Econ 340

Lecture 5
Tariffs

Outline: Tariffs

- What Are They?
- Who Uses Them?
- Effects of Tariffs
  - Small Country Case
    - Effects on quantities and prices
    - Effects on economic welfare
  - Large Country Case
    - Effect on world price
    - Effect on welfare
  - Size of These Effects
- Addenda on Tariffs

What Are Tariffs?

- Tariffs are Taxes on imports
- Two main types
  - Ad valorem: % of value
  - Specific: $ per unit
- How are they implemented?
  - At the border, by customs officers
  - They determine
    - What good it is
    - What price to use for ad valorem tariffs
  - Customs officers have power that may be abused (e.g., bribery)

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Who Uses Tariffs?

- Virtually all countries
- How big are tariffs?
  - In US, today, average only 2-3% (before Trump)
  - In developing countries, often around 20%
  - Both used to be much higher
  - Some particular tariffs are still much higher
  - And President Trump has put tariffs of
    - 25% on steel
    - 10% on aluminum
    - Up to 25% so far on well over $250 billion of Chinese exports, with more coming on most of the rest

Who Uses Tariffs?

- Sample US tariffs
  - Cars: 2.5%
  - Trucks: 25%
  - Men's cotton shirts 19.7%
  - Women's blouses 26.9%
  - Blankets 8.5%
  - Pullover apparel 14.9%
  - Tariffs facing exports of developing countries:
    - Nepal 13.2%
    - Bangladesh 13.6%

"Chicken tax"
Raised in 1963 in retaliation against Europe's tariffs on chickens

That's why minivans are "trucks"

Sorry. Men write the tariffs

See Swanson & the "Snuggie"

See Schavey

Who Uses Tariffs?

- Aside: Schavey, “The Catch-22 of U.S. Trade”
  - US tariffs are much larger against developing countries than against developed countries
  - Who gains and loses?
    - Some US workers gain, but they have social policies to protect them (unemployment insurance, etc.)
    - Developing-country workers lose, and their governments are too poor to help
  - WTO Agreement on Textiles and Clothing (1995) promised to eliminate <u>quotas</u> on these products by 2005, but not tariffs. (It did.)
  - Why “Catch-22”?
    - Countries can only develop by exporting
    - But if they do, we raise tariffs!

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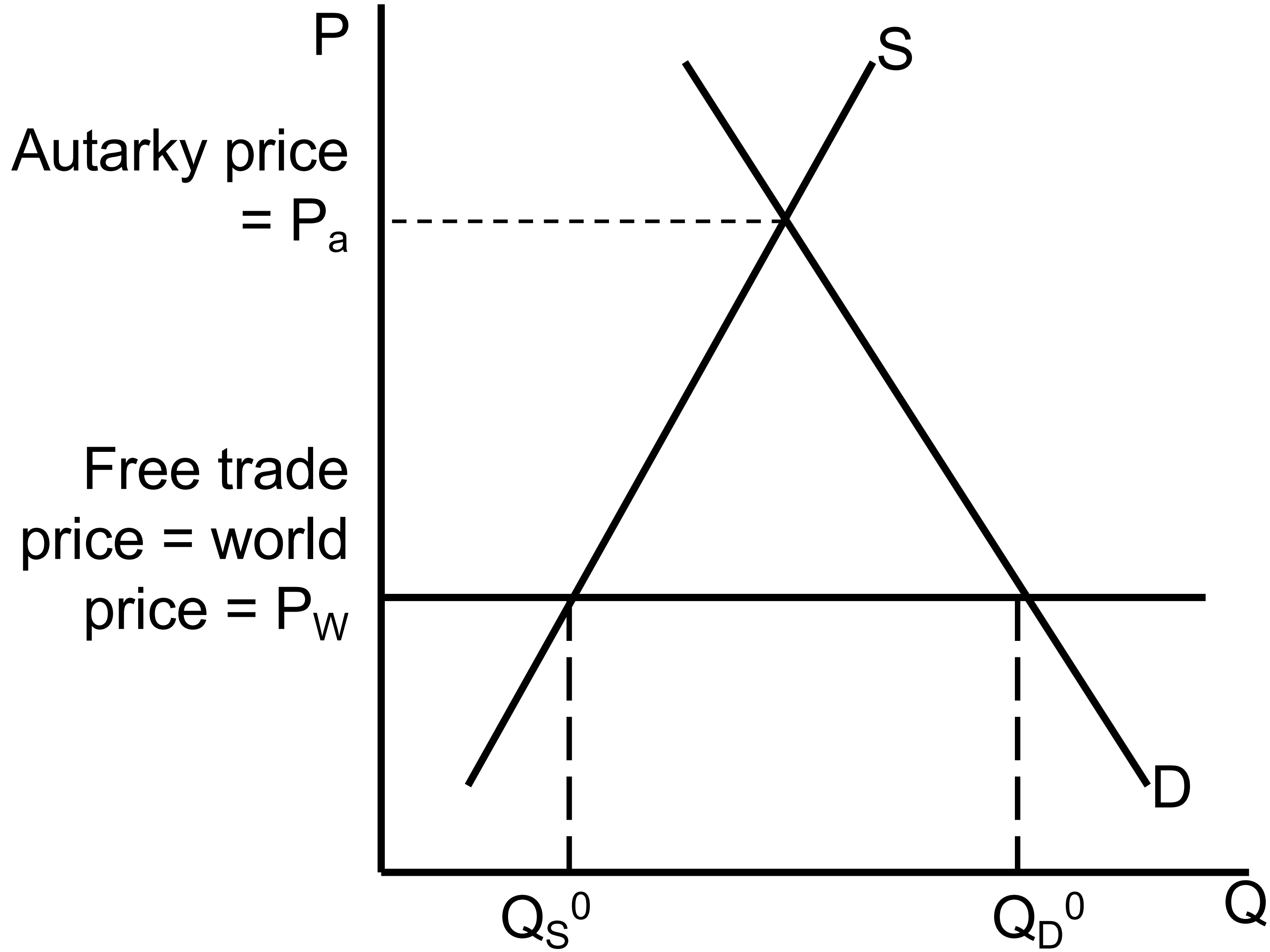
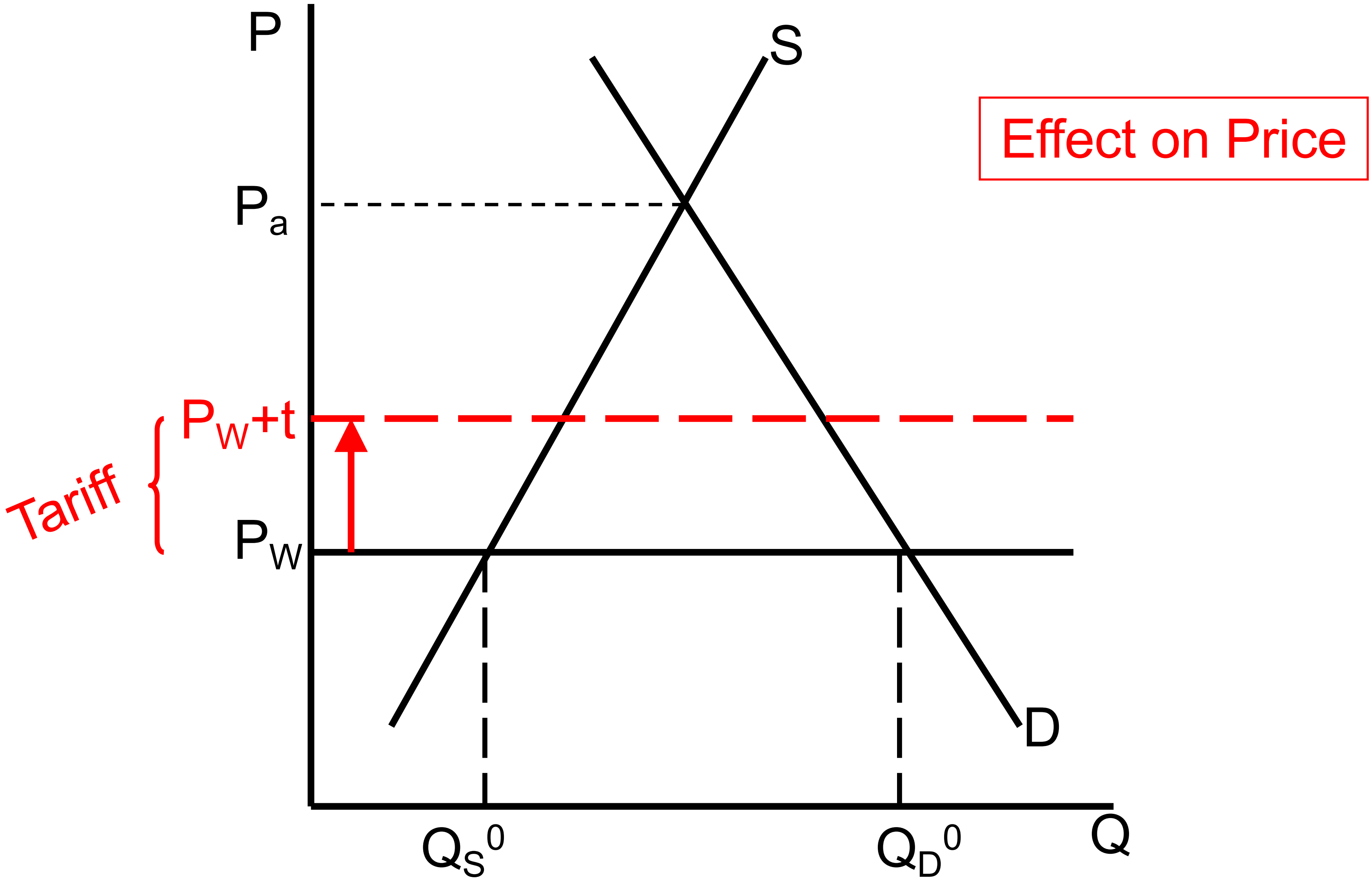
Effects of Tariffs

- Easy to see from supply and demand
- Consider a good whose price would be above the world price without trade
- We will look at two cases:
  - Small country: Too small for its behavior to matter for the world price
  - Large country: Large enough (in market for this good) that its behavior may change world price

