Introduction

1. How large are tariffs?

2. Is it beneficial to set a positive tariff on imports?

3. Two cases:
    - Small economies taking prices as given
    - Large economies

Introduction

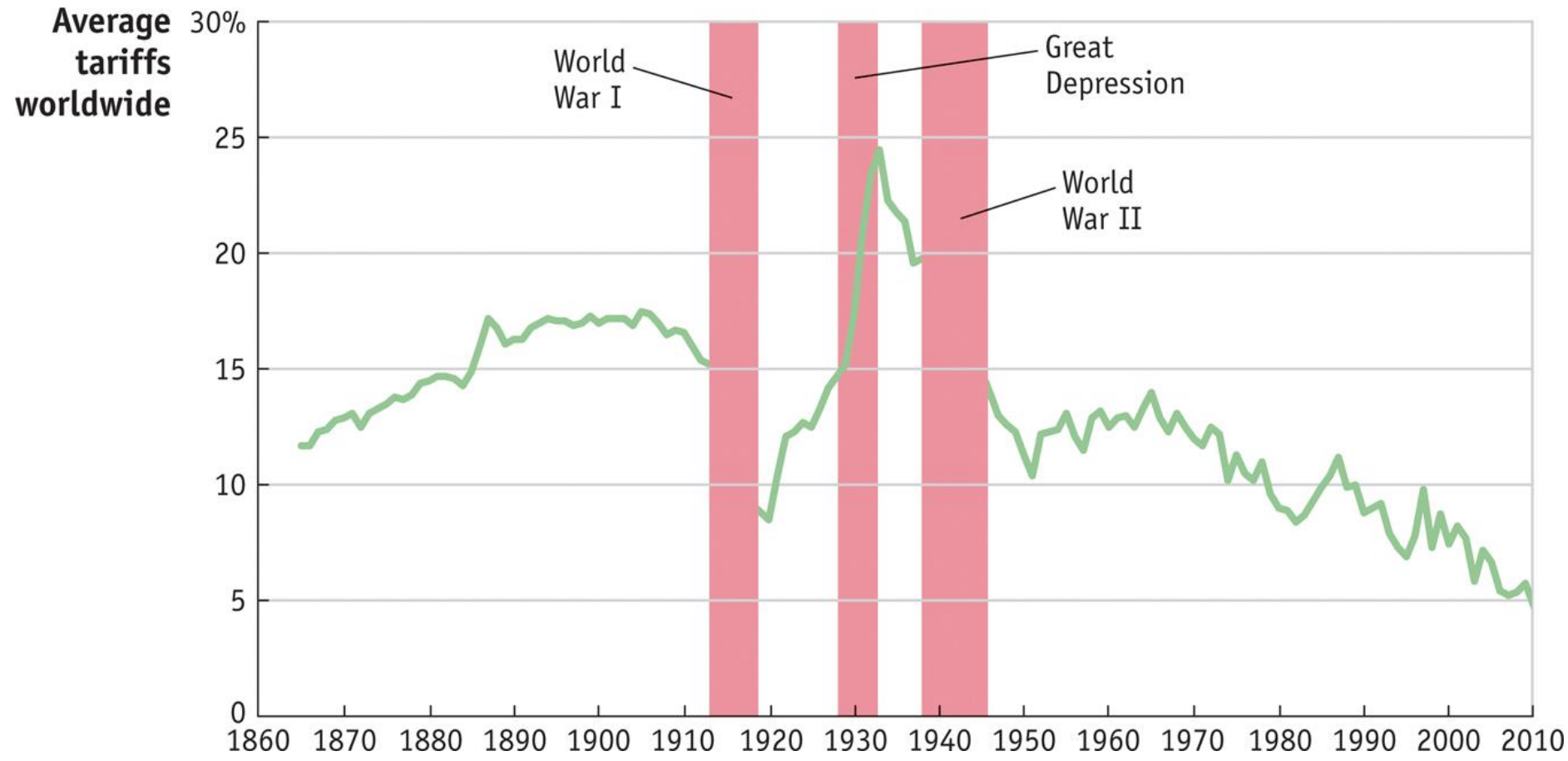
What is a tariff?

- Definition: tariff = tax on imports

- Can be a tax in dollars (e.g. P=$6 + $2tax)

  …or “ad valorem” (% tax on value of imports)

Note: There are other trade barriers (such as quotas) but effect usually similar to a tariff:


Average tariffs worldwide
30%
25
20
15
10
5
0
World War I
Great Depression
World War II
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Introduction

How large are tariff?

- Tariffs were very high historically

- Low on average in rich countries but there are exceptions if we look more closely across industries

  … Especially food items

- Tariffs are now often imposed on a temporary basis

  (e.g. recently to protect US steel and tire industries)

Tariffs in a small economy

Setup

- Perfect competition
- Partial equilibrium: looking at a specific industry,
  no effect on wages
- General setup to account for effects on two sides:
  - Consumer surplus
  - Producer surplus
- Small open economy: ***constant international price***

Tariffs in a small economy

Gains from tariffs?

- What we have seen so far:

- ***In most the trade models:***

→ Both countries gain from trade compared to autarky

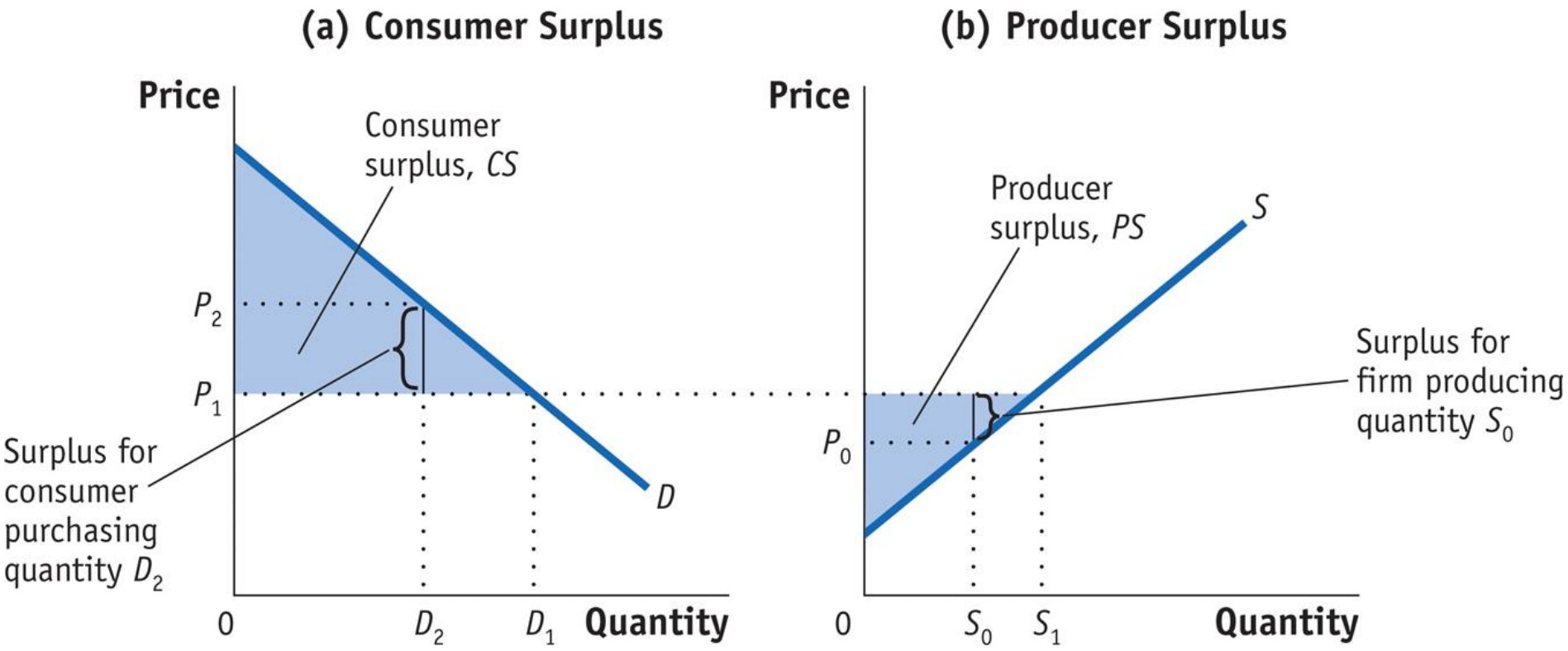
- Same conclusion here?

