

International Trade

8. Import Tariffs and Quotas under Perfect Competition

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1. Introduction

- Gains from trade are unevenly distributed, so producers often feel government should help them limit losses due to competition from trade.
- Trade policy can include the use of import tariffs (taxes on imports), import quotas (limits on imports), and other non-tariff measures.
- Examples of other non-tariff trade policies:
 - export subsidies and export credit subsidies;
 - local content requirements;
 - price and earnings restrictions;
 - national procurement (purchases by government directed towards domestic goods).

1. Introduction

- This chapter will focus on the use of tariffs and quotas as trade policy.
 - The tariff is the most commonly used trade policy.
 - Import quotas can have similar costs to tariffs, but costs can also be greater.
- The international governing body, the World Trade Organization (WTO), acts as a forum for trade issues between countries.
- Given the potentially greater costs of quotas, they have been greatly reduced under the WTO.

1. Introduction

- We will assume that firms are perfectly competitive. They produce a homogeneous good and are small compared to the market.
- Under perfect competition, each firm is a price-taker in its market.

2. The WTO

- After WWII, representatives of 44 countries met in Bretton Woods, NH, to discuss rebuilding of Europe and issues of high trade barriers and unstable exchange rates.
- Outcome was agreement outlining international system of free trade, convertible currencies, and fixed exchange rates.
- As part of Bretton Woods Agreement, the General Agreement on Tariffs and Trade (GATT) was established in 1947 to reduce barriers to trade between nations.

2. The WTO

- Under GATT, countries met periodically to negotiate lower trade barriers between them.
- Each meeting named for location where it took place; at Uruguay Round, WTO was founded (1995).
- The WTO greatly expanded GATT by adding rules that govern large set of global interactions through binding agreements.
- Most recent round of the WTO is the Doha Round, in Doha, Qatar, which began in November 2001.

2. The WTO

- Some Articles of GATT which still govern trade in WTO:
 1. A nation must extend the same tariffs to all trading partners that are WTO members. This is the “most favored nation” clause.
 2. Tariffs may be imposed in response to unfair trade practices such as dumping.
 3. Countries should not limit the quantity of goods and services that they import. Article XI states that countries should not maintain quotas against imports.
 4. Countries should declare export subsidies provided to particular firms, sectors, or industries.

2. The WTO

5. Countries can temporarily raise tariffs for certain products. Article XIX is called the **safeguard provision** or **escape clause** and is focus in this chapter.
 - ◆ Importing country can temporarily raise a tariff when domestic producers are suffering due to import competition.
 - Example: European governments strenuously objected to U.S. steel tariffs in 2002-03, and filed complaint against U.S. with WTO.

2. The WTO

- A panel at the WTO ruled in favor of the European countries, entitling them to retaliate by placing tariffs of their own on \$2.2 billion worth of U.S. exports.
- This led President Bush to remove the steel tariffs in December 2003.

6. Regional trade agreements are permitted under Articles XXIV of the GATT

- ◆ Free trade areas
- ◆ Customs unions

3. Gains from Trade

- Demonstrate gains from trade using Home demand and supply curves, together with the concepts of **consumer surplus** and **producer surplus**.
- Consumer and Producer Surplus
 - Figure 8.1 (a) shows Home demand curve D where consumers face price P_1 .
 - A person buying unit D_2 is willing to pay P_2 , but only has to pay P_1 .
 - The individual obtains a surplus of $(P_2 - P_1)$ from being able to purchase the good for less than their willingness to pay.

3. Gains from Trade

- Consumer and Producer Surplus (cont'd)
 - For each unit before D_1 , consumer's value exceeds purchase price of P_1 .
 - Adding up surplus obtained on each unit purchased from zero to D_1 gives total surplus.
 - Consumer surplus is shaded region between demand curve and market price, up to total quantity purchased, D_1 in this case.

3. Gains from Trade

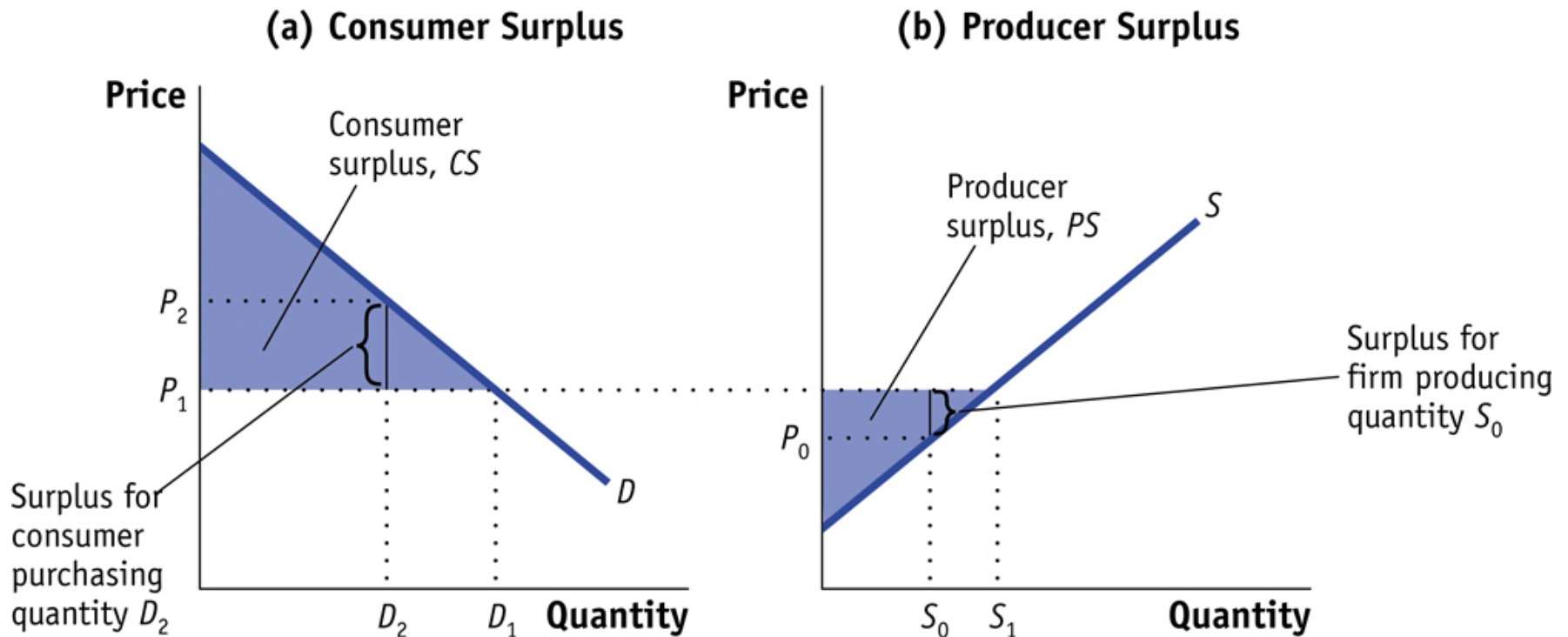


Figure 8.1 Consumer and producer surplus

3. Gains from Trade

- Consumer and Producer Surplus (cont'd)
 - Part (b) of Figure 8.1 illustrates producer surplus.
 - At the price of P_1 , the industry will supply S_1 .
 - Supply curve represents firm's marginal cost of production → firm supplying unit S_0 could produce it with marginal cost of P_0 , but is able to sell it for P_1 .
 - This gives the firm a surplus of $(P_1 - P_0)$.

3. Gains from Trade

- Consumer and Producer Surplus (cont'd)
 - For each unit sold before S_1 , the marginal cost to the firm is less than the sale price of P_1 .
 - Adding up individual surpluses we get the total producer surplus (PS).
 - Producer surplus is the area above the supply curve to the price received, up to the quantity sold.
 - We can also refer to PS as the return to fixed factors of production in the industry, and can loosely refer to it as “profit.”

3. Gains from Trade

- Home Welfare
 - Again consider world of two countries, Home and Foreign, with producers and consumers.
 - Total Home welfare can be measured by adding up consumer and producer surplus.
 - Compare welfare in Home in no-trade and free-trade situations.

3. Gains from Trade

- No-Trade equilibrium
 - In Figure 8.2 (a), no-trade equilibrium occurs at autarky price of P^A , where quantity demanded equals quantity supplied at Q_0 .
 - Consumer and producer surplus are shown as the areas defined before. Adding these gives total surplus for Home before trade.