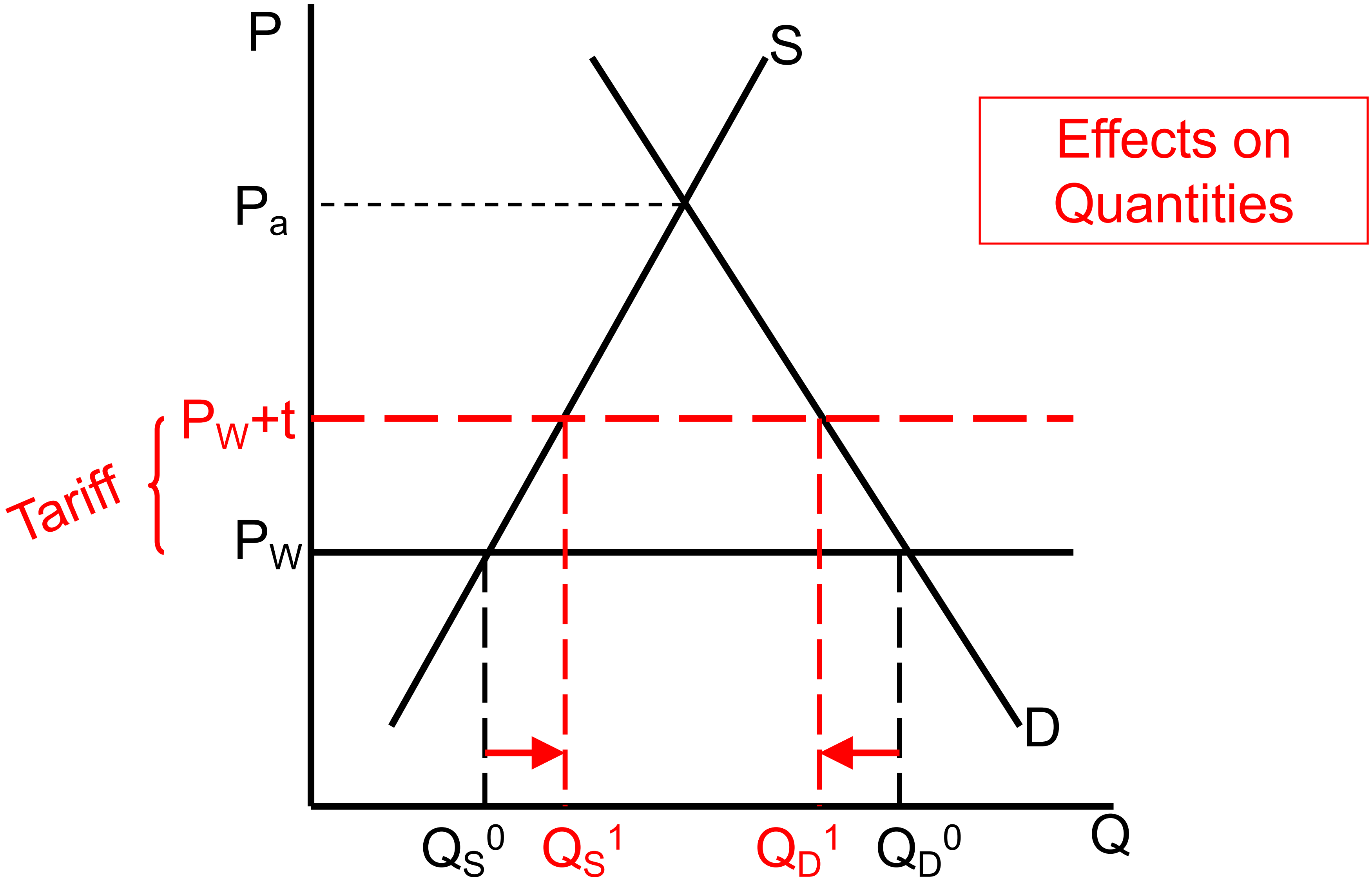
Effects of Tariffs: Small Country



Effects of Tariffs: Small Country



Effects of Tariffs: Small Country

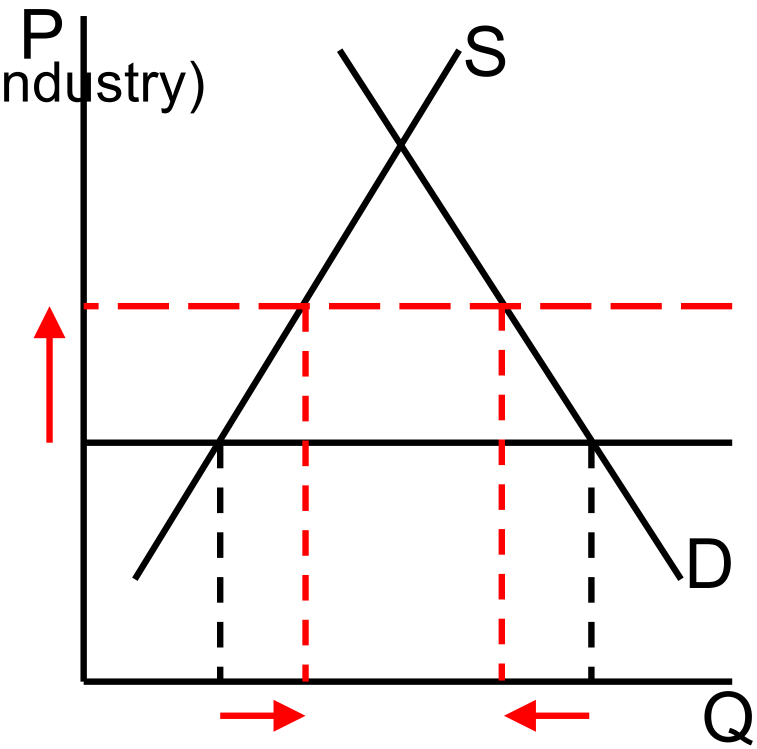


Effects of Tariffs: Small Country

- Why the price increase?
  - On imports
    - Tariff is simply added to the price paid to foreign exporters
  - On domestically produced goods
    - Buyers don't pay the tariff
    - But if price stayed below P_W+t, demand for the domestically produced good would be greater than supply
    - This shortage would drive up price

Effects of Tariffs: Small Country

- Thus: what happens due to a tariff:
  - Domestic price rises
    (by full amount of tariff)
  - Domestic output rises
    (Employment also rises in this industry)
  - Domestic demand falls
  - Imports (=D−S) fall
  - Suppliers gain
  - Demanders lose
  - Gov't gets tariff revenue
  - World sells less to us
    (but it doesn't lose,
    because we're too small for it
    to notice)



Effects of Tariffs: Small Country

- How much do we gain and lose?
- Use changes in “consumer surplus” and “producer surplus” from Econ 101

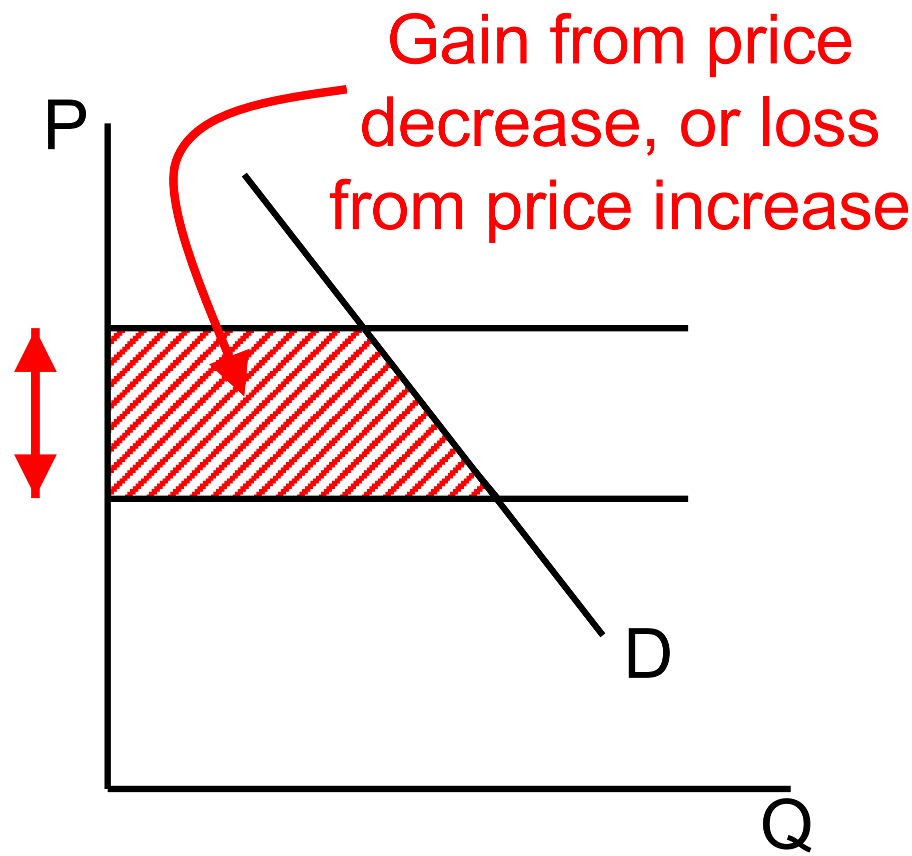
Reminder: Change in Consumer Surplus

When price changes,

Consumers

- Gain from price decrease
- Lose from price increase
    - By amount equal to area to the left of the demand curve

