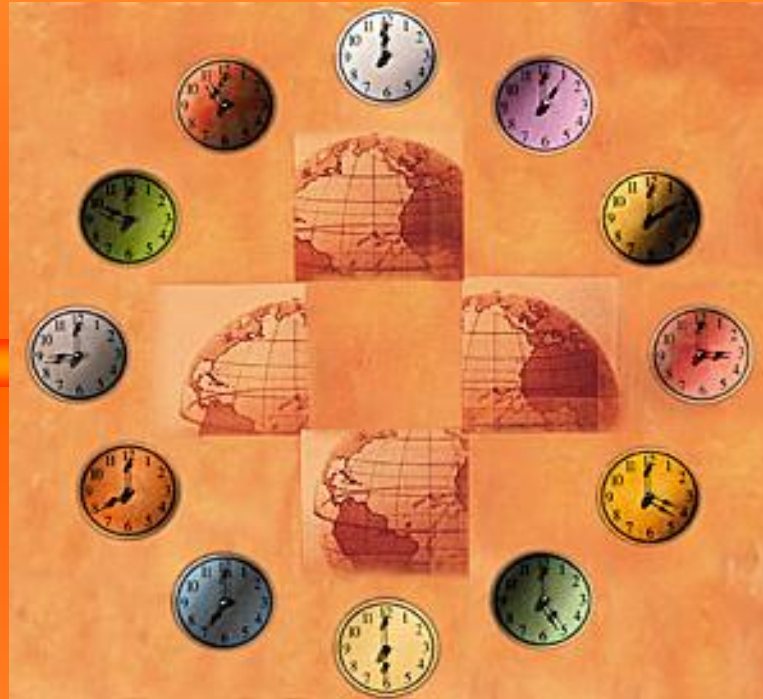# Chapter 8
The Instruments of Trade Policy

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To Accompany

International Economics: Theory and Policy, Sixth Edition
by **Paul R. Krugman and Maurice Obstfeld**

Chapter Organization

- Introduction
- Basic Tariff Analysis
- Costs and Benefits of a Tariff
- Other Instruments of Trade Policy
- The Effects of Trade Policy: A Summary
- Summary
- Appendix I: Tariff Analysis in General Equilibrium
- Appendix II: Tariffs and Import Quotas in the Presence of Monopoly
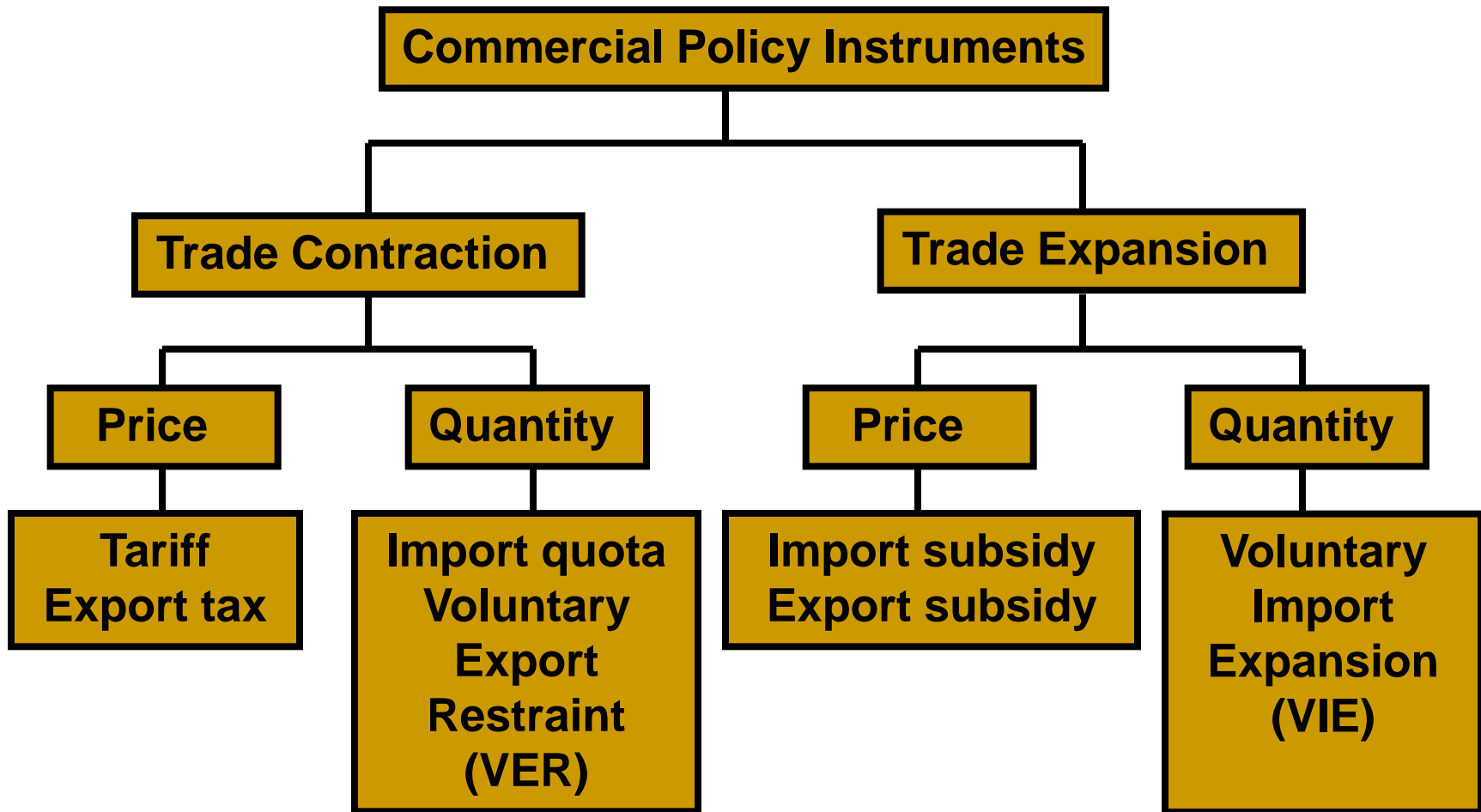
Introduction

- This chapter is focused on the following questions:
  - What are the effects of various trade policy instruments?
    - Who will benefit and who will lose from these trade policy instruments?
  - What are the costs and benefits of protection?
    - Will the benefits outweigh the costs?
  - What should a nation's trade policy be?
    - For example, should the United States use a tariff or an import quota to protect its automobile industry against competition from Japan and South Korea?

Introduction

Classification of Commercial Policy Instruments

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                    ┌─────────────────────────────────┐
                    │  Commercial Policy Instruments  │
                    └─────────────────────────────────┘
              ┌──────────────┴──────────────┐
    ┌─────────────────────┐        ┌─────────────────────┐
    │  Trade Contraction  │        │   Trade Expansion   │
    └─────────────────────┘        └─────────────────────┘
       ┌──────┴──────┐                ┌──────┴──────┐
  ┌─────────┐  ┌──────────┐      ┌─────────┐  ┌──────────┐
  │  Price  │  │ Quantity │      │  Price  │  │ Quantity │
  └─────────┘  └──────────┘      └─────────┘  └──────────┘
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Price	Quantity	Price	Quantity
Tariff Export tax	Import quota Voluntary Export Restraint (VER)	Import subsidy Export subsidy	Voluntary Import Expansion (VIE)

Basic Tariff Analysis

■ Tariffs can be classified as:

- **Specific tariffs**
  - Taxes that are levied as a fixed charge for each unit of goods imported
    - Example: A specific tariff of $10 on each imported bicycle with an international price of $100 means that customs officials collect the fixed sum of $10.

- **Ad valorem tariffs**
  - Taxes that are levied as a fraction of the value of the imported goods
    - Example: A 20% ad valorem tariff on bicycles generates a $20 payment on each $100 imported bicycle.

Basic Tariff Analysis

- A compound duty (tariff) is a combination of an ad valorem and a specific tariff.

- Modern governments usually prefer to protect domestic industries through a variety of nontariff barriers, such as:

    - **Import quotas**

        - Limit the quantity of imports

    - **Export restraints**

        - Limit the quantity of exports

Basic Tariff Analysis

- **Supply, Demand, and Trade in a Single Industry**
  - Suppose that there are two countries (Home and Foreign).
  - Both countries consume and produce wheat, which can be costless transported between the countries.
  - In each country, wheat is a competitive industry.
  - Suppose that in the absence of trade the price of wheat at Home exceeds the corresponding price at Foreign.
    - This implies that shippers begin to move wheat from Foreign to Home.
      - The export of wheat raises its price in Foreign and lowers its price in Home until the initial difference in prices has been eliminated.

Basic Tariff Analysis

- To determine the world price (P_w) and the quantity trade (Q_w), two curves are defined:

    - Home **import demand curve**

        - Shows the maximum quantity of imports the Home country would like to consume at each price of the imported good.

