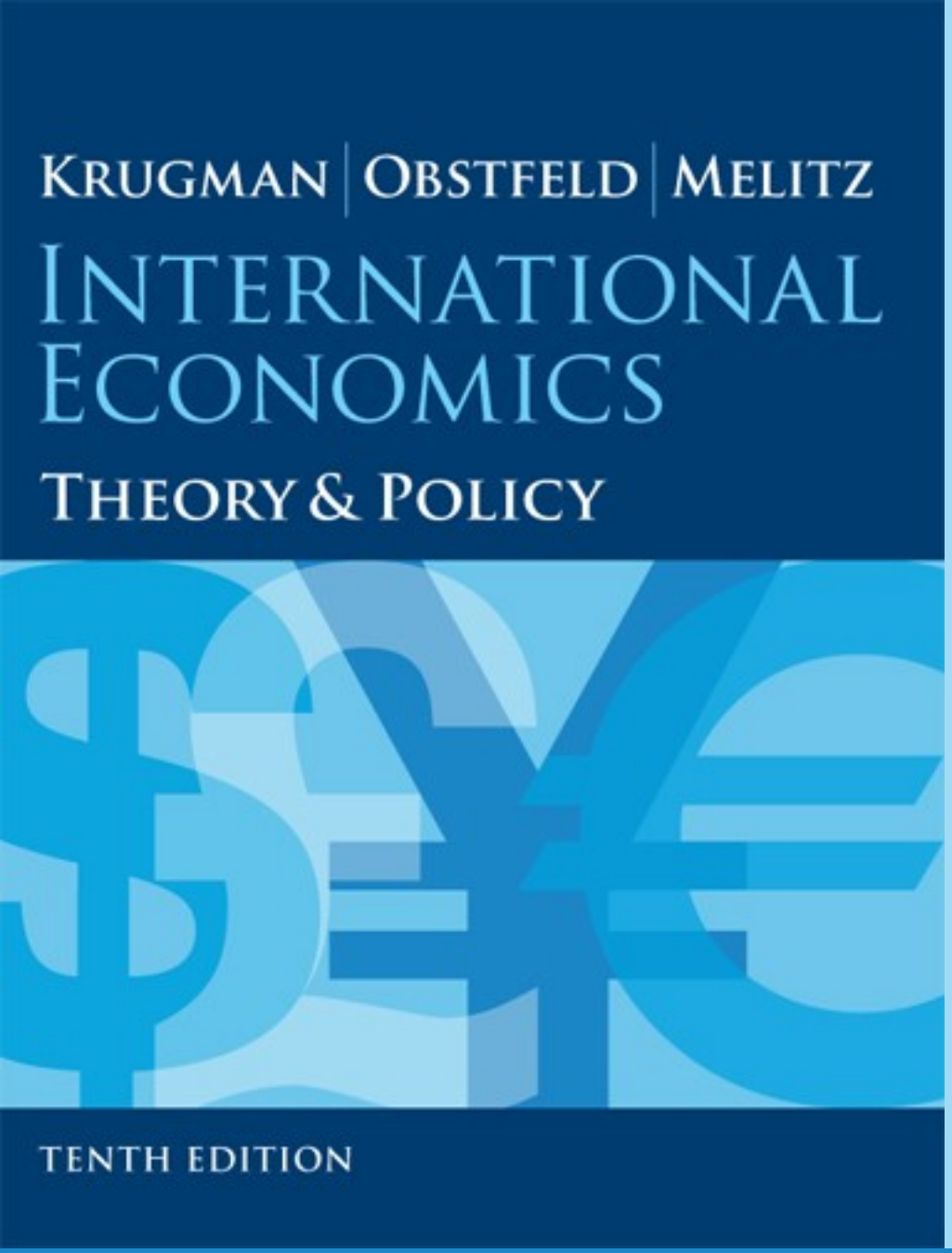


Chapter 9

The Instruments of Trade Policy

Preview

- Import tariffs
  - Import demand, export supply, and world equilibrium
  - Effects of a tarriff
  - Measuring the amount of protection
  - Costs and benefits of tariffs
- Export subsidies
  - CAP in EU

Preview

- Import quotas
  - sugar quota in U.S.
- Voluntary export restraints
  - Japanese cars
- Local content requirements
  - ARRA in U.S.
- Other trade policies
- Tariff vs quota in the presence of monopoly

Types of Tariffs

- A tariff is a tax levied when a good is imported.
- A **specific tariff** is levied as a fixed charge for each unit of imported goods.
  - For example, $3 per barrel of oil.
- An **ad valorem tariff** is levied as a fraction of the value of imported goods.
  - For example, 25% tariff on the value of imported trucks.

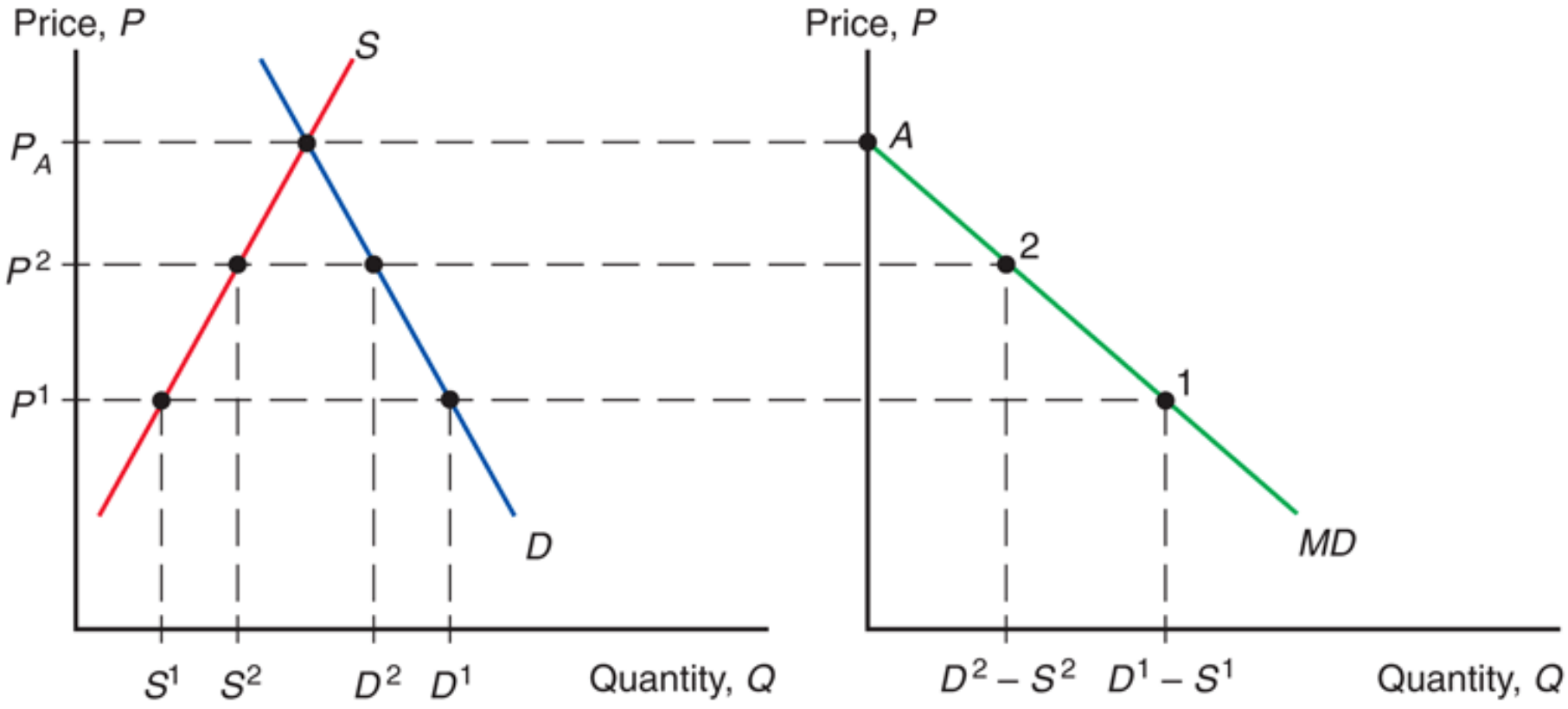
Supply, Demand, and Trade in a Single Industry

- Consider how a tariff affects a single market, say that of wheat.
- Suppose that in the absence of trade the price of wheat is higher in Home than it is in Foreign.
- With trade, wheat will be shipped from Foreign to Home until the price difference is eliminated.

Supply, Demand, and Trade in a Single Industry

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

Fig. 9-1: Deriving Home's Import Demand Curve



The Home import demand curve: $MD = D - S$.