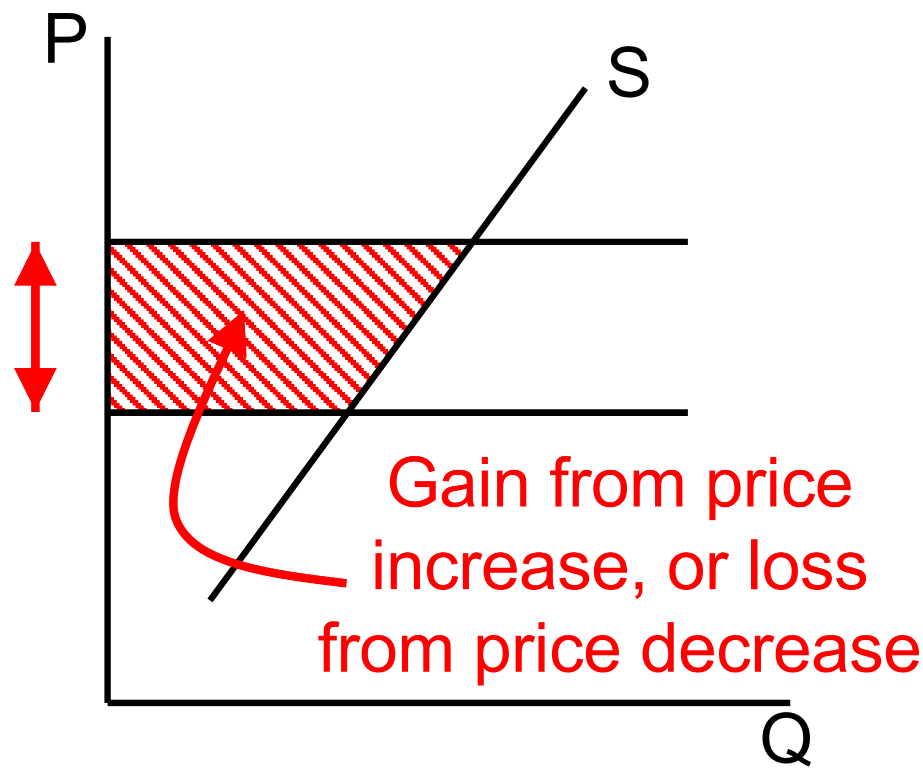
while…



Reminder:
Change in Producer Surplus

<u>Producers</u>

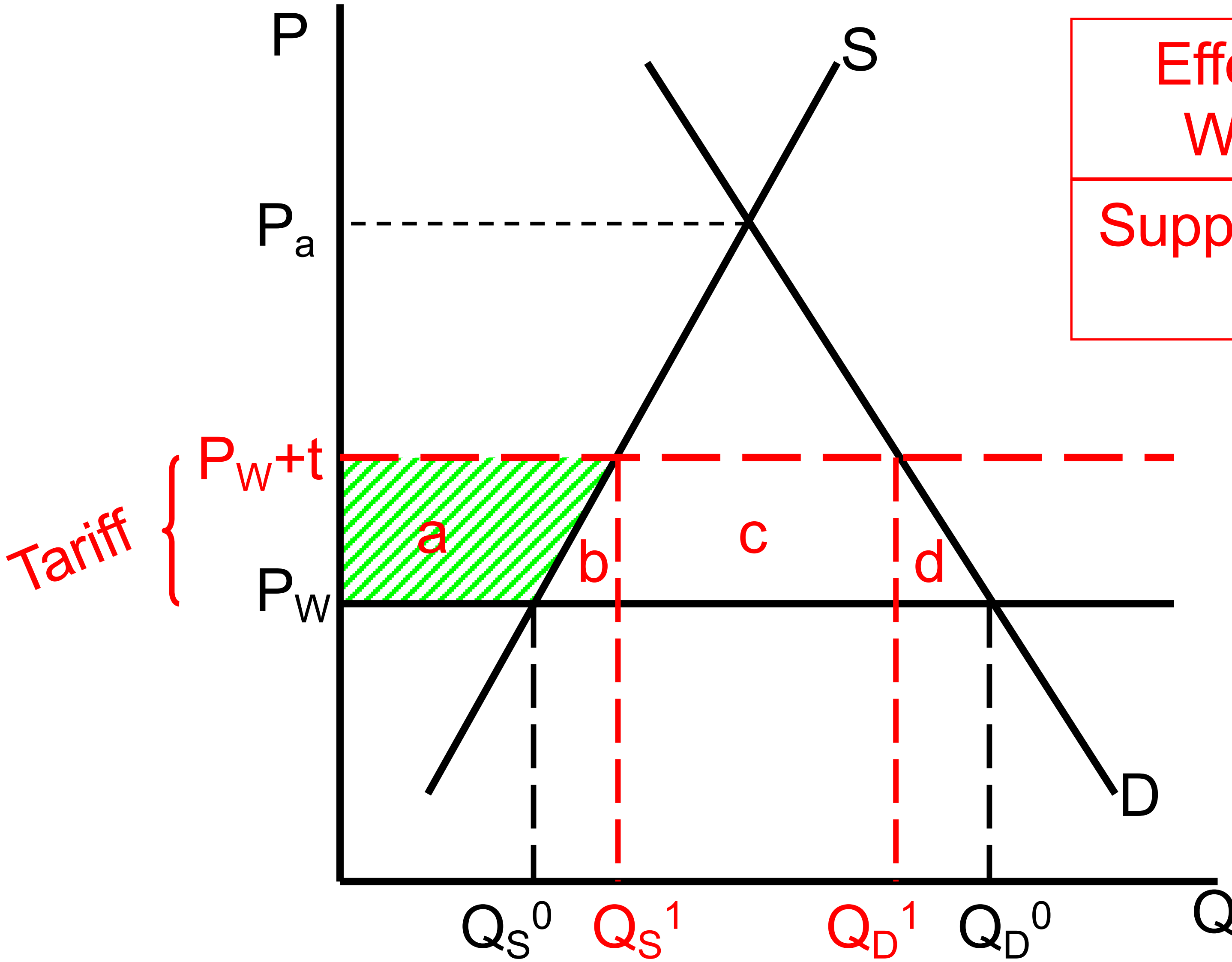
- Gain from price increase
- Lose from price decrease
  - By amount equal to area to the <u>left</u> of the <u>supply</u> curve



Effects of Tariffs: Small Country

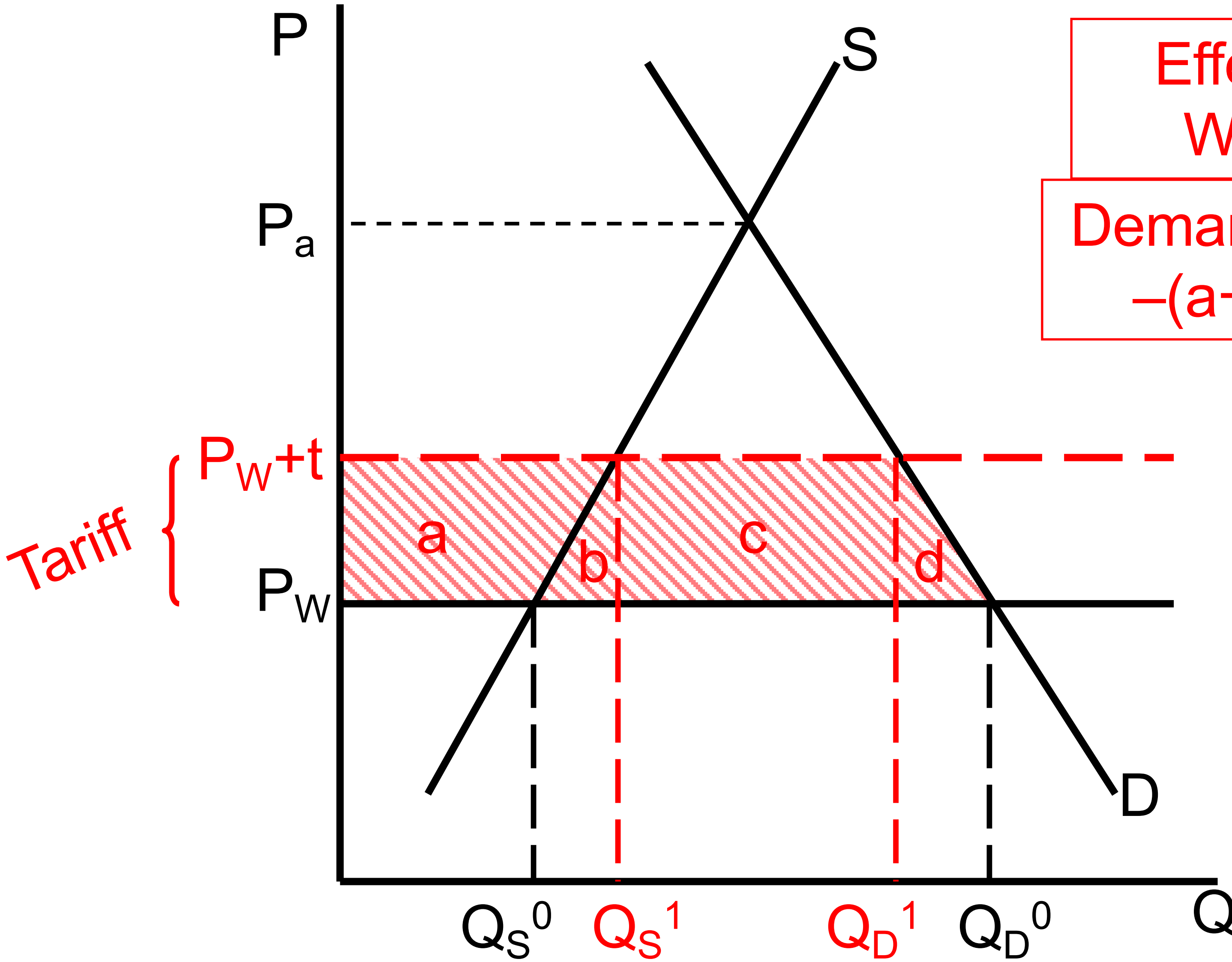
- Apply these to the effects we found for a tariff
- Also note that the government (and thus the taxpayer) of the country gets benefit of tariff revenue

