

**Chapter 8**

**The Instruments of Trade Policy**

With revisions for ANU

Econ  
3103/3013/8015

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Slides prepared by Thomas Bishop

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**Preview**

- Partial equilibrium analysis of tariffs: supply, demand and trade in a single industry
- Costs and benefits of tariffs
- Export subsidies
- Import quotas
- Voluntary export restraints
- Local content requirements

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**Types of Tariffs**

- A **specific tariff** is levied as a fixed charge for each unit of imported goods.
  - ◆ For example, \$1 per kg of cheese
- An **ad valorem tariff** is levied as a fraction of the value of imported goods.
  - ◆ For example, 25% tariff on the value of imported cars.
- Let's now analyze how tariffs affect the economy.

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## Supply, Demand and Trade in a Single Industry

- Let's construct a model measuring how a tariff affects a single market, say that of wheat.
- Suppose that in the absence of trade the price of wheat in the foreign country is lower than that in the domestic country.
  - ◆ With trade the foreign country will export: construct an export supply curve
  - ◆ With trade the domestic country will import: construct an import demand curve

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## Supply, Demand and Trade in a Single Industry (cont.)

- An export supply curve is the difference between the quantity that foreign producers supply minus the quantity that foreign consumers demand, at each price.
- An import demand curve is the difference between the quantity that domestic consumers demand minus the quantity that domestic producers supply, at each price.

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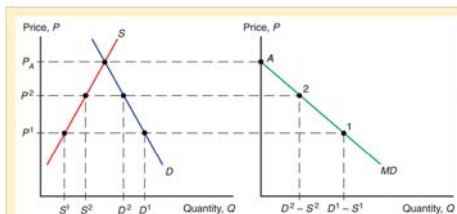
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## Supply, Demand and Trade in a Single Industry (cont.)



**Figure 8-1**  
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.

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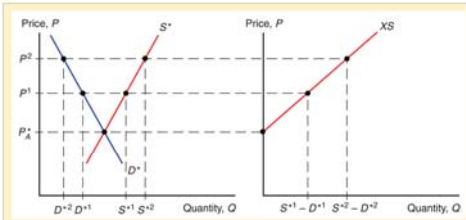
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## Supply, Demand and Trade in a Single Industry (cont.)



**Figure 8-2**

### 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.

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## Supply, Demand and Trade in a Single Industry (cont.)

- In equilibrium,  
import demand = export supply  
domestic demand – domestic supply =  
foreign supply – foreign demand
- In equilibrium,  
world demand = world supply

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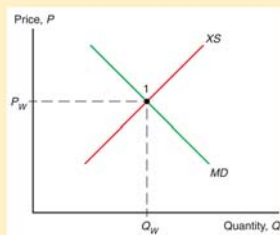
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## Supply, Demand and Trade in a Single Industry (cont.)

**Figure 8-3**

### World Equilibrium

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



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## The Effects of a Tariff

- A tariff acts as an added cost of transportation, making shippers unwilling to ship goods unless the price difference between the domestic and foreign markets exceeds the tariff.
- If shippers are unwilling to ship wheat, there is *excess demand* for wheat in the domestic market and *excess supply* in the foreign market.
  - The price of wheat will tend to rise in the domestic market.
  - The price of wheat will tend to fall in the foreign market.

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## The Effects of a Tariff (cont.)

- Thus, a tariff will make the price of a good rise in the domestic market and will make the price of a good fall in the foreign market, until the price difference equals the tariff.
  - $P_T - P_T^* = t$
  - $P_T = P_T^* + t$
  - The price of the good in foreign (world) markets should fall if there is a *significant* drop in the quantity demanded of the good caused by the domestic tariff.

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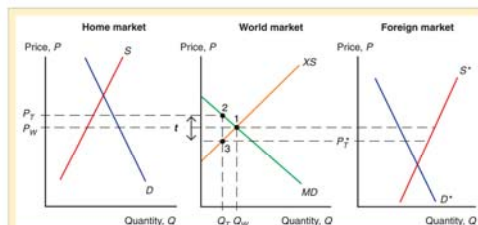
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## The Effects of a Tariff (cont.)