3. Gains from Trade

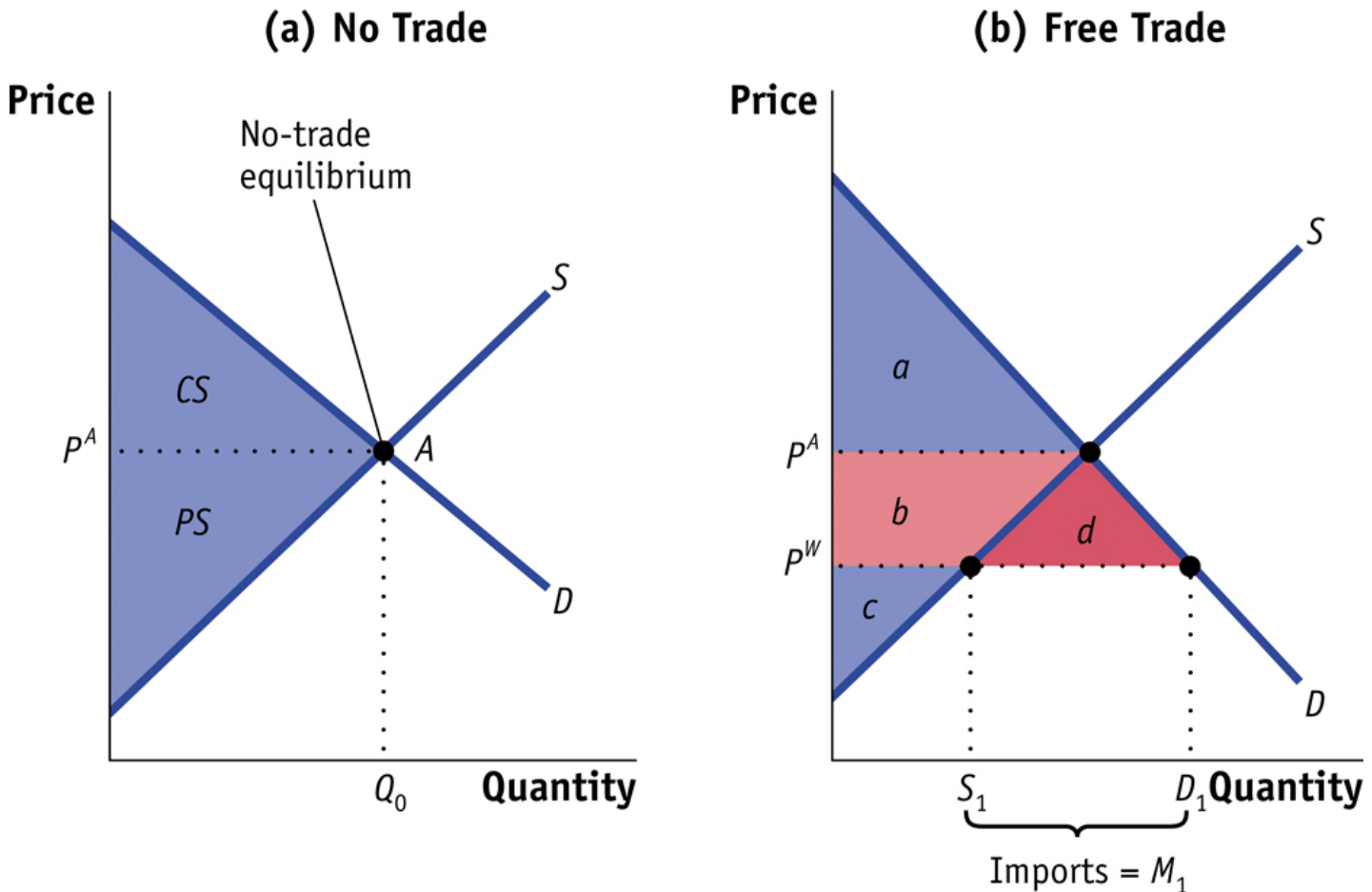


Figure 8.2 The gains from free trade at Home

3. Gains from Trade

Free Trade for a Small Country

- World price P^W is determined by supply and demand in world market (shown in Figure 8.2 (b)).
- Suppose Home is a small open economy (SMOPEC):
 - Price taker in world market; faces fixed price at P^W
- Assume P^W is below Home no-trade price P^A .
- At lower price, Home quantity demanded will increase to D_1 and Home quantity supplied will decrease to S_1 .
- Home will be importer of product at world price.

3. Gains from Trade

- Consumers gain more due to lower prices ($b+d$) than producers lose ($-b$) indicating total Home welfare increased (by d).
- d is a measure of the gains from trade for the importing country due to free trade.
- We can measure this gain directly using the formula for the area of the triangle = $\frac{1}{2} bh$
 - Base gives free-trade imports $M_1 = D_1 - S_1$
 - Height gives change in prices $P^A - P^W$
 - Welfare increase = $\frac{1}{2} (M_1)(P^A - P^W)$

3. Gains from Trade

- Home Import Demand Curve
 - We can derive the import demand curve, shown in Figure 8.3
 - At no-trade equilibrium, there are zero imports
 - Point A' in panel (b).
 - At the world price of P^W , the quantity demanded is greater than quantity supplied, and we import M_1 .
 - Point B in panel (b).
 - Joining A' and B gives import demand curve M .

3. Gains from Trade

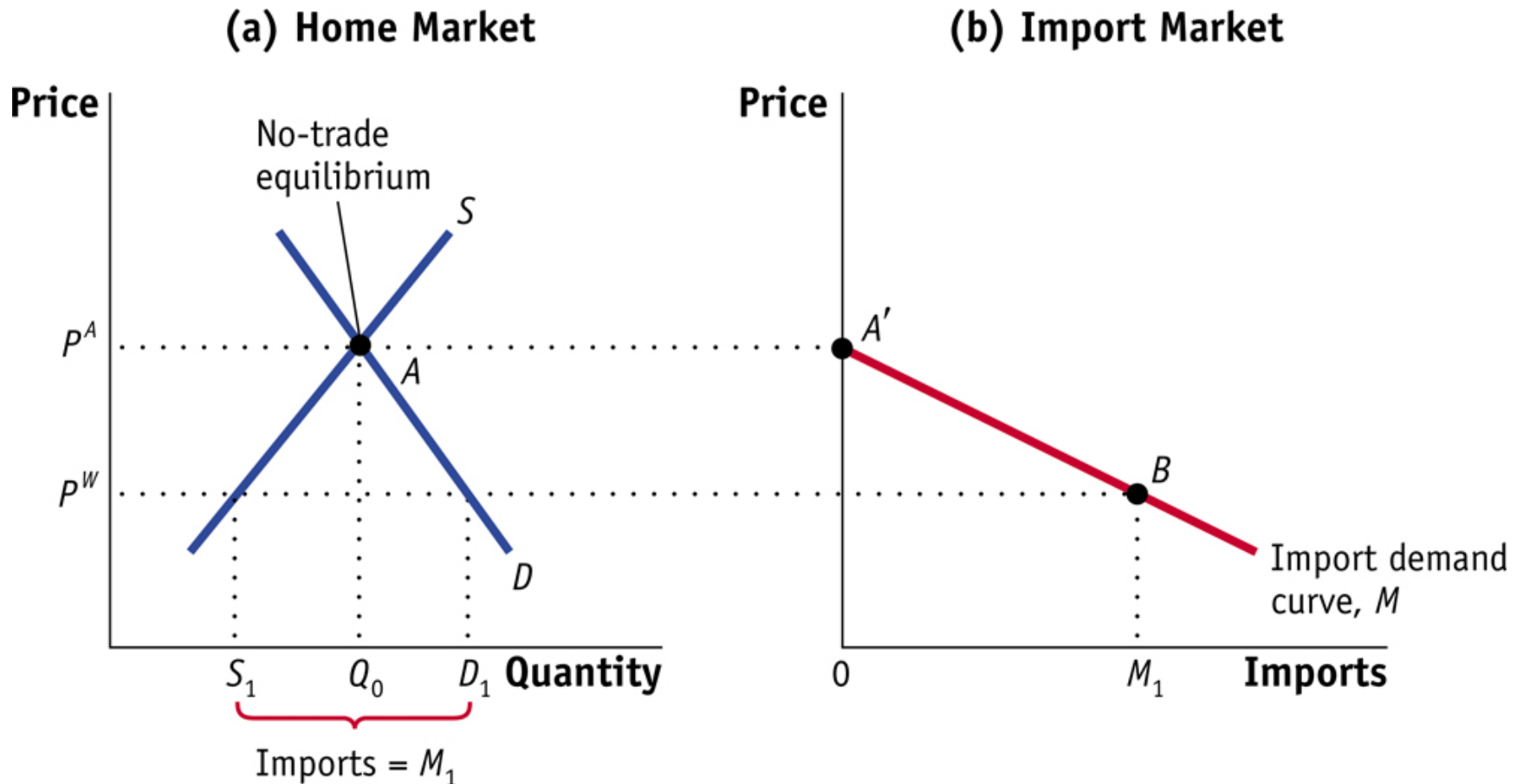


Figure 8.3 Home import demand

4. Import tariffs for a small country

- What happens when a small country imposes a tariff (tariff does not have effect on world price)?
 - Price charged to Home consumers will increase by the amount of the tariff.

Free Trade for a Small Country

- Start with free-trade-equilibrium for Home (in Figure 8.5).
- Foreign export supply curve X^* is horizontal at the world price P^W .
 - Home can import an amount at the price P^W without having an impact on that price.