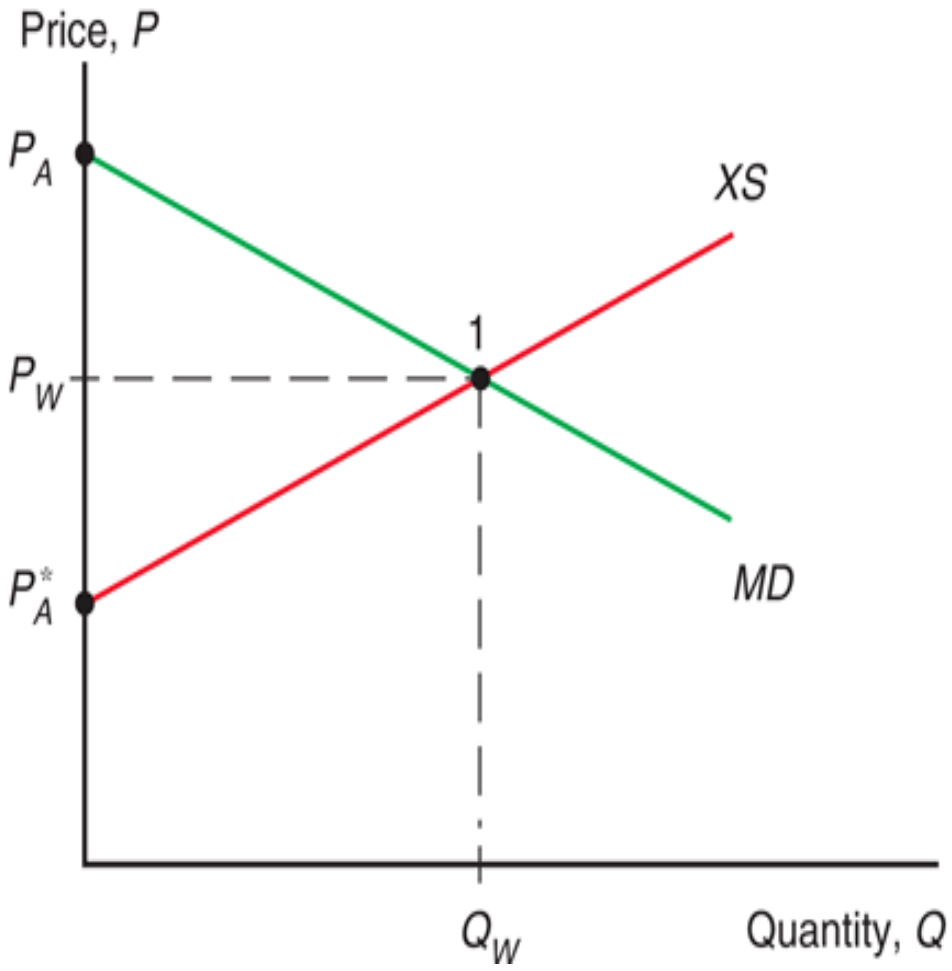
It intercepts the price axis at P_A and is downward sloping: As price increases, the quantity of imports demanded declines.

Fig. 9-2: Deriving Foreign's Export Supply Curve

The Foreign export supply curve: $XS^* = S^* - D^*$.

It intersects the price axis at P_A^* and is upward sloping: As price increases, the quantity of exports supplied rises.

Fig. 9-3: World Equilibrium



In equilibrium:

import demand = export supply

home demand – home supply = foreign supply – foreign demand

home demand + foreign demand = home supply + foreign supply

world demand = world supply.

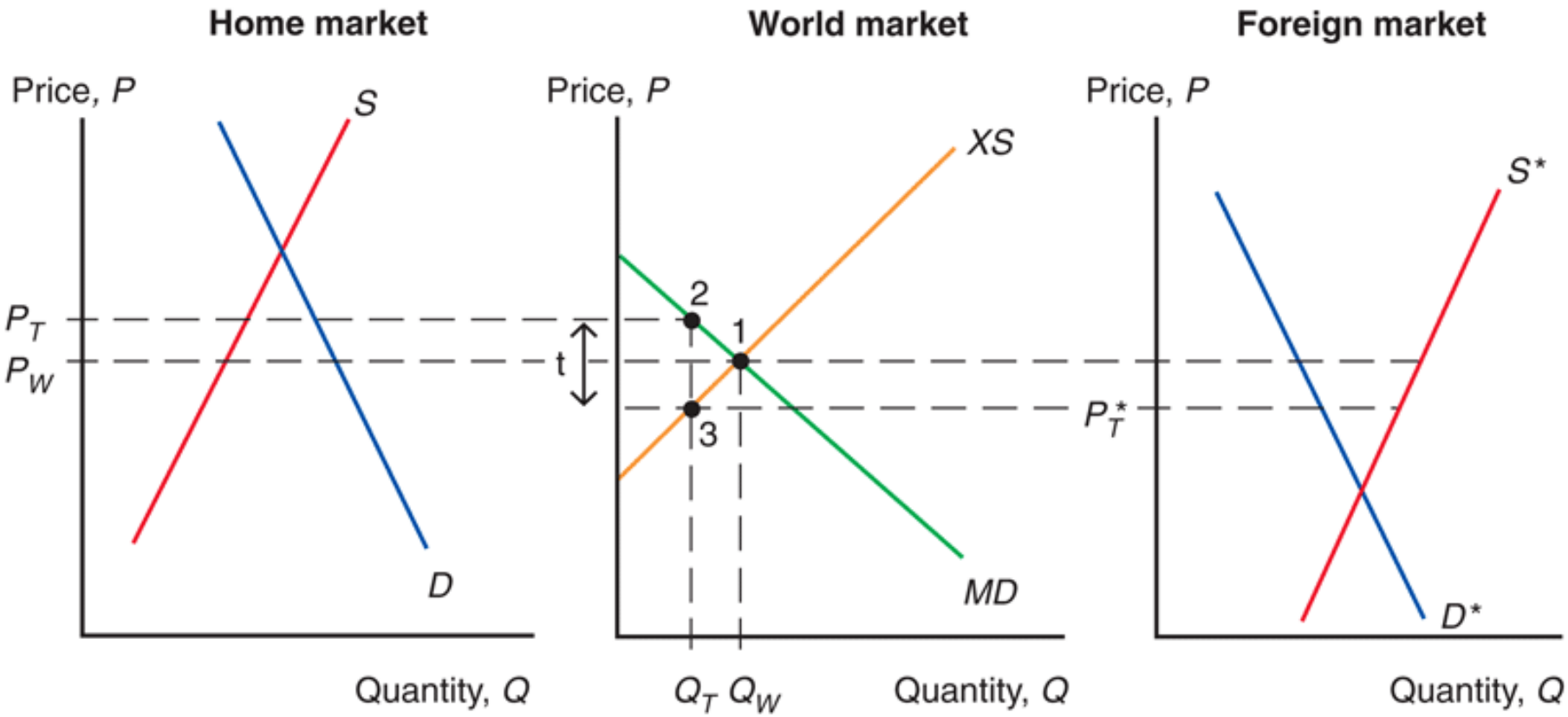
Effects of a Tariff

- A tariff acts like a transportation cost, making sellers unwilling to ship goods unless the Home price exceeds the Foreign price by the amount of the tariff:

$$P_T - t = P_T^*$$

- A tariff makes the price rise in the Home market and fall in the Foreign market.

Fig. 9-4: Effects of a Tariff



Effects of a Tariff

- Because the price in the Home market rises from P_W under free trade to P_T with the tariff,
  - Home producers supply more and Home consumers demand less, so
  - the quantity of imports falls from Q_W under free trade to Q_T with the tariff.
- Because the price in the Foreign market falls from P_W under free trade to P_T^* with the tariff,
  - Foreign producers supply less, and Foreign consumers demand more, so
  - the quantity of exports falls from Q_W to Q_T .

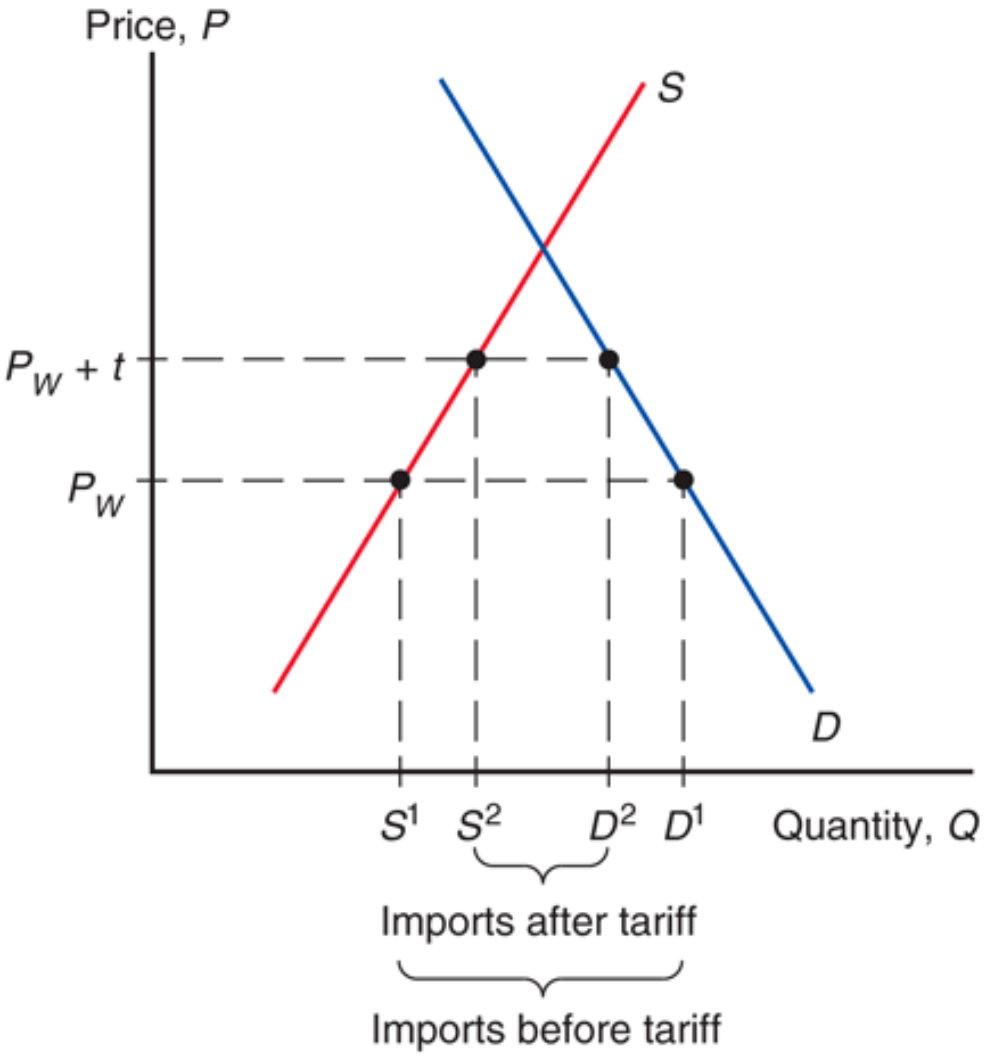
Effects of a Tariff

- The quantity of Home imports demanded equals the quantity of Foreign exports supplied when

$$P_T - P_T^* = t$$

- The increase in the price in Home can be less than the amount of the tariff.
  - Part of the effect of the tariff causes the Foreign export price to decline.
  - But this effect is sometimes very small.