**Figure 9-4**  
**Effects of a Tariff**  
 A tariff raises the price in Home while lowering the price in Foreign. The volume traded declines.

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### The Effects of a Tariff (cont.)

- Because the price in domestic markets rises (to  $P_T$ ), domestic producers should supply more and domestic consumers should demand less.
  - ◆ The quantity of imports falls from  $Q_W$  to  $Q_T$
- Because the price in foreign markets falls (to  $P^*_T$ ), foreign producers should supply less and foreign consumers should demand more.
  - ◆ The quantity of exports falls from  $Q_W$  to  $Q_T$

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### The Effects of a Tariff (cont.)

- The quantity of domestic import demand equals the quantity of foreign export supply when  $P_T - P^*_T = t$
- In this case, the increase in the price of the good in the domestic country is less than the amount of the tariff.
  - ◆ Part of the tariff is reflected in a decline of the foreign country's export price, and thus is not passed on to domestic consumers.
  - ◆ But this effect is often not very significant.

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### The Effects of a Tariff in a Small Country

- When a country is "small", it has no effect on the foreign (world) price of a good, because its demand for the good is an insignificant part of world demand.
  - ◆ Therefore, the foreign price will not fall, but will remain at  $P_w$
  - ◆ The price in the domestic market, however, will rise to  $P_T = P_w + t$

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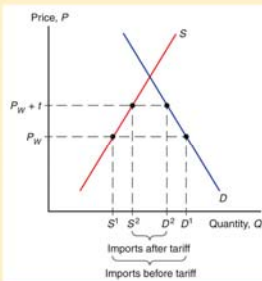
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## The Effects of a Tariff in a Small Country (cont.)

**Figure 8-5**

### 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  $D^2 - S^2$ .



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## Effective Rate of Protection

- The **effective rate of protection** measures how much protection a tariff or other trade policy provides domestic producers.
  - ♦ It represents the change in value that an industry adds to the production process when trade policy changes.
  - ♦ The change in value that an industry provides depends on the change in prices when trade policies change.
  - ♦ Effective rates of protection often differ from tariff rates because tariffs affect sectors other than the protected sector, a fact which affects the prices and value added for the protected sector.

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## Effective Rate of Protection (cont.)

- For example, suppose that an automobile sells on the world market for \$8000, and the parts that made it are worth \$6000.
  - ♦ The value added of the auto production is \$8000-\$6000
- Suppose that a country puts a 25% tariff on imported autos so that domestic auto assembly firms can now charge up to \$10000 instead of \$8000.
- Now auto assembly will occur if the value added is up to \$10000-\$6000.

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### Effective Rate of Protection (cont.)

- The effective rate of protection for domestic auto assembly firms is the change in value added:

$$(\$4000 - \$2000)/\$2000 = 100\%$$

- In this case, the effective rate of protection is greater than the tariff rate.

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### Costs and Benefits of Tariffs

- A tariff raises the price of a good in the importing country, so we expect it to hurt consumers and benefit producers there.
- In addition, the government gains tariff revenue from a tariff.
- How to measure these costs and benefits?
- We use the concepts of consumer surplus and producer surplus.

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### Consumer Surplus

- **Consumer surplus** measures the amount that a consumer gains from a purchase by the difference in the price he pays from the price he would have been willing to pay.
  - ♦ The price he would have been willing to pay is determined by a demand (willingness to buy) curve.
  - ♦ When the price increases, the quantity demanded decreases as well as the consumer surplus.

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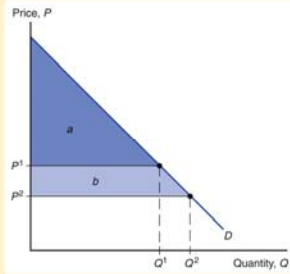
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## Consumer Surplus (cont.)