            - That is, the excess of what Home consumers demand over what Home producers supply: $MD = D(P) - S(P)$

    - Foreign **export supply curve**

        - Shows the maximum quantity of exports Foreign would like to provide the rest of the world at each price.

            - That is, the excess of what Foreign producers supply over what foreign consumers demand: $XS = S*(P*) - D*(P*)$

Basic Tariff Analysis

Figure 8-1: Deriving Home's Import Demand Curve
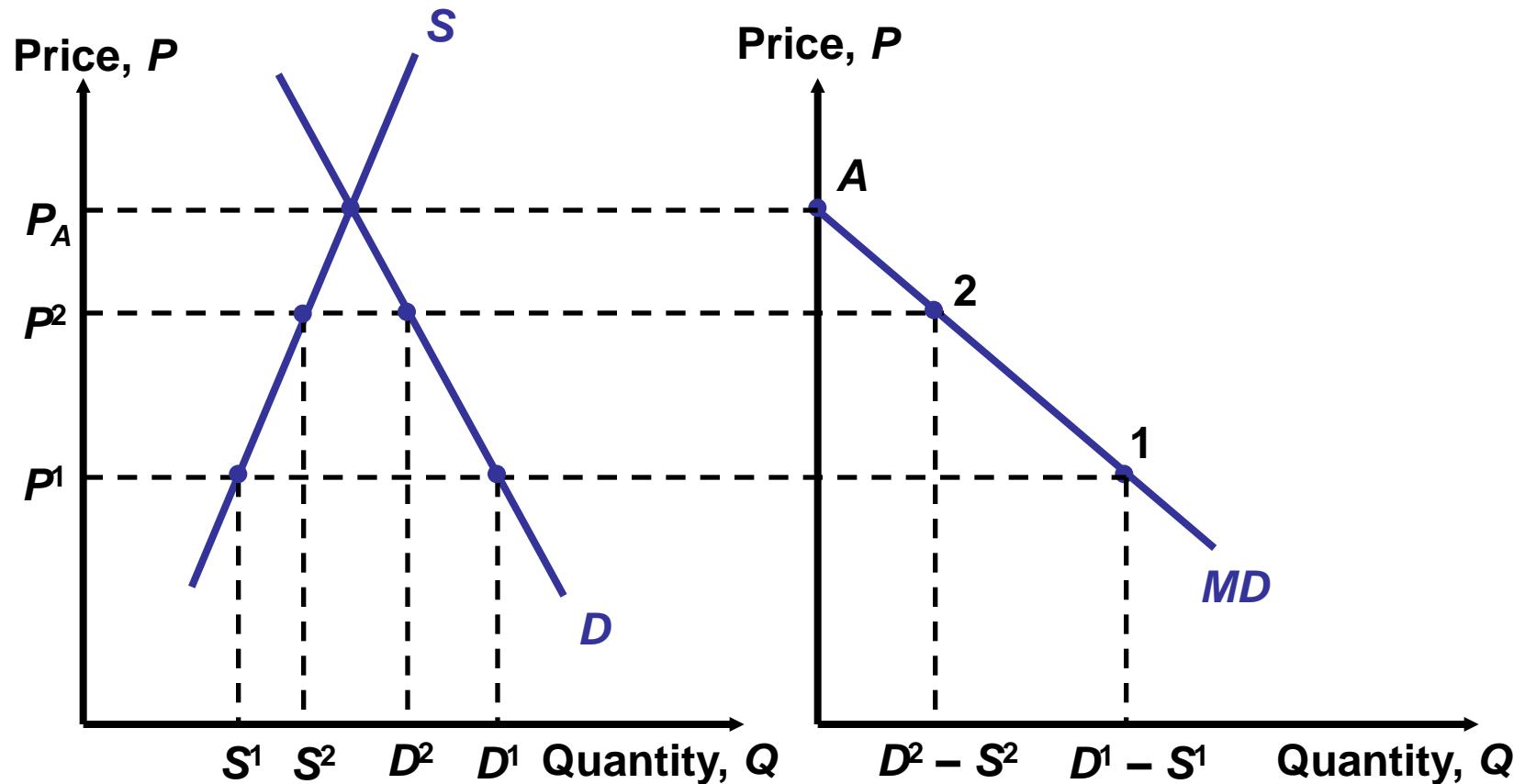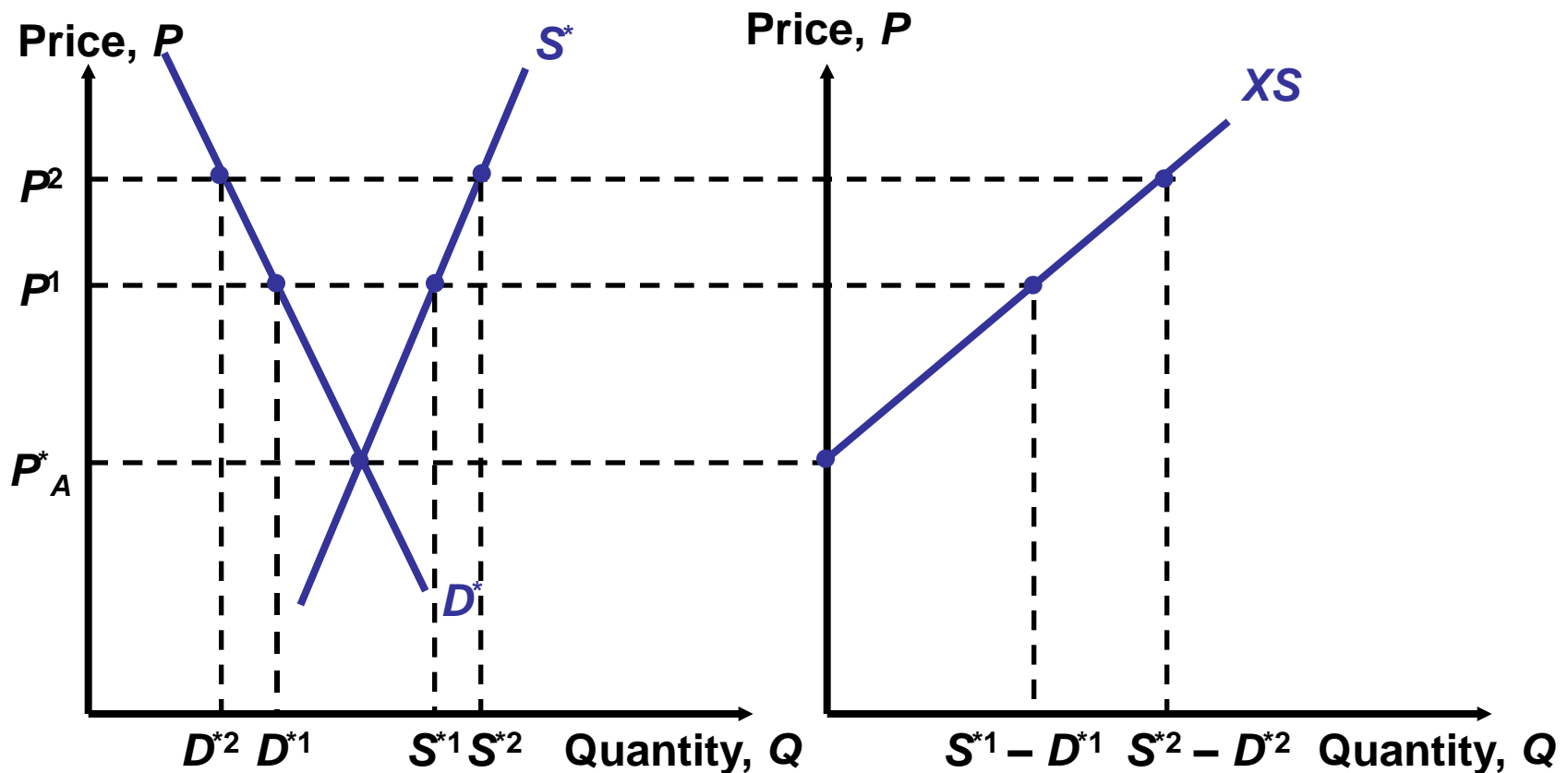
Basic Tariff Analysis

- **Properties of the import demand curve:**
  - It intersects the vertical axis at the closed economy price of the importing country.
  - It is downward sloping.
  - It is flatter than the domestic demand curve in the importing country.