Fig. 9-5: A Tariff in a Small Country



When a country is "small," it has no effect on the foreign (world) price because its demand is an insignificant part of world demand for the good.

The foreign price does not fall, but remains at P_w.

The price in the home market rises by the full amount of the tariff, to

$P_T = P_w + t$.

Measuring the Amount of Protection

- The **effective rate of protection** measures how much protection a tariff (or other trade policy) provides to an industry.
  - It represents the change in value that firms in an industry add to the production process when trade policy changes, which depends on the change in prices the trade policy causes.
- Effective rates of protection often differ from tariff rates, see the next example.

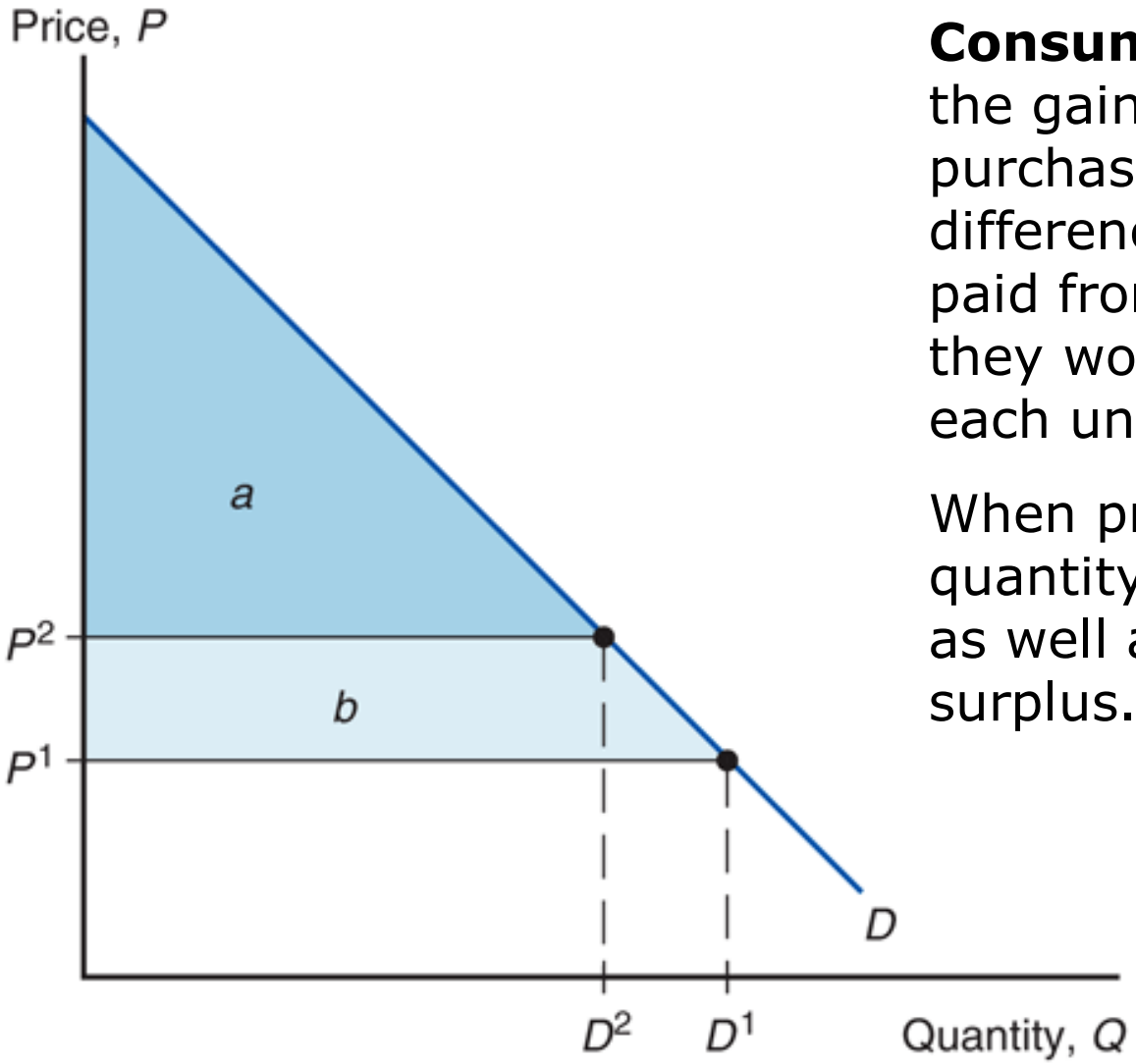
Measuring the Amount of Protection – Numerical Example

- Suppose that cars sell in world markets for $8,000, and that they are made from components worth $6,000.
  - The value added by assembling is $8,000 – $6,000 = $2,000.
- Suppose that a country puts a 25% tariff on imported autos so that home auto assembly firms can now charge up to $10,000 instead of $8,000 for a car.
  - The value added by assembling is $10,000 – $6,000 = $4,000.
- The effective rate of protection for auto assembly firms in Home: ($4,000 – $2,000)/$2,000 = 100%
- In this case, the effective rate of protection is 4 times greater than the tariff rate (100% vs 25%).

Costs and Benefits of Tariffs

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

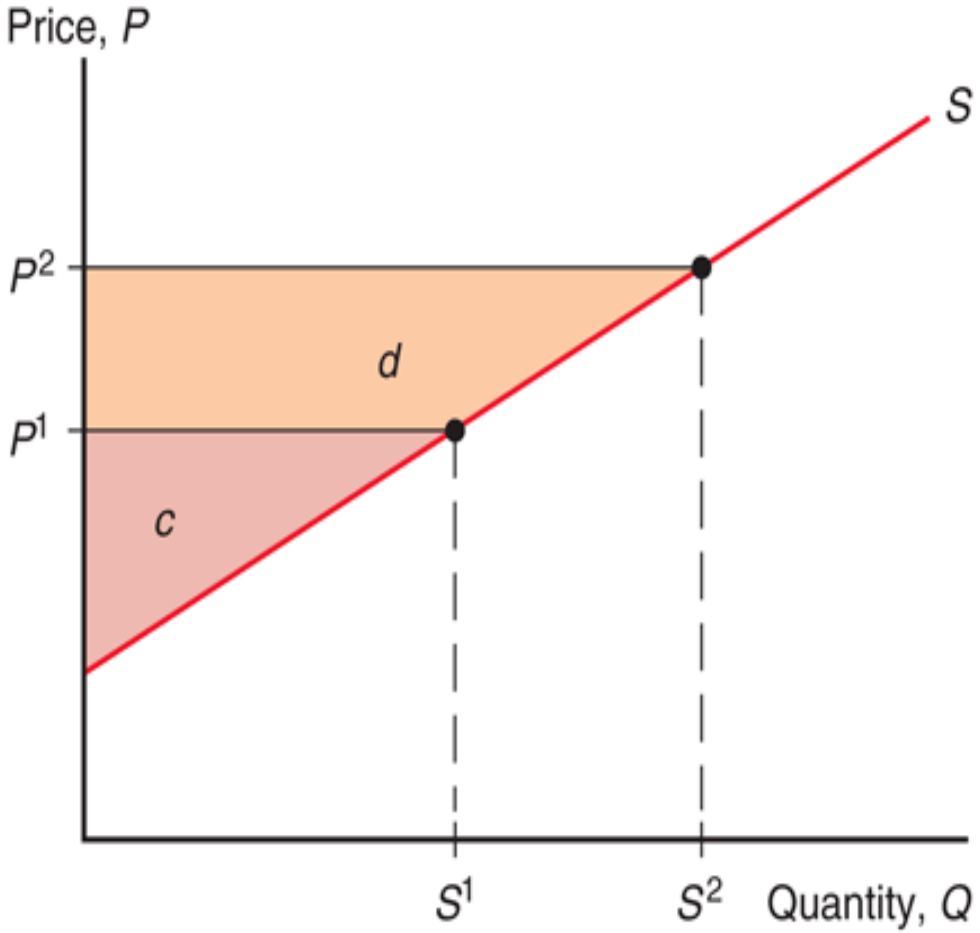
Fig. 9-7: Geometry of Consumer Surplus



Consumer surplus measures the gains of consumers from purchases by computing the difference in the price actually paid from the maximum price they would be willing to pay for each unit consumed.

When price increases, the quantity demanded decreases as well as the consumer surplus.