- Not obvious: tariffs generate revenues.

- Gains to be redistributed from/to consumers/producers?

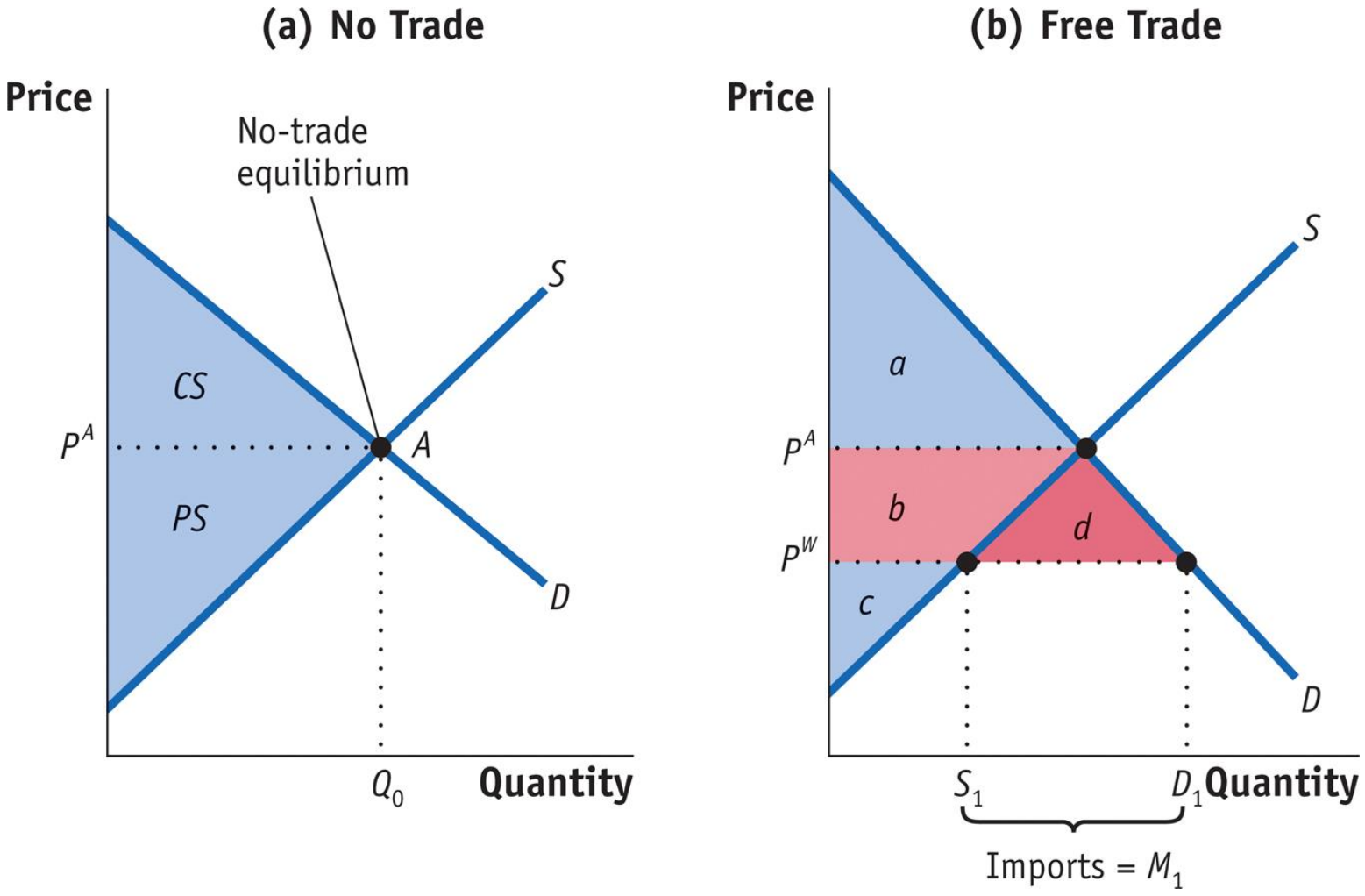
Tariffs in a small economy

Side by side:

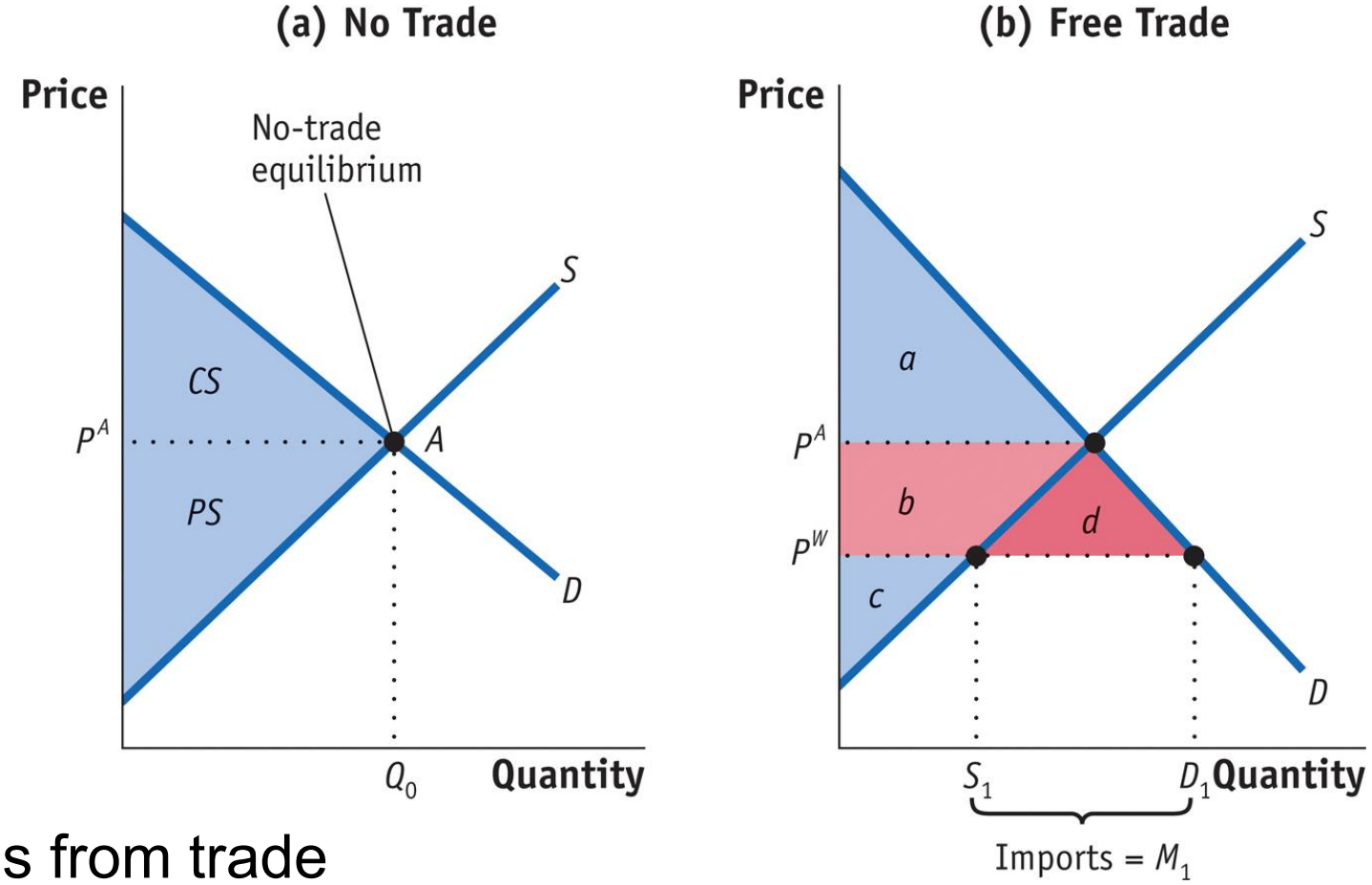


Tariffs in a small economy

Gains from going from Autarky to trade:



Gains from going from Autarky to trade:



Gains from trade

= increase in consumer surplus – decrease in producer surplus

= (b + d) - (b)

= d

Tariffs in a small economy

Effect of tariffs?