4. Import tariffs for a small country

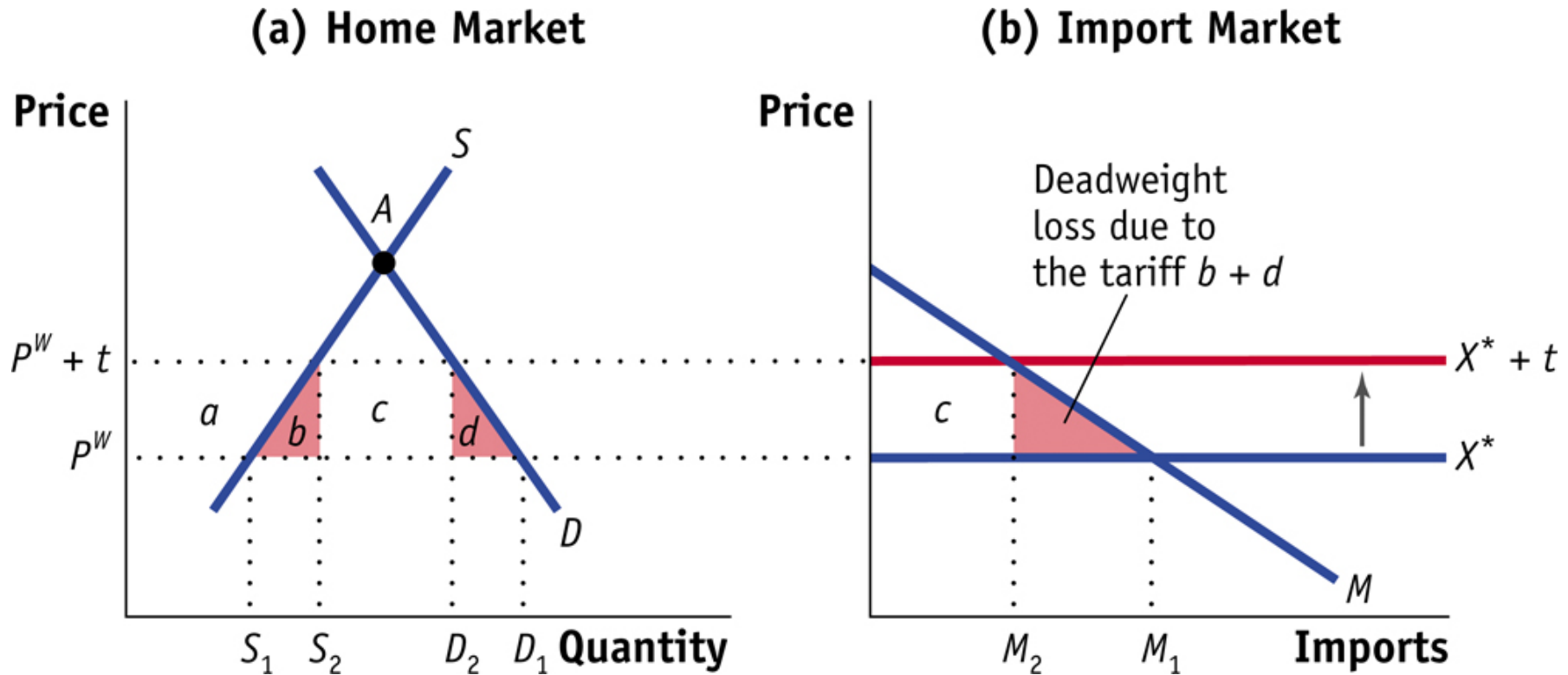


Figure 8.5 Tariff and its effect on welfare for a small country

4. Import tariffs for a small country

- Effect of the Tariff
 - With an import tariff of t dollars (tax on imports or duty), the export supply curve facing Home shifts up by exactly the amount of the tariff.
 - New export supply curve shifts up to X^*+t .
 - New intersection occurs at price of P^W+t and the import quantity of M_2 .
 - Import tariff has reduced amount imported, from M_1 under free trade to M_2 under the tariff.

4. Import tariffs for a small country

- Effect of the Tariff (cont'd)
 - At higher import price, quantity demanded in Home falls and quantity supplied in Home rises from S_1 to S_2 .
 - However, as firms increase quantity produced, marginal costs of production rise.
 - Home price rises along S until firms are supplying quantity S_2 at a MC just equal to the new price, P^W+t .
 - Domestic price will equal import price.

4. Import tariffs for a small country

- Effect of the Tariff (cont'd)
 - Less excess demand, therefore imports fall.
 - Foreign exporters still receive the “net-of-tariff” price, P^W .
 - These changes affect producer and consumer surplus, and overall Home welfare.

4. Import tariffs for a small country

- Effect of the Tariff on Consumer Surplus
 - With the tariff, consumers now pay higher price P^W+t , and their surplus is the area under the demand curve and above the higher price.
 - The fall in consumer surplus due to the tariff is the area in between the two prices and to the left of Home demand, $(a+b+c+d)$ in panel (a) of Figure 8.5.

4. Import tariffs for a small country

- Effect of the Tariff on Producer Surplus
 - With the tariff, producer surplus is the area above the supply and below the higher price, P^W+t .
 - Since the tariff increases Home price, firms can sell more goods, and producer surplus increases.
 - This area, a in Figure 8.5 (a), is amount that Home firms gain due to higher price caused by tariff.
 - Increases in producer surplus can benefit Home workers but at expense of consumers.

4. Import tariffs for a small country

- Effect of the Tariff on Government Revenue
 - In addition to the tariff's impact on consumers and producers, it also affects government revenue.
 - The amount of revenue collected is the tariff t times the quantity of imports ($D_2 - S_2$).
 - In Figure 8.5 (a), the revenue is shown by area c .
 - The collection of revenue is a gain for the government in the importing country.

4. Import tariffs for a small country

- Overall Effect of the Tariff on Welfare
 - Summarize total impact of tariff on welfare of the Home importing country by adding gains and losses for each party.
 - Note, we do not care whether the consumers facing higher prices are rich or poor, and do not care whether the specific factors in the industry earn a lot or a little.
 - Under this approach, transferring one dollar from consumer to producer surplus will have no impact on overall welfare.
 - We are simply evaluating the *efficiency* of the tariff.

4. Import tariffs for a small country

- Overall Effect of the Tariff on Welfare (cont'd)
 - The overall impact of the tariff in the small country can be summarized as follows:

Fall in consumer surplus	$-(a+b+c+d)$
Rise in producer surplus	$+a$
Rise in government revenue	$+c$
<hr/>	
Net effect on Home welfare	$-(b+d)$

- The areas b and d in Figure 8.5 (a) correspond to the triangle $(b+d)$ in Figure 8.5 (b) and give net welfare loss.
 - We refer to this area as a *deadweight loss* – it is not offset by a gain elsewhere in the economy.

4. Import tariffs for a small country

- Overall Effect of the Tariff on Welfare (cont'd)
 - Area a is effectively a transfer from consumers to producers via higher domestic prices induced by tariff.
 - Area c , the gain in government revenue, is a transfer from consumers to the government.
 - The deadweight loss, $(b+d)$, is measured by the two triangles b and d .
 - The two triangles can each be given a precise interpretation.

4. Import tariffs for a small country

- Production Loss (triangle b)
 - The base of b is net increase in Home supply due to the tariff, from $S1$ to $S2$.
 - The height of this triangle is increase in marginal costs due to increase in supply.
 - Marginal costs are greater than world price, so this country is producing the extra supply inefficiently.
 - Fewer resources would be used if imported rather than produced at home.
 - The area of b is the production loss or **efficiency loss** – due to producing at marginal costs above world price.

4. Import tariffs for a small country

- Consumption Loss (triangle d)
 - Due to the tariff, the price increase from P^W to P^W+t reduces quantity consumed at Home from D_1 to D_2 .
 - d gives drop in consumer surplus for those individuals who are no longer able to consume units from D_1 to D_2 because of higher price.
 - We refer to this drop in consumer surplus as the **consumption loss** for the economy.

4.1 Why are tariffs used?

- Finding that tariffs always lead to deadweight losses for small countries explains why most economists are opposed to them.
- Why do so many countries use tariffs?
 - One idea is that developing countries do not have any other source of revenue.
 - Import tariffs are “easy to collect” because every country has customs agents at major ports checking goods crossing borders.
 - However, since tariffs have a higher deadweight loss, we would expect that over time developing countries will shift away from such “easy-to-collect” taxes.

4.1 Why are tariffs used?

- A second reason is politics.
 - If the government cares more about producer surplus than consumer surplus, it could impose the tariff despite the deadweight loss it incurs.
 - The benefits to producers (and their workers) are typically more concentrated on specific firms and regions than the costs to consumers, which are spread nationwide (collective action problem).

4.2 U.S. tariffs on steel

- In 2001, President Bush requested that the U.S. International Trade Commission (ITC) initiate a Section 201 investigation into the steel industry.
 - Section 201 of U.S. Trade Act states that tariffs may be imposed on an imported product if it is being imported in a way that substantially harms U.S. production of the same or a very similar product → escape clause of WTO.
- The ITC determined that the conditions were met and recommended that tariffs be put in place to protect the U.S. steel industry.
- The ITC decision showed it thought that losses from rising imports and falling prices met conditions of “serious injury”.

4.2 U.S. tariffs on steel

- Use small country model from above to calculate a rough estimate of how costly U.S. steel tariffs were in terms of welfare.
- Estimate the deadweight loss due to the U.S. steel tariff in place from March 2002 to December 2003.
- ITC recommended varied tariffs across products, ranging from 10%-20%, shown in Table 8.1, then falling over time to be eliminated after 3 years (according to plan).
- President Bush took recommendation of ITC but applied even higher tariffs, ranging from 8%-30%.

4.2 U.S. tariffs on steel

- Knowing U.S. trade partners would be upset by tariffs, President Bush exempted some countries from tariffs.
 - These included Canada, Mexico, Jordan, and Israel, which all have free trade agreements with U.S., and 100 small developing countries that were exporting only a very small amount of steel to U.S.