Effects of Tariffs: Small Country



Effects on Welfare
Suppliers gain +a

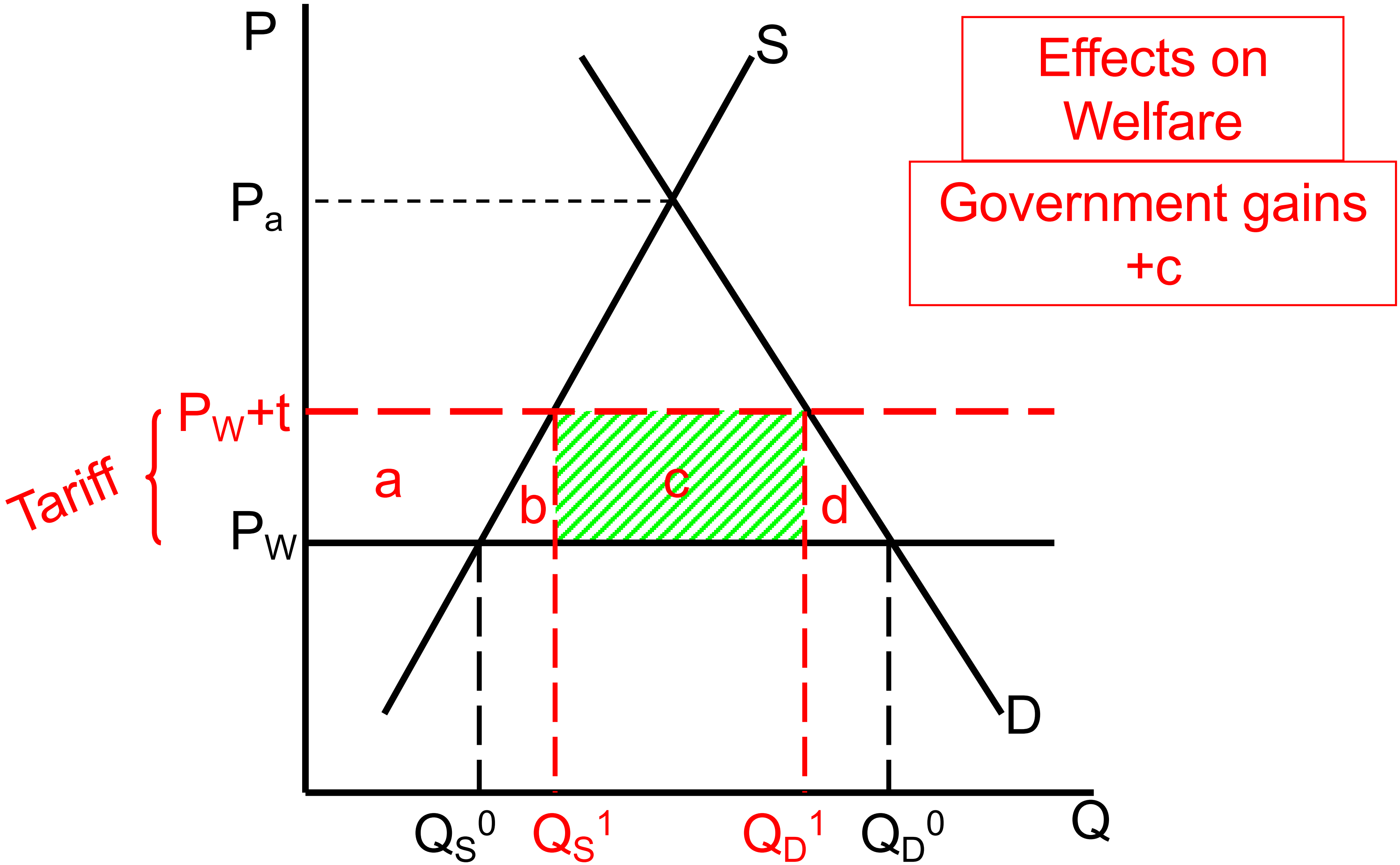
Effects of Tariffs: Small Country



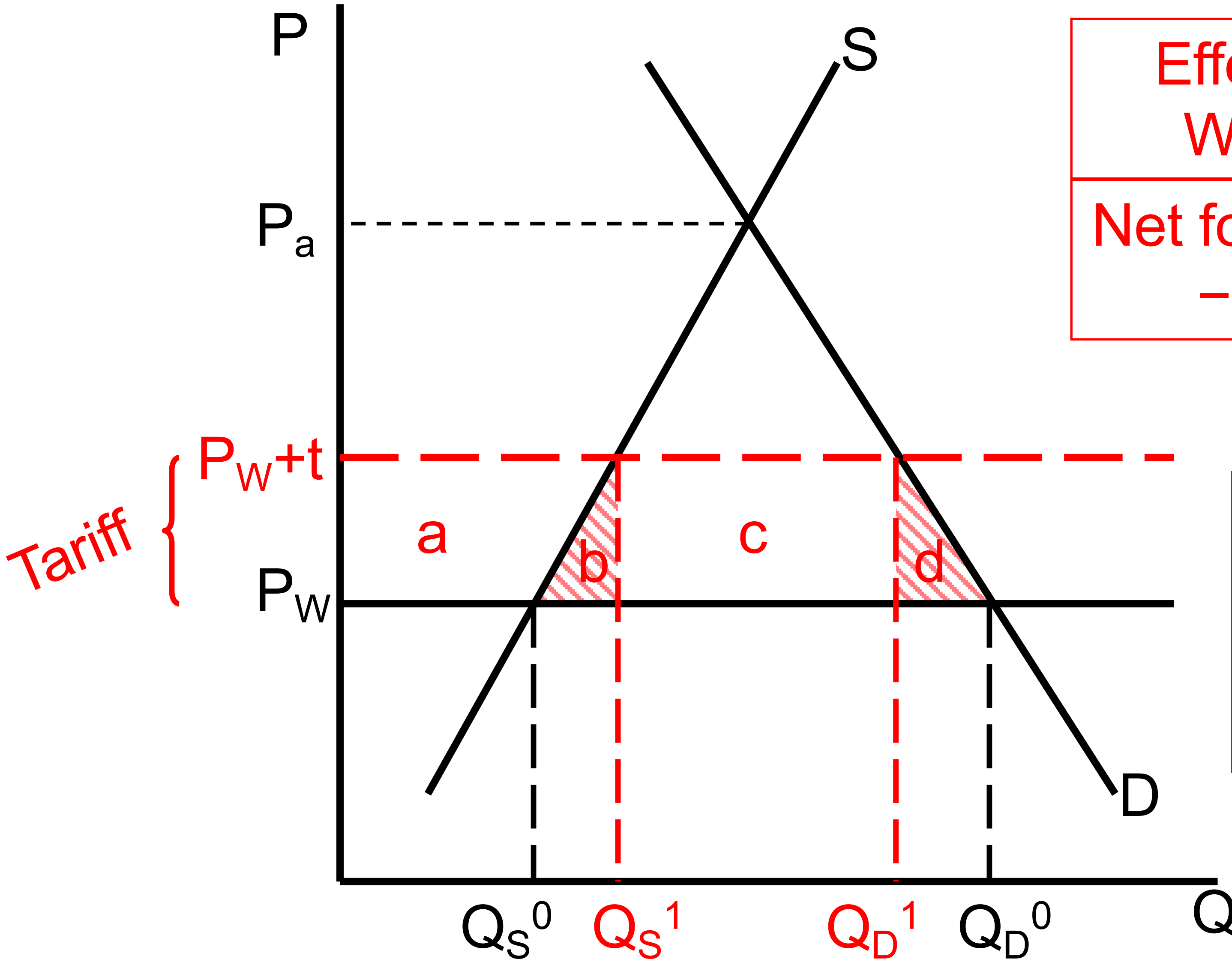
Effects on Welfare

Demanders lose –(a+b+c+d)

Effects of Tariffs: Small Country



Effects of Tariffs: Small Country



Effects on Welfare

Net for country
−(b+d)

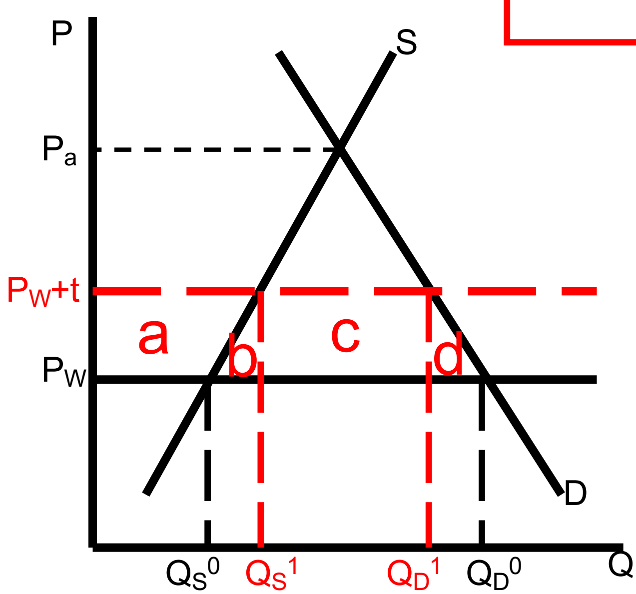
Country <u>loses</u> from tariff

Effects of Tariffs: Small Country

Summary:

- Suppliers gain +a
- Demanders lose −(a+b+c+d)
- Government gains +c
- Net effect on country

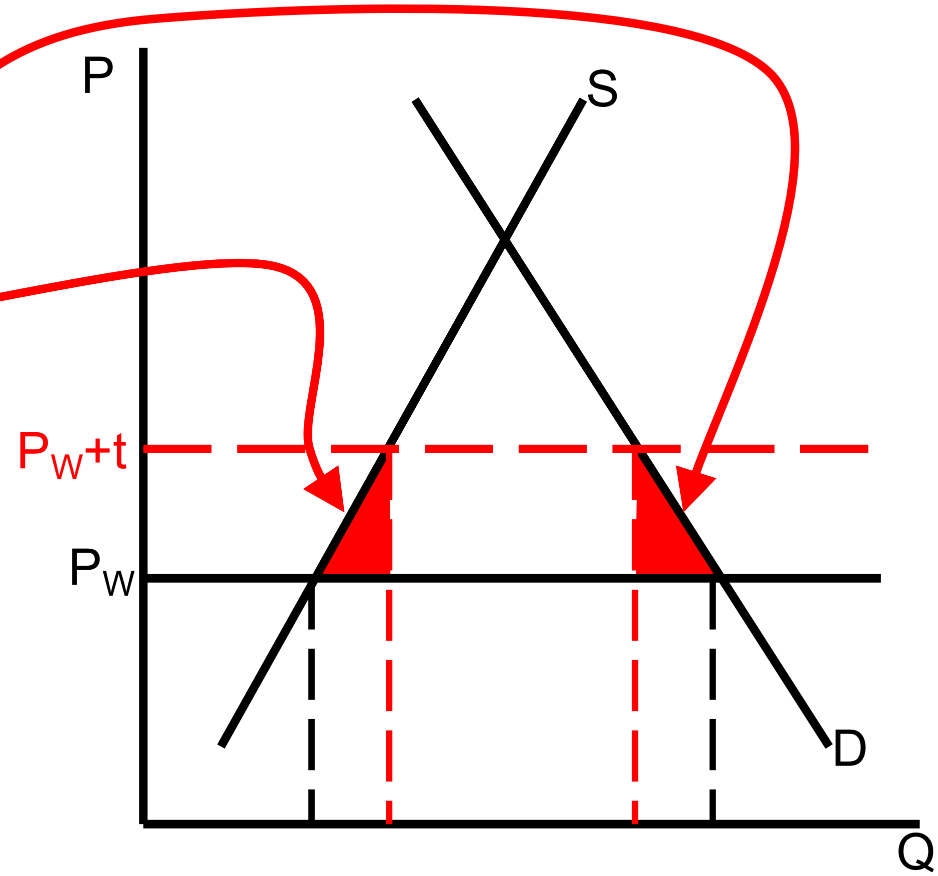
Loss = −(b+d)



"Dead Weight Loss" =

Effects of Tariffs: Small Country

- Dead Weight Loss
- Why?
- Because demanders and suppliers both are misled by the tariff to behave as if the good's value were P_W+t, when in fact the country can buy or sell it for P_W.



Clicker Question

Suppose the world price of a good is initially \$10 and it then rises to \$20. In which of the following cases will the domestic price of the good rise the most?

	Price rises from
a) It has a \$2 specific tariff	\$12 to \$22, by \$10
b) It has a 20% ad valorem tariff	\$12 to \$24, by \$12
c) It has a \$4 specific tariff	\$14 to \$24, by \$10
✓ d) It has a 30% ad valorem tariff	\$13 to \$26, by \$13

Clicker Question

Which of the following would cause the dead-weight loss due to a tariff to be zero?

a) Domestic supply curve is vertical

b) Domestic demand curve is vertical

✓ c) Both domestic supply and demand are vertical

d) Nothing: dead-weight loss due to a tariff can never be zero

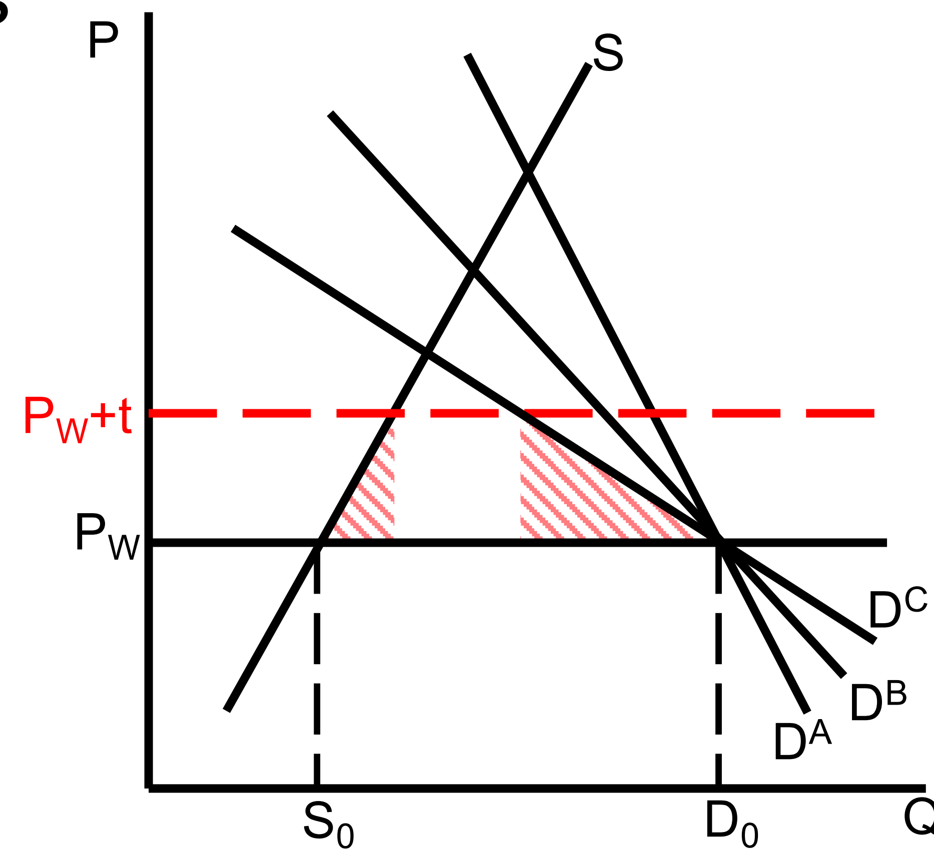
Clicker Question

In the graph, initial price is P_W and quantities are S_0 and D_0. A tariff t is then applied to imports. For which demand curve is the dead-weight loss the largest?