Basic Tariff Analysis

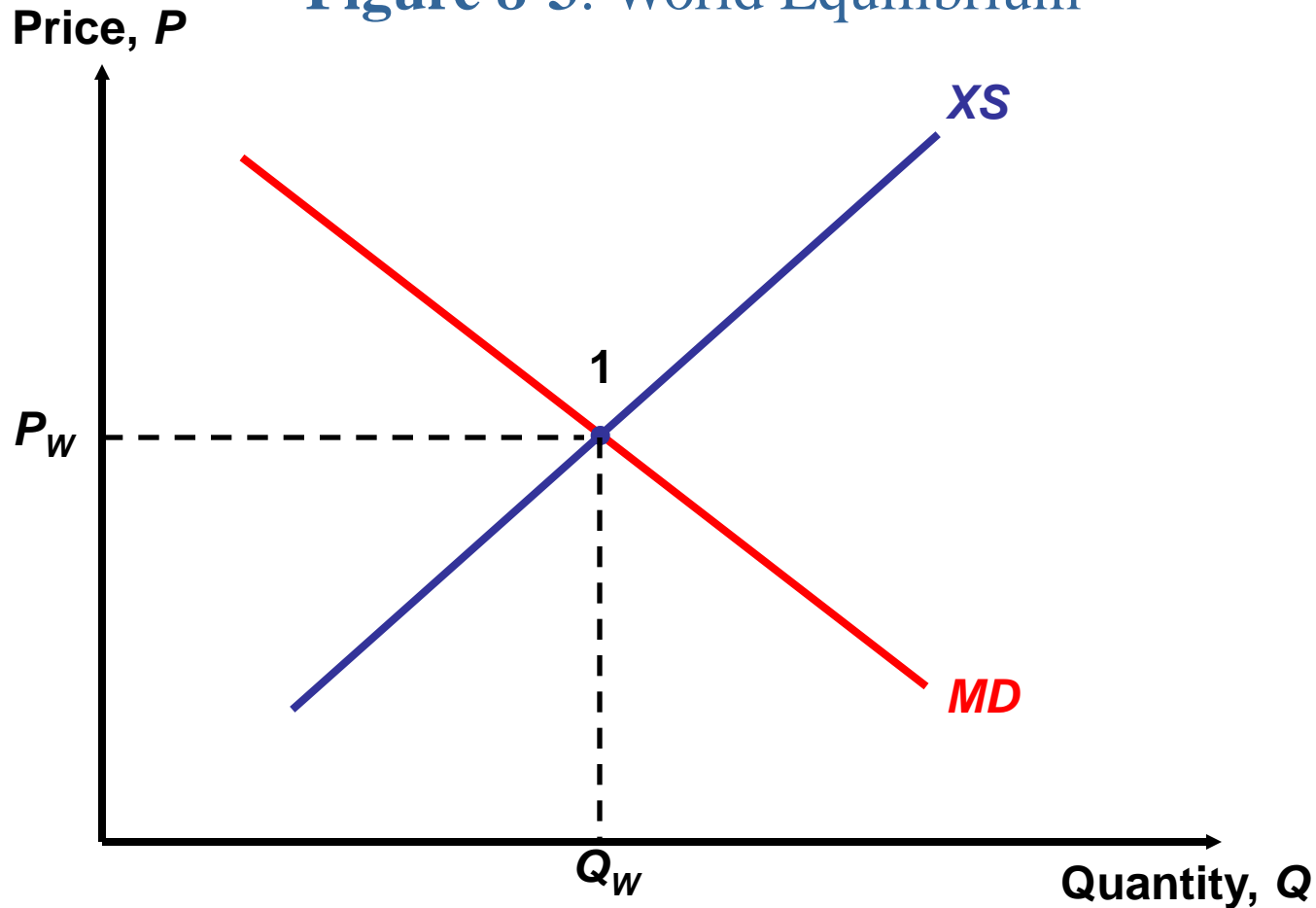## **Figure 8-2**: Deriving Foreign's Export Supply Curve

Basic Tariff Analysis

- Properties of the **export supply curve**:
  - It intersects the vertical axis at the closed economy price of the exporting country.
  - It is upward sloping.
  - It is flatter that the domestic supply curve in the exporting country.

Basic Tariff Analysis

Figure 8-3: World Equilibrium

Basic Tariff Analysis

- Useful definitions:
  - The **terms of trade** is the relative price of the exportable good expressed in units of the importable good.
  - A **small country** is a country that cannot affect its terms of trade no matter how much it trades with the rest of the world.
- The analytical framework will be based on either of the following:
  - Two large countries trading with each other
  - A small country trading with the rest of the world
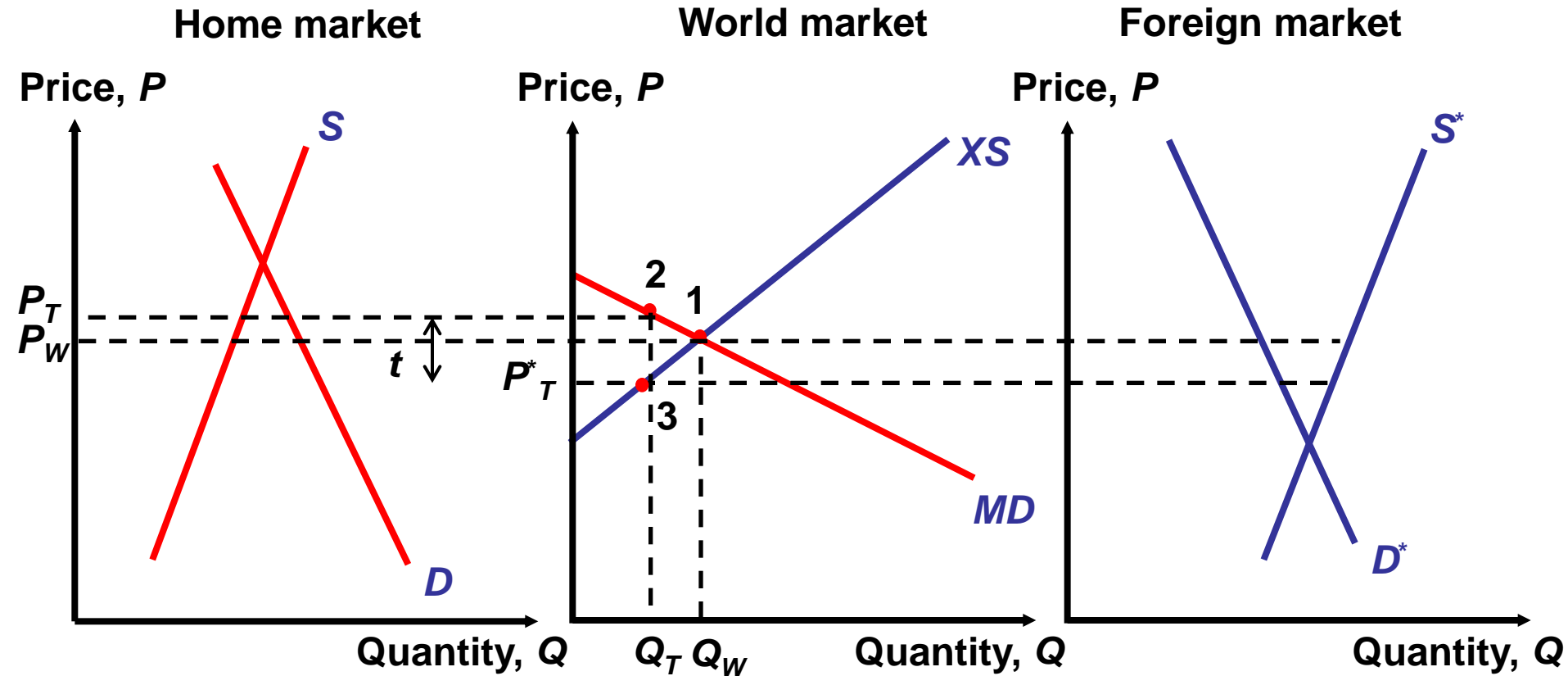
Basic Tariff Analysis

■ **Effects of a Tariff**

- Assume that two large countries trade with each other.

- Suppose Home imposes a tax of $2 on every bushel of wheat imported.

  – Then shippers will be unwilling to move the wheat unless the price difference between the two markets is at least $2.

- Figure 8-4 illustrates the effects of a specific tariff of t per unit of wheat.

Basic Tariff Analysis

Figure 8-4: Effects of a Tariff

Home market

Foreign market

World market

Basic Tariff Analysis

- In the absence of tariff, the world price of wheat (P_w) would be equalized in both countries.

- With the tariff in place, the price of wheat rises to P_T at Home and falls to P^*_T ($= P_T - t$) at Foreign until the price difference is $\$t$.

  - <u>In Home</u>: producers supply more and consumers demand less due to the higher price, so that fewer imports are demanded.

  - <u>In Foreign</u>: producers supply less and consumers demand more due to the lower price, so that fewer exports are supplied.