4.2 U.S. tariffs on steel

Product Category	U.S. ITC Recommendation (First Year, %)	Actual U.S. Tariff (First Year, %)
<i>Carbon and Alloy Flat Products</i>		
Slab	20	30
Flat products	20	30
Tin mill products	U*	30
<i>Carbon and Alloy Long Products</i>		
Hot-rolled bar	20	30
Cold-finished bar	20	30
Rebar	10	15
<i>Carbon and Alloy Tubular Products</i>		
Tubular products	?**	15
Alloy fittings and flanges	13	13
<i>Stainless and Tool Steel Products</i>		
Stainless steel bar	15	15
Stainless steel rod	?**	15
Stainless steel wire	U*	8

Table 8.1 U.S. ITC recommended and actual tariffs for steel

4.2 U.S. tariffs on steel

Deadweight Loss due to Steel Tariff

- Estimate areas of triangle $b+d$ found in Figure 8.5(b).
- Base is change in imports, ΔM , and height is increase in domestic price, $\Delta P = t$.
- Deadweight loss then equals $DWL = \frac{1}{2} t \Delta M$.
- It is convenient to measure deadweight loss relative to value of imports, which is $P^W \cdot M$.
- We will also use the percentage tariff, t/P^W , and the percentage change in quantity of imports, $\% \Delta M = \Delta M/M$.

4.2 U.S. tariffs on steel

- Using these definitions, deadweight loss relative to value of imports can be rewritten as:

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

- Most commonly used products had tariff of 30%, so percentage increase in the price is $t/P^W = 0.3$, which lead to a decrease in imports of $\% \Delta M = 0.3$.
- This leads to a DWL of:

$$\frac{DWL}{P^W \cdot M} = \frac{1}{2} \left(\frac{t}{P^W} \right) \cdot \% \Delta M = \frac{1}{2} (0.3)(0.3) = 4.5\%$$

4.2 U.S. tariffs on steel

- Value of steel imports affected by tariff was about \$4.7 billion prior to March 2002 and \$3.5 billion after March 2002.
 - Average imports over two years were then \$4.1 billion.
- Applying DWL of 4.5% to average import value of \$4.1 billion, dollar magnitude of deadweight loss is equal to \$185 million.
- This deadweight loss reflects net annual loss to U.S. from applying the tariff.

4.2 U.S. tariffs on steel

Response of the European Countries

- The tariffs on steel most heavily affected Europe, Japan, and South Korea, along with some developing countries.
- European Union therefore took action by bringing case to WTO.
- The WTO has formal dispute settlement procedure, under which countries can bring complaint and have it evaluated.
- The WTO ruled that the U.S. had failed to prove its steel industry had been harmed by imports and therefore did not have the right to impose the tariffs.

4.2 U.S. tariffs on steel

Response of the European Countries (cont'd)

- The WTO ruling entitled the European Union and other countries to retaliate against the U.S. by imposing tariffs of their own against U.S. exports.
- The EU quickly began to draw up a list of products and naturally picked products that would have the greatest impact on the U.S. (among them steel products, oranges and orange juice, and toilet paper).
- The threat of tariffs (and a tariff war) led President Bush to reconsider the U.S. tariffs on steel, and on December 5, 2003, he announced that they would be suspended.

5. Import tariffs for a large country

- Under small country assumption used so far, the importing country is always harmed due to the tariff.
 - The small country is a world price taker.
- If we consider a large enough importing country or a large economy, then its tariff could change world price.
 - Its imports are large enough that it can affect world prices with a change in its imports.

5. Import tariffs for a large country

Foreign Export Supply

- If Home country is large, then Foreign export supply curve X^* is no longer horizontal at world price P^W .
- We need to derive the foreign export supply curve using the Foreign market demand and supply curves.
- Panel (a) of Figure 8.6 shows Foreign demand curve D^* and supply curve S^* , giving price of P^{A^*} at A^* .
 - At this point, Foreign exports are zero.

5. Import tariffs for a large country

Foreign Export Supply (cont'd)

- Suppose the world price is P^W above P^{A*} .
- At the higher price, Foreign quantity demanded is lower at D_1^* , but quantity supplied by foreign firms is higher at S_1^* .
- Foreign excess supply of $X_1^* = S_1^* - D_1^*$, will be exported at the price of P^W at point B^* .
- Connecting A^* and B^* gives the upward sloping Foreign export supply curve, X^* .
- Combining with Home import demand, M , we get an equilibrium at P^W and X_1^* .

5. Import tariffs for a large country

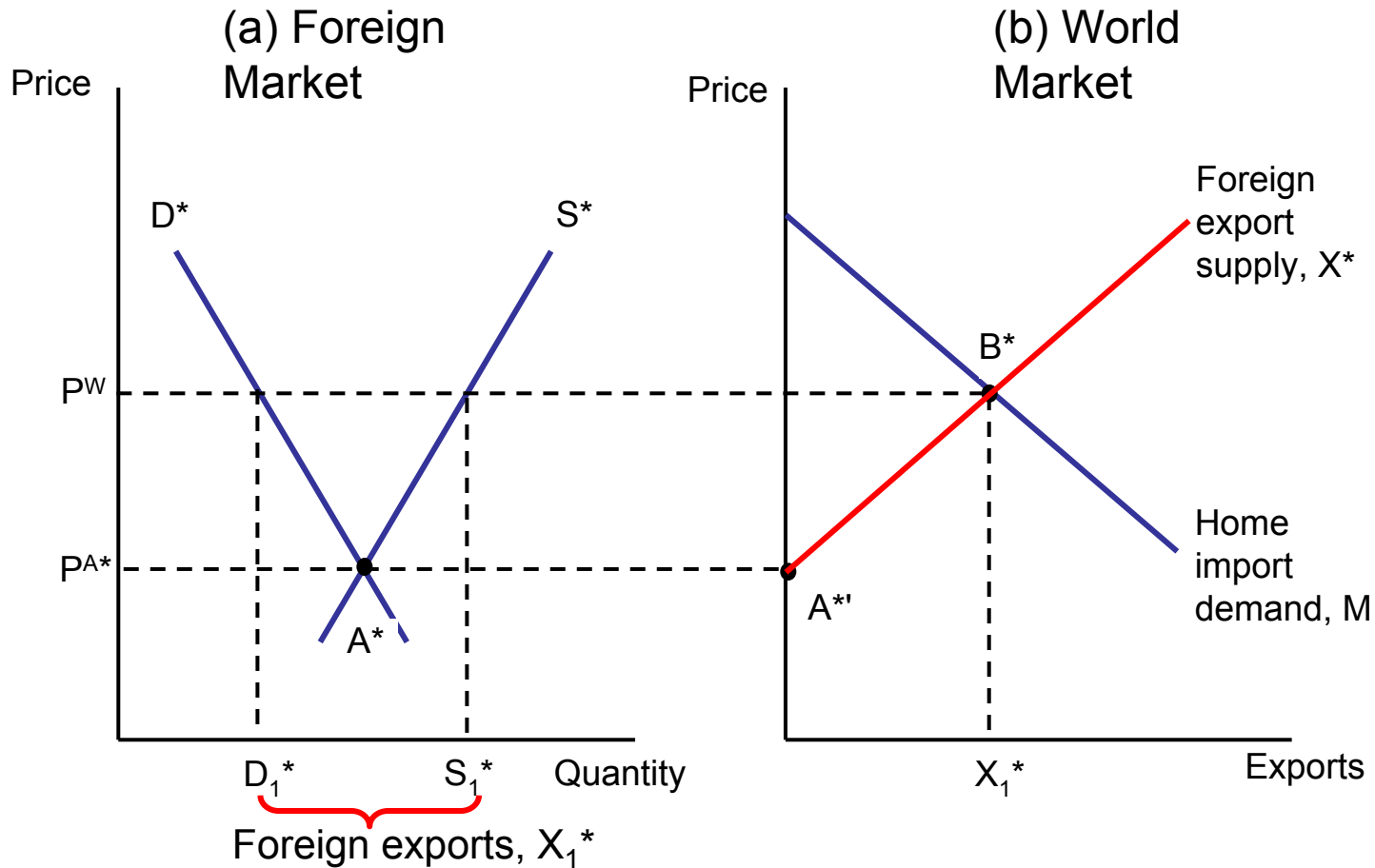


Figure 8.6 Foreign export supply

5. Import tariffs for a large country

Effect of the Tariff

- Figure 8.7 shows effect when Home applies a tariff of t dollars on imports.
- The tariff increases the cost to Foreign producers of supplying to the Home market.
- Foreign export supply curve shifts up by exactly the amount of the tariff, shifting from X^* to X^*+t .
- The new supply crosses demand at C , giving a new Home price.
- The price that Foreign producers receive, P^* , ends up below the original free trade price.

5. Import tariffs for a large country

Effect of the Tariff (cont'd)

- The price Home pays for its imports P^*+t rises by less than the amount of the tariff, t , as compared to the initial world price, P^W .
- This is because the price received by foreign exporters, P^* , has fallen as compared to the initial world price, P^W .
- Foreign producers are “absorbing” part of the tariff by lowering their price from P^W to P^* .
- The tariff drives a wedge between what Home consumers pay and what foreign producers receive, with the difference, t , going to the Home government.