Account for:

- change in consumer surplus
- change in producer surplus
- Tariff revenues

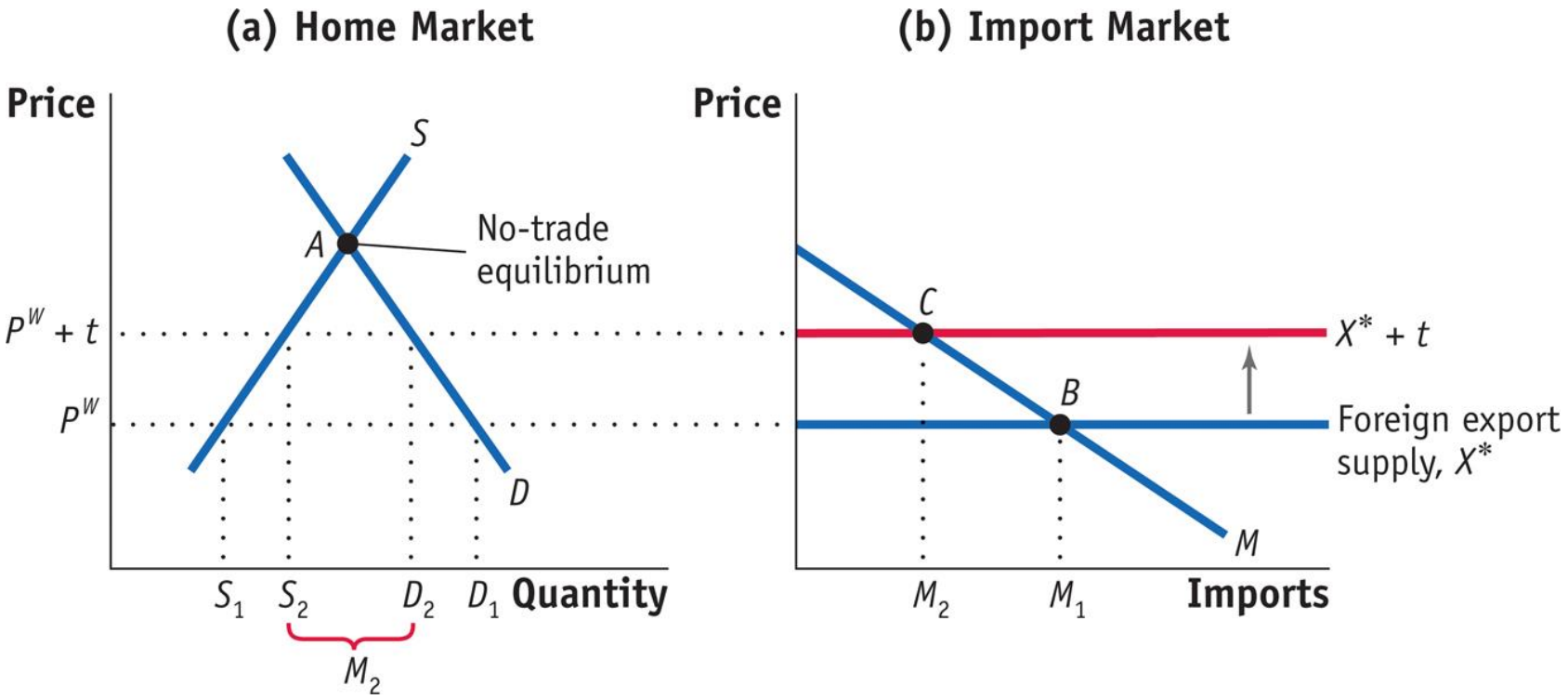
Tariffs in a small economy

Effect of tariffs?

First step: effect of the tariff on **prices** and **imports**:

→ Increase in price: P^W to P^W+t

→ Decrease in imports: M_1 to M_2

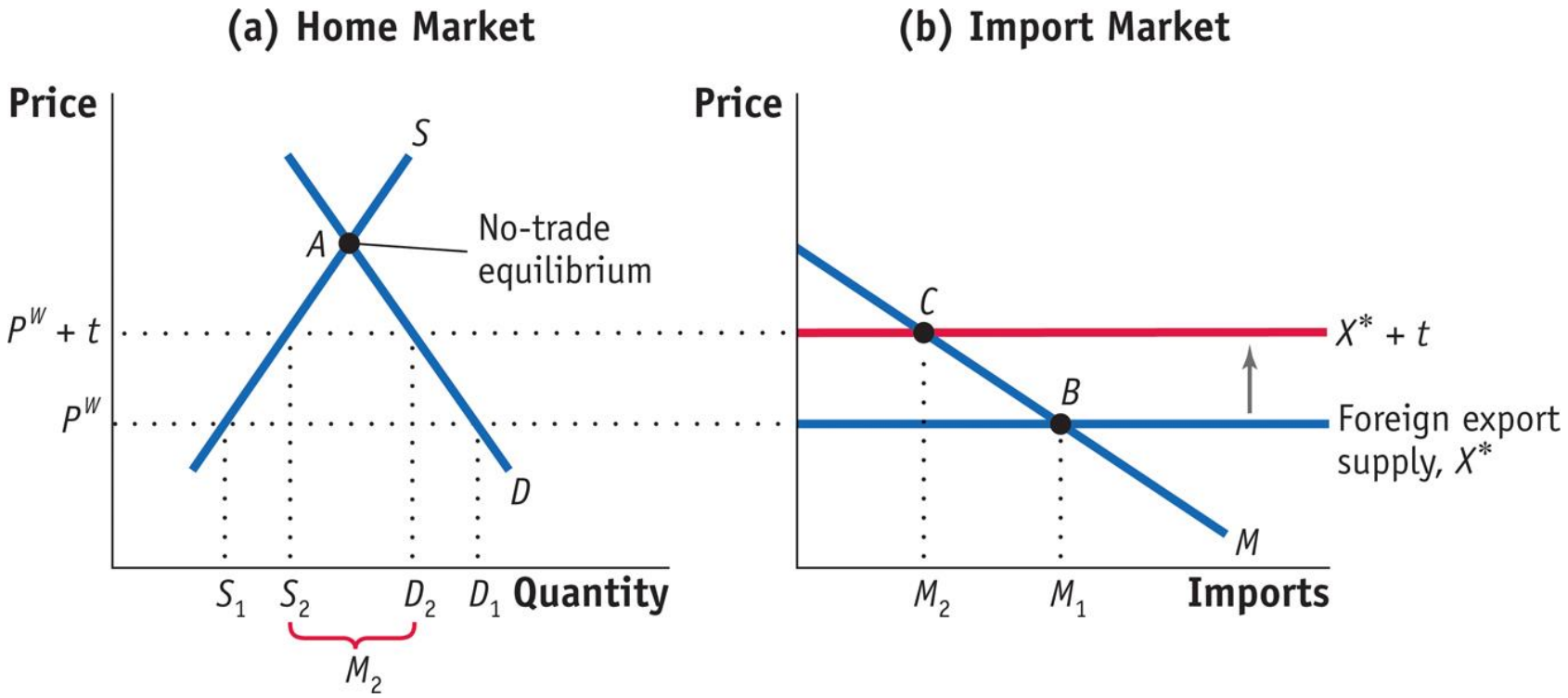


Tariffs in a small economy

Effect of tariffs?