  - Thus, the volume of wheat traded declines due to the imposition of the tariff.
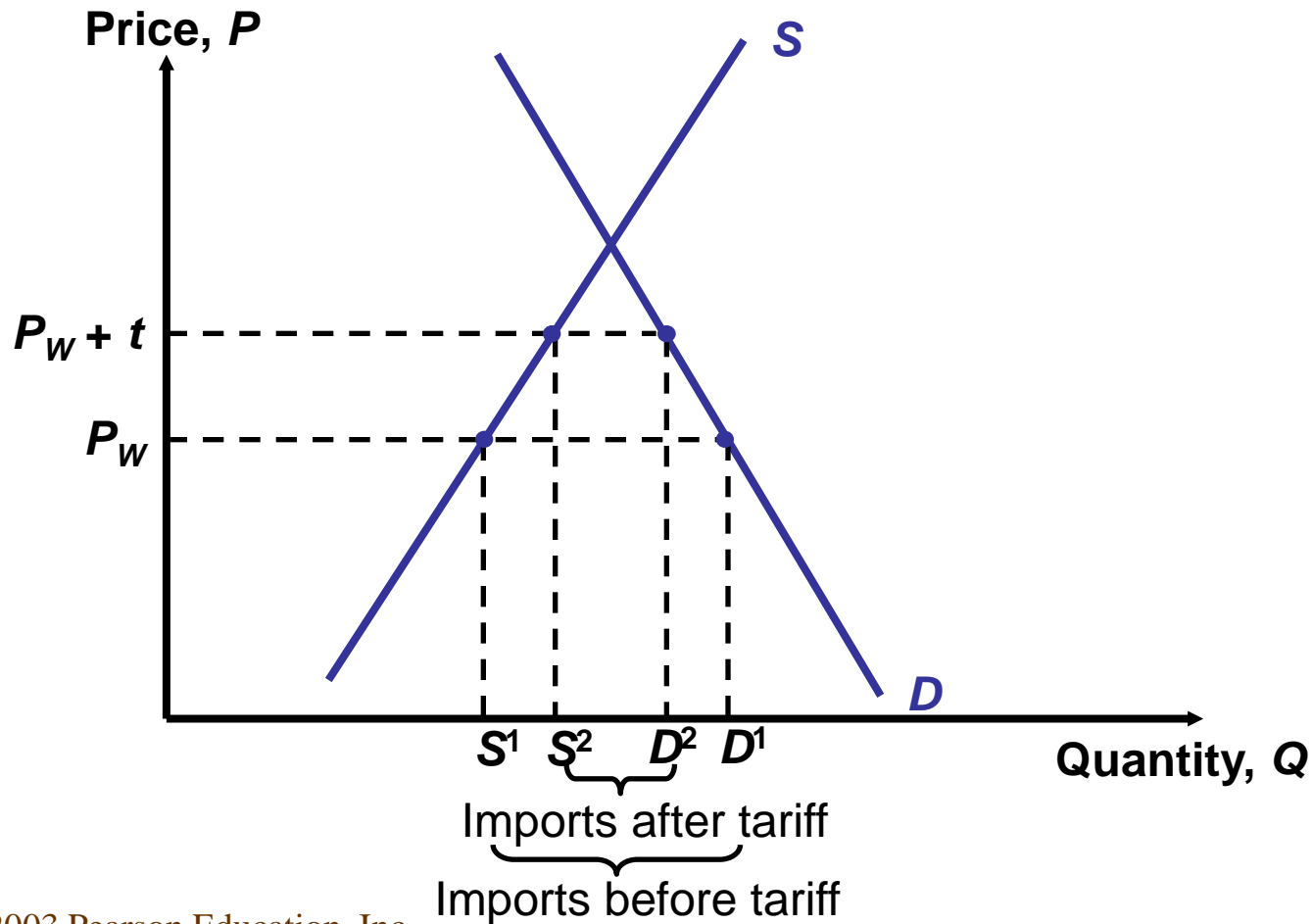
Basic Tariff Analysis

- The increase in the domestic Home price is less than the tariff, because part of the tariff is reflected in a decline in Foreign's export price.

  - If Home is a small country and imposes a tariff, the foreign export prices are unaffected and the domestic price at Home (the importing country) rises by the full amount of the tariff.

Basic Tariff Analysis

Figure 8-5: A Tariff in a Small Country

Price, *P*

S

$P_W + t$

P_W

S^1 S^2 D^2 D^1 Quantity, *Q*

D

Imports after tariff

Imports before tariff

Basic Tariff Analysis

- **Measuring the Amount of Protection**
  - In analyzing trade policy in practice, it is important to know how much protection a trade policy actually provides.
    - One can express the amount of protection as a percentage of the price that would prevail under free trade.
      - Two problems arise from this method of measurement:
        » In the large country case, the tariff will lower the foreign export price.
        » Tariffs may have different effects on different stages of production of a good.

Basic Tariff Analysis

- **Effective rate of protection**
  - One must consider both the effects of tariffs on the final price of a good, and the effects of tariffs on the costs of inputs used in production.
    - The actual protection provided by a tariff will not equal the tariff rate if imported intermediate goods are used in the production of the protected good.
      - Example: A European airplane that sells for $50 million has cost $60 million to produce. Half of the purchase price of the aircraft represents the cost of components purchased from other countries. A subsidy of $10 million from the European government cuts the cost of the value added to purchasers of the airplane from $30 to $20 million. Thus, the effective rate of protection is $(30-20)/20 = 50\%$.

Costs and Benefits of a Tariff

- A tariff raises the price of a good in the importing country and lowers it in the exporting country.
- As a result of these price changes:
  - Consumers lose in the importing country and gain in the exporting country
  - Producers gain in the importing country and lose in the exporting country
  - Government imposing the tariff gains revenue
- To measure and compare these costs and benefits, we need to define consumer and producer surplus.