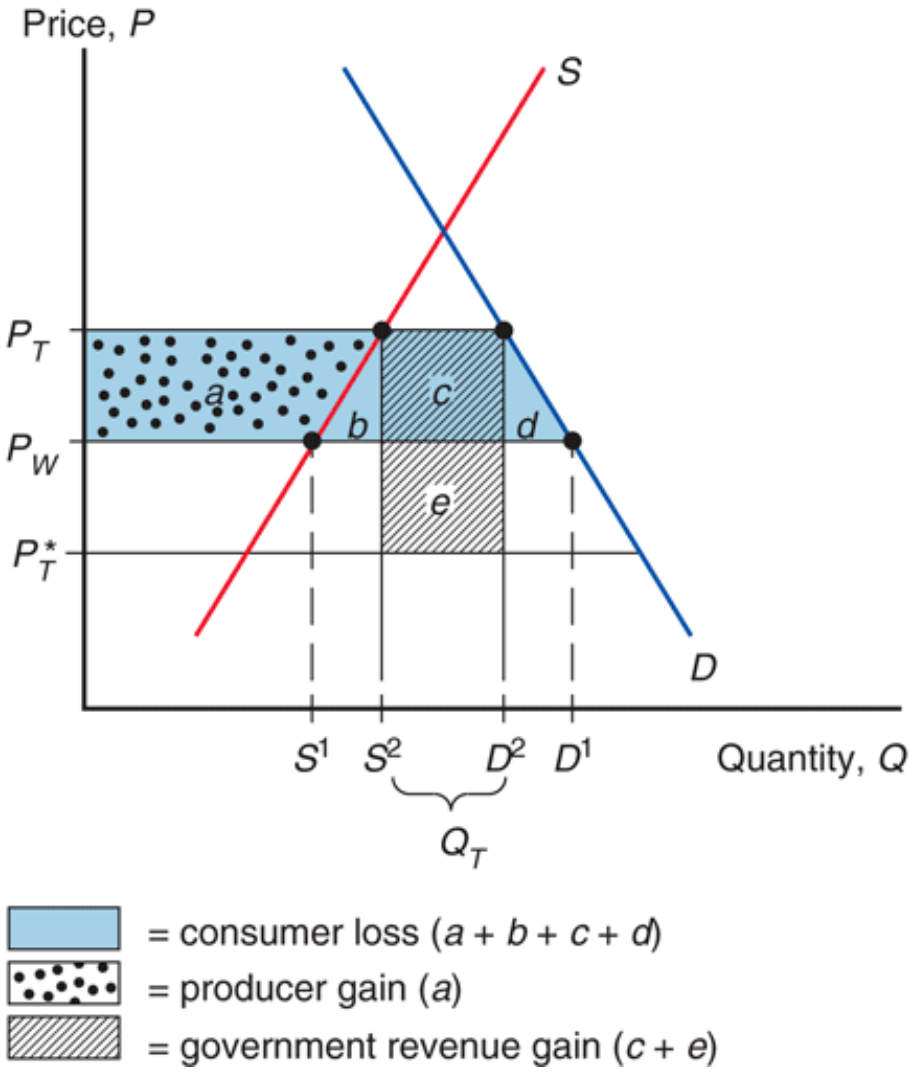
Fig. 9-8: Geometry of Producer Surplus



Producer surplus measures the gain of producers from sales by computing the difference in the price received from the minimum price at which they would be willing to sell.

When price increases, the quantity supplied increases as well as the producer surplus.

Fig. 9-9: Costs and Benefits of a Tariff for the Importing Country



A tariff raises the price in the importing country and lowers the price abroad.

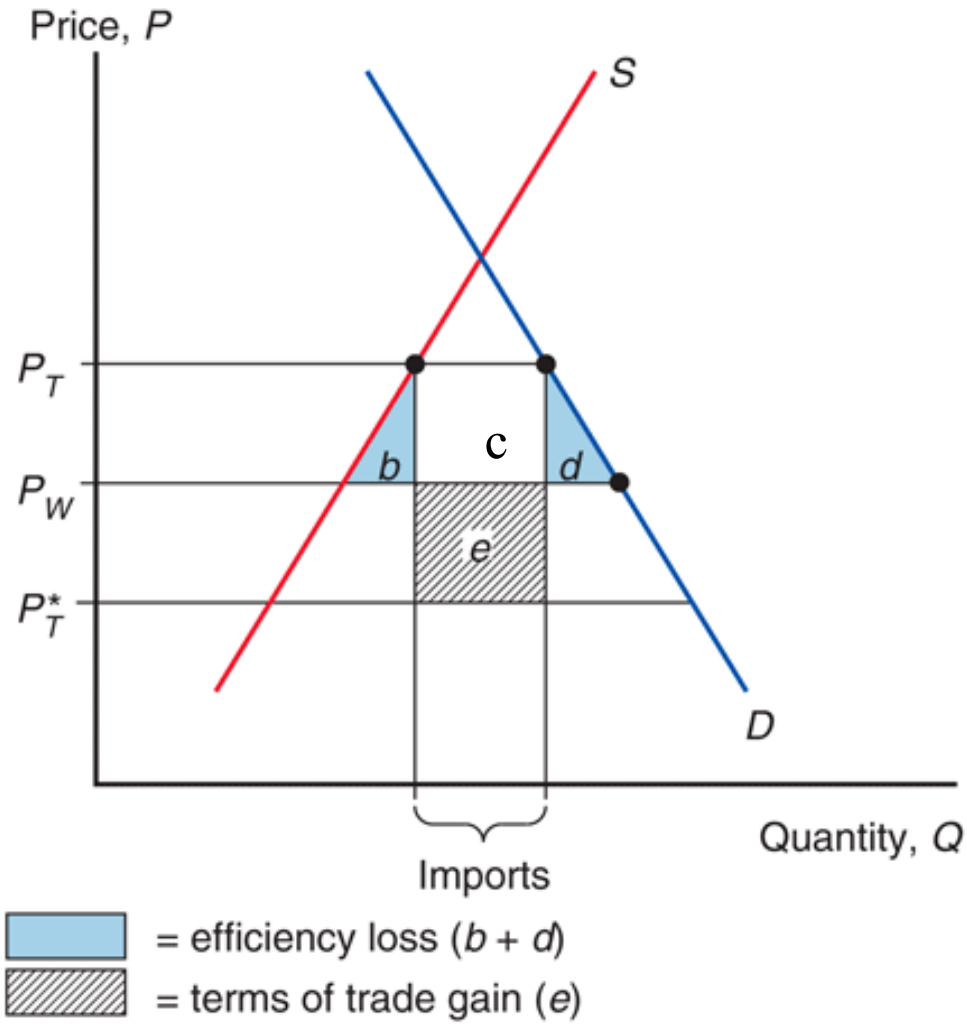
Consumer surplus decreases by the area ***a + b + c + d***.

Producer surplus increases by the area ***a.***

The government revenue equal to the tariff rate times the quantity of imports with the tariff, i.e. $t^*Q_T = (P_T - P_T^*)^*(D_2 - S_2)$ (area ***c + e***).

Change in welfare due to the tariff is ***e – (b + d)***.

Fig. 9-10: Net Welfare Effects of a Tariff



The triangles *b* and *d* represent the **efficiency loss**.

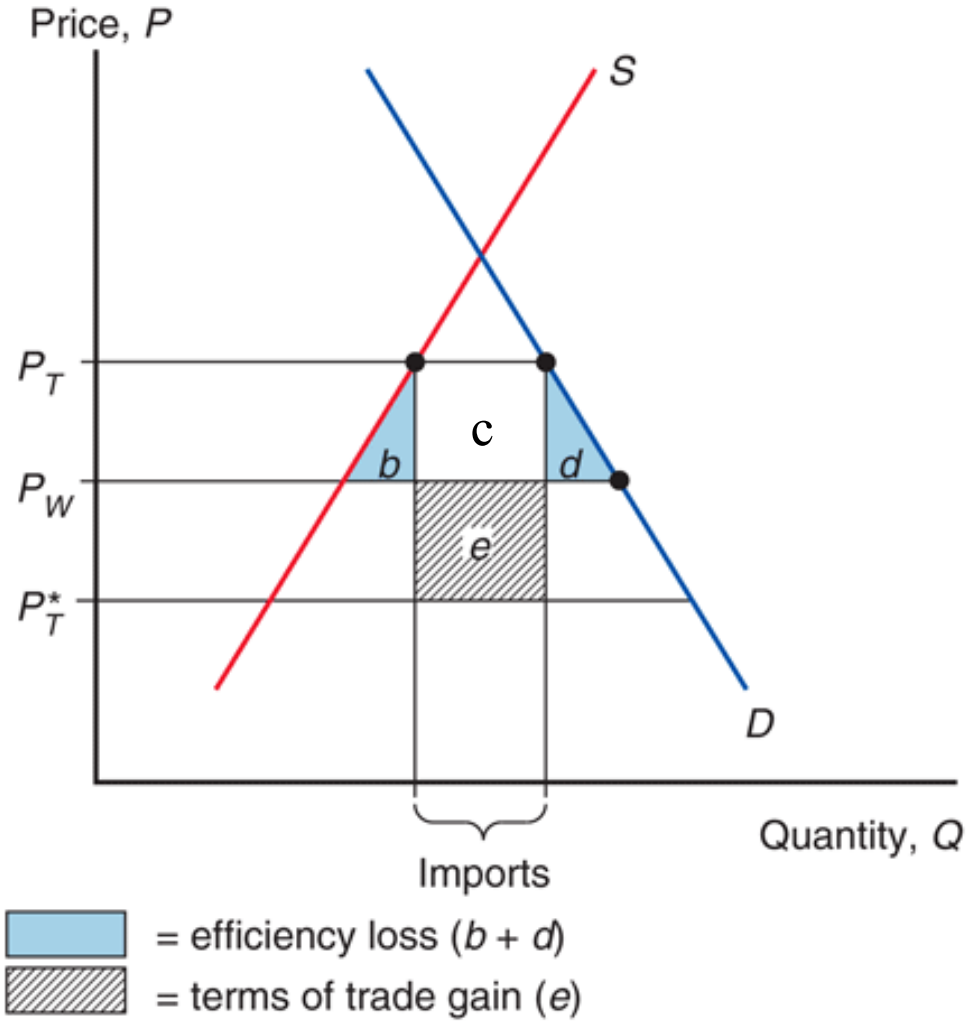
The tariff distorts production and consumption decisions: producers produce too much and consumers consume too little.