Second step: effect of the tariff on:

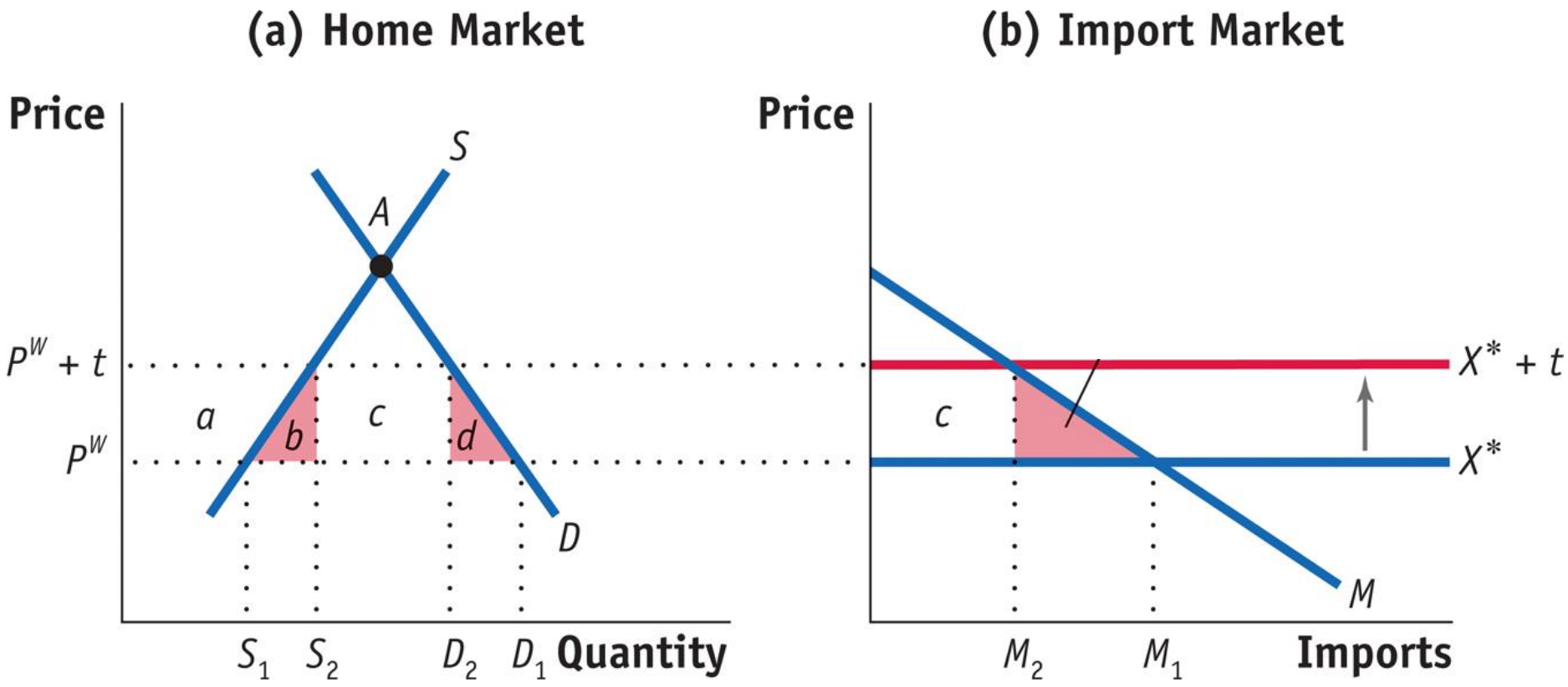
consumer and **producer** surplus + **tariff revenues**:



Tariffs in a small economy

Effect of tariffs?

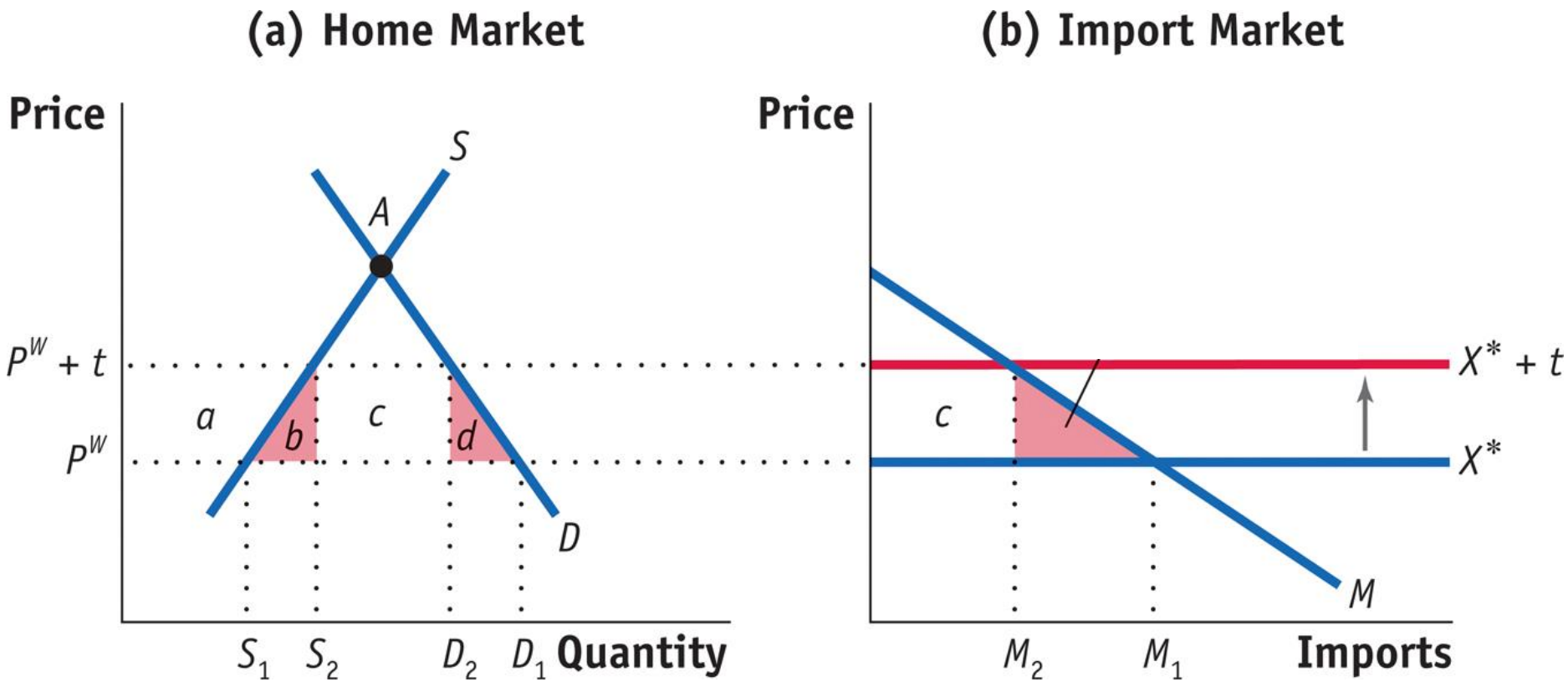
Decrease in **consumer surplus = ?**



Tariffs in a small economy

Effect of tariffs?

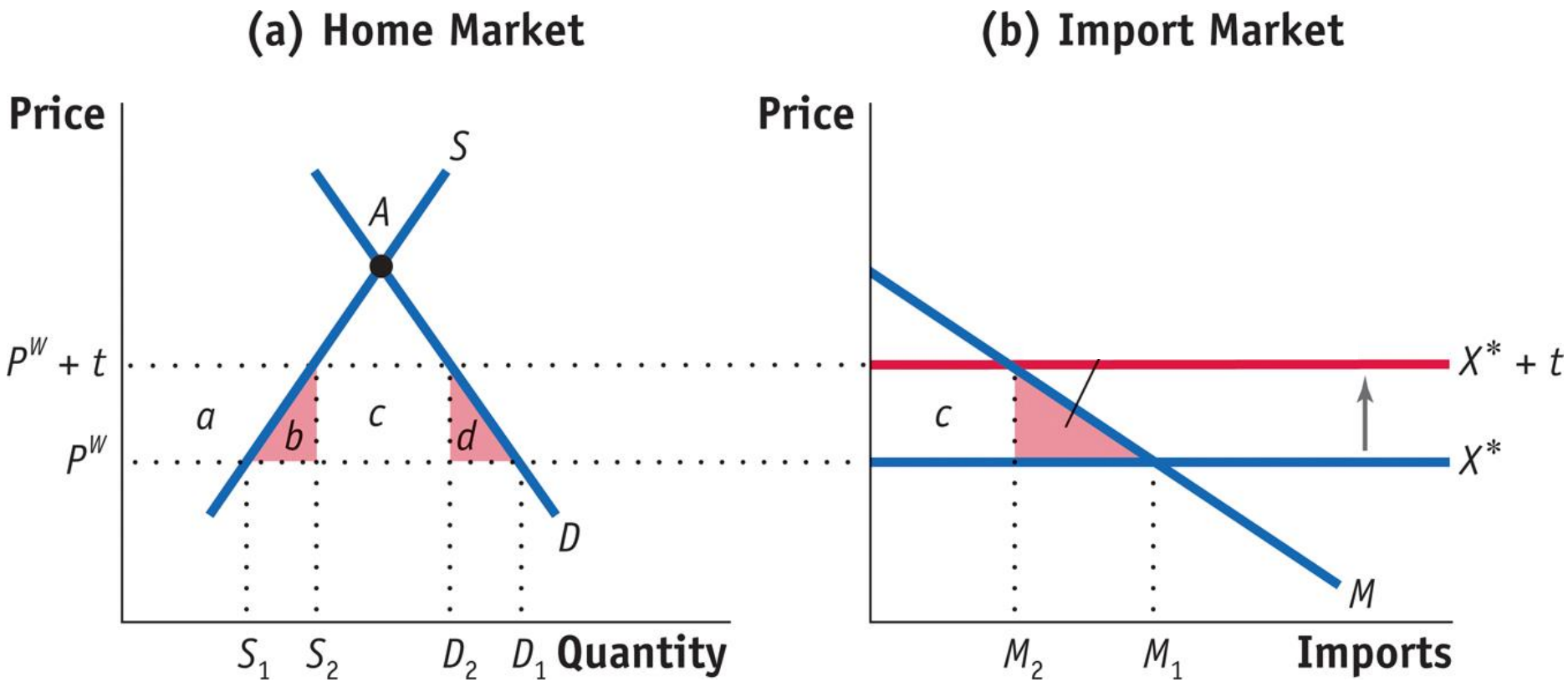
Decrease in **consumer surplus** = **(a+b+c+d)**