a) D^A

b) D^B

✓ c) D^C



Clicker Question

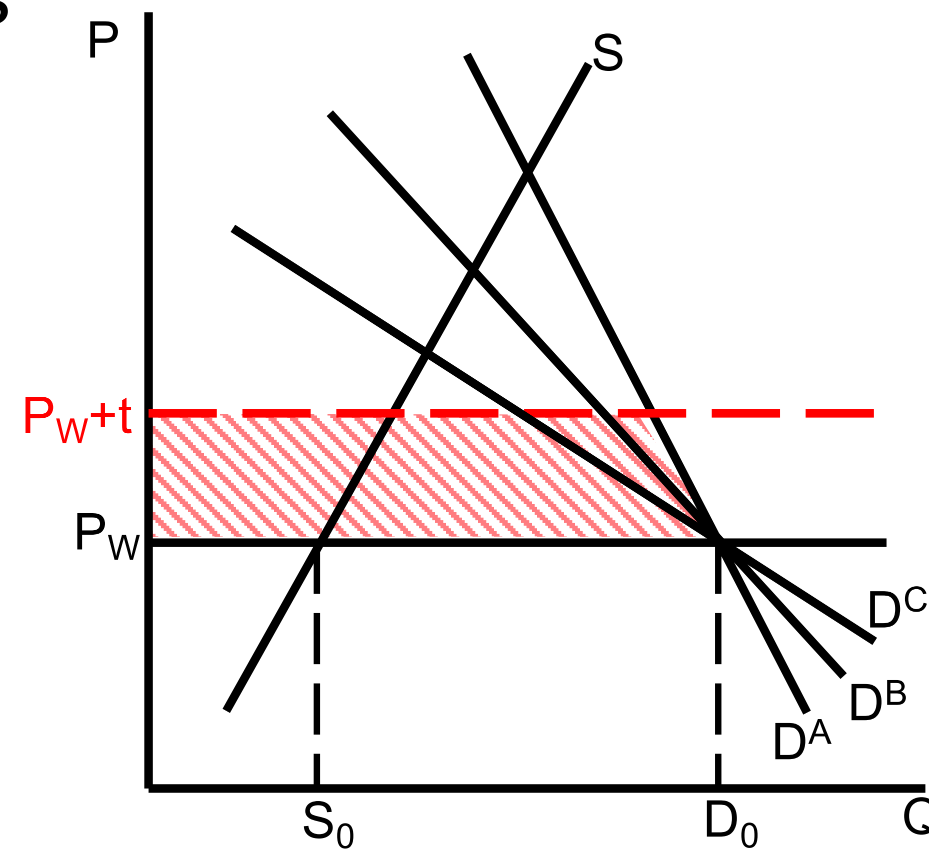
Same graph.

For which demand curve is the loss to consumers the largest?

✓ a) D^A

b) D^B

c) D^C



Clicker Question

Same graph

How is this possible? If the country loses more with D^A (dead-weight loss) but consumers lose less, who loses more?

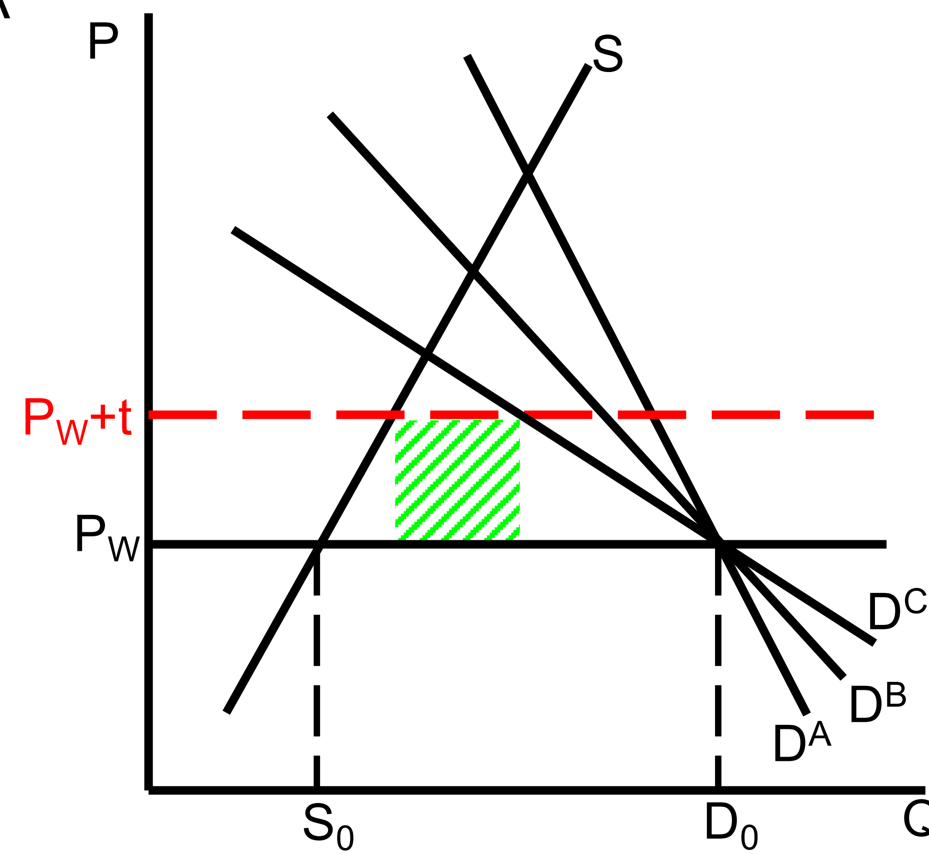
a) Suppliers

✓ b) Government

c) Foreigners

d) Other industries

Gains less, actually



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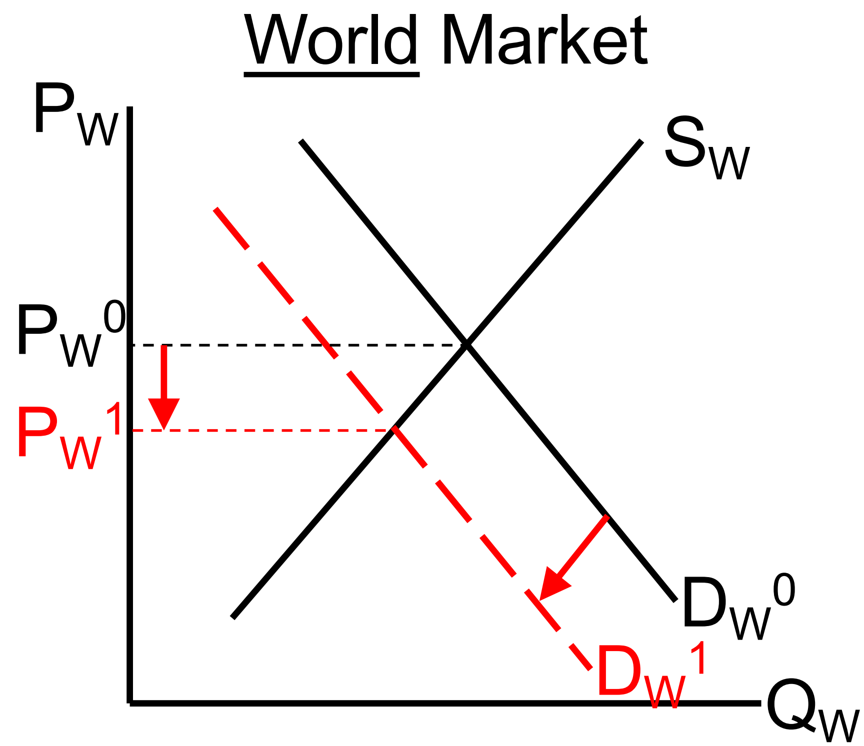
Effects of Tariffs: Large Country

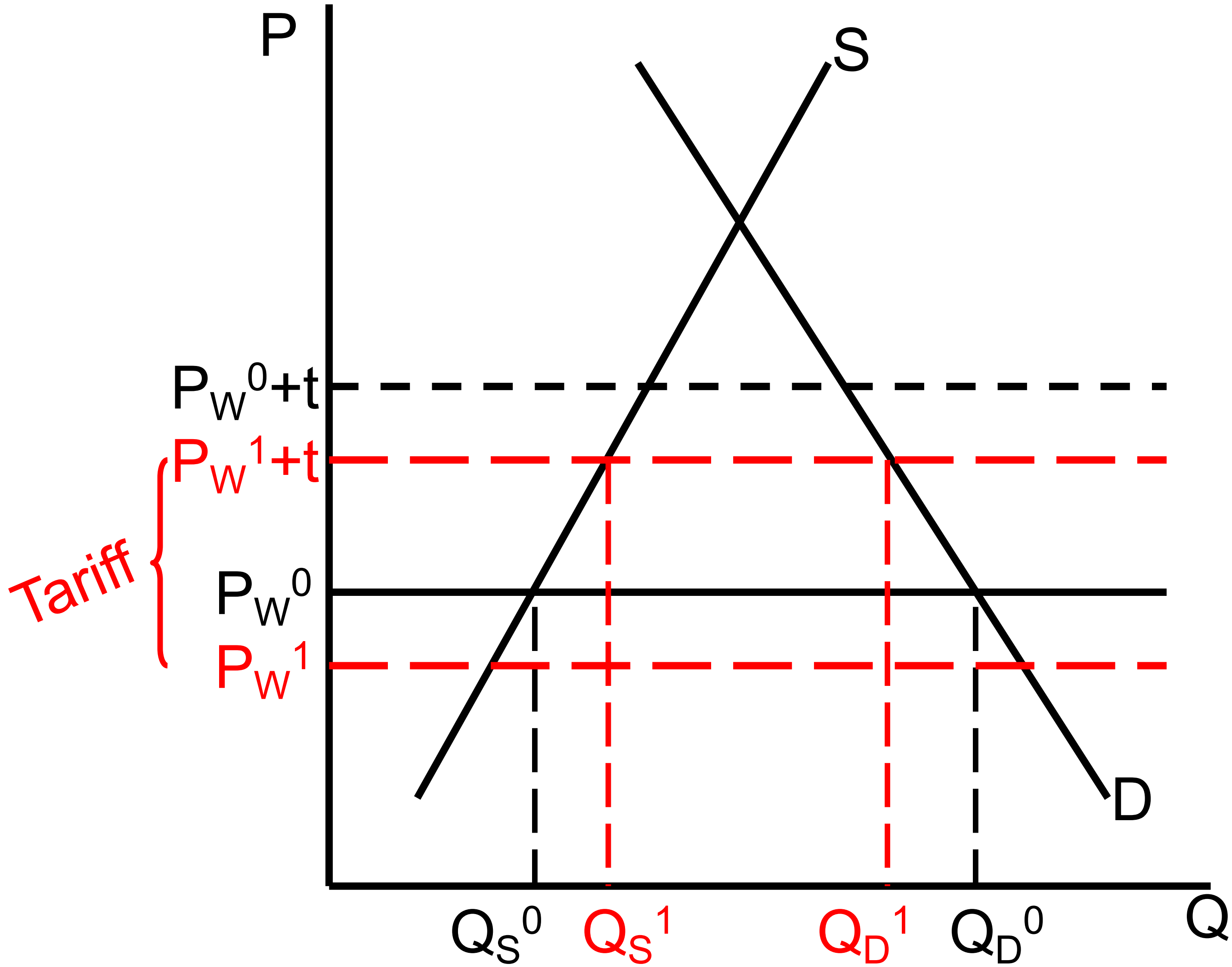
- If the country is not small, but large, then
  - when it reduces its imports of the good from the world market
  - the world price will fall.
- Why?
  - Because, with less import demand by large country, world demand shifts left.