The rectangle *e* represents the **terms of trade gain**.

The tariff lowers the Foreign price, allowing Home to buy its imports cheaper.

For a "large" country, whose imports and exports affect world prices, the welfare effect of a tariff is ambiguous.

Fig. 9-10: Net Welfare Effects of a Tariff



The government gains at the expense of consumers (rectangle ***c***) and foreigners (rectangle ***e***) .

If the terms of trade gain exceeds the efficiency loss, then national welfare will increase under a tariff, at the expense of foreign countries.

In a small economy, the terms of trade gain is negligible. In such case, the tariff clearly worsens the national welfare.

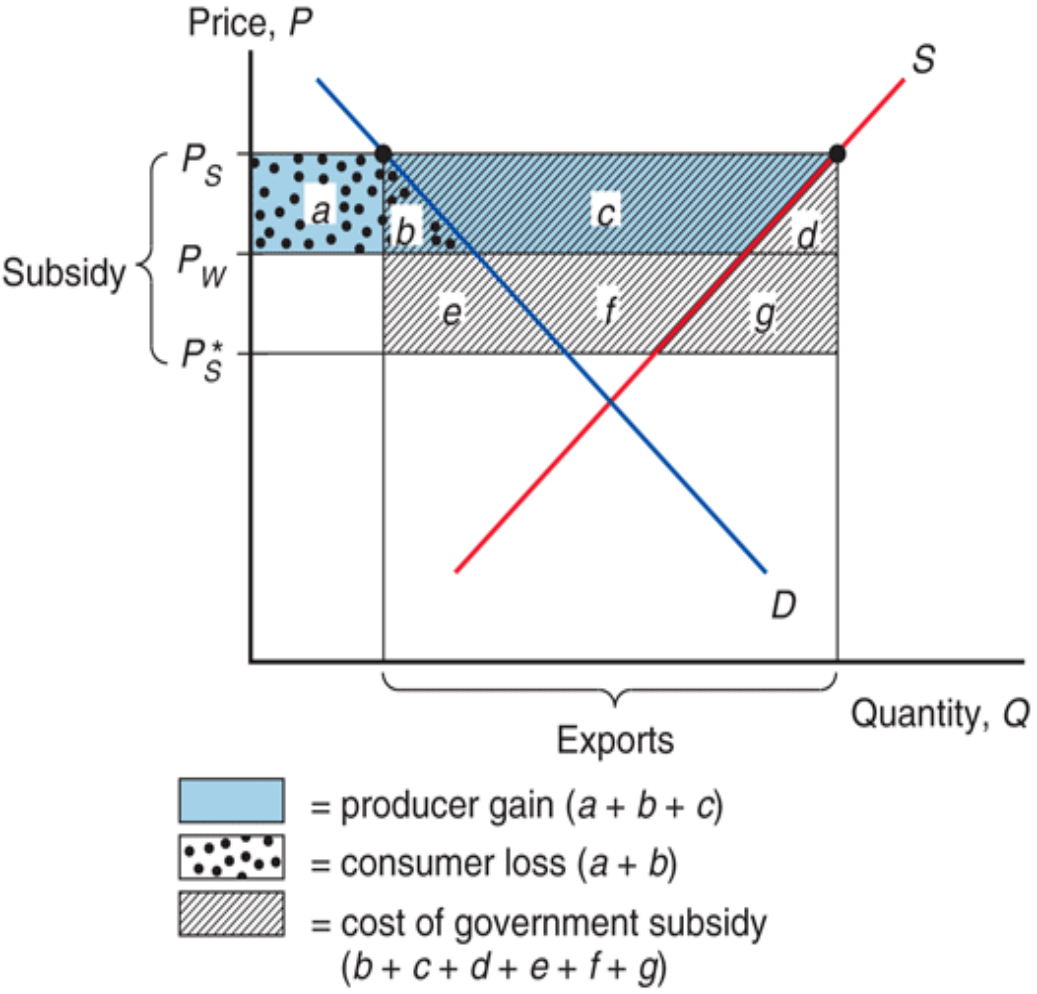
The Costs and Benefits of Tariffs

- Tariffs can lead trading partners to retaliate with their own tariffs, thus hurting exporters in the country that first adopted the tariff.
- Tariffs can be hard to remove and large tariffs may induce producers to engage in wasteful activities to avoid paying tariffs.
  - Ford and Subaru install (then later remove) seats in vans and pickups trucks to avoid U.S. tariff on imports of light commercial trucks.
- Producers may also waste resources in order to preserve the protection of a domestic market, see the next lecture/chapter.

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 in the exporting country, decreasing its consumer surplus and increasing its producer surplus.
- Also, government revenue falls due to paying $s^*X_s^*$ for the export subsidy.
  - s denotes the specific subsidy per unit of exported output.
- An export subsidy lowers the price paid in importing countries $P_s^* = P_s - s$.

Fig. 9-11: Effects of an Export Subsidy



The triangles ***b*** and ***d*** represent the **efficiency loss**. Producers produce too much (area ***d***) and consumers consume too little (area ***b***).

In contrast to a tariff, an export subsidy worsens the terms of trade by lowering the price of exports in world markets – the terms of trade loss is equal to ***e + f + g***.

The area ***b + c + d + e + f + g*** represents the cost of the subsidy paid by government.

The area ***b + d + e + f + g*** represents the net overall loss of national welfare.

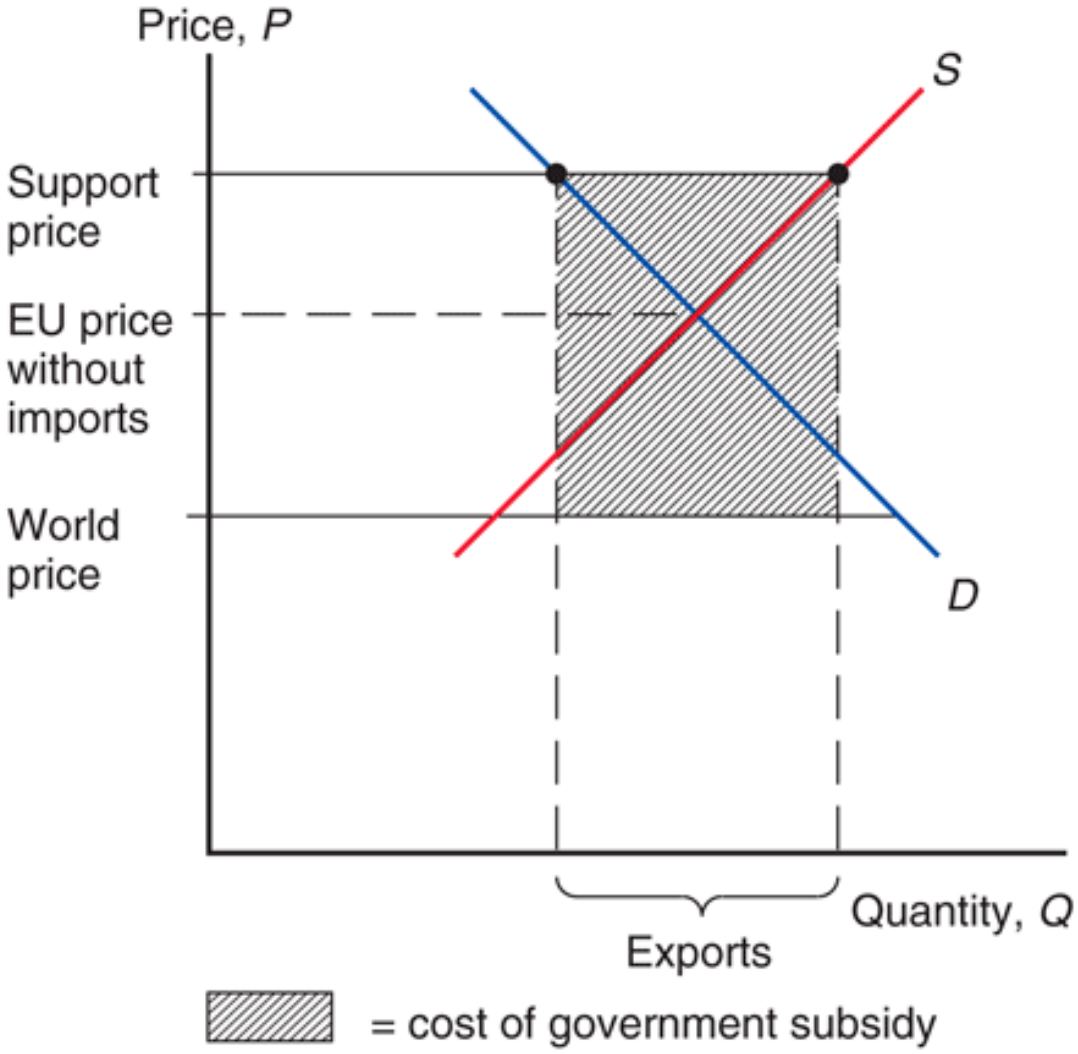
Europe's Common Agricultural Policy

- **Beginning**: EU guaranteed high prices to European farmers by buing agricultural products whenever the prices fell below specified support levels.
- To prevent this policy from drawing in large quantities of imports, it was initially backed by tariffs that offset the difference between European and world agricultural prices.
- As a result, the EU found itself obliged to buy and store huge quantities of food.
- In 1985: 780 000 tons of beef, 1.2 million tons of butter, and 12 million tons of wheat.