Costs and Benefits of a Tariff

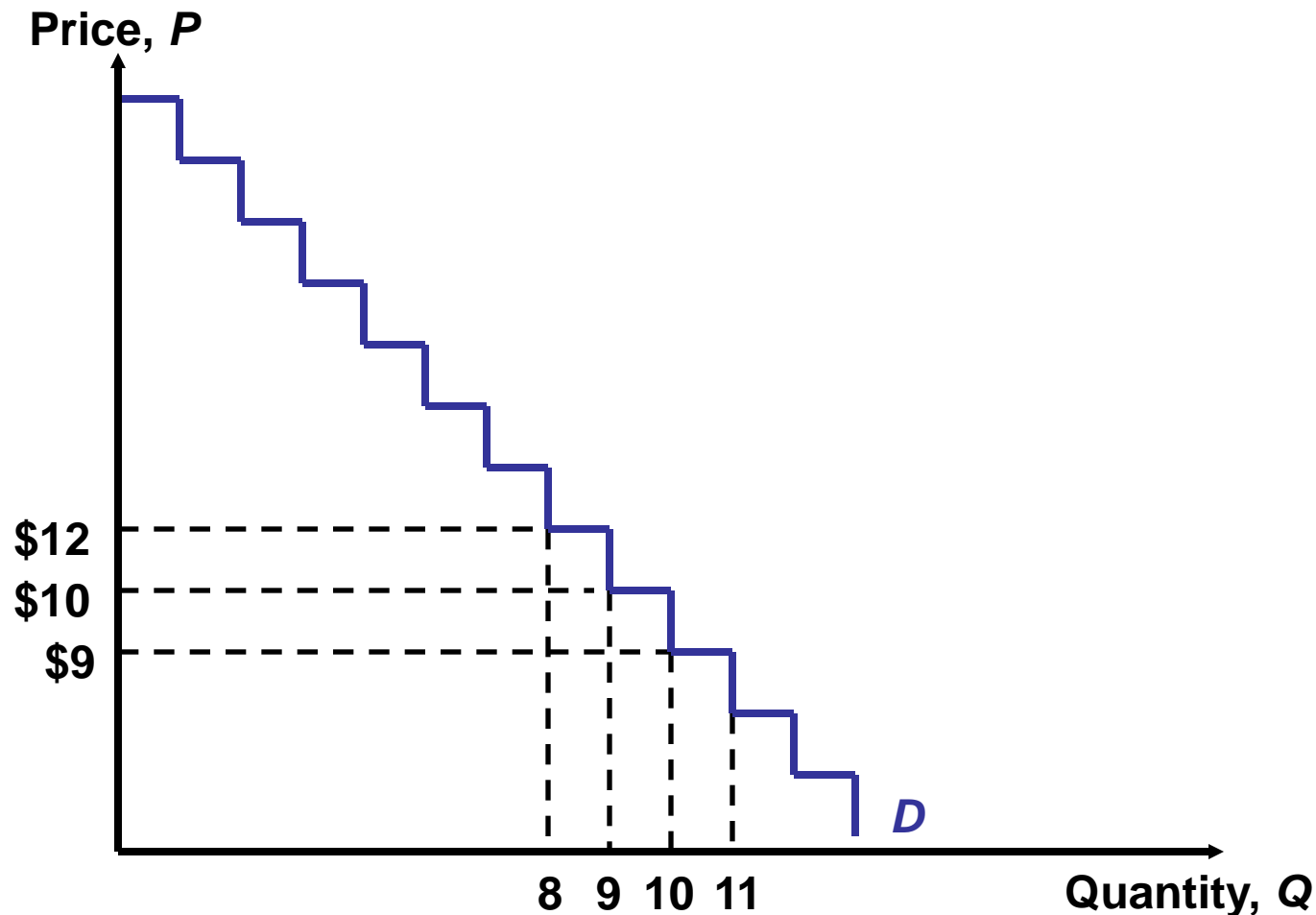- **Consumer and Producer Surplus**
  - **Consumer surplus**
    - It measures the amount a consumer gains from a purchase by the difference between the price he actually pays and the price he would have been willing to pay.
    - It can be derived from the market demand curve.
    - Graphically, it is equal to the area under the demand curve and above the price.
    - <u>Example</u>: Suppose a person is willing to pay $20 per packet of pills, but the price is only $5. Then, the consumer surplus gained by the purchase of a packet of pills is $15.
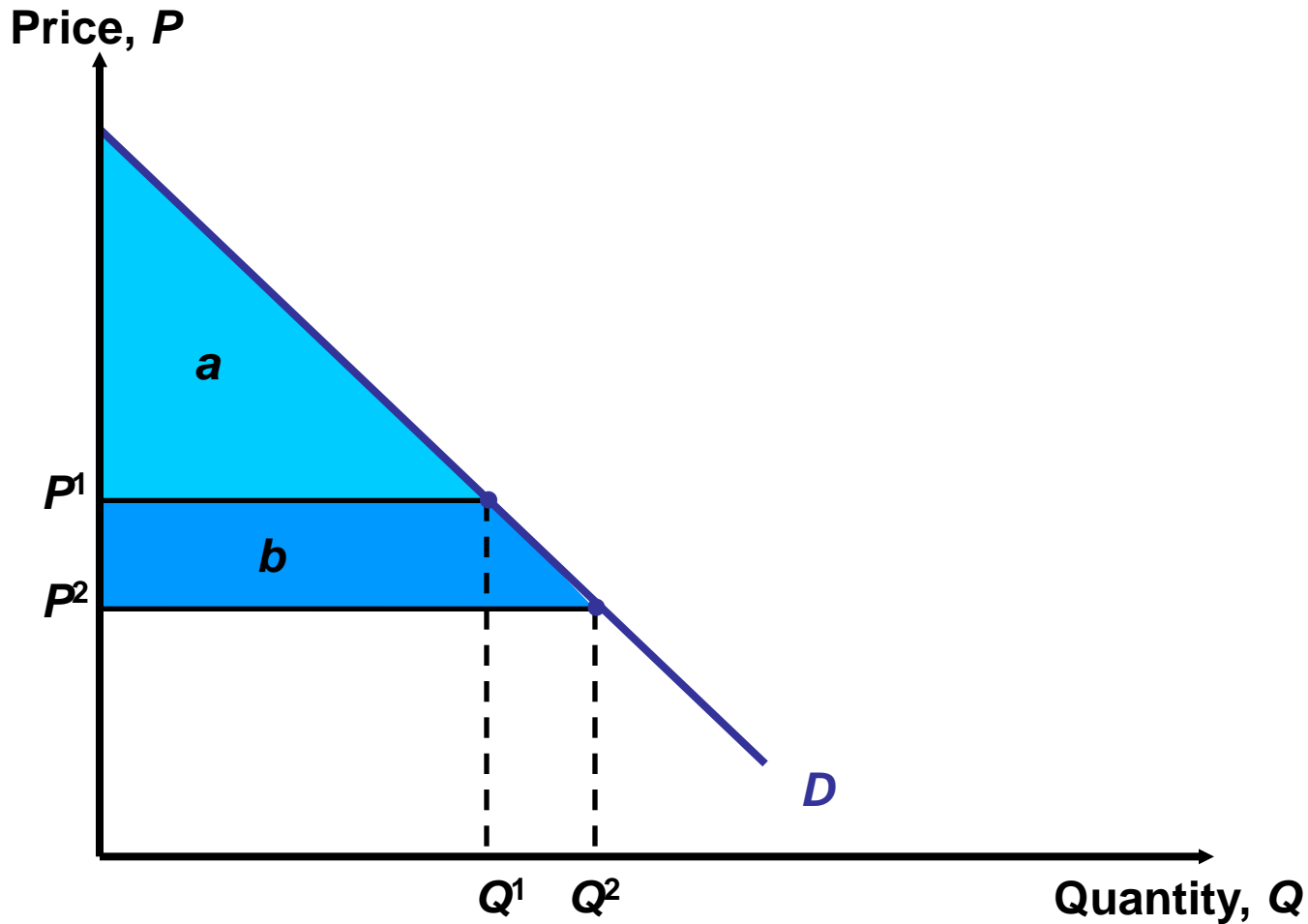
Costs and Benefits of a Tariff

Figure 8-6: Deriving Consumer Surplus from the Demand Curve

Costs and Benefits of a Tariff

Figure 8-7: Geometry of Consumer Surplus

Price, *P*

P¹

P²

a

b

D

Q¹ *Q²*

Quantity, *Q*

Costs and Benefits of a Tariff

- **Producer surplus**
  - It measures the amount a producer gains from a sale by the difference between the price he actually receives and the price at which he would have been willing to sell.
  - It can be derived from the market supply curve.
  - Graphically, it is equal to the area above the supply curve and below the price.
  - <u>Example</u>: A producer willing to sell a good for $2 but receiving a price of $5 gains a producer surplus of $3.