Figure 8-7

### Geometry of Consumer Surplus

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



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## Producer Surplus

- **Producer surplus** measures the amount that a producer gains from a sale by the difference in the price he receives from the price he would have been willing to sell at.
  - ◆ The price he would have been willing to sell at is determined by a supply (willingness to sell) curve.
  - ◆ When price increases, the quantity supplied increases as well as the producer surplus.

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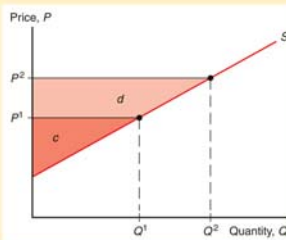
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## Producer Surplus (cont.)

Figure 8-8

### Geometry of Producer Surplus

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



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## Costs and Benefits of Tariffs

- A tariff raises the price of a good in the importing country, making its consumer surplus decrease (making its consumers worse off) and making its producer surplus increase (making its producers better off).
- Also, government revenue will increase.

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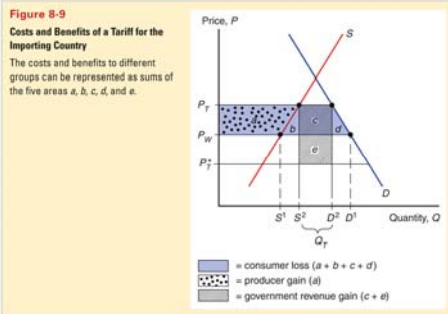
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## Costs and Benefits of Tariffs (cont.)



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## Costs and Benefits of Tariffs (cont.)

- For a "large" country that can affect foreign (world) prices, the welfare effect of a tariff is ambiguous.
- The triangles *b* and *d* represent the **efficiency loss**.
  - ♦ The tariff distorts production and consumption decisions: producers produce too much and consumers consume too little compared to the market outcome.
- The rectangle *e* represents the **terms of trade gain**.
  - ♦ The terms of trade increases because the tariff lowers foreign export (domestic import) prices.

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### Costs and Benefits of Tariffs (cont.)

- Government revenue from the tariff equals the tariff rate times the quantity of imports.
  - ◆  $t = P_T - P^*_T$
  - ◆  $Q_T = D_2 - S_2$
  - ◆ Government revenue =  $t \times Q_T = c + e$
- Part of government revenue (rectangle  $e$ ) represents the terms of trade gain, and part (rectangle  $c$ ) represents part of the value of lost consumer surplus.
  - ◆ The government gains at the expense of consumers and foreigners.

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### Costs and Benefits of Tariffs (cont.)

- If the terms of trade gain exceeds the efficiency loss, then national welfare will increase under a tariff, at the expense of foreign countries.
  - ◆ However, this analysis assumes that the terms of trade does not change due to tariff changes by foreign countries (i.e., due to retaliation).

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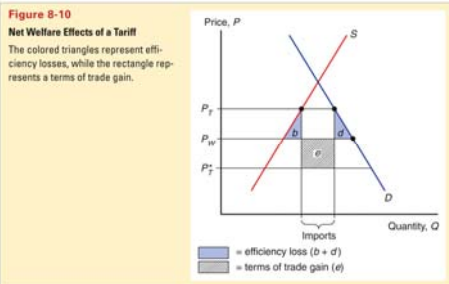
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### Costs and Benefits of Tariffs (cont.)



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## Export Subsidy

- An export subsidy can also be *specific* or *ad valorem*
  - ♦ A specific subsidy is a payment per unit exported.
  - ♦ An ad valorem subsidy is a payment as a proportion of the value exported.
- An export subsidy raises the price of a good in the exporting country, making its consumer surplus decrease (making its consumers worse off) and making its producer surplus increase (making its producers better off).
- Also, government revenue will decrease.

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## Export Subsidy (cont.)

- An export subsidy raises the price of a good in the exporting country, while lowering it in foreign countries.
- In contrast to a tariff, an export subsidy worsens the terms of trade by lowering the price of domestic products in world markets.

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## Export Subsidy (cont.)