Tariffs in a small economy

Effect of tariffs?

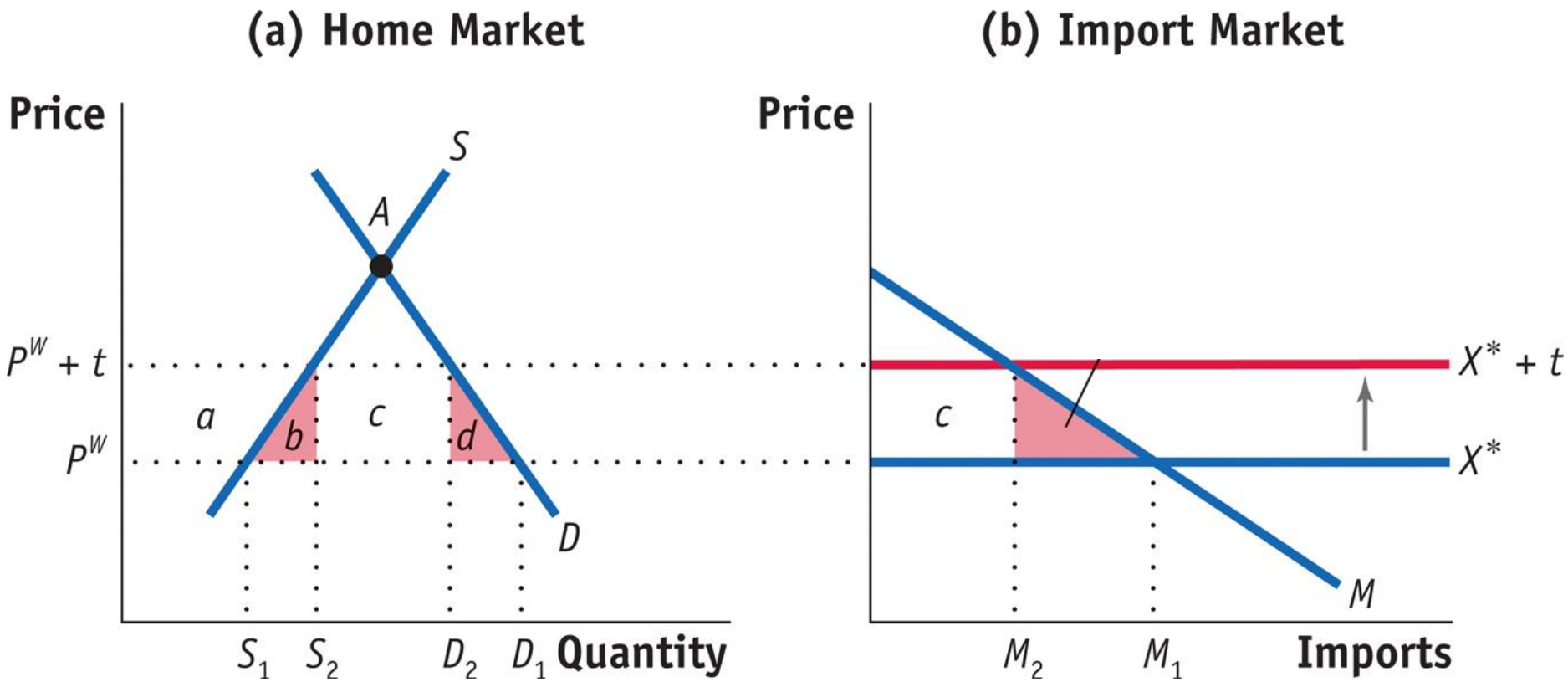
Increase in **producer surplus** = ?



Tariffs in a small economy

Effect of tariffs?

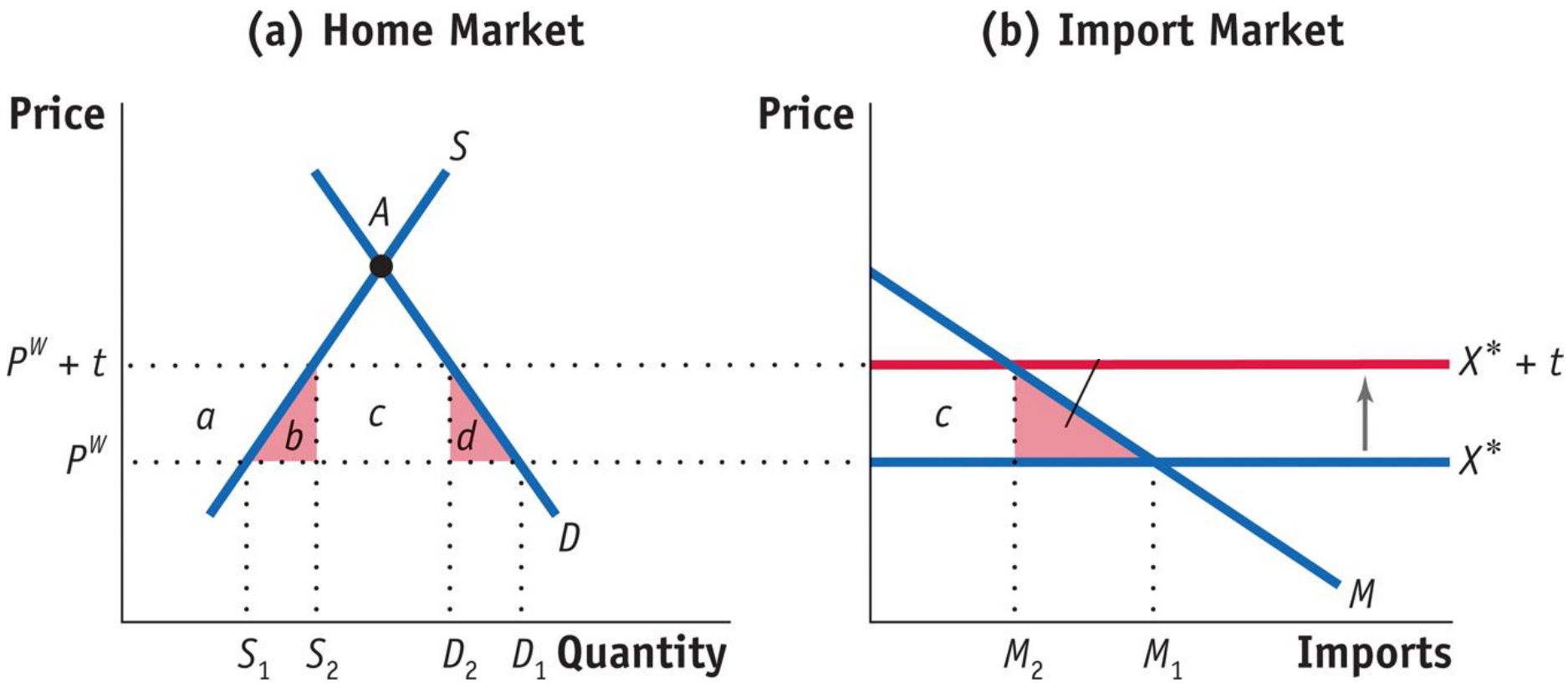
Increase in **producer surplus** = **a**



Tariffs in a small economy

Effect of tariffs?