5. Import tariffs for a large country

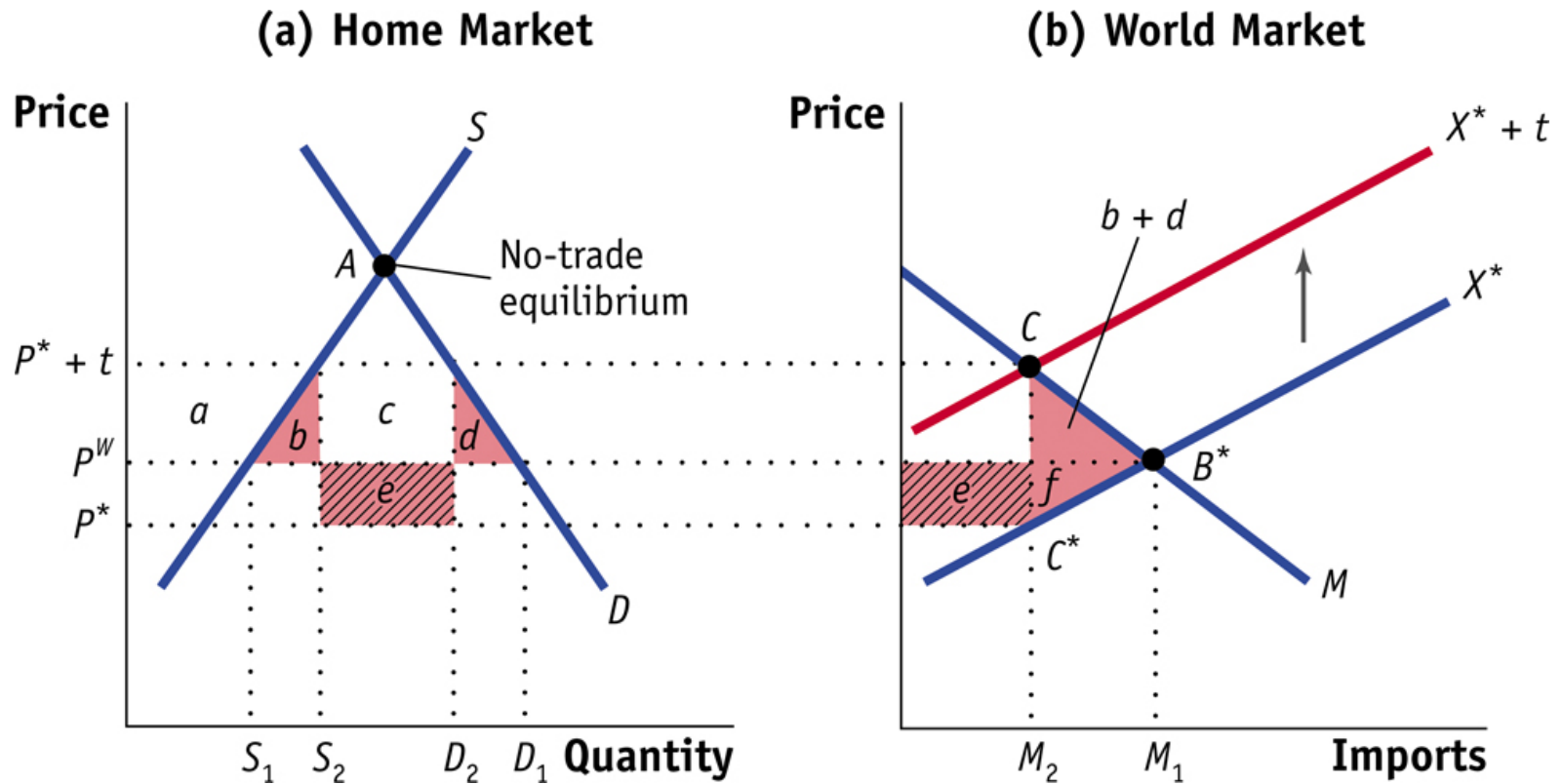


Figure 8.7 Tariff for a large country

5. Import tariffs for a large country

Terms of Trade (ToT)

- Terms of trade is ratio of export prices to import prices.
- In order to measure terms of trade, we want to use the net-of-tariff import price, P^* .
- Since P^* is lower than P^W , it follows that the Home ToT have increased.
- We might expect, therefore, that the Home country gains from the tariff.
- We need to analyze the impact of the tariff on Home consumers, producers, and government revenue.

5. Import tariffs for a large country

Home Welfare

- The higher Home price makes consumers worse off, lowering consumer surplus (shown by $(a+b+c+d)$ in Figure 8.7).
- Home firms are better off with the higher price and increased surplus, a .
- Revenue collected from the tariff equals the amount of the tariff, t , times the new amount of imports, M_2 , giving total revenue of $(c+e)$.
- Summing all the gains and losses, we obtain the overall impact of the tariff in the large country.

5. Import tariffs for a large country

Home Welfare (cont'd)

Fall in consumer surplus	$-(a+b+c+d)$
Rise in producer surplus	$+a$
<u>Rise in government revenue</u>	<u>$+(c + e)$</u>
Net effect on Home welfare	$e - (b+d)$

- The triangle $(b+d)$ is the deadweight loss due to tariff.
- Notice the source of gain, e , that offsets part of the loss.
- If $e > (b+d)$, then Home is better off.
- If $e < (b+d)$, then Home is worse off.

5. Import tariffs for a large country

Home Welfare (cont'd)

- A large importer might gain due to application of tariff.
- However, for the large country, any net gain due to the tariff comes at the expense of Foreign exporters.
- Although Home might gain from the tariff, Foreign definitely loses.

5. Import tariffs for a large country

Foreign and World Welfare

- The Foreign loss, measured by $(e+f)$ in Figure 8.7, is the loss in Foreign producer surplus from selling fewer goods to Home at a lower price.
- The area e is the *terms-of-trade gain* for Home but an equivalent *terms-of-trade loss* for Foreign.
- Additionally, there is an extra deadweight loss in Foreign of f , giving a combined total greater than the benefits to Home.
 - Therefore, it is sometimes called the “beggar-thy-neighbor” tariff.

5. Import tariffs for a large country

Foreign and World Welfare (cont'd)

- Adding together the change in Home and Foreign welfare, e cancels out leaving a net loss to world welfare of $(b+d+f)$.
- This triangle, which is the deadweight loss for the world, can be seen in panel (b) of Figure 8.7.
- The fact that the large country tariff leads to a world deadweight loss is another reason that most economists oppose the use of tariffs.

5.1 U.S. tariffs on steel once again

- Returning to the U.S. tariff on steel, we can re-evaluate the effect on U.S. welfare in the large-country case.
- If the U.S. is a large enough importer of steel, then the foreign export price will fall and the U.S. import price will rise by less than the tariff.
 - It is possible that the U.S. gained from the tariff.

5.1 U.S. tariffs on steel once again

Optimal Tariff

- Compute deadweight loss (area $b+d$) and terms-of-trade gain (area e) for each imported steel product.
- This would give us the information to see if the U.S. gained from the steel tariffs.
- Rather than do all these calculations, however, we can use the concept of the **optimal tariff**.
- This is the tariff that leads to the maximum increase in welfare for the importing country.
- We have shown that for a small tariff, a large country can gain. But if the tariff is too large, the country will still lose.

5.1 U.S. tariffs on steel once again

Optimal Tariff (cont'd)

- Figure 8.8 graphs Home welfare against the level of the tariff.
- Free trade is at point B where the tariff is zero.
- Starting at B, increasing the tariff can increase the importer's welfare, to a point.
- If the tariff is too large, then welfare will fall below the free trade level of welfare.
 - For example, a prohibitive tariff is one so high there are no imports – this is point A.
- Given this, the highest point of welfare for the importing country is shown by C.