Europe's Common Agricultural Policy

- **Now**: The EU's CAP sets high prices for agricultural products and subsidizes exports to dispose of excess output.
  - Subsidized exports reduce world prices of agricultural products which further increase the costs of subsidy.
  - The costs of this policy for European tax payers are almost 58 billion euros (2013).
  - Subsidy payments are about 22% of the value of farm output (in USA only 8.6%).
  - Boulanger and Jomini (2010): The welfare costs to consumers exceed the benefits to farm producers by nearly 21.5 billion euros in 2007.
  - The EU has proposed that farmers receive direct payments independent of the amount of production to help lower EU prices and reduce production.

Fig. 9-12: Europe's Common Agricultural Policy



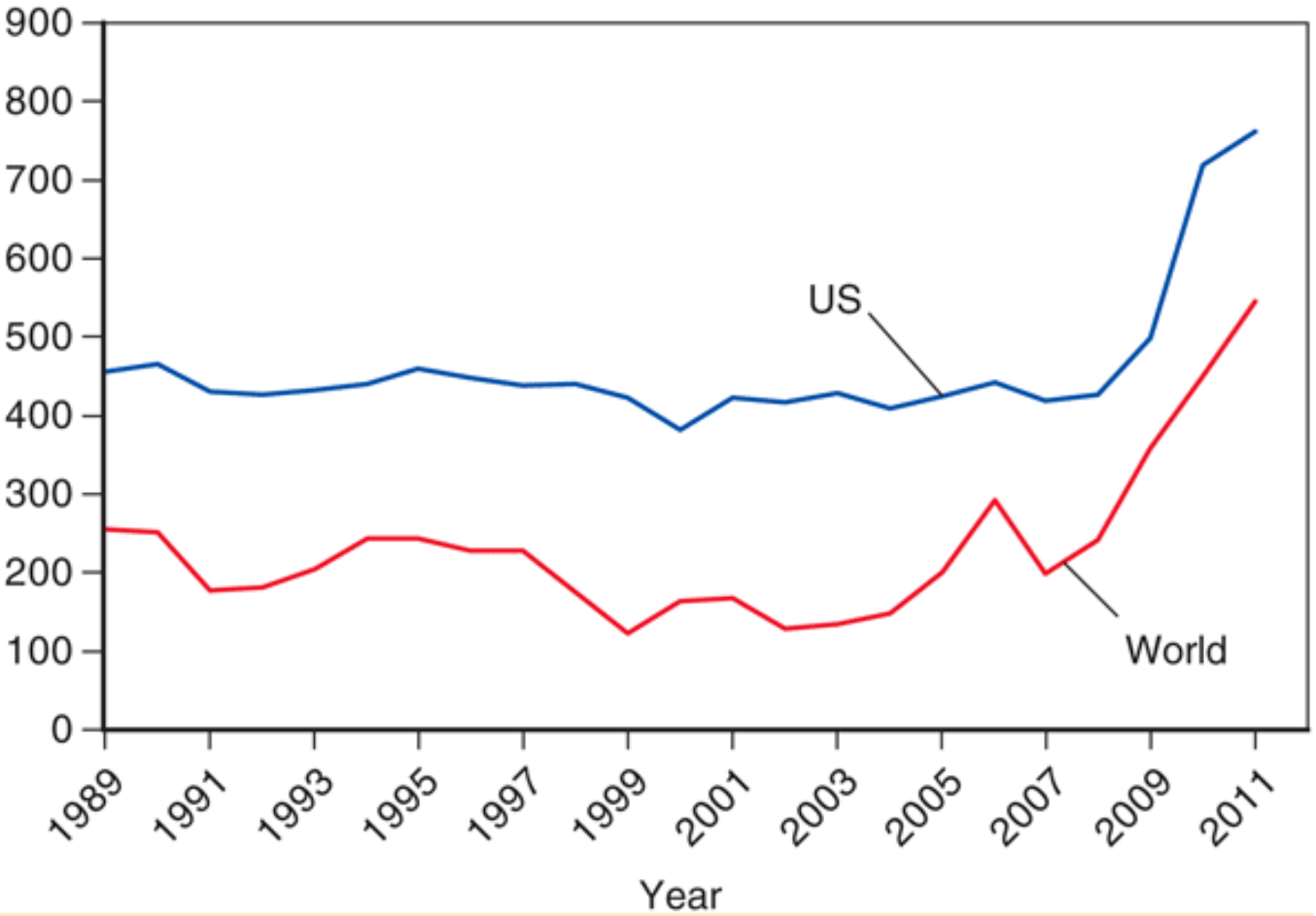
Agricultural prices are fixed not only above world market levels but also above the price that would clear the European market. An export subsidy is used to dispose of the resulting surplus.

The shaded area represents the costs of export subsidy for EU (58 billion euros in 2013).

Import Quota

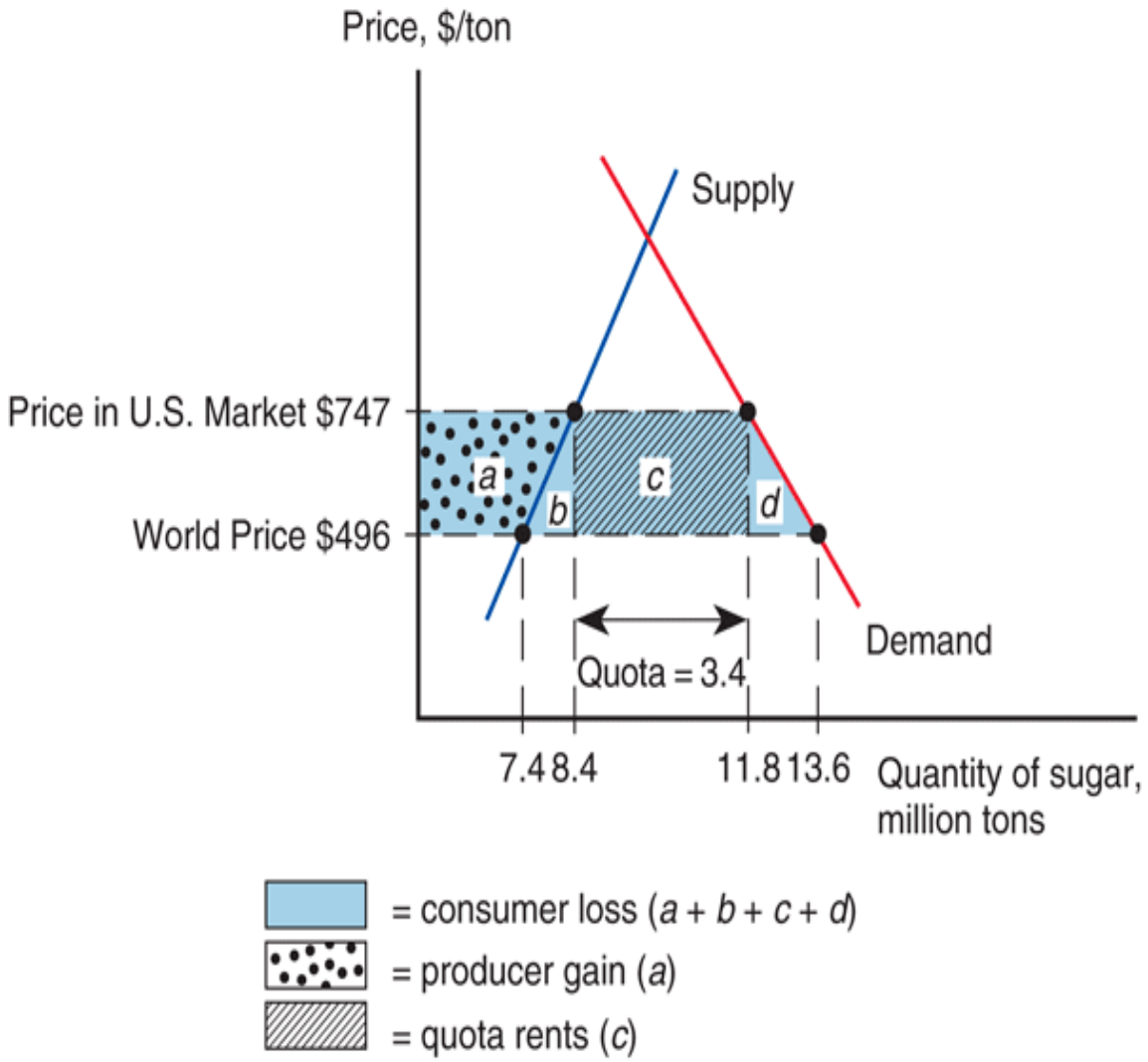
- An import quota is a restriction on the quantity of a good that may be imported.
  - This restriction is usually enforced by issuing licenses or quota rights.
- A binding import quota will push up the price of the import because the quantity demanded will exceed the quantity supplied by Home producers and from imports.
- 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.
  - These extra revenues are called **quota rents**.

Fig. 9-13: U.S. and World Raw Sugar Prices in $ per ton, 1989–2011



Source: U.S. Department of Agriculture.

Fig. 9-14: Effects of the U.S. Import Quota on Sugar, 2014 Estimate



Assumption: The import quota on sugar in U.S. does not influence the world price.

The quota limits imports of raw sugar to 3.4 million tons. Without the quota, imports of sugar would be 84 percent higher (6.2 million tons).

The result of the quota is that the price of sugar is $747 per ton, versus the $496 price on world markets.

This produces a gain for U.S. sugar producers, but a much larger loss for U.S. consumers. Moreover, the quota rents are collected by foreign governments.

Effects of the U.S. Import Quota on Sugar, 2014 Estimate

- Estimated gains for sugar producers: $3.9 billion a year
  - Most of those gains go to sugar refiners with "only" $486 million going to sugar farmers.
  - Together they employ only about 20 000 workers which means an implicit subsidy of $200 000 per worker and a year.
  - In 2012 they donated $4.5 million to political campaigns and in 2013 they spent $3 million on lobbying expenses associated with the congressional vote on import sugar restriction.
- Estimated loss for consumers and food producers: $4.4 billion a year
  - $3.5 billion loss for consumers and $909 million loss for food producers.
  - less than 30 dollars a year for a typical U.S. household.