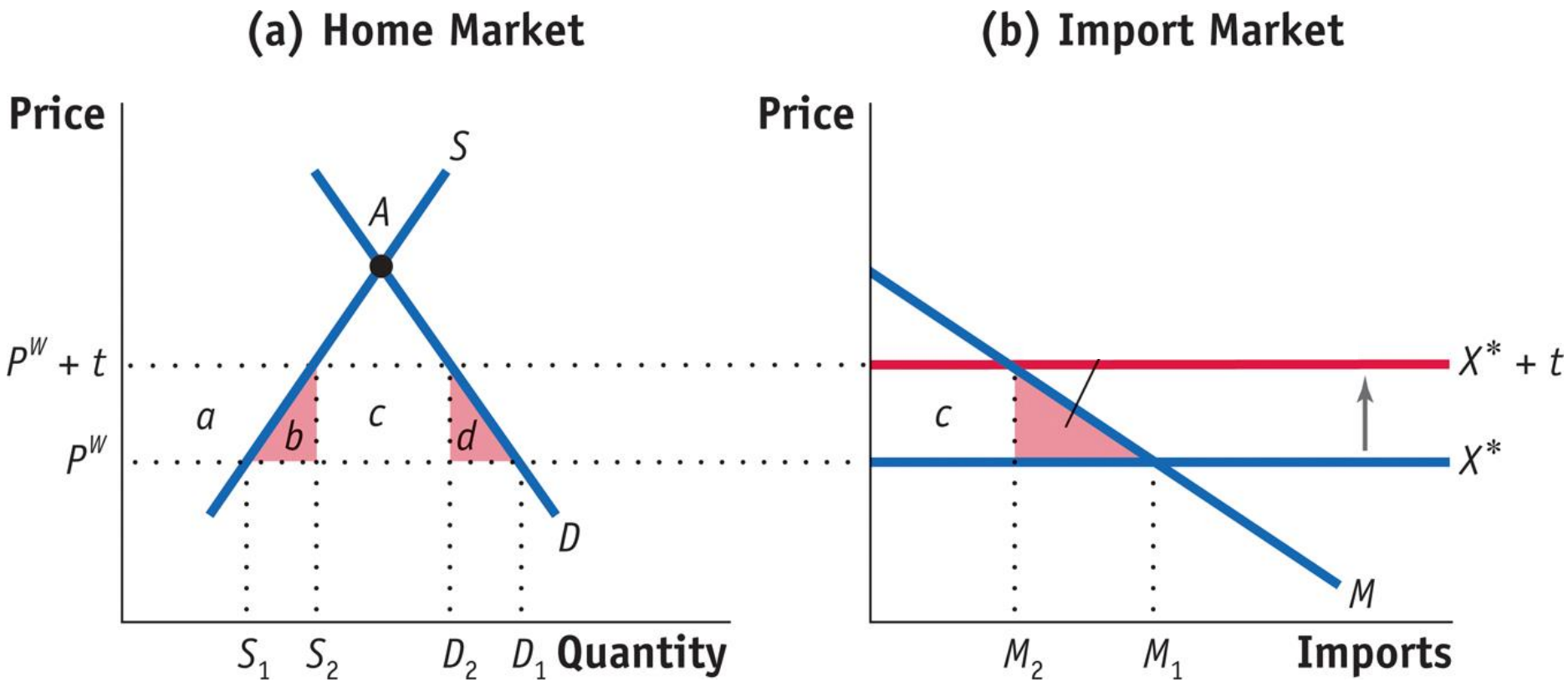
Additional **tariff revenues** = ?



Tariffs in a small economy

Effect of tariffs?

Additional **tariff revenues** = **c**



Tariffs in a small economy

Effect of tariffs?

Account for:

- change in consumer surplus: - (a+b+c+d)
- change in producer surplus: + a
- Tariff revenues: + c

- TOTAL: “deadweight loss” - (b+d)

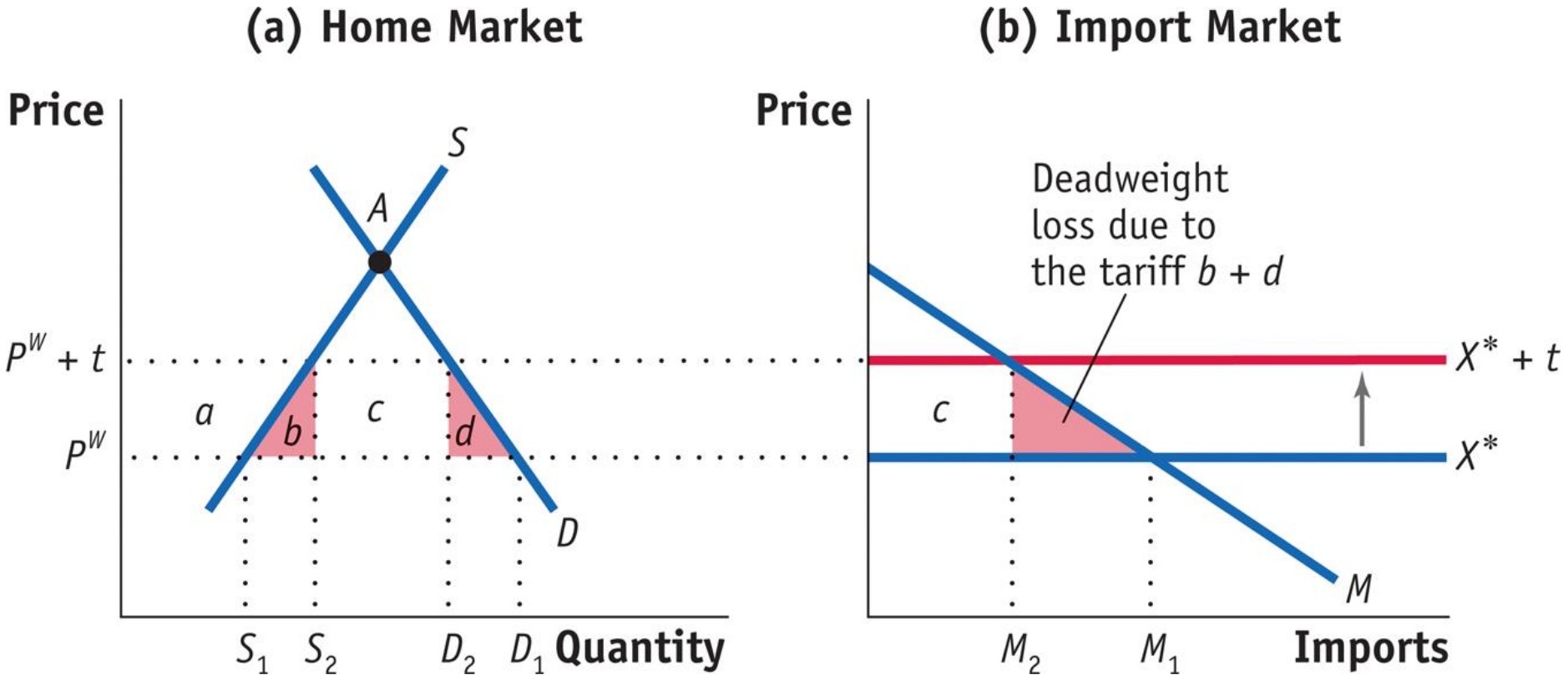
Tariffs in a small economy

Effect of tariffs?