5.1 U.S. tariffs on steel once again

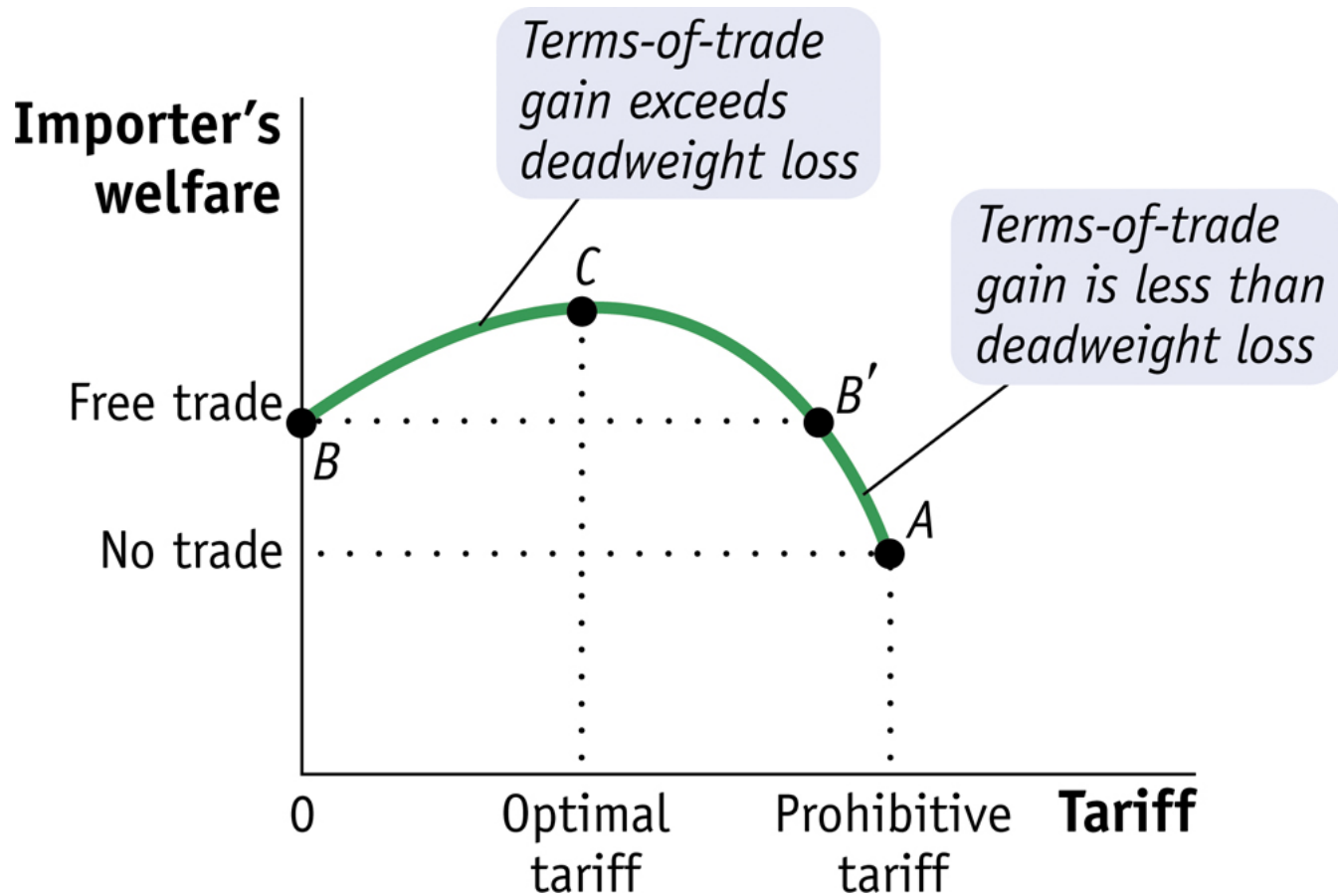


Figure 8.8 Tariffs and welfare for a large country

5.1 U.S. tariffs on steel once again

Optimal Tariff Formula

- The optimal tariff depends on the elasticity of Foreign export supply, E_X^* .
 - This is the percentage change in the quantity exported in response to a percent change in the world price of the export.
 - If the export supply curve is very steep, there is little response in quantity supplied → inelastic → E_X^* is low.
 - If the export supply curve is very flat, there is a large response in quantity supplied → elastic → E_X^* is high.

5.1 U.S. tariffs on steel once again

Optimal Tariff Formula (cont'd)

$$\text{Optimal Tariff} = 1/E_x^*$$

- For a small importing country, the elasticity of Foreign export supply is infinite, and so the optimal tariff is zero.
- As the elasticity of Foreign export supply decreases, the Foreign export supply curve is steeper, and the optimal tariff is higher.
 - With steep Foreign export supply curve, Foreign exporters will lower price more in response to tariff.

5.1 U.S. tariffs on steel once again

Optimal Tariffs for Steel

- If we apply this formula to the U.S. steel tariffs, we can see how the tariffs applied compare to the theoretical optimal tariff.
- Table 8.2 shows various steel products along with their respective elasticities of export supply to U.S.
- We can compare the actual tariff to the optimal tariff to see where there were gains and where there were losses from the tariffs.

5.1 U.S. tariffs on steel once again

Product Category	Elasticity of Export Supply	Optimal Tariff (%)	Actual Tariff (%)
Alloy steel flat-rolled products	0.27	370%	30%
Iron and steel rails and railway track	0.80	125	0
Iron and steel bars, rods, angles, shapes	0.80	125	15–30
Ferrous waste and scrap	17	6	0
Iron and steel tubes, pipes, and fittings	90	1	13–15
Iron and nonalloy steel flat-rolled products	750	0	0

Table 8.2 Optimal tariffs for steel products

5.1 U.S. tariffs on steel once again

- For alloy steel flat-rolled products, the actual tariff was 30%, which is far below the optimal tariff.
 - The terms of trade gain for that product was higher than the deadweight loss.
 - U.S. welfare is above its free trade level.
- In summary, two products had terms of trade gains greater than the deadweight loss, but the third had a larger deadweight loss.
 - The first two illustrate the large country case, while the third illustrates the small country case.

5.1 U.S. tariffs on steel once again

- Even if there was an overall terms of trade gain for the U.S. when adding up across all steel products, that gain would be at the expense of the European countries and other steel exporters.
- By allowing exporting countries to retaliate with tariffs, the WTO prevents importers from using optimal tariffs to their own advantage.

6. Import quotas

- On January 1, 2005, China was poised to become the world's largest exporter of textiles and apparel.
 - On that date, the *Multifibre Arrangement* (MFA) was abolished.
 - Under the MFA, import quotas restricted the amount of nearly every textile and apparel product that was imported to Canada, Europe, and the U.S.
 - The quotas were to protect their own domestic firms producing those products.
 - With the end of the MFA, China was ready to enjoy greatly increased imports.

6. Import quotas

- The threat of import competition from China led the U.S. and Europe to negotiate new quotas with China.
- Other examples of quotas:
 - The European Union had a quota on the imports of bananas that allowed for a greater number of bananas to enter from former colonies in Africa than from Latin America.
 - In 2005, this quota became a tariff.
 - U.S. sugar import quotas, which are combined with guaranteed set prices for U.S. sugar producers.
- In the next section, we explain how quotas affect the importing and exporting countries, and examine the differences between quotas and tariffs.

6. Import quotas

Import Quota in a Small Country

- Free Trade Equilibrium
 - Figure 8.9 (a) shows the free-trade-equilibrium at a world price of P^W , home quantity demanded of D_1 , quantity supplied of S_1 , with imports of M_1 as before.
 - Assuming the country is small means the world price is not affected by the import quota so the Foreign export supply curve, X^* , is horizontal at P^W .
 - We can see the free trade amount of imports in panel (b) as well: M_1 at P^W .

6. Import quotas

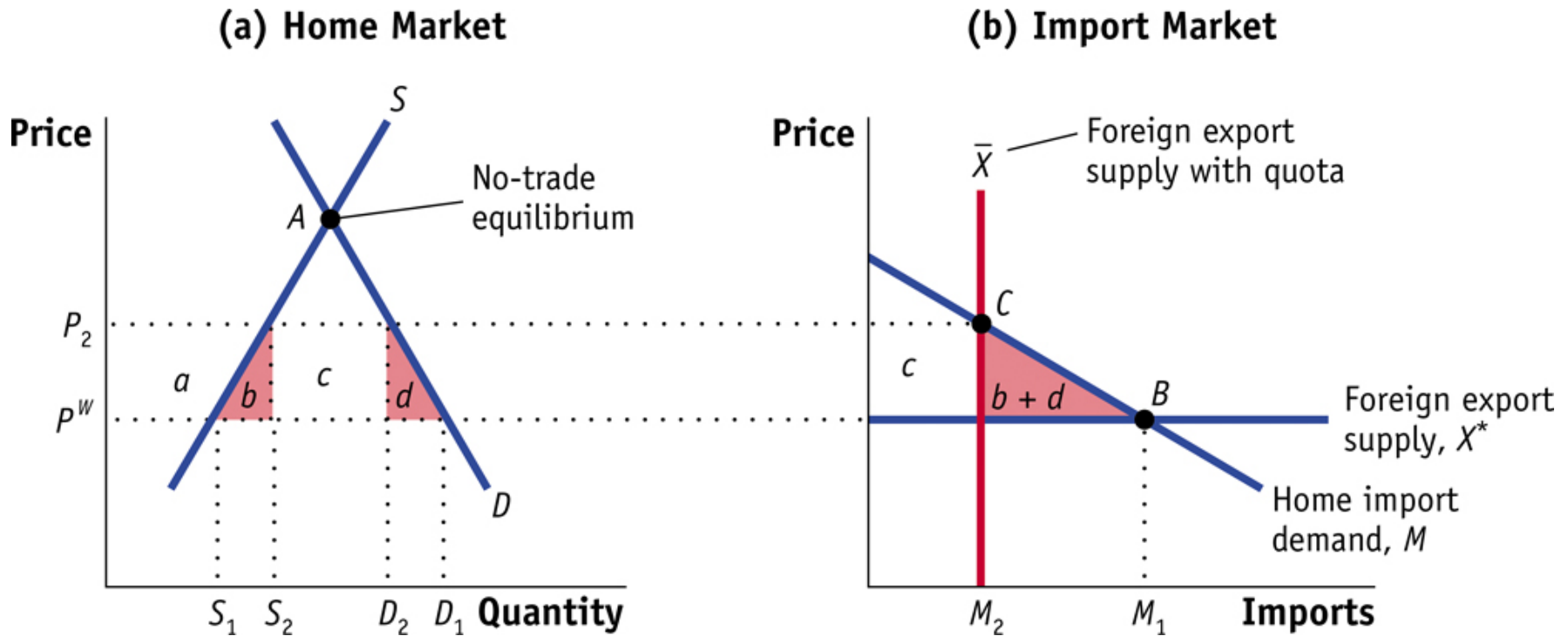


Figure 8.9 Quota for a small country

6. Import quotas

- Effect of the Quota
 - Suppose the import quota of $M_2 < M_1$ is imposed.
 - Quantity imported cannot exceed this amount.
 - This essentially gives a vertical supply curve, \bar{X} in panel (b) (at prices above P^W).
 - Fixes the import quantity at M_2 .
 - The vertical export supply curve now intersects import demand at point C, which gives Home price of P_2 .
 - In panel (a), the price of P_2 leads firms to increase the quantity supplied to S_2 and consumers to decrease their quantity demanded to D_2 .