Figure 8-8: Geometry of Producer Surplus
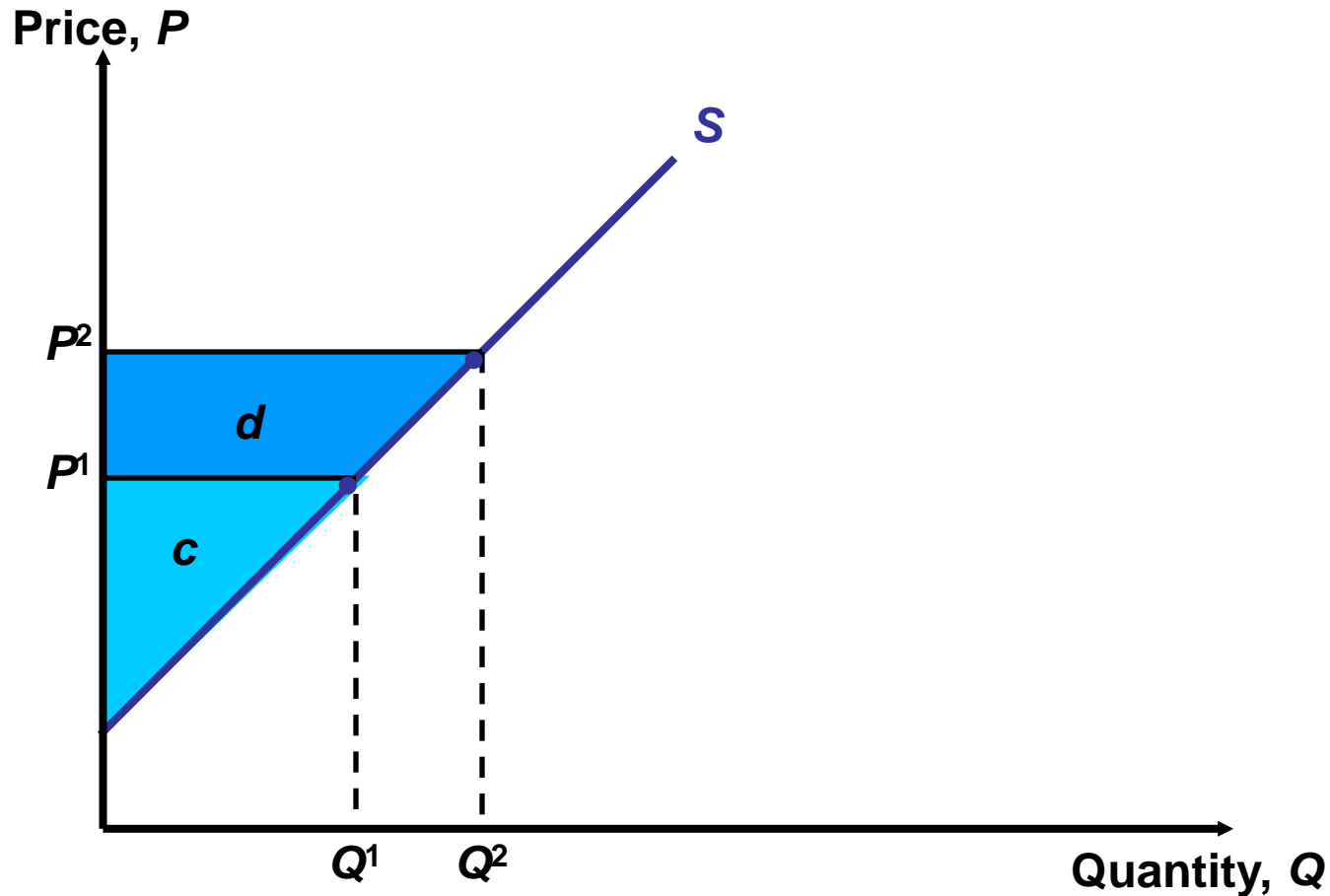
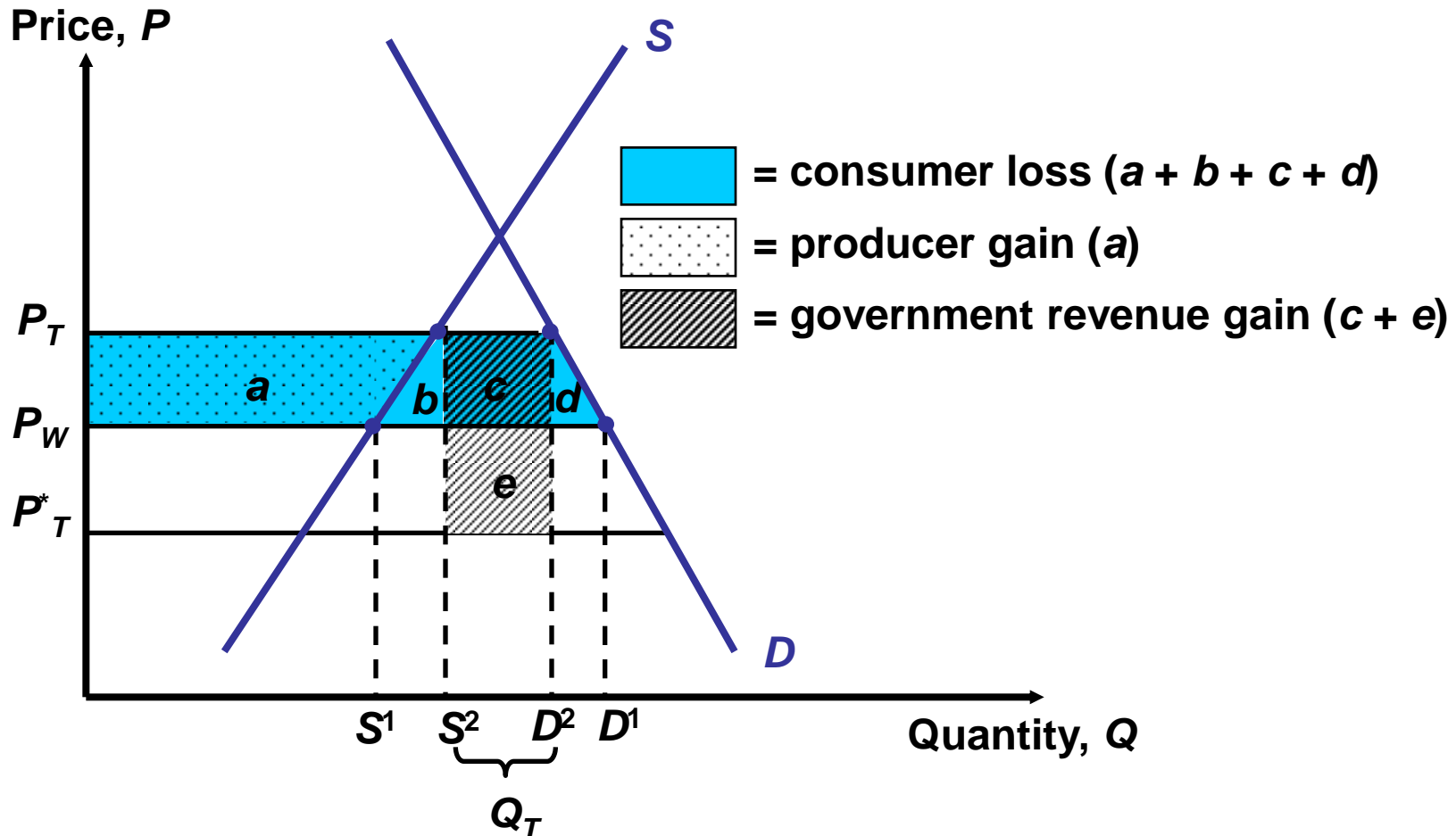# Costs and Benefits of a Tariff

- **Measuring the Cost and Benefits**
  - Is it possible to add consumer and producer surplus?
    - We can (algebraically) add consumer and producer surplus because any change in price affects each individual in two ways:
      - As a consumer
      - As a worker
    - We assume that at the margin a dollar's worth of gain or loss to each group is of the same social worth.

Figure 8-9: Costs and Benefits of a Tariff for the Importing Country

Costs and Benefits of a Tariff

- The areas of the two triangles *b* and *d* measure the loss to the nation as a whole (efficiency loss) and the area of the rectangle *e* measures an offsetting gain (terms of trade gain).

  – The **efficiency loss** arises because a tariff distorts incentives to consume and produce.

    – Producers and consumers act as if imports were more expensive than they actually are.

    – Triangle *b* is the **production distortion loss** and triangle *d* is the **consumption distortion loss**.

  – The **terms of trade gain** arises because a tariff lowers foreign export prices.
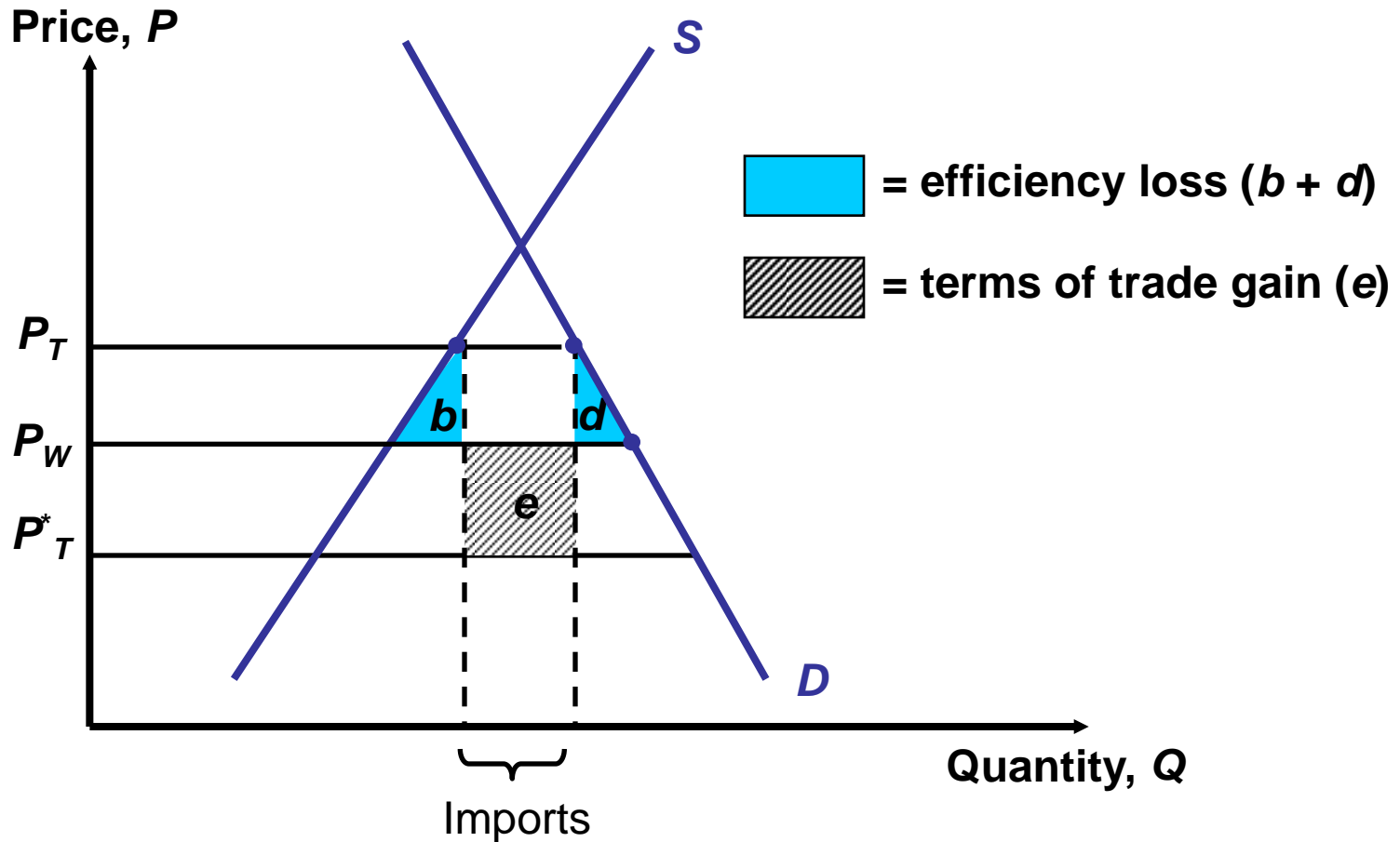
Costs and Benefits of a Tariff

- If the terms of trade gain is greater than the efficiency loss, the tariff increases welfare for the importing country.