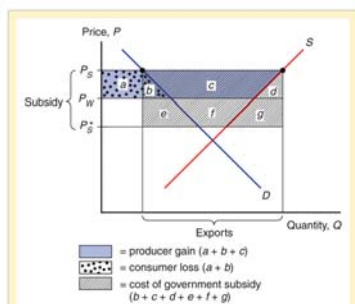


Figure 8-11

### Effects of an Export Subsidy

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

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## Export Subsidy (cont.)

- An export subsidy unambiguously produces a negative effect on national welfare.
- The triangles  $b$  and  $d$  represent the **efficiency loss**.
  - ♦ The tariff distorts production and consumption decisions: producers produce too much and consumers consume too little compared to the market outcome.
- The area  $b + c + d + f + g$  represents the **cost of government subsidy**.
  - ♦ In addition, the terms of trade *decreases*, because the price of exports falls in foreign markets to  $P_s^*$ .

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## Export Subsidy in Europe

- The European Union's Common Agricultural Policy sets high prices for agricultural products and subsidizes exports to dispose of excess production.
  - ♦ The subsidized exports reduce world prices of agricultural products.
- The direct cost of this policy for European taxpayers is almost \$50 billion.
  - ♦ But the EU has proposed that farmers receive direct payments independent of the amount of production to help lower EU prices and reduce production.

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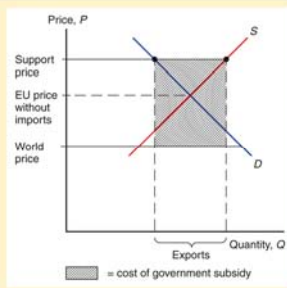
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## Export Subsidy in Europe (cont.)

**Figure 8-12**

### Europe's Common Agricultural Program

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



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## Import Quota

- An import quota is a restriction on the quantity of a good that may be imported.
- This restriction is usually enforced by issuing licenses to domestic firms that import, or in some cases to foreign governments of exporting countries.
- A binding import quota will push up the price of the import because the quantity demanded will exceed the quantity supplied by domestic producers and from imports.

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## Import Quota (cont.)

- When a quota instead of a tariff is used to restrict imports, the government receives no revenue.
  - ◆ Instead, the revenue from selling imports at high prices goes to quota license holders: either domestic firms or foreign governments.
  - ◆ These extra revenues are called **quota rents**.

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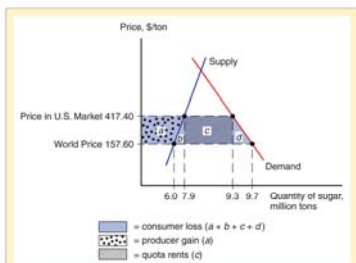
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## US Import Quota on Sugar



**Figure 8-13**  
Effects of the U.S. Import Quota on Sugar

The sugar import quota holds imports to about half the level that would occur under free trade. The result is that the price of sugar is \$417.40 per ton, versus the \$157.60 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.

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## Voluntary Export Restraint

- A **voluntary export restraint** works like an import quota, except that the quota is imposed by the exporting country rather than the importing country.
- However, these restraints are usually requested by the importing country.
- The profits or rents from this policy are earned by foreign governments or foreign producers.
  - ◆ Foreigners sell a restricted quantity at an increased price.

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## Local Content Requirement

- A **local content requirement** is a regulation that requires a specified fraction of a final good to be produced domestically.
- It may be specified in value terms, by requiring that some minimum share of the value of a good represent domestic value added, or in physical units.

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## Local Content Requirement (cont.)

- From the viewpoint of domestic producers of inputs, a local content requirement provides protection in the same way that an import quota would.
- From the viewpoint of firms that must buy domestic inputs, however, the requirement does not place a strict limit on imports, but allows firms to import more if they also use more domestic parts.

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## Local Content Requirement (cont.)

- Local content requirement provides neither government revenue (as a tariff would) nor quota rents.
- Instead the difference between the prices of domestic goods and imports is averaged into the price of the final good and is passed on to consumers.