6. Import quotas

- Equivalent Tariff
 - The import quota leads to increase in Home price and reduction in Home imports, just like tariff.
 - We can see what the equivalent tariff – the tariff that would be set to give the same quantity and price as the quota – would be: $t = P_2 - P^W$.
 - For every level of import quota, there is an equivalent import tariff.

6. Import quotas

- Effect on Welfare
 - The rise in price from the quota leads to a fall in consumer surplus: $(a+b+c+d)$.
 - The increase in price facing Home producers leads to a gain in producer surplus: a .
 - What changes with the quota is the area c which was government revenue under the tariff.

6. Import quotas

- Effect on Welfare (cont'd)
 - With a quota, whoever is actually importing the good will be able to earn c , the difference between the world price and the higher Home price times the imports sold in the Home market.
 - The difference between these two prices is the rent associated with the quota.
 - Area c represents the total quota rents.

6. Import quotas

- There are four possible ways these rents can be allocated.
- 1. Giving the Quota to Home Firms:
 - Quota licenses can be given to Home firms
 - Permits to import the quantity allowed under the quota system.
 - The net effects on Home welfare due to the quota are then as follows:

Fall in consumer surplus	$-(a+b+c+d)$
Rise in producer surplus	$+a$
<u>Quota rents earned at Home</u>	<u>$+c$</u>
Net effect on Home welfare:	$-(b+d)$

6. Import quotas

1. Giving the Quota to Home Firms (cont'd)
 - This is the same loss we saw with a tariff.
 - $(b+d)$ is still deadweight loss associated with quota.

2. Rent Seeking
 - Because of the gains associated with owning a quota license, firms have an incentive to engage in inefficient activities in order to obtain them.

6. Import quotas

2. Rent Seeking (cont'd)

- How licenses are allocated matters.
 - a. If licenses are allocated in proportion to each firm's production, Home firms will likely produce more than they can sell just to obtain the import licenses for the following year.
 - b. Firms might engage in bribery or other lobbying activities to obtain the licenses.
- Some suggest that the waste of resources devoted to rent seeking could be as large as the value of the rents themselves, c.

6. Import quotas

2. Rent Seeking (cont'd)

- If rent seeking occurs, welfare loss of quota is:

Fall in consumer surplus	$-(a+b+c+d)$
<u>Rise in producer surplus</u>	<u>$+a$</u>
Net effect on Home welfare:	$-(b+c+d)$

- This loss is larger than a tariff.
- It is thought that rent seeking is worse in developing countries.

6. Import quotas

3. Auctioning the Quota

- The government of the importing country can auction off the quota licenses.
- In a well-organized, competitive auction, the revenue collected should exactly equal the value of the rents:

Fall in consumer surplus	$-(a+b+c+d)$
Rise in producer surplus	$+a$
<u>Auction revenue earned at Home</u>	<u>$+c$</u>
Net effect on Home welfare:	$-(b+d)$

- This is the same loss as the tariff.

6. Import quotas

4. “Voluntary” Export Restraint

- The importing country can give authority for implementing the quota to the exporting government.
- This is often called a “voluntary” export restraint (VER) or a “voluntary” restraint agreement (VRA).
- In the 1980s the U.S. used this type of arrangement to restrict imports of Japanese automobiles.
 - The Japanese government told each Japanese firm how much it could export to the U.S.

6. Import quotas

4. “Voluntary” Export Restraint (cont’d)

- With VERs, quota rents are earned by foreign producers, making Home welfare:

Fall in consumer surplus	$-(a+b+c+d)$
<u>Rise in producer surplus</u>	<u>$+a$</u>
Net effect on Home welfare:	$-(b+c+d)$

- This is a higher net loss than with a tariff.
- Why would an importing country do this?
 - It is typically political—the exporting country is less likely to retaliate since they gain the area c .
 - This can often avoid a tariff or quota war.

6.1 Auctioning import quotas in Australia and New Zealand

- During the 1980s, Australia and New Zealand both auctioned quota licenses to import specific goods.
- Table 8.3 shows the value of imports covered by quotas during 1981–1987.
- In 1988, New Zealand announced plans to phase out import quotas as part of a liberalization of trade, and all quota licenses were eliminated by 1992.

6.1 Auctioning import quotas in Australia and New Zealand

- Table 8.3 also shows the value of bids for the quota licenses.
 - These are estimates of rents.
- If we take the ratio of the value of bids to the value of imports covered by the quota, we obtain an estimate of the tariff equivalent to the quota.
 - These are shown in the final column of Table 8.3

6.1 Auctioning import quotas in Australia and New Zealand

- Since there was no penalty from not following through, some firms decided not to purchase licenses after all.
- Other firms re-sold their licenses at higher prices.
- The government therefore did not collect all the winning bids as revenue.
- This makes it appear that the government was not collecting all of the rents in area *c*.

6.1 Auctioning import quotas in Australia and New Zealand

Year (March–February)	Value of Imports (\$ millions)	Value of Bids (\$ millions)	Tariff Equivalent (Bid/Import Value)
1981–1983	\$56	\$10.5	18.7%
1983–1984	134	8.3	6.2
1984–1985	397	42.7	10.7
1985–1986	621	NA	NA
Total	1,208	NA	NA

Table 8.3 Auction of import quotas in New Zealand

6.2 Costs of import quotas in U.S.

- Table 8.4 presents estimates of Home deadweight losses and quota rents for some major U.S. quotas in the 1980s.
- In all cases except dairy, rents were earned by Foreign exporters (under VERs).
- Adding up the costs in the table, the total U.S. deadweight loss due to these quotas ranged from \$8–\$12 billion annually.
- Quota rents transferred another \$7–\$17 billion to foreigners.
- Some, but not all, of these costs are irrelevant today since many of the quotas are no longer in place.

6.2 Costs of import quotas in U.S.

	U.S. Deadweight Loss (\$) (area <i>b</i> + <i>d</i>)	Quota Rents (\$) (area <i>c</i>)
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

Table 8.4 Annual cost of U.S. import protection (\$ billion)

6.3 China and the Multifibre Agreement

- One of the principles of GATT was that countries should not use quotas to restrict imports.
- The MFA was a major exception, which allowed the industrialized countries to restrict imports of textile and apparel products from the developing countries.
- Organized under GATT, importing countries could join the MFA and arrange quotas bilaterally or unilaterally.
- While the amount of the quotas was occasionally revised upward, they did not keep up with the increasing ability of new supplying countries to sell.

6.3 China and the Multifibre Agreement

- Under the Uruguay round of WTO, developing countries were able to negotiate an end to this system of import quotas. MFA ended on January 1, 2005.
- Given that China was a large supplier of textiles, the expiration of the MFA theoretically meant that China could export as much as it wanted.
- Some developing countries and large producers in importing countries were concerned with the potential of Chinese exports on their economies.

6.3 China and the Multifibre Agreement

Growth in Exports from China

- Immediately after January 1, 2005, exports of textiles and apparel from China grew rapidly.
- In 2005, China's textile and apparel imports to the U.S. rose by more than 40% compared to 2004.
- Figure 8.10 (a) shows the change in the value of exports of textiles and apparel from different countries. Note China.
- The increases from China came at the expense of some higher-cost exporters, some of whose exports to the U.S. declined by 10 to 20%.