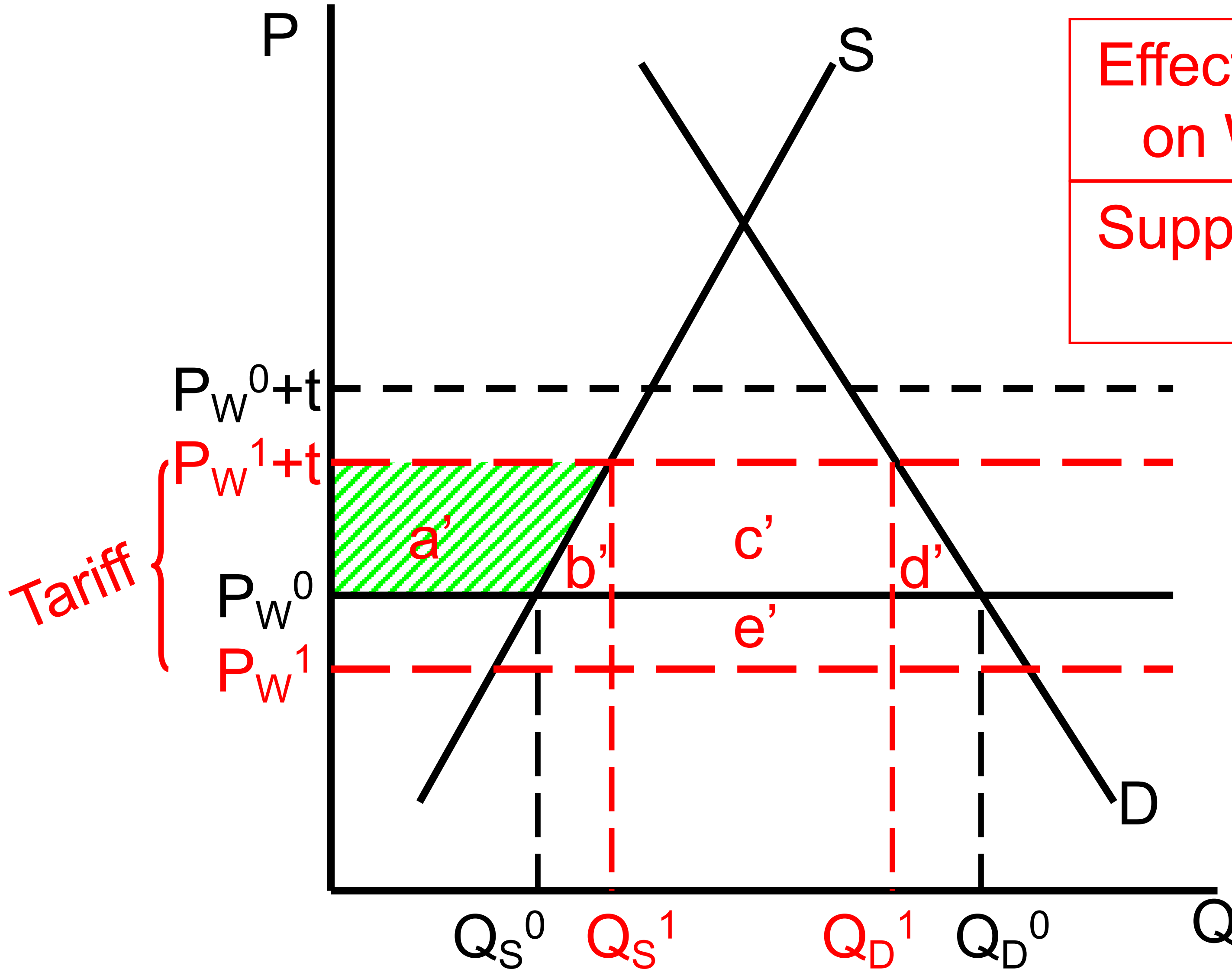
Effects of Tariffs: Large Country

- Results due to tariff <u>and</u> fall in world price:
  - Domestic price rises, but by <u>less</u> than the tariff
  - Thus, compared to the same tariff in a small country
    - Output (and employment) rises by less
      - Thus the benefit to suppliers is smaller
    - Demand falls by less
      - Thus the harm to demanders is smaller
    - Imports fall by less
    - Tariff revenue is larger (since imports fall less)

Effects of Tariffs: Large Country

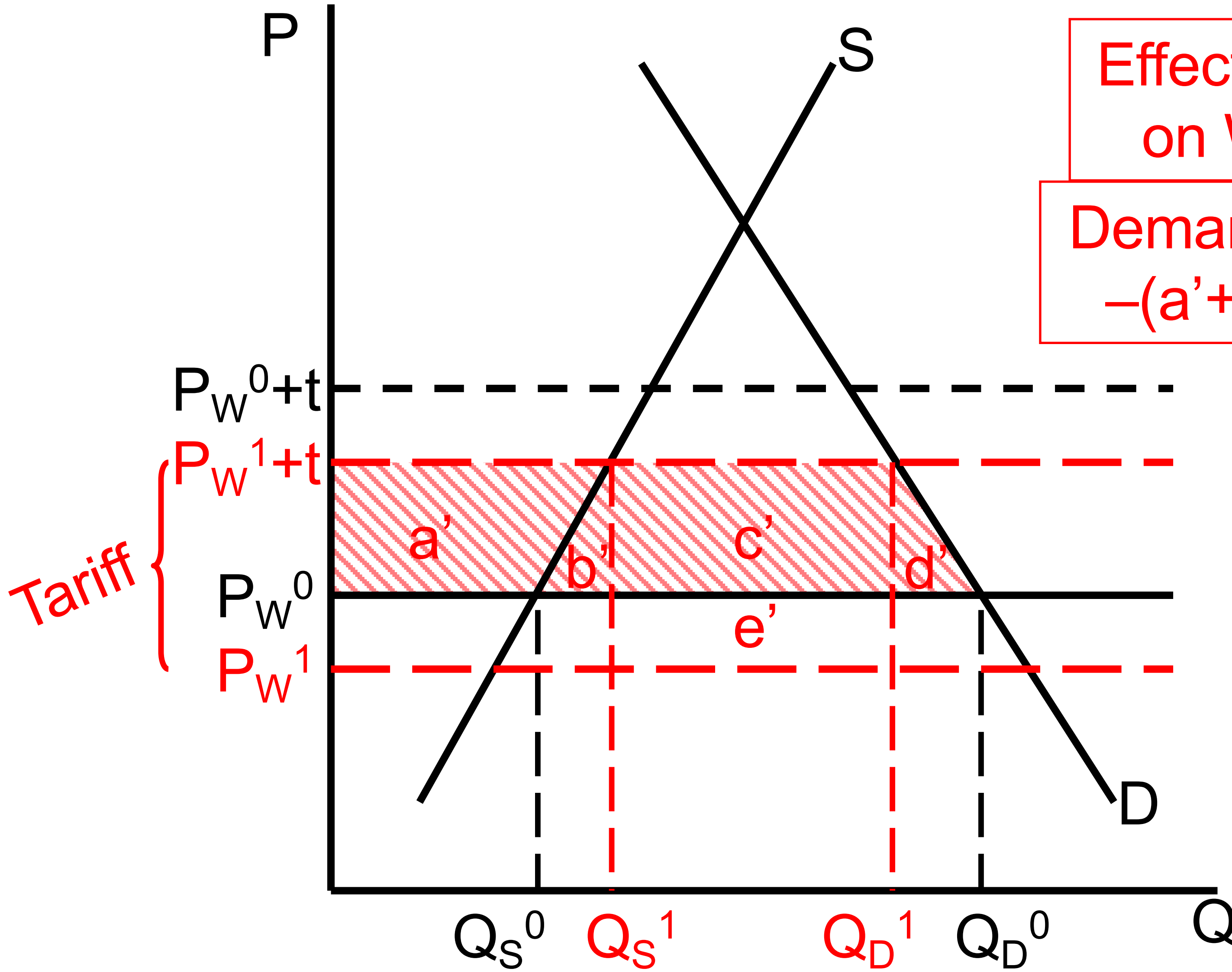


Effects of Tariffs: Large Country



Effects of tariff on Welfare
Suppliers gain +a'