Effects of the U.S. Import Quota on Sugar, 2014 Estimate

- The deadweight losses are relatively minor, most of the differential between estimated gains and losses is given by quota rents which benefit foreign governments.
- Sugar producers argue that it "saves" jobs in U.S.
  - $200 000 per year for 1 worker is quite a lot.
  - Quota, which raises the price of raw sugar in U.S., forces candy makers to move production to Canada and Mexico where the price of raw sugar is lower.
- Estimated effects of the elimination of sugar quota on the employment in U.S.:
  - Lower employment in sugar production: 500 - 2000 workers.
  - Higher employment in food production: 17000 – 20000 workers.

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.
- 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.

Voluntary Export Restraint: Japanese Autos

- The sharp oil price increase in 1979 shifted the demand in U.S. toward smaller Japanese cars
- Due to the political power of American producers, Japan agreed on voluntary restrictions of their car exports.
  - The threat of unilateral tariffs from the U.S.
  - The first agreement from 1981 limited exports to U.S. to 1.68 million cars, in 1984 it was adjusted to 1.85 million cars, in 1985 the agreement was allowed to lapse.
- The price of Japanese cars in U.S. rose, with the rent captured by Japanese firms.
  - U.S. government estimates: In 1984 the total costs were $3.2 billion, mainly in the form of rent transfers to Japan rather than efficiency losses.

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 home value added or
  - in physical units, by requiring that some particular components of the product to be produced domestically.
- From the viewpoint of domestic producers of inputs, a local content requirement provides protection in the same way that an import quota would.

Local Content Requirement

- From the viewpoint of firms that must buy home inputs, however, the requirement does not place a strict limit on imports, but allows firms to import more if they also use more home parts.
- Local content requirement provides neither government revenue (as a tariff would) nor quota rents.
- Instead, the difference between the prices of home goods and imports is averaged into the price of the final good and is passed on to consumers.

Local Content Requirement

- American Recovery and Re-Investment Act (ARRA) passed in 2009
  - Any public work project funded ARRA must use U.S. iron, steel, and manufactured goods (unless foreign bid more than 25% lower).
  - The Bay Bridge linking San Francisco and Oakland did not use ARRA funding because some key components would have been 23% ($400 million) more expensive.
  - Delays due to having to show that some items are unavailable from U.S. sources.
  - Has triggered protectionist clauses that shut U.S. firms out of opportunities abroad.

Other Trade Policies

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

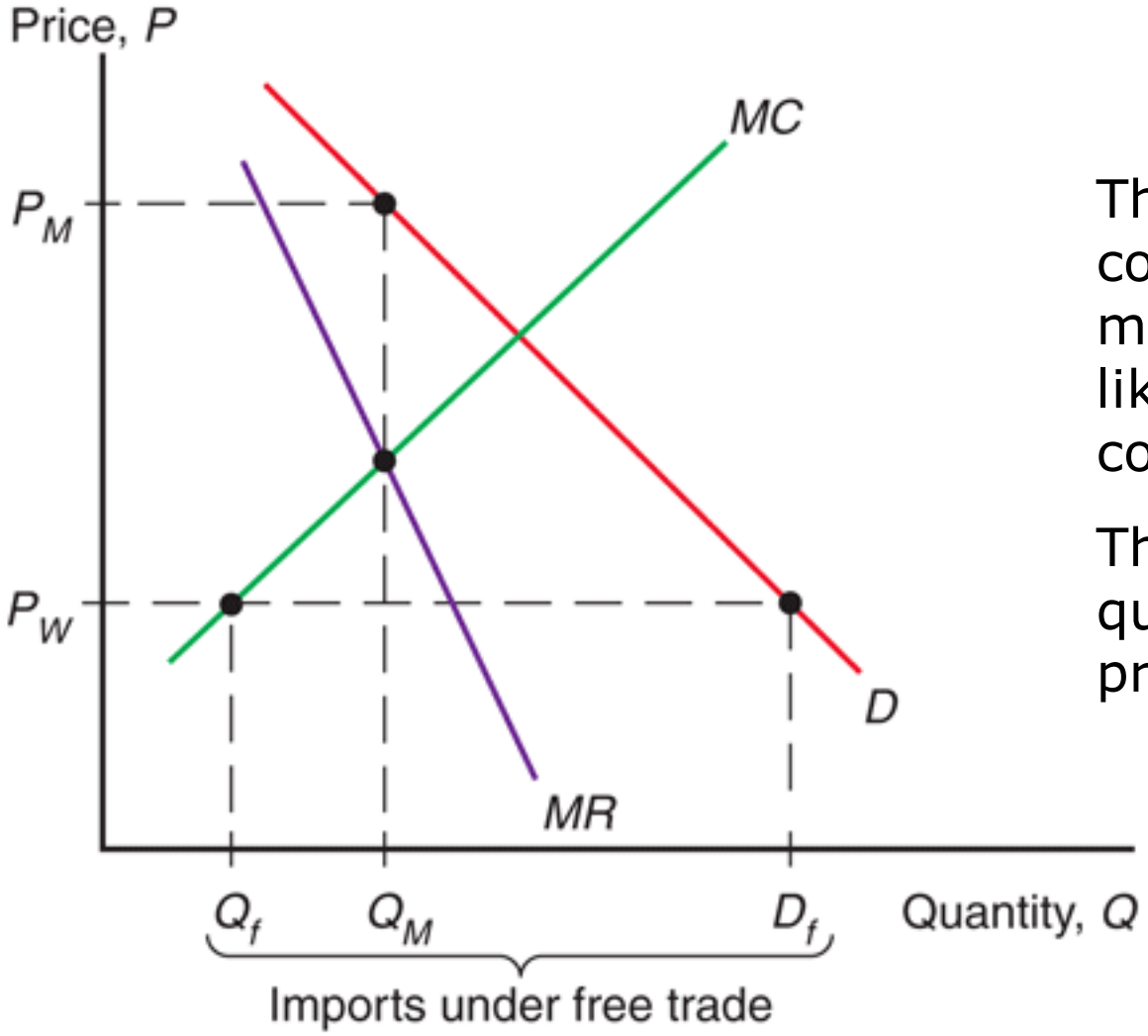
Table 9-1: Effects of Alternative Trade Policies

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

The Effects of Tariffs and Import Quotas in the Presence of Monopoly

- In case of competitive markets, the effect of comparable tariff and import quota on price and quantity produced is the same.
- Is it also true for domestic monopoly?

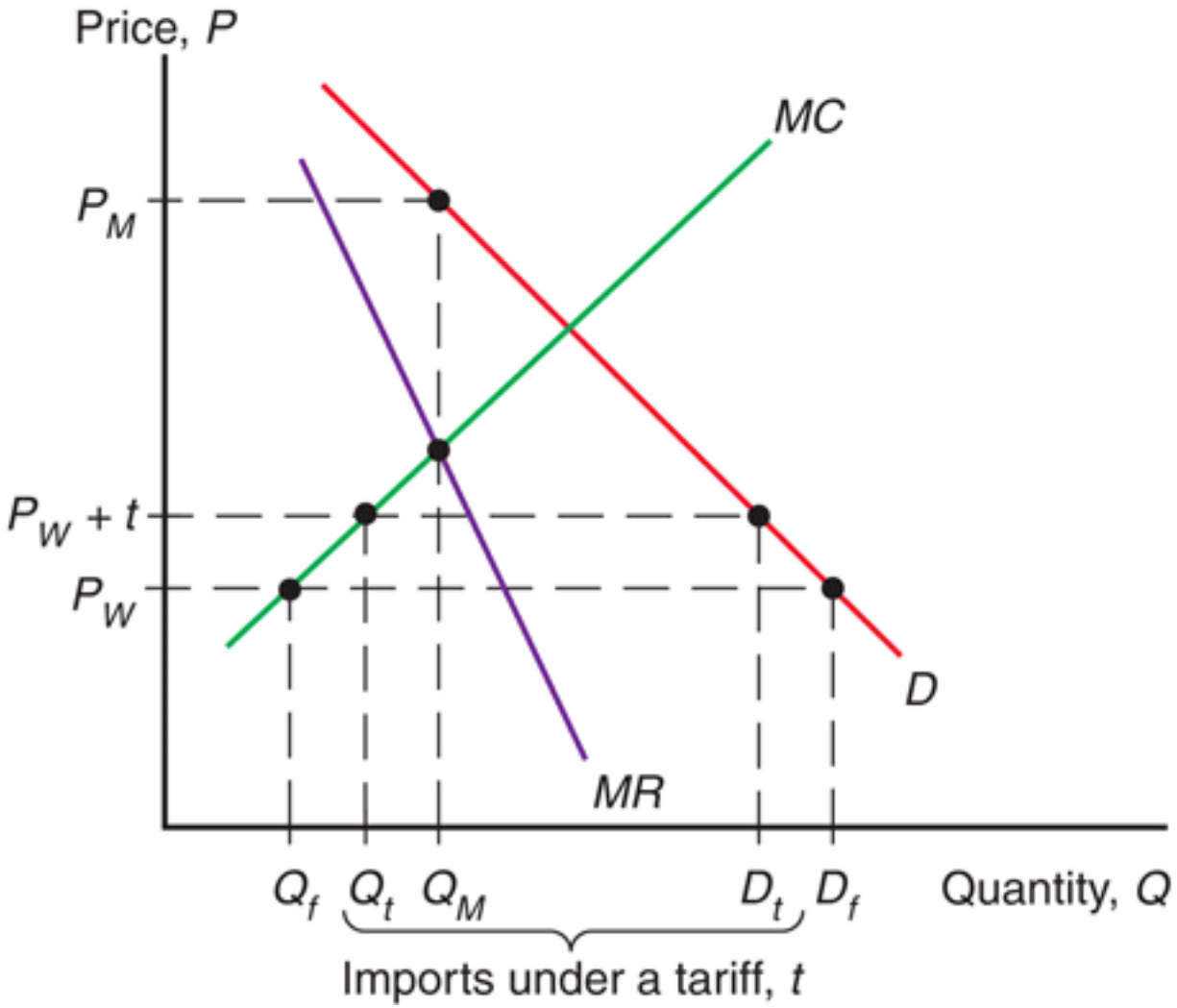
Fig. 9A-1: A Monopolist under Free Trade



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

The monopolist sells quantity Q_f at the world price $P_W = MC$.