6.3 China and the Multifibre Agreement

(a) Change in the Value of Exports

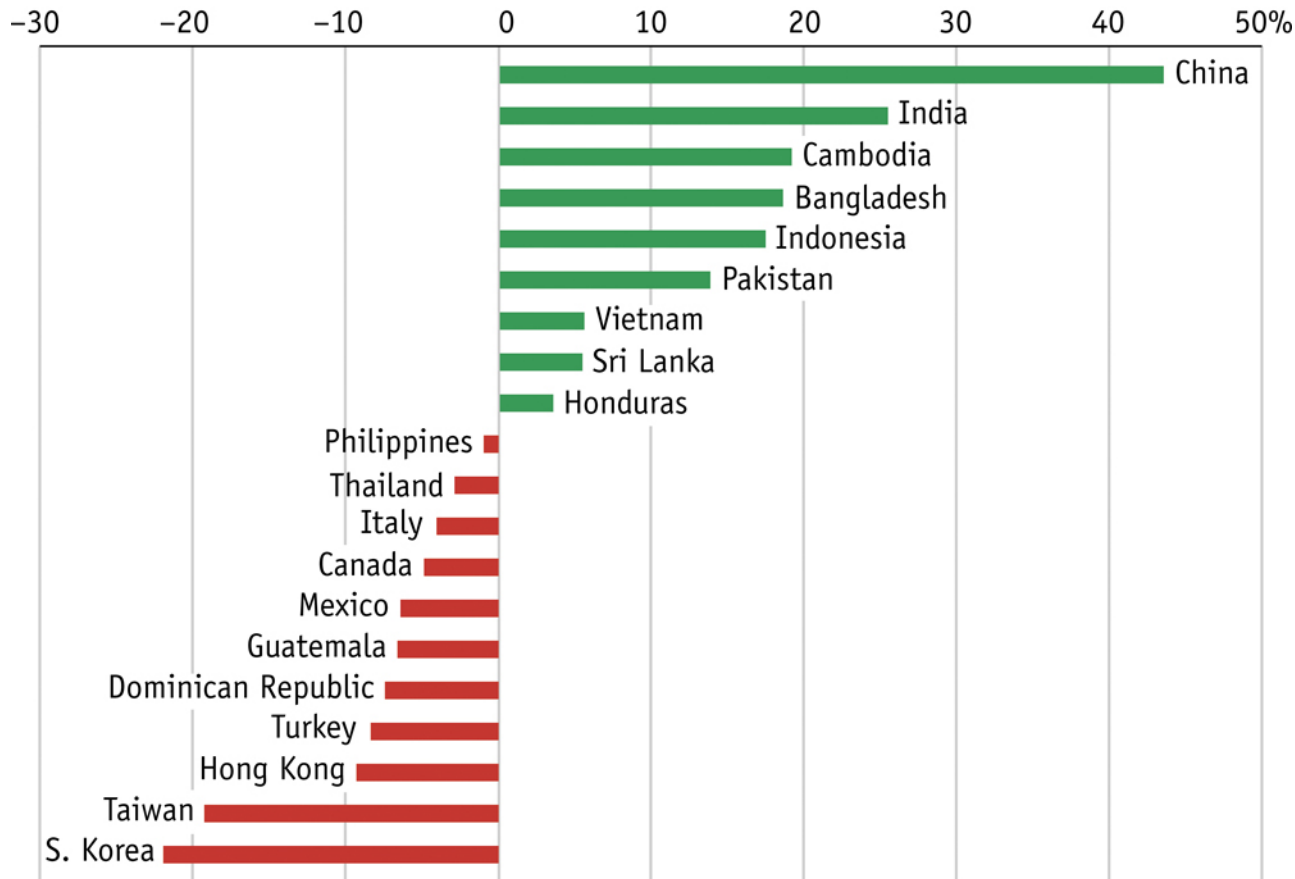


Figure 8.10 (a) change in value of clothing and textiles exports to the U.S. after end of MFA

6.3 China and the Multifibre Agreement

Growth in Exports from China (cont'd)

- Panel (b) of Figure 8.10 shows percentage change in prices of textiles and apparel products from each country, depending on whether products were subject to MFA quota before January 1, 2005, or not.
- China had largest drop in prices from 2004 to 2005.
- Many other countries had substantial fall in their prices due to the end of the MFA quota.

6.3 China and the Multifibre Agreement

(b) Change in the Price of Exports

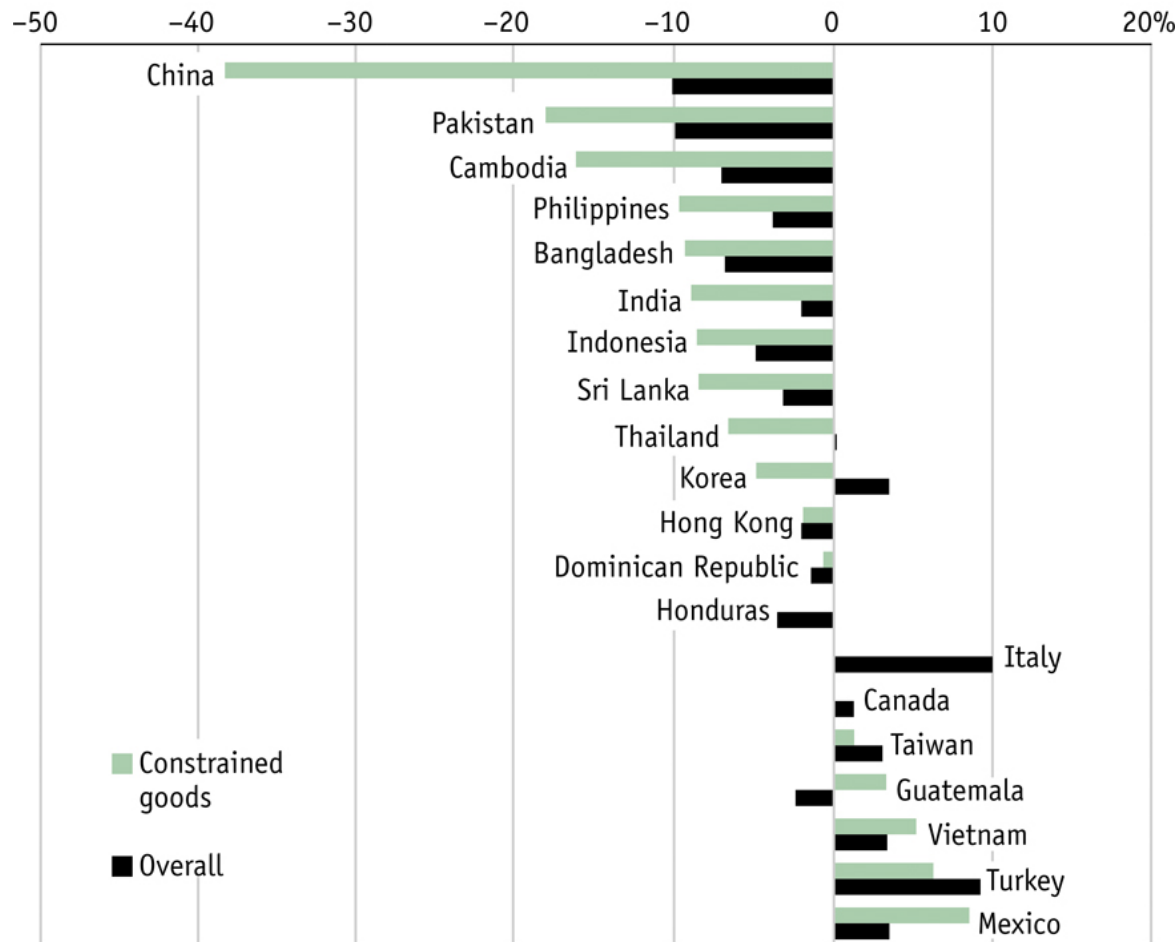


Figure 8.10 (b) change in prices of clothing and textiles exports to the U.S. after end of MFA

6.3 China and the Multifibre Agreement

Welfare cost of the MFA

- Given drop in prices in 2005, it is possible to estimate the welfare loss due to MFA.
- Quota rents were earned by foreign exporting firms, giving a welfare loss to Home of area $(b+c+d)$ shown in Figure 8.9.
- Using price drops from Figure 8.10 $(b+c+d)$, U.S. is estimated at \$6.5 to \$16.2 billion in 2005 from the MFA.
- Averaging out all losses and dividing among households gives an estimate of \$100 per household, or 7% of total annual spending on apparel.

6.3 China and the Multifibre Agreement

Import Quality

- Interesting pattern to price drops: the price dropped the most for lower-priced items.
 - An inexpensive T-shirt had a greater drop in price than a more expensively priced item.
- U.S. demand shifted towards lower-priced items imported from China: there was “quality downgrading” in exports from China.
- When a quota like the MFA is applied, there is an effect on quality.

6.3 China and the Multifibre Agreement

Import Quality (cont'd)

- Quotas are set on *quantity*, not *quality* of items that are imported.
- This means that exporting countries have an incentive to upgrade the quality of the product.
- Selling the same quantity of a higher-value good will still meet the quota limit but will bring more money back home.
- Import quotas bring “quality upgrading” in exports.
- Similarly, when quota is removed, you will see “quality downgrading.”

6.3 China and the Multifibre Agreement

Reaction of the United States and Europe

- EU threatened to impose new quotas on Chinese exports.
- In response, China agreed on June 11, 2005 to "voluntarily" restrict exports limiting the growth of textile exports to about 10% per year through the end of 2008.
- The U.S. had the ability to negotiate a new system of quotas because China had joined the WTO in 2001.
- The U.S. deal limited growth to 7.5% until 2008.
 - Chinese textile export restrictions to U.S. and Europe ended January 1, 2009, but global financial crisis meant exports declined by as much as 10% in 2009.

7. Conclusions

- The government of a country can use trade policies such as tariffs or quotas to affect international trade flows.
- The rules governing trade policies in most countries are outlined by the General Agreement on Tariffs and Trade (GATT), now the World Trade Organization (WTO).
- In a small country, the world price faced is fixed, so the price faced by consumers and producers will rise by the full amount of the tariff.
 - The use of a tariff by a small importing country always leads to a net loss in welfare.

7. Conclusions

- In a large country, the change in imports from a tariff will lower world price so the price to the importing country does not rise by the full amount of the tariff.
 - The use of a tariff for a large country can lead to a net gain in welfare.
- The optimal tariff is the tariff amount that maximizes welfare for the importer.
- The formula for the optimal tariff shows that it depends inversely on the foreign export supply elasticity.

7. Conclusions

- Import quotas restrict the quantity of a particular import, thereby increasing the domestic price, benefiting domestic production, and creating a benefit for those who are allowed to import the quantity allotted. Benefits are quota rents.
- Assuming perfectly competitive markets for goods, quotas are similar to tariffs since the restriction in the amount imported leads to a higher domestic price. Rents, however, can be earned by the foreign country and can create additional deadweight losses (VER).