NET effect **= - (b+d)**

= ½ [(S_2 - S_1) + (D_1 - D_2)] . t

= ½ (M_1-M_2) . t



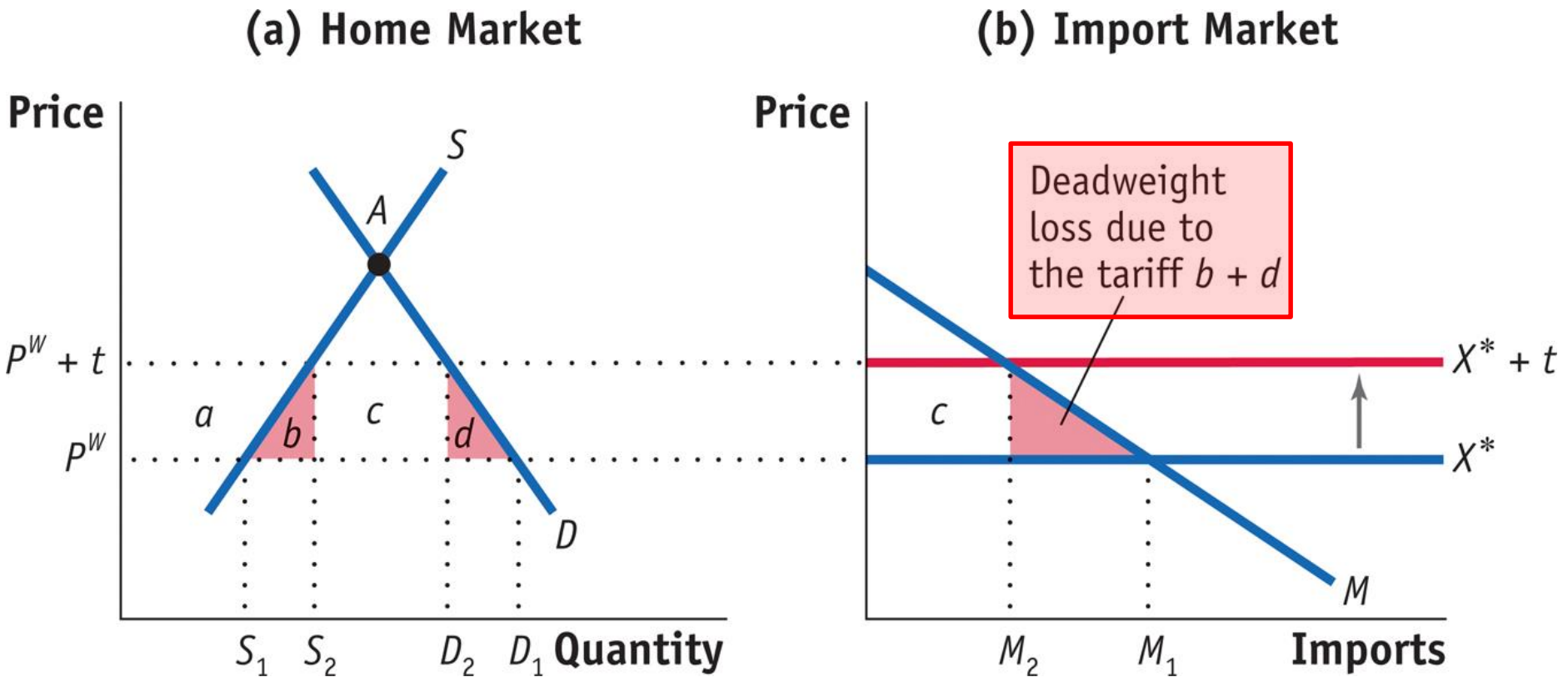
Tariffs in a small economy

Effect of tariffs?

NET effect **= - (b+d)**

= ½ (M_1-M_2) x t

= consumer surplus using import curve!

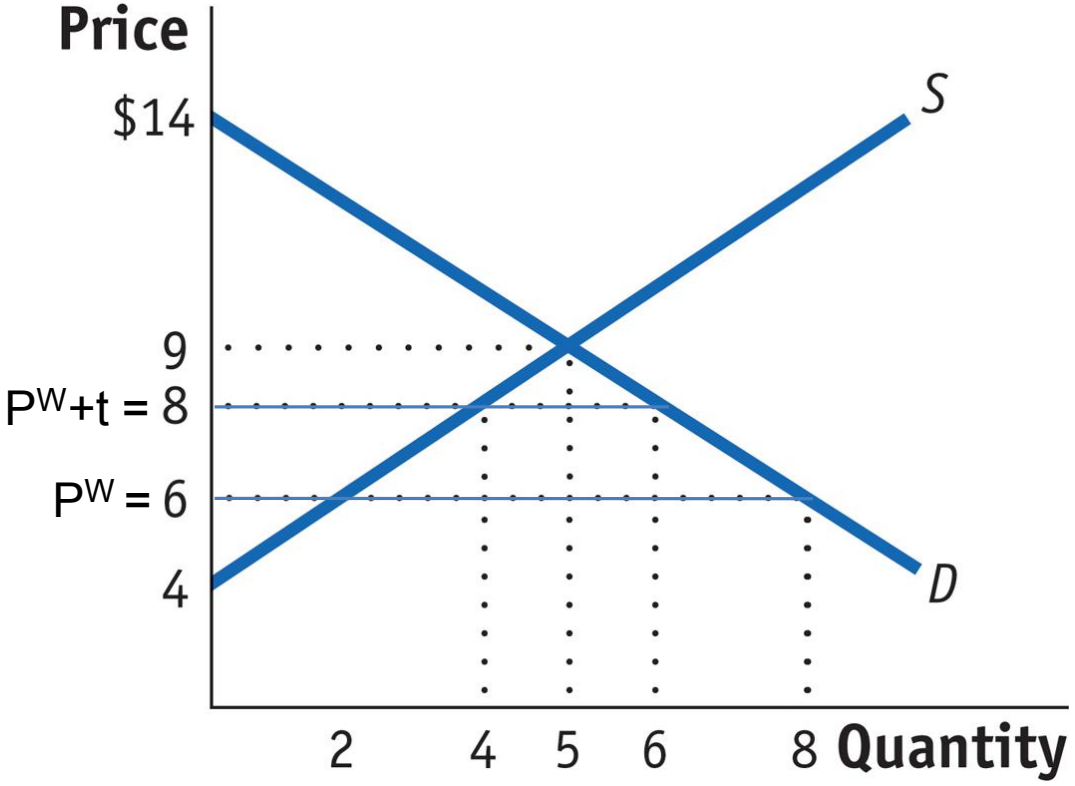


Tariffs in a small economy

Numerical example:

Compared to free trade (P^W=\$6), with tariff t = \$2:

Net welfare loss from tariff? (new price: \$8)



a) \$2

b) \$4

c) \$8

d) \$16

e) \$32

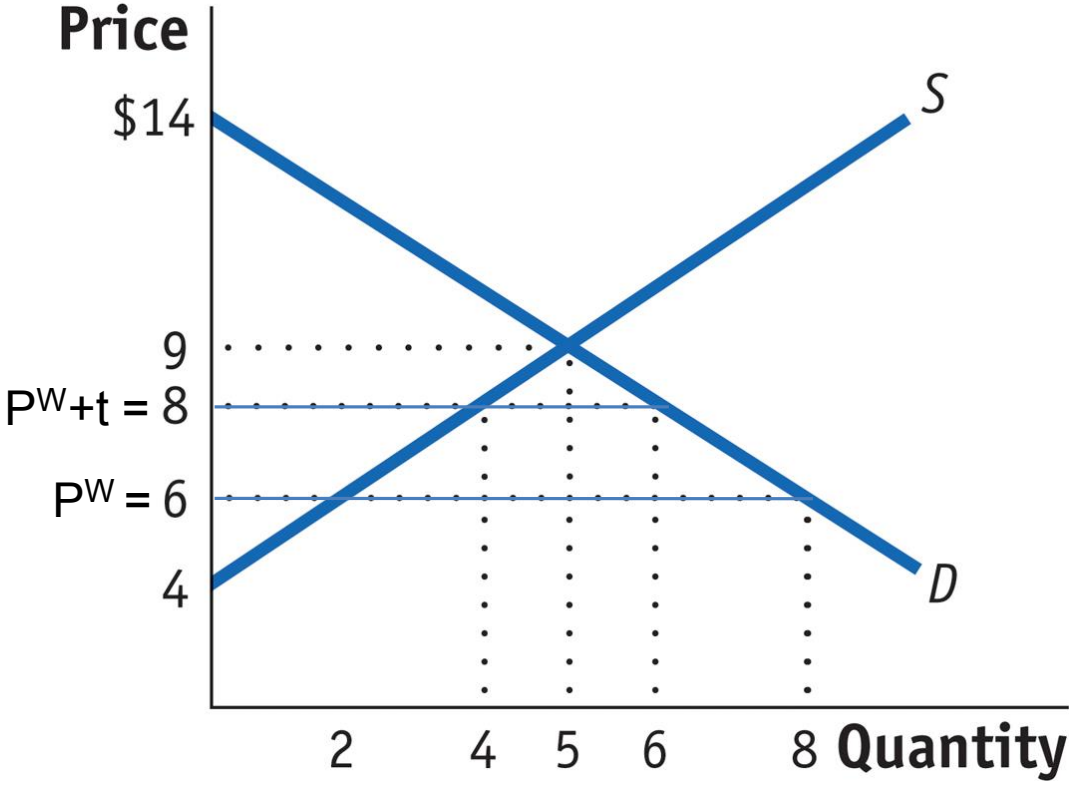
f) \$64

Tariffs in a small economy

Numerical example:

Compared to free trade (P^W=\$6), with tariff t = \$2:

Net welfare loss from tariff = ½ x \$2 x 4 = \$4 loss



Tariffs in a small economy

Effect of tariffs?

