optimal tariff} = \frac{1}{E_X^*}$$

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APPLICATION: U.S. Tariffs on Steel Once Again

Optimal Tariffs for Steel

TABLE 8-4

Optimal Tariffs for Steel Products This table shows optimal tariffs for steel products, calculated with the elasticity formula, as compared to actual tariffs used on U.S. steel imports 2002-03 and 2018-19.

(1) Product Category	(2) Elasticity of Export Supply	(3) Optimal Tariff (%)	(4) Actual Tariff (%) 2002-03	(5) Actual Product Tariff (%) 2018-19
Alloy steel flat-rolled products	0.27	370	30	25
Iron and steel rails and railway track	0.80	125	0	25
Iron and steel bars, rods, angles, shapes	0.80	125	15-30	25
Ferrous waste and scrap	17	6	0	25
Iron and steel tubes, pipes, and fittings	90	1	13-15	25

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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

APPLICATION: U.S. and Foreign Tariffs Under President Trump Once Again

TABLE 8-5

Welfare Impact of 2018 U.S. and Foreign Tariffs, with Terms-of-Trade Effects
This table shows the welfare impact of the 2018 tariffs on U.S. imports and of the foreign retaliatory tariffs on U.S. exports. These estimates treat the United States as a large country because it can influence export prices.

	(1)	(2)	(3)	(4)
	Consumer Loss from Higher Import Prices	Tariff Revenue	Terms-of-Trade Gain	Net Loss
Annual cost (\$ billions)	68.8	39.4	21.6	7.8
Annual cost per household (\$ billions)	539	309	169	61

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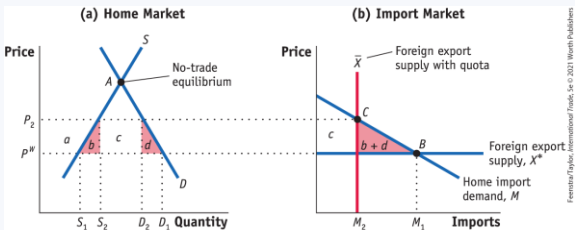
Import Quotas

- On January 1, 2005, China was poised to become the world's largest exporter of textiles and apparel. On that date, a system of worldwide import quotas known as the Multifibre Arrangement (MFA) was abolished.
- Besides the MFA, there are other examples of import quotas.
- For example, since 1993 Europe had a quota on the imports of bananas that allowed for a greater number of bananas to enter from its former colonies in Africa than from Latin America. This was converted to a tariff in 2005, which was reduced in 2009, ending this "banana war."
- Another example is the quota on U.S. imports of cars from Japan, which began in 1981 and lasted through much of the 1980's.

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Import Quotas

Import Quota in a Small Country - Free-Trade Equilibrium, Effect of the Quota, Effect on Welfare - FIGURE 8-9

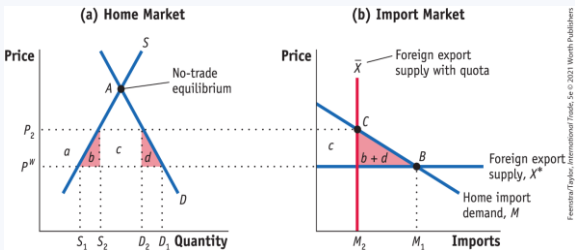


Quota for a Small Country Under free trade, the Foreign export supply curve is horizontal at the world price P^w , and the free-trade equilibrium is at point B with imports of M_1 . Applying an import quota of $M_2 < M_1$ leads to the vertical export supply curve $\bar{X}$ —with the equilibrium at point C. The quota increases the import price from P^w to P_2 . There would be the same impact on price and quantities if instead of the quota, a tariff of $t = P_2 - P^w$ had been used.

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Import Quotas

Import Quota in a Small Country - Free-Trade Equilibrium, Effect of the Quota, Effect on Welfare - FIGURE 8-9



- The quota and tariff differ in terms of area c in Figure 8-9, which would be collected as government revenue under a tariff.
- Under the quota, this area equals the difference between the domestic price P_2 and the world price P^w , times the quantity of imports M_2 .

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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

Import Quotas

Import Quota in a Small Country

- Whoever is actually importing the good will be able to earn the difference between the world price P^W and the higher Home price P_2 by selling the imports in the Home market.
- We call the difference between these two prices the rent associated with the quota, and hence the area c represents the total quota rents.
- Next we examine the four possible ways that these quota rents can be allocated.

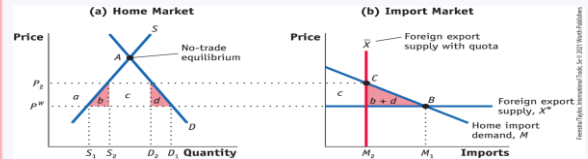
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Import Quotas

Import Quota in a Small Country

1. Giving the Quota to Home Firms

Quota licenses (i.e., permits to import the quantity allowed under the quota system) can be given to Home firms: With home firms earning the rents c , the net effect of the quota on Home welfare is



Fall in consumer surplus: $-(a + b + c + d)$

Rise in producer surplus: $+a$

Quota rents earned at Home $+c$

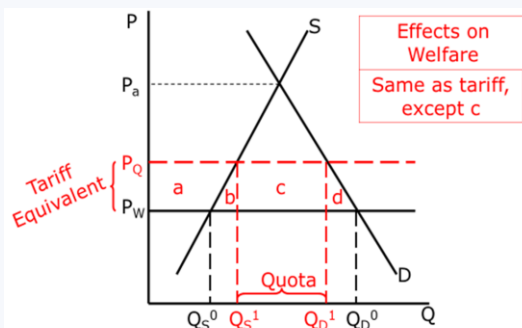
Net effect on Home welfare: $-(b + d)$

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Tariff Versus Quota: Small Country



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Import Quotas

Import Quota in a Small Country

2. Rent Seeking

If licenses for imported chemicals, for example, are allocated in proportion to each firm's production of batteries in the previous years, then the Home firms will likely produce more batteries than they can sell (and at lower quality) just to obtain the import licenses for the following year.