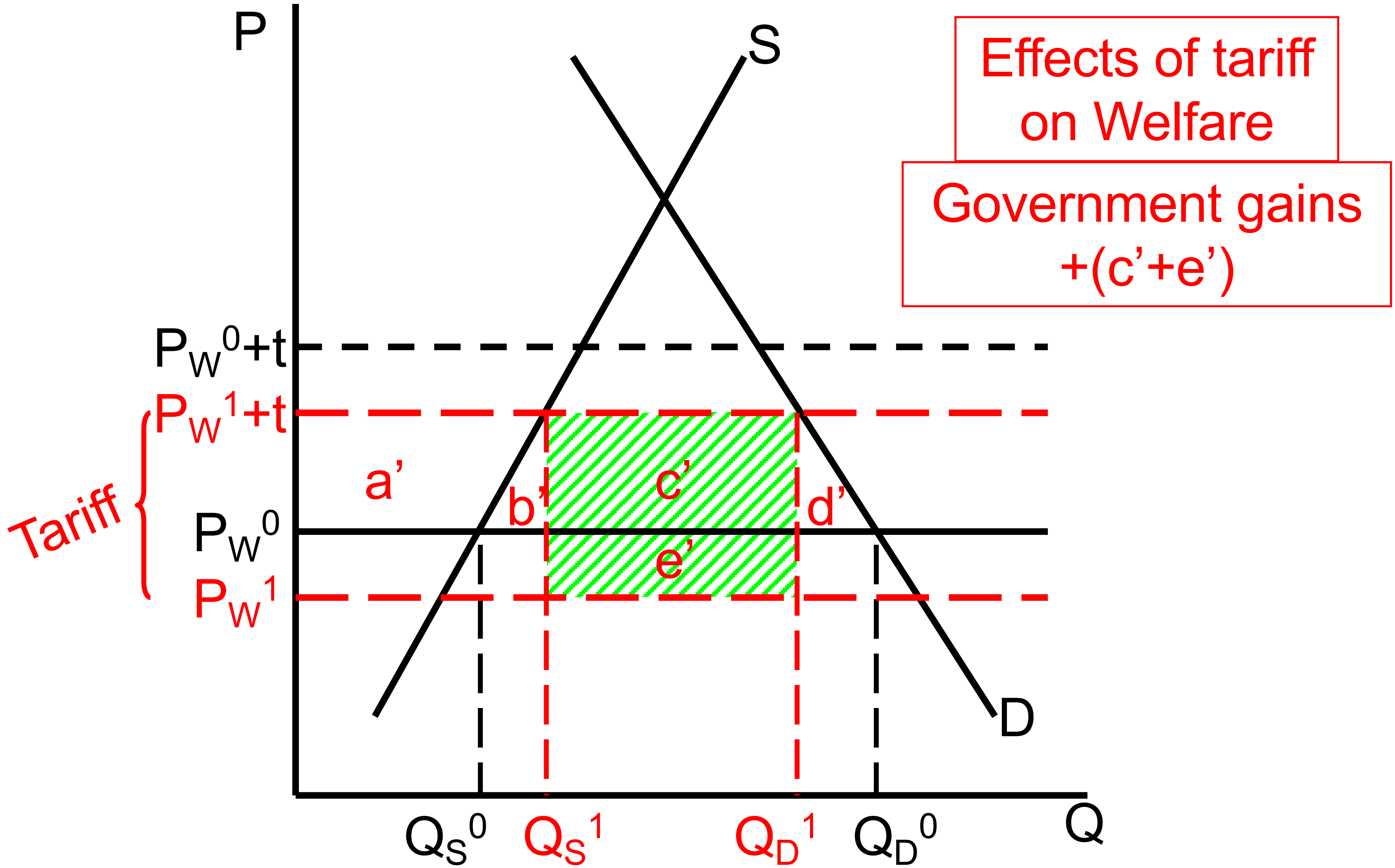
Effects of Tariffs: Large Country



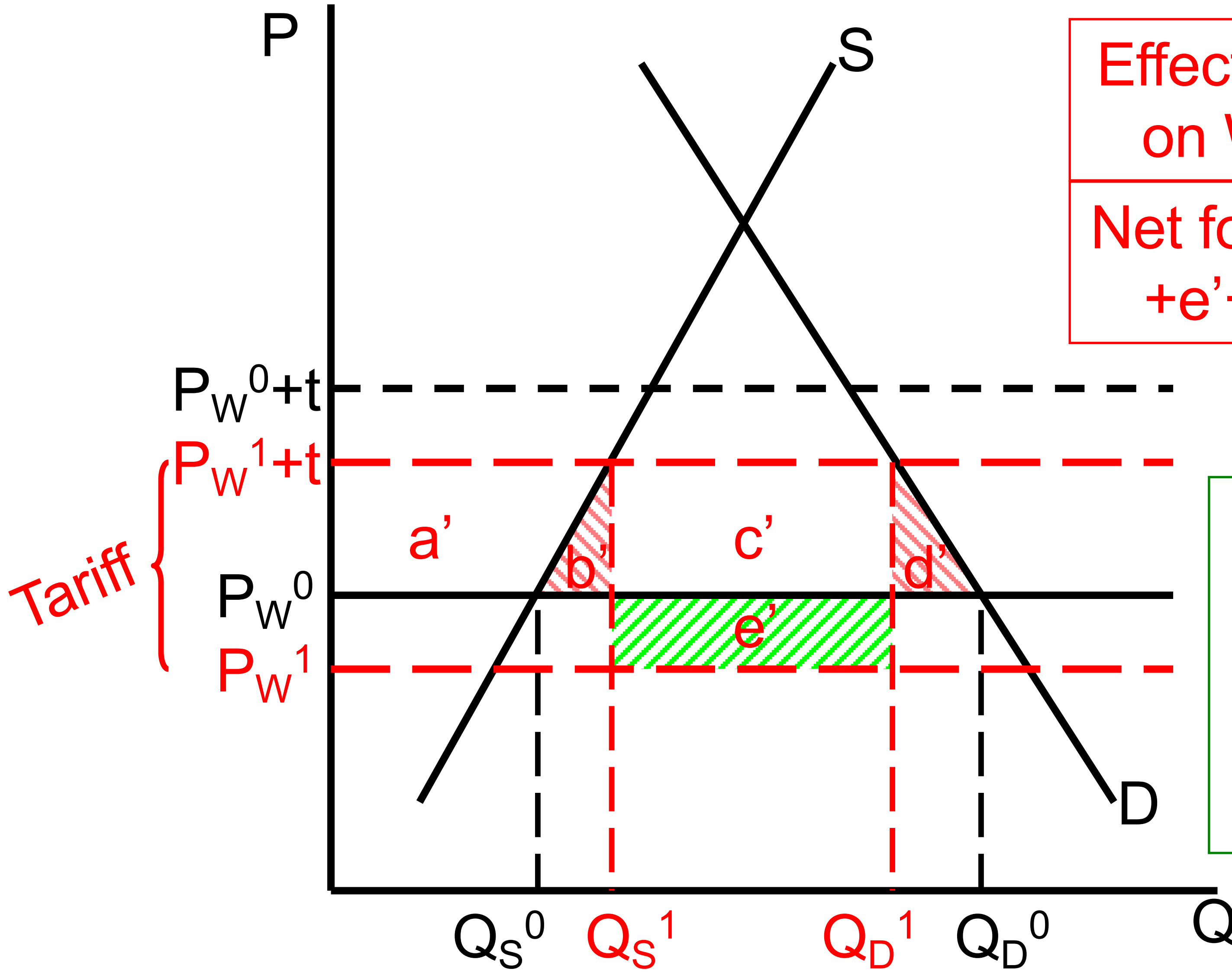
Effects of tariff on Welfare

Demanders lose –(a'+b'+c'+d')

Effects of Tariffs: Large Country



Effects of Tariffs: Large Country



Effects of tariff on Welfare

Net for country
+e'−(b'+d')

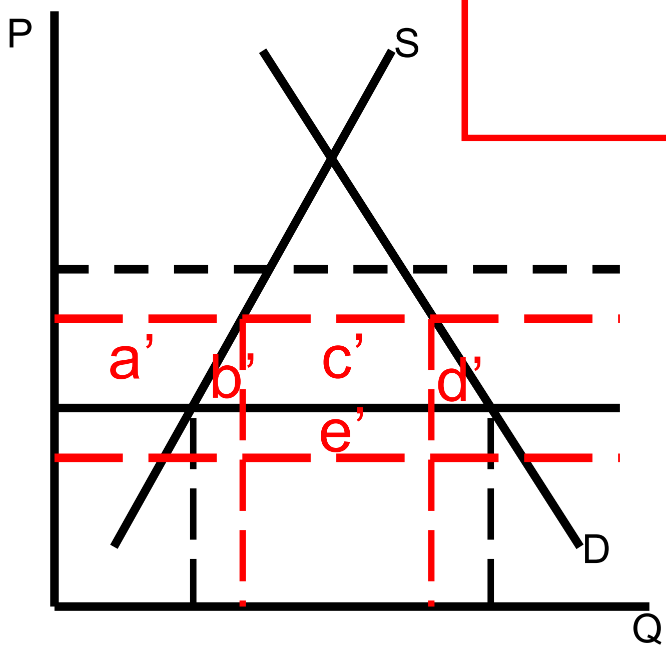
Country gains from tariff if e'>(b'+d')

Effects of Tariffs: Large Country

Summary:

- Suppliers gain +a’
- Demanders lose −(a’+b’+c’+d’)
- Government gains +(c’+e’)
- Net effect on country

  Gain or Loss = +e’−(b’+d’)



Effects of Tariffs: Large Country

- This possibility of gain from a tariff goes under <u>several names</u>:
  - The "terms of trade" effect of a tariff
  - The "monopoly" effect of a tariff
  - The "optimal tariff"

Effects of Tariffs: Large Country

- The "Terms of Trade" Effect
  - Definition:

    A country's "Terms of Trade" is defined as the price of its exports relative to its imports

$$TOT = \frac{P_{\text{exports}}}{P_{\text{imports}}}$$

  - If *TOT* rises, the "terms of trade improves"
    - because the country gets more imports in return for its exports
  - A tariff by a large country drives <u>down</u> the world price of its imports
    - and thus <u>improves</u> its terms of trade

Effects of Tariffs: Large Country

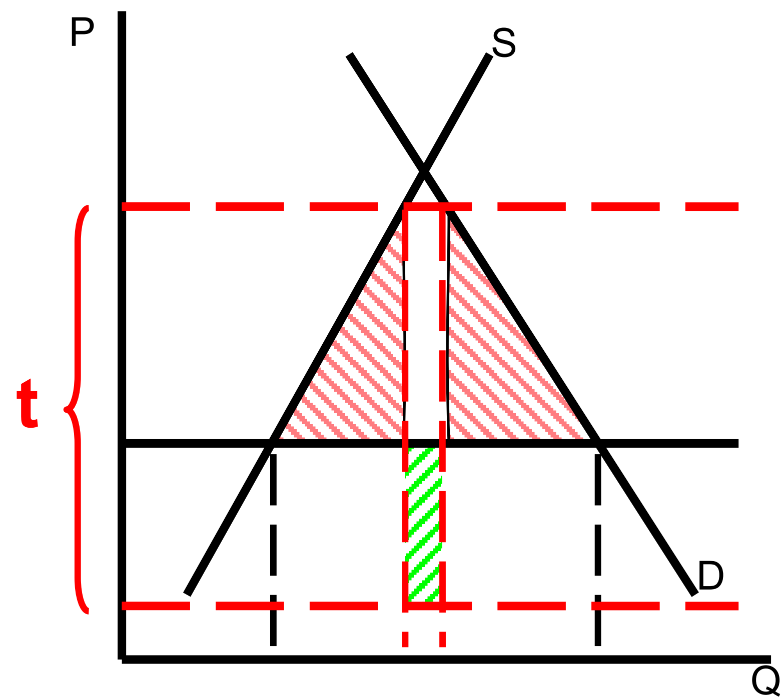
- The “monopoly” effect
  - From Econ 101, a monopoly firm increases its profit by
    - Selling less to the market, and hence
    - Raising the price that it gets
  - A large country can increase its welfare by
    - Buying less from the market (via a tariff), and hence
    - Lowering the price that it pays
  - Note: Large country could also gain by restricting exports, as OPEC has done with oil

(Not in recent years, but it keeps trying)