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## Other Trade Policies

- Export credit subsidies
  - ◆ A subsidized loan to exporters
  - ◆ US Export-Import Bank subsidizes loans to US exporters.
- Government procurement
  - ◆ Government agencies are obligated to purchase from domestic suppliers, even when they charge higher prices (or have inferior quality) compared to foreign suppliers.
- Bureaucratic regulations
  - ◆ Safety, health, quality or customs regulations can act as a form of protection and trade restriction.

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## Summary

|                        | Tariff                             | Export subsidy | Import quota                        | Voluntary export restraint     |
|------------------------|------------------------------------|----------------|-------------------------------------|--------------------------------|
| Producer surplus       | Increases                          | Increases      | Increases                           | Increases                      |
| Consumer surplus       | Decreases                          | Decreases      | Decreases                           | Decreases                      |
| Government net revenue | Increases                          | Decreases      | No change: rents to license holders | No change: rents to foreigners |
| National welfare       | Ambiguous, falls for small country | Decreases      | Ambiguous, falls for small country  | Decreases                      |

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### Summary (cont.)

1. A tariff decreases the world price of the imported good when a country is "large", increases the domestic price of the imported good and reduces the quantity traded.
2. A quota does the same.
3. An export subsidy decreases the world price of the exported good when a country is "large", increases the domestic price of the exported good and increases the quantity produced.

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### Summary (cont.)

4. The welfare effect of a tariff, quota and export subsidy can be measured by:
  - Efficiency loss from consumers and producers
  - Terms of trade gain or loss
5. With import quotas, voluntary export restraints and local content requirements, the government of the importing country receives no revenue.
6. With voluntary export restraints and occasionally import quotas, quota rents go to foreigners.

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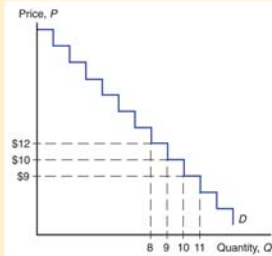
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Figure 9-6

#### 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.



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**TABLE 8-1 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<br>(government spending rises) | No change<br>(rents to license holders) | No change<br>(rents to foreigners) |
| Overall national welfare | Ambiguous<br>(falls for small country) | Falls                                | Ambiguous<br>(falls for small country)  | Falls                              |

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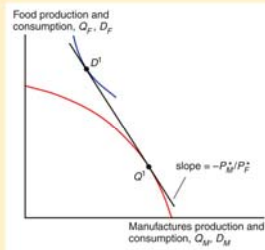
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**Figure 8A1-1**

**Free Trade Equilibrium for a Small Country**

The country produces at the point on its production frontier that is tangent to a line whose slope equals relative prices, and it consumes at the point on the budget line tangent to the highest possible indifference curve.



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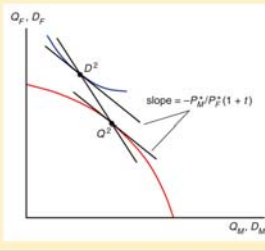
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**Figure 8A1-2**

**A Tariff in a Small Country**

The country produces less of its export good and more of its imported good. Consumption is also distorted. The result is a reduction in both welfare and the volume of the country's trade.