Fig. 9A-2: A Monopolist Protected by a Tariff

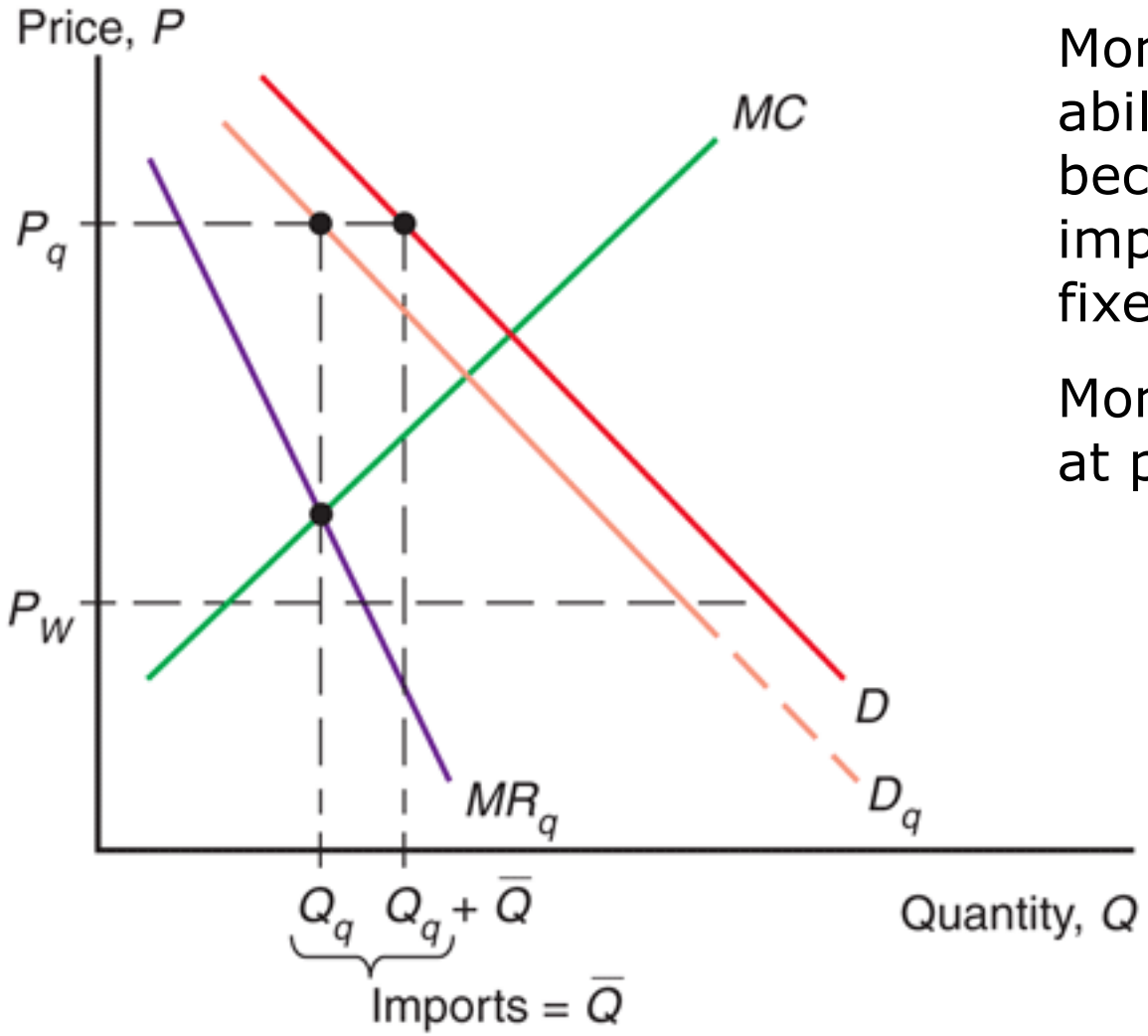


The tariff allows the monopolist to raise its price to $P_W + t$. Monopolist therefore sells the quantity Q_t

The monopolist still behaves like a competitive industry – it sells for price equal to marginal costs.

Because of import competition, it is not possible to raise the price to monopoly level P_M.

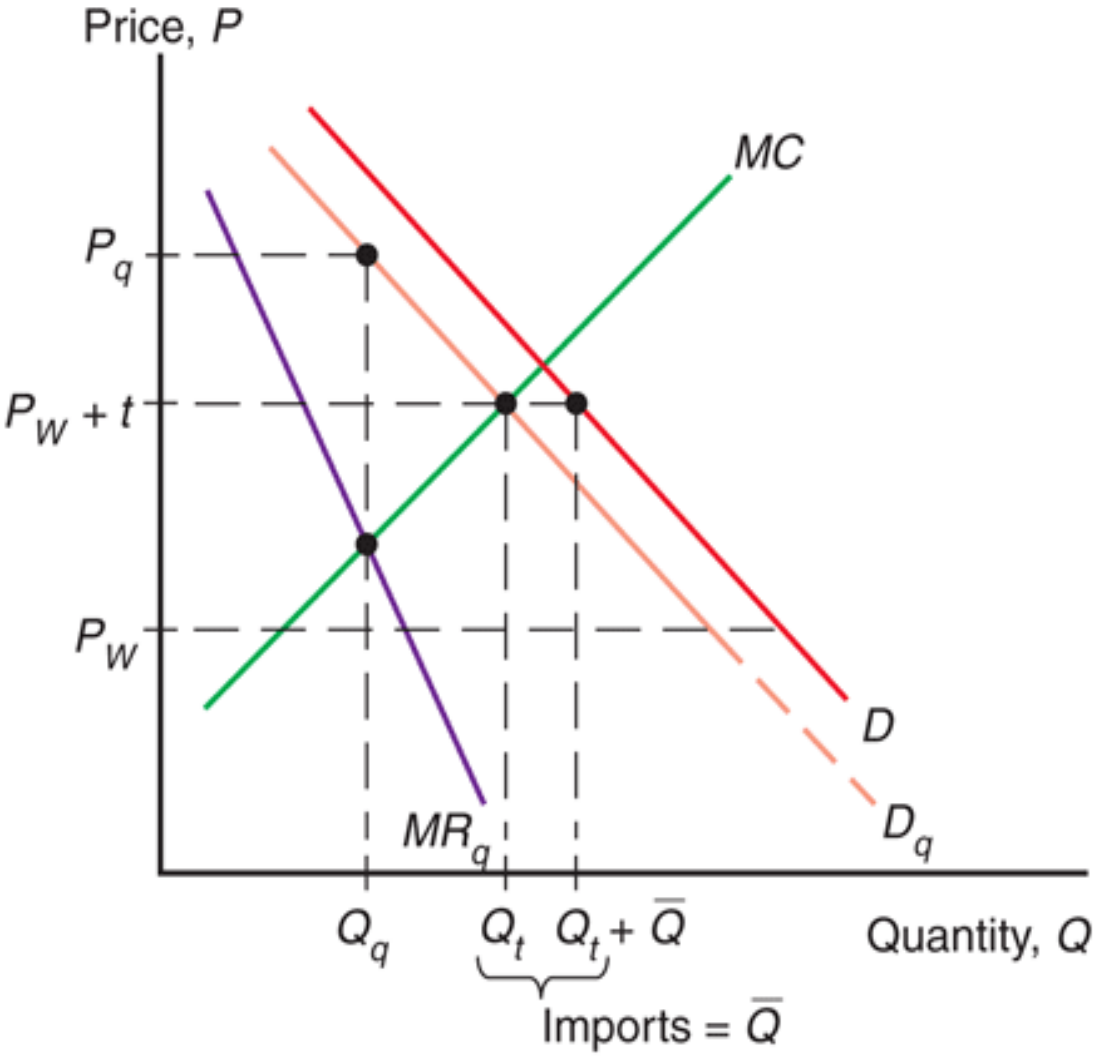
Fig. 9A-3: A Monopolist Protected by an Import Quota



Monopolist has now a higher ability to raise the price, because the volume of import is restricted to the fixed amount.

Monopolist sells quantity Q_q at price P_q.

Fig. 9A-4: Comparing a Tariff and a Quota



A quota leads to lower domestic output ($Q_q < Q_t$) and higher price ($P_q > P_w+t$) than a tariff that yields the same level of imports.

A quota gives domestic monopoly much higher monopoly power than a comparable tariff.

However, protection has increasingly drifted away from tariffs toward nontariff barriers, such as import quotas.

Why? See the next lecture.

Summary

1. A tariff increases the home price and the quantity supplied and reduces the quantity demanded and the quantity traded; also decreases the world price when the country is “large.”
2. A quota does the same; an export subsidy does the same.
3. Tariffs generate government revenue; export subsidies drain it; import quotas are revenue neutral.

Summary

4. The welfare effect of a tariff, quota, or export subsidy can be measured by
   - efficiency loss from consumption and production distortions.
   - 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.
7. In the presence of domestic monopoly, a quota gives domestic monopoly much higher monopoly power than a comparable tariff.