  – In the case of a small country, the tariff reduces welfare for the importing country.

Costs and Benefits of a Tariff

Figure 8-10: Net Welfare Effects of a Tariff

= efficiency loss (b + d)

= terms of trade gain (e)

Other Instruments of Trade Policy

- Export Subsidies: Theory
  - **Export subsidy**
    - A payment by the government to a firm or individual that ships a good abroad
      - When the government offers an export subsidy, shippers will export the good up to the point where the domestic price exceeds the foreign price by the amount of the subsidy.
    - It can be either specific or ad valorem.

Figure 8-11: Effects of an Export Subsidy
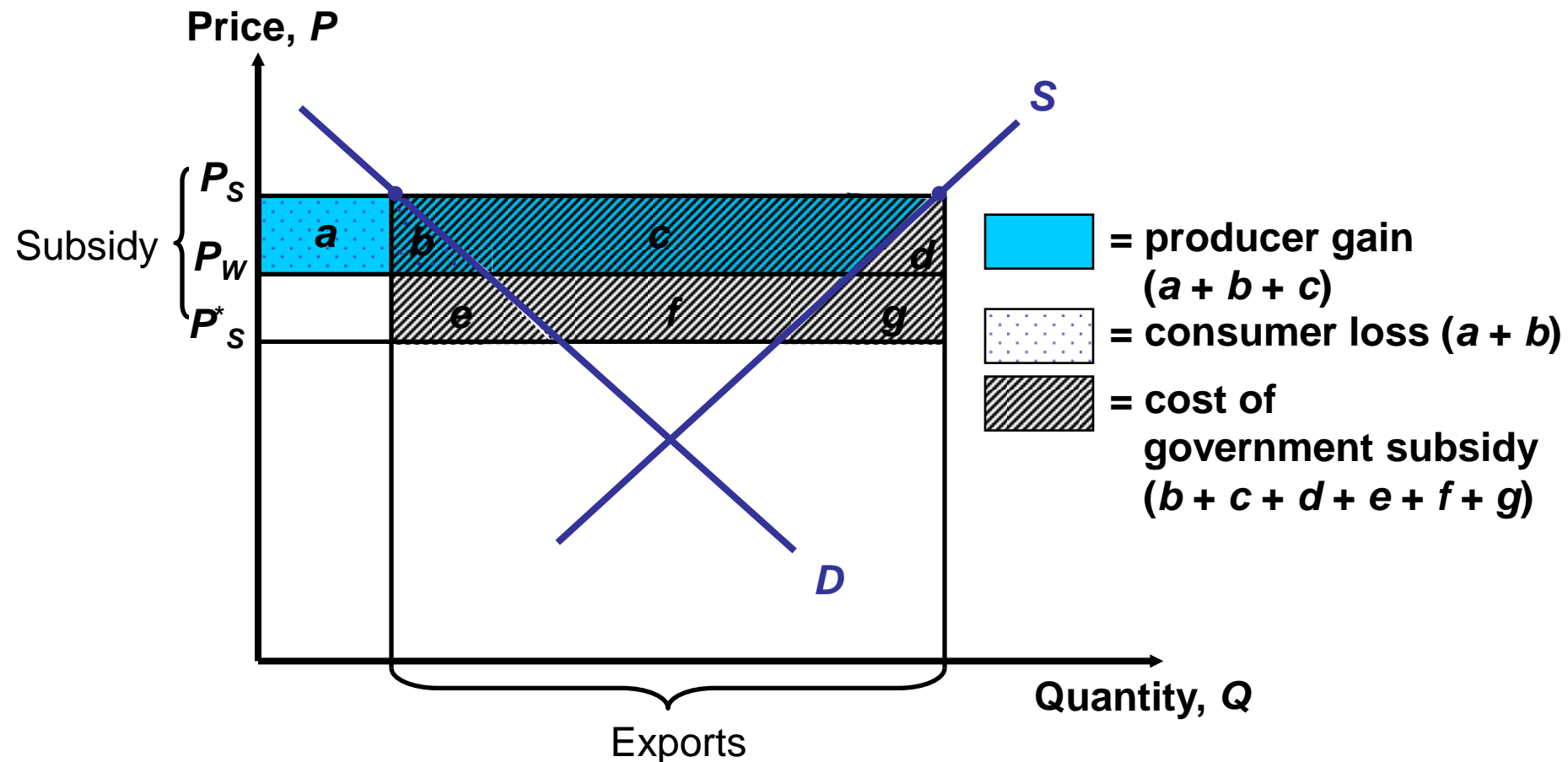
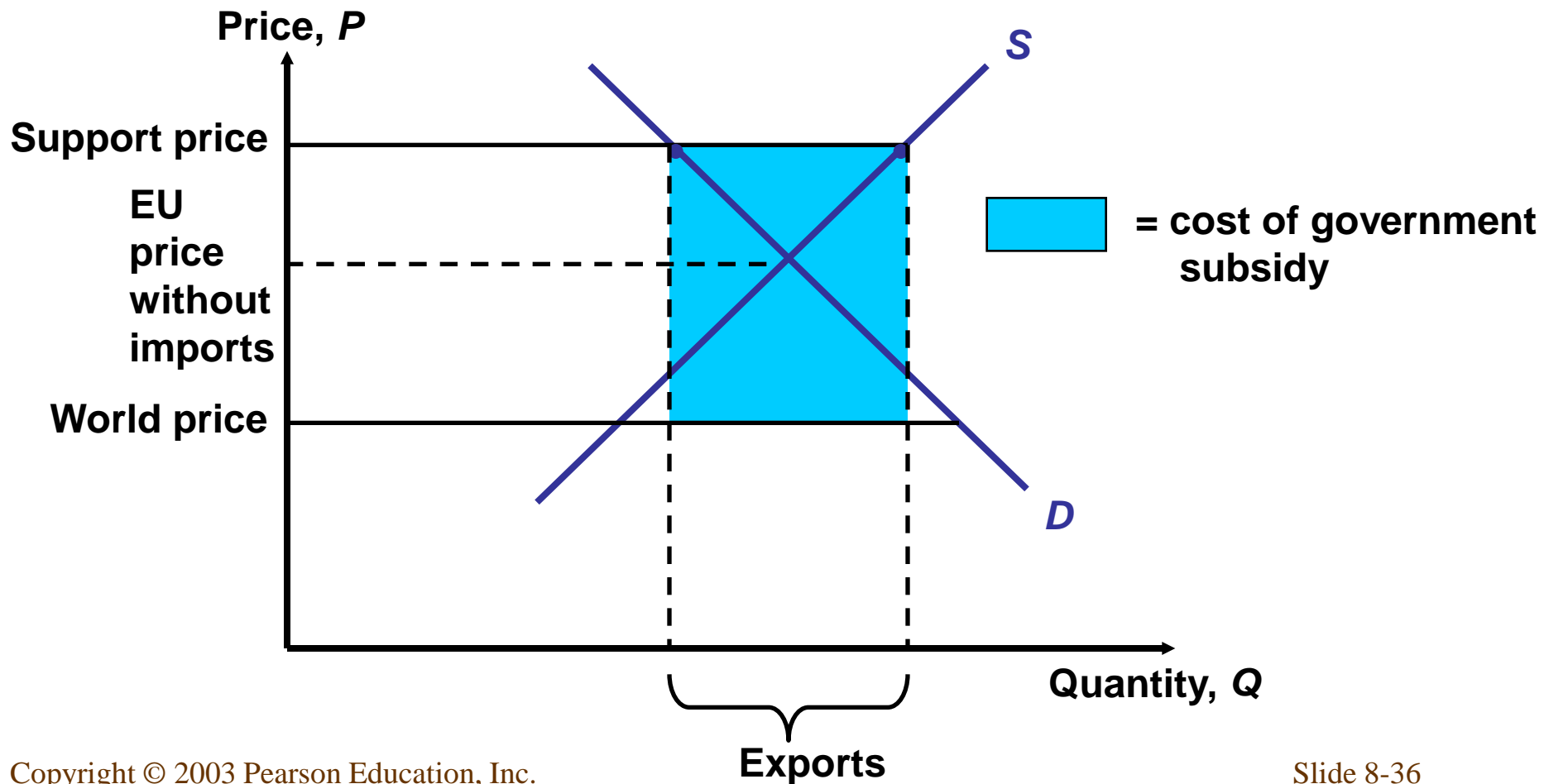# Other Instruments of Trade Policy

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

- In addition, and in contrast to a tariff, the export subsidy worsens the terms of trade.