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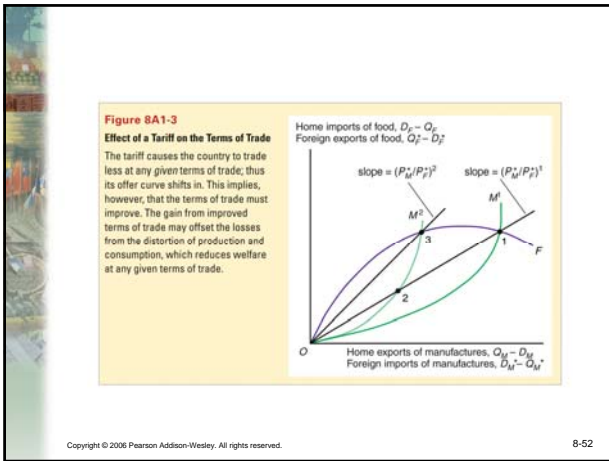
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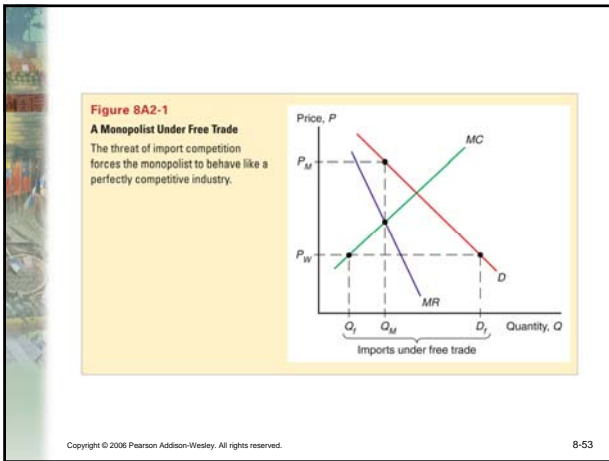
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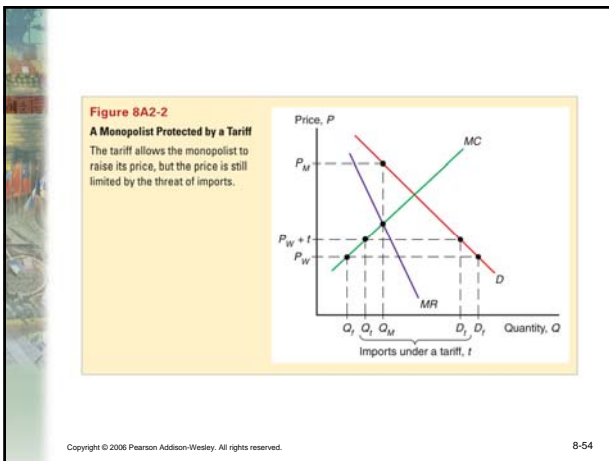
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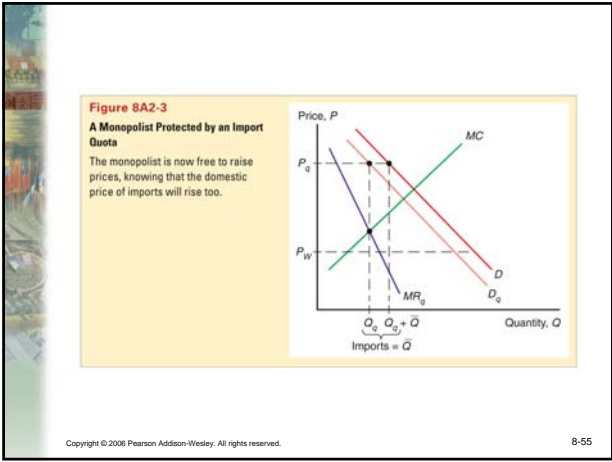
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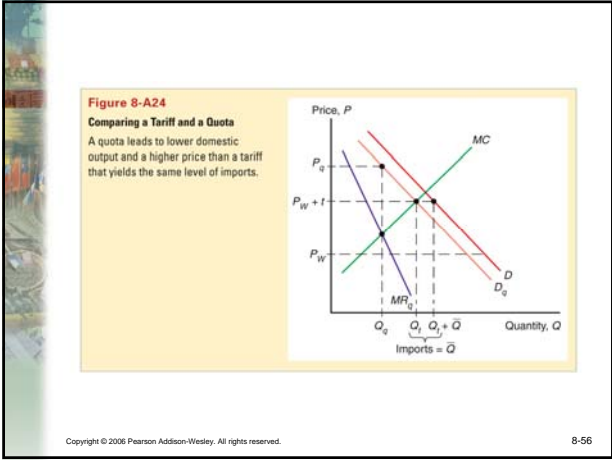
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