Effects of Tariffs: Large Country

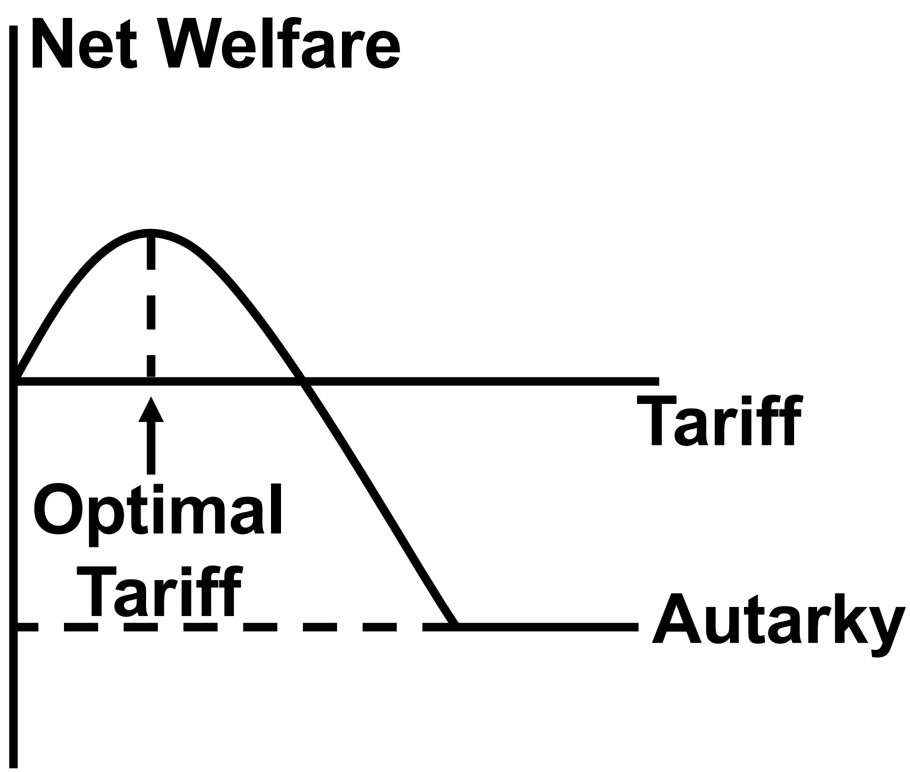
- The "optimal tariff"
  - If a large country uses a tariff that is too large, it must lose.
  - Thus there is some level of tariff that is optimal

Example of a too large tariff:



Effects of Tariffs: Large Country

- The "optimal tariff"



Is the US Large

- One would think so
- But evidence from Trump's tariffs in 2018 (see Foy) found
  - US prices rose by full amount of tariffs
  - <u>No</u> fall in prices for foreign exporters
- Apparently,
  - Even though US appears to be large
  - Our share of the world market is not that big

Clicker Question

Who loses within a large country when it uses an optimal tariff?

a) Domestic suppliers
✓ b) Domestic demanders
c) The government
d) Nobody: only foreigners lose

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The Size of These Effects

- See Feenstra
  - Uses analysis like this one to measure effects of protection
  - Sectors with high US protection in 1985:
    - Automobiles
    - Dairy
    - Steel
    - Sugar
    - Textiles and Apparel

      (All these had quotas and other NTBs as well as tariffs.)

The Size of These Effects

- See Feenstra
  - For 1985, U.S. average tariffs caused dead-weight loss (DWL) for U.S. of

    $\boxed{\text{DWL = \$1.2-3.4 billion per year}}$

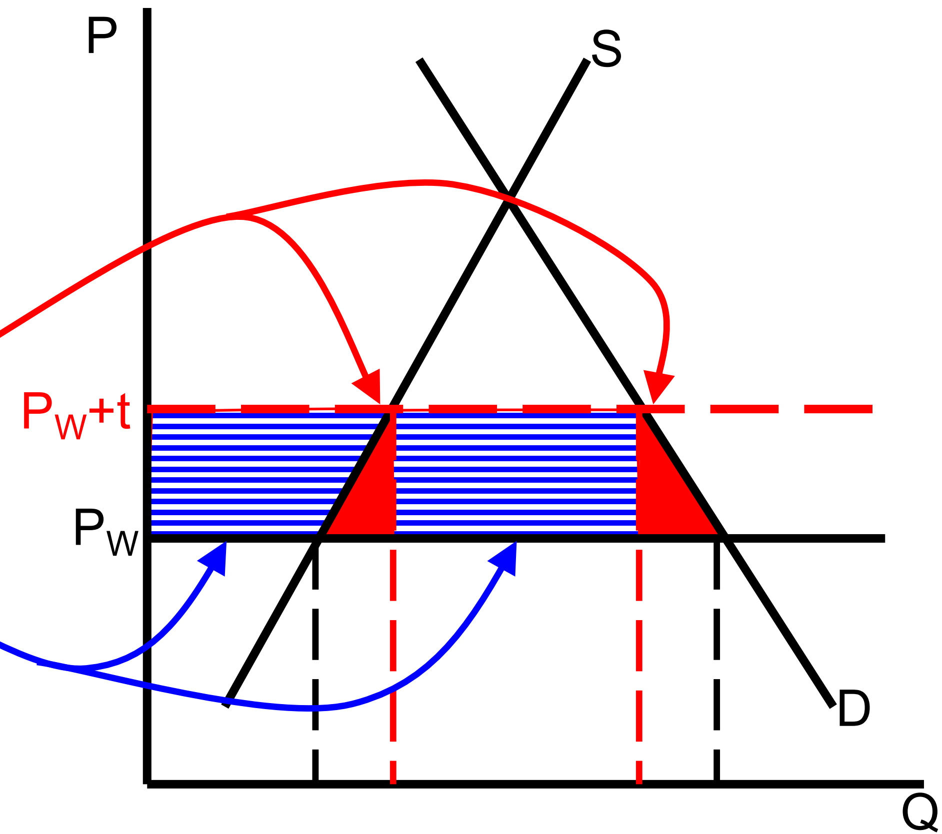
  - Sounds like a lot! But U.S. 1985 GDP was \$4,181 b. So

    $\boxed{\text{DWL = 0.03\% of GDP}}$

TINY!

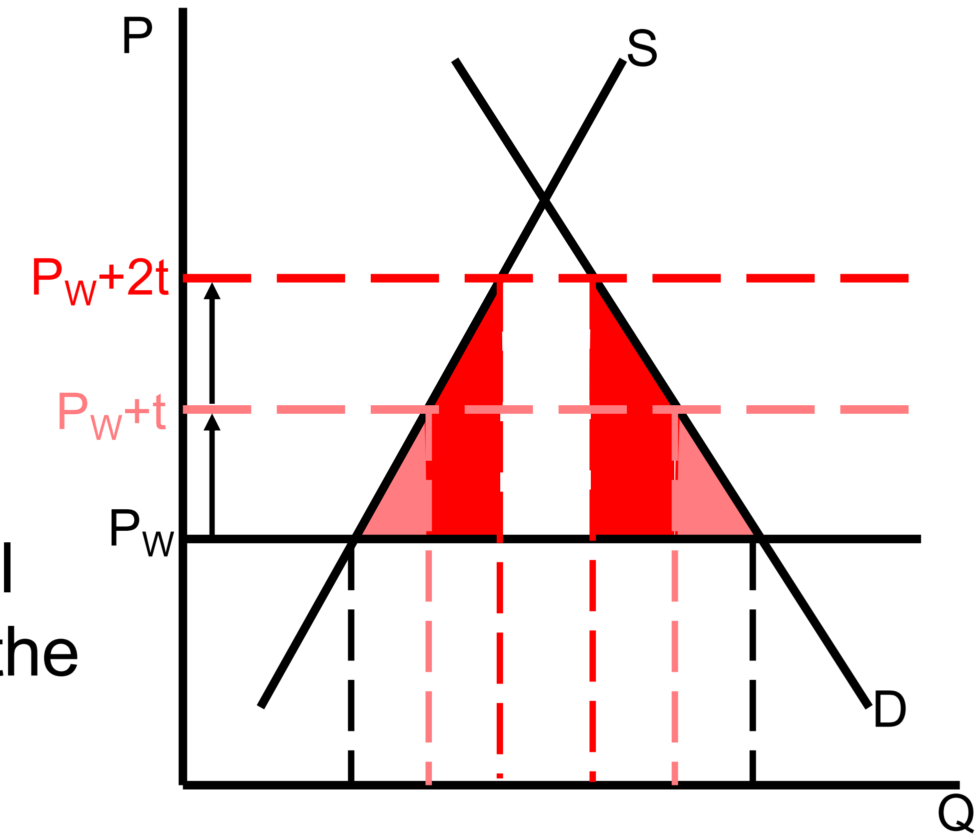
The Size of These Effects

- Why is the loss from tariffs so small?
  - Most U.S. tariffs are small
  - But note, this is only the DWL
  - The transfer from consumers, to producers and to government, is much larger



The Size of These Effects

- Why so small?
  - DWL grows with the square of the tariff
  - Example:
    - Doubling the tariff
    - Multiplies DWL by 4
  - So DWL due to small tariff is smaller than the tariff itself might suggest



Clicker Question

The US tariff on cars is 2.5%. The US tariff on light trucks is 25%. Suppose that the world prices of cars and trucks are the same and that US demand at those prices is the same. Then if the dead-weight loss due to the car tariff would be $75 per car, what would be the dead-weight loss due to the truck tariff per truck?

a) $75
b) $175
c) $750
d) $1,375
✓ e) $7500

The tariff is 10 times as large, so the dead weight loss is 10^2=100 times as large.

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Addenda on Tariffs

- Three more things:
  1. The model we are using makes several assumptions:
     - Perfect competition:
       - All buyers and sellers are too small, individually, to affect price (even if the country is large). Answers could be different otherwise
     - Partial equilibrium
       - Market is small part of large economy, so that effects on other markets can be ignored
     - Homogeneous products
       - The imported good is a perfect substitute for domestically produced good

Addenda on Tariffs

- Three more things:

  2. The large-country tariff

     - Harms the other country (or rest of world)
     - Lowers world welfare. Thus the rest-of-world loses more than the tariff-levying country gains.
     - The other country may retaliate with its own tariff. Then both lose.

Addenda on Tariffs

- Three more things:
  3. Effective Protection
     - Just as a tariff on an industry's <u>output</u> helps it by raising its price, a tariff on its <u>input</u> hurts the industry
     - The Effective Rate of Protection takes account of tariffs on both inputs and outputs to gauge the level of protection in an industry:

$$ERP = (t_o - a t_i) / (1 - a)$$

where

t_o = *ad valorem tariff on output*

t_i = *ad valorem tariff on input*

a = *value of input as share of value of output*

Clicker Question

Suppose that to make a $100 bicycle requires $50 of imported steel. If the tariff on bicycles is 10% and the tariff on steel is 20%, what is the effective rate of protection on bicycles?

a) 20%
b) 10%
✓ c) 0% ERP = $(t_o - at_i) / (1 - a) = (0.1 - 0.5 \times 0.2) / (1 - 0.5) = 0$
d) –10%
e) –20%

Next Time

- Nontariff Barriers
  - Quotas, etc.
  - Subsidies