Alternatively, firms might engage in bribery or other lobbying activities to obtain the licenses.

These kinds of inefficient activities done to obtain quota licenses are called rent seeking. If rent seeking occurs, the welfare loss due to the quota will be

Fall in consumer surplus: $-(a + b + c + d)$

Rise in producer surplus: $+a$

Net effect on Home welfare: $-(b + c + d)$

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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

Import Quotas

Import Quota in a Small Country

3. Auctioning the Quota

A third possibility for allocating the rents that come from the quota is for the government of the importing country to auction off the quota licenses.

In a well-organized, competitive auction, the revenue collected should exactly equal the value of the rents, so that area c would be earned by the Home government.

Using the auction method to allocate quota rents, the net loss in domestic welfare due to the quota becomes

Fall in consumer surplus: $-(a + b + c + d)$

Rise in producer surplus: $+a$

Auction revenue earned in Home: $+c$

Net effect on Home welfare: $-(b + d)$

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Import Quotas

Import Quota in a Small Country

4. "Voluntary" Export Restraint

The final possibility for allocating quota rents is for the government of the importing country to give authority for implementing the quota to the government of the exporting country.

Because the exporting country allocates the quota among its own producers, this is sometimes called a "voluntary" export restraint (VER), or a "voluntary" restraint agreement (VRA).

In the 1980s the United States used this type of arrangement to restrict Japanese automobile imports.

In this case, the quota rents are earned by foreign producers, so the loss in Home welfare equals

Fall in consumer surplus: $-(a + b + c + d)$

Rise in producer surplus: $+a$

Net effect on Home welfare: $-(b + c + d)$

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Import Quotas

Import Quota in a Small Country - Costs of Import Quotas in the United States

TABLE 8-6

Annual Cost of U.S. Import Protection (\$ billions) Shown here are estimates of the deadweight losses and quota rents due to U.S. import quotas in the 1980s, for the years around 1985. Many of these quotas are no longer in place today.

	U.S. Deadweight Loss (area $b + d$)	Quota Rents (area c)
Automobiles	0.2-1.2	2.2-7.9
Dairy	1.4	0.25*
Steel	0.1-0.3	0.7-2.0
Sugar	0.1	0.4-1.3
Textiles and apparel	4.9-5.9	4.0-6.1
Import tariffs	1.2-3.4	0
Total	7.9-12.3	7.3-17.3

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Conclusions

- For a large country, when we add up the drop in consumer surplus, the gain in producer surplus, and the government revenue collected, it is possible for a small tariff to generate welfare gains for the importing country.
- However, in this case, any gain for the importer comes at the expense of the foreign exporters. The drop in the exporter's welfare due to the tariff is greater than the gain in the importer's welfare. Therefore, the world loses overall because of the tariff.
- Under perfect competition, the effect of applying an import quota is similar to the effect of applying an import tariff; they both lead to an increase in the domestic price in the importing country, with a loss for consumers and a gain for producers.
- Quota rents are the gain to whoever can bring in the import.

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Chapter 8 - Import Tariffs and Quotas Under Perfect Competition

KEY POINTS

1. The government of a country can use laws and regulations, called "trade policies," to affect international trade flows. An import tariff, which is a tax at the border, is the most commonly used trade policy.
2. The rules governing trade policies in most countries are outlined by the General Agreement on Tariffs and Trade (GATT), an international legal convention adopted after World War II to promote increased international trade. Since 1995 the new name for the GATT is the World Trade Organization (WTO).
3. In a small country, the quantity of imports demanded is assumed to be very small compared with the total world market. For this reason, the importer faces a fixed world price. In that case, the price faced by consumers and producers in the importing country will rise by the full amount of the tariff.

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KEY POINTS

4. The use of a tariff by a small importing country always leads to a net loss in welfare. We call that loss the "deadweight loss."
5. In a large country, the decrease in imports demanded due to the tariff causes foreign exporters to lower their prices. Consumer and producer prices in the importing country still go up, since these prices include the tariff, but they rise by less than the full amount of the tariff (since the exporter price falls).
6. The use of a tariff for a large country can lead to a net gain in welfare because the price charged by the exporter has fallen; this is a terms-of-trade gain for the importer.

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KEY POINTS

7. The "optimal tariff" is the tariff amount that maximizes welfare for the importer. For a small country, the optimal tariff is zero since any tariff leads to a net loss. For a large country, however, the optimal tariff is positive.
8. The formula for the optimal tariff states that it depends inversely on the foreign export supply elasticity. If the foreign export supply elasticity is high, then the optimal tariff is low, but if the foreign export supply elasticity is low, then the optimal tariff is high.
9. Import quotas restrict the quantity of a particular import, thereby increasing the domestic price, increasing domestic production, and creating a benefit for those who are allowed to import the quantity allotted. These benefits are called "quota rents."

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KEY POINTS

10. Assuming perfectly competitive markets for goods, quotas are similar to tariffs since the restriction in the amount imported leads to a higher domestic price. However, the welfare implications of quotas are different from those of tariffs depending on who earns the quota rents. These rents might be earned by firms in the importing country (if they have the licenses to import the good), or by firms in the exporting country (if the foreign government administers the quota), or by the government in the importing country (if it auctions off the quota licenses). The last case is most similar to a tariff since the importing government earns the revenue.

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