- An export subsidy unambiguously leads to costs that exceed its benefits.

Other Instruments of Trade Policy

Figure 8-12: Europe's Common Agricultural Program

Other Instruments of Trade Policy

- **Import Quotas: Theory**
  - An import quota is a direct restriction on the quantity of a good that is imported.
    - Example: The United States has a quota on imports of foreign cheese.
  - The restriction is usually enforced by issuing licenses to some group of individuals or firms.
    - Example: The only firms allowed to import cheese are certain trading companies.
  - In some cases (e.g. sugar and apparel), the right to sell in the United States is given directly to the governments of exporting countries.

Other Instruments of Trade Policy

- An import quota always raises the domestic price of the imported good.

- License holders are able to buy imports and resell them at a higher price in the domestic market.

  – The profits received by the holders of import licenses are known as **quota rents**.
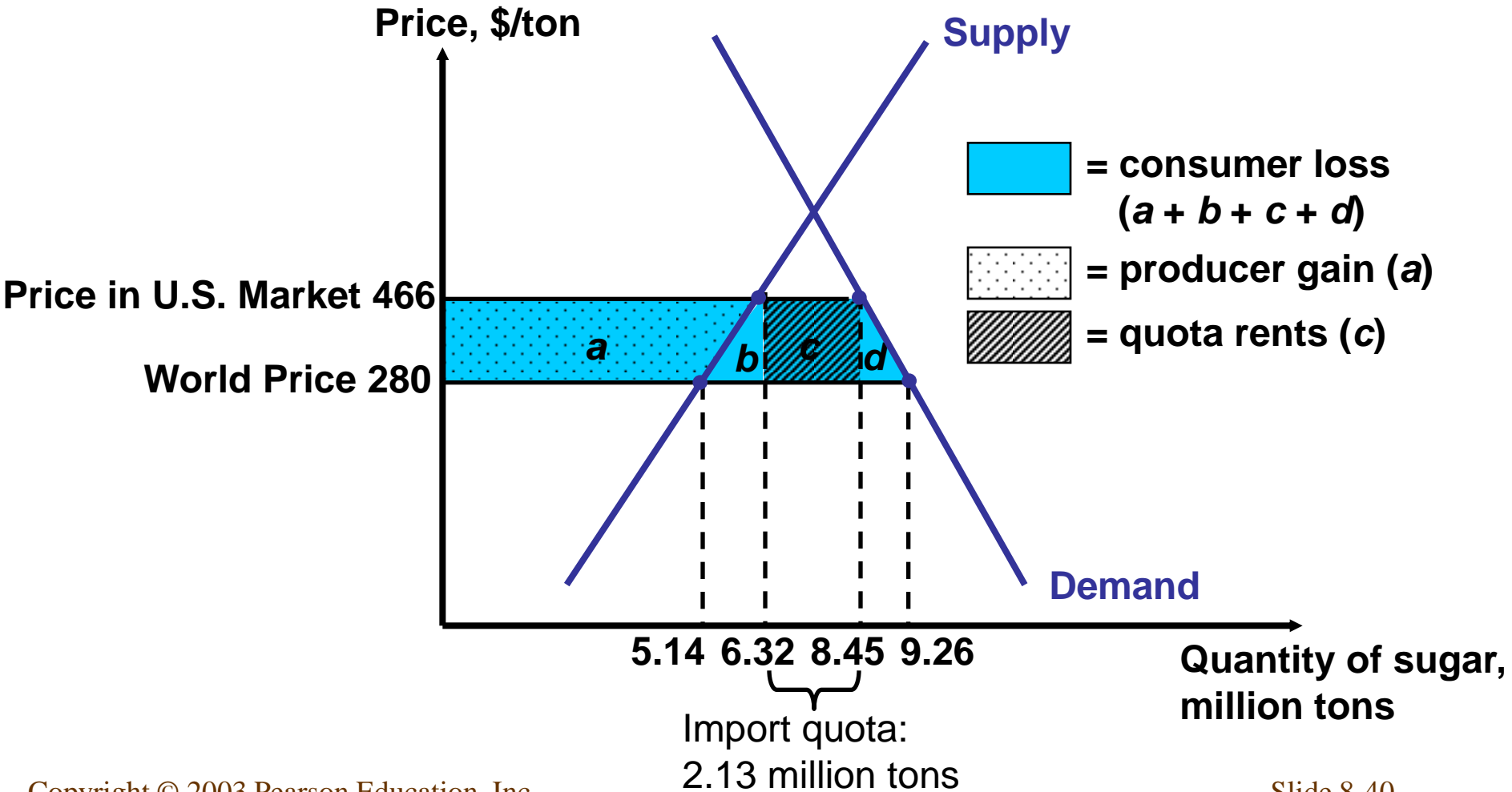
Other Instruments of Trade Policy

- Welfare analysis of import quotas versus of that of tariffs
  - The difference between a quota and a tariff is that with a quota the government receives *no* revenue.
  - In assessing the costs and benefits of an import quota, it is crucial to determine who gets the rents.
    - When the rights to sell in the domestic market are assigned to governments of exporting countries, the transfer of rents abroad makes the costs of a quota substantially higher than the equivalent tariff.

Other Instruments of Trade Policy

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

Price, $/ton

Supply

Price in U.S. Market 466

World Price 280

a   b   c   d

= consumer loss (a + b + c + d)

= producer gain (a)

= quota rents (c)

Demand

5.14 6.32 8.45 9.26

Quantity of sugar, million tons

Import quota: 2.13 million tons

Other Instruments of Trade Policy

- **Voluntary Export Restraints**
  - A **voluntary export restraint (VER)** is an export quota administered by the exporting country.
    - It is also known as a voluntary restraint agreement (VRA).
  - VERs are imposed at the request of the importer and are agreed to by the exporter to forestall other trade restrictions.

Other Instruments of Trade Policy

- A VER is exactly like an import quota where the licenses are assigned to foreign governments and is therefore very costly to the importing country.
- A VER is always more costly to the importing country than a tariff that limits imports by the same amount.
  - The tariff equivalent revenue becomes rents earned by foreigners under the VER.
    - Example: About 2/3 of the cost to consumers of the three major U.S. voluntary restraints in textiles and apparel, steel, and automobiles is accounted for by the rents earned by foreigners.
- A VER produces a loss for the importing country.

Other Instruments of Trade Policy

- Local Content Requirements
  - A **local content requirement** is a regulation that requires that some specified fraction of a final good be produced domestically.
    - This fraction can be specified in physical units or in value terms.
  - Local content laws have been widely used by developing countries trying to shift their manufacturing base from assembly back into intermediate goods.

Other Instruments of Trade Policy

- Local content laws do not produce either government revenue or quota rents.
  - Instead, the difference between the prices of imports and domestic goods gets averaged in the final price and is passed on to consumers.
    - Example: Suppose that auto assembly firms are required to use 50% domestic parts. The cost of imported parts is $6000 and the cost of the same parts domestically is $10,000. Then the average cost of parts is $8000 (0.5 x $6000 + 0.5 x $10,000).
- Firms are allowed to satisfy their local content requirement by exporting instead of using parts domestically.

Other Instruments of Trade Policy

- **Other Trade Policy Instruments**
  - Export credit subsidies
    - A form of a subsidized loan to the buyer of exports.
    - They have the same effect as regular export subsidies.
  - National procurement
    - Purchases by the government (or public firms) can be directed towards domestic goods, even if they are more expensive than imports.
  - Red-tape barriers
    - Sometimes governments place substantial barriers based on health, safety and customs procedures.

The Effects of Trade Policy: A Summary

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 (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

Summary

- A tariff drives a wedge between foreign and domestic prices, raising the domestic price but by less than the tariff rate (except in the "small" country case).
  - In the small country case, a tariff is fully reflected in domestic prices.
- The costs and benefits of a tariff or other trade policy instruments may be measured using the concepts of consumer and producer surplus.
  - The domestic producers of a good gain
  - The domestic consumers lose
  - The government collects tariff revenue

Summary

- The net welfare effect of a tariff can be separated into two parts:
  - Efficiency (consumption and production) loss
  - Terms of trade gain (is zero in the case of a small country)
- An export subsidy causes efficiency losses similar to a tariff but compounds these losses by causing a deterioration of the terms of trade.
- Under import quotas and voluntary export restraints the government of the importing country receives no revenue.