Conclusion for a small open economy:

- Tariffs → net welfare loss

Next

- Tariffs in a large economy

Tariffs in a large economy

"Large" economy

Definition:

- A large economy has an effect on world price:
  - Lower imports lead to lower prices
  - Larger imports lead to higher prices

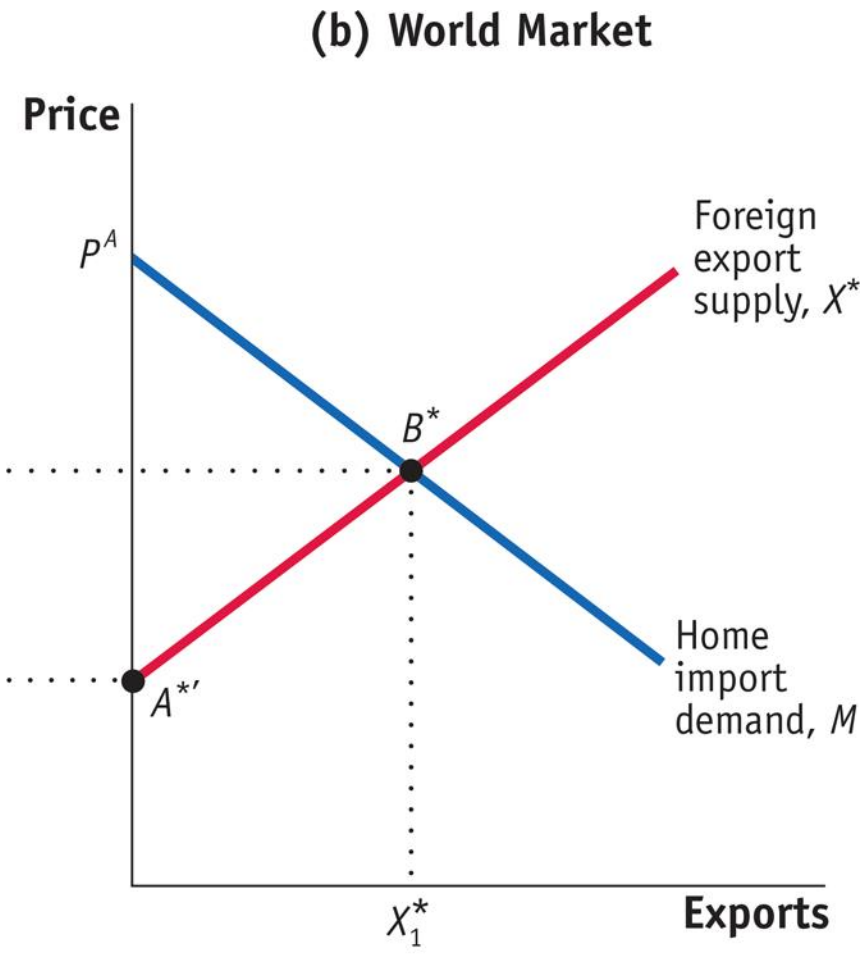
→ Upward-slopping export curve

→ **Tariffs** lead to a decrease imports and **lower P^W**

"Large" economy

Foreign supply is no longer **"infinitely elastic"**

(i.e. foreign supply curve no longer flat, world price no longer constant)



Tariffs in a large economy

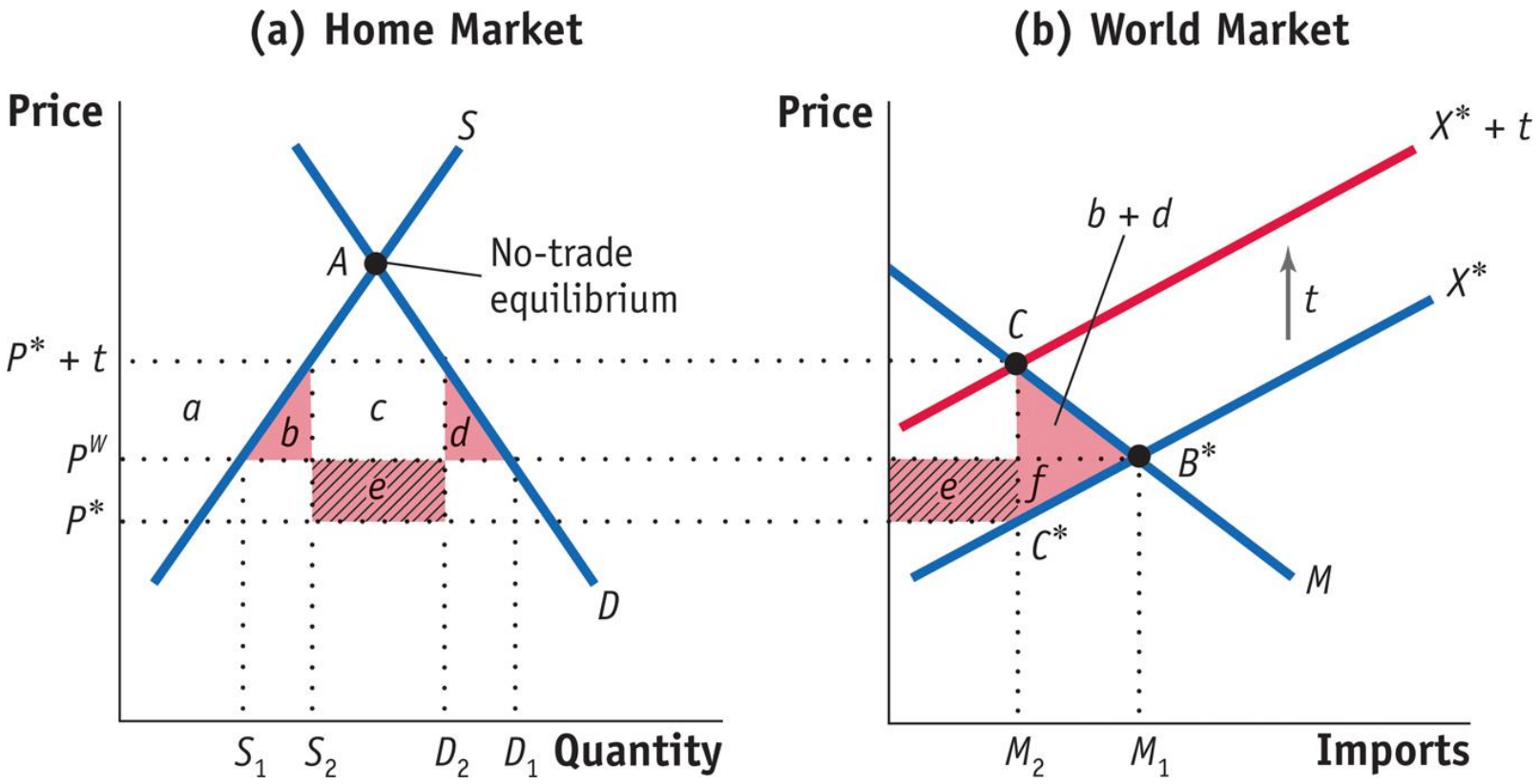
"Large" economy

Effect of a tariffs on prices:

- **Tariffs** lead to a decrease imports and **lower P^W**
- Hence the price for consumers does not increase as much as for a small economy
  → Smaller loss in consumer surplus
- Hence the price for consumers does not increase as much as for a small economy
  → Smaller gain in producer surplus
- Q: Can it be beneficial to have a tariff after all?

Tariffs in a large economy

It's all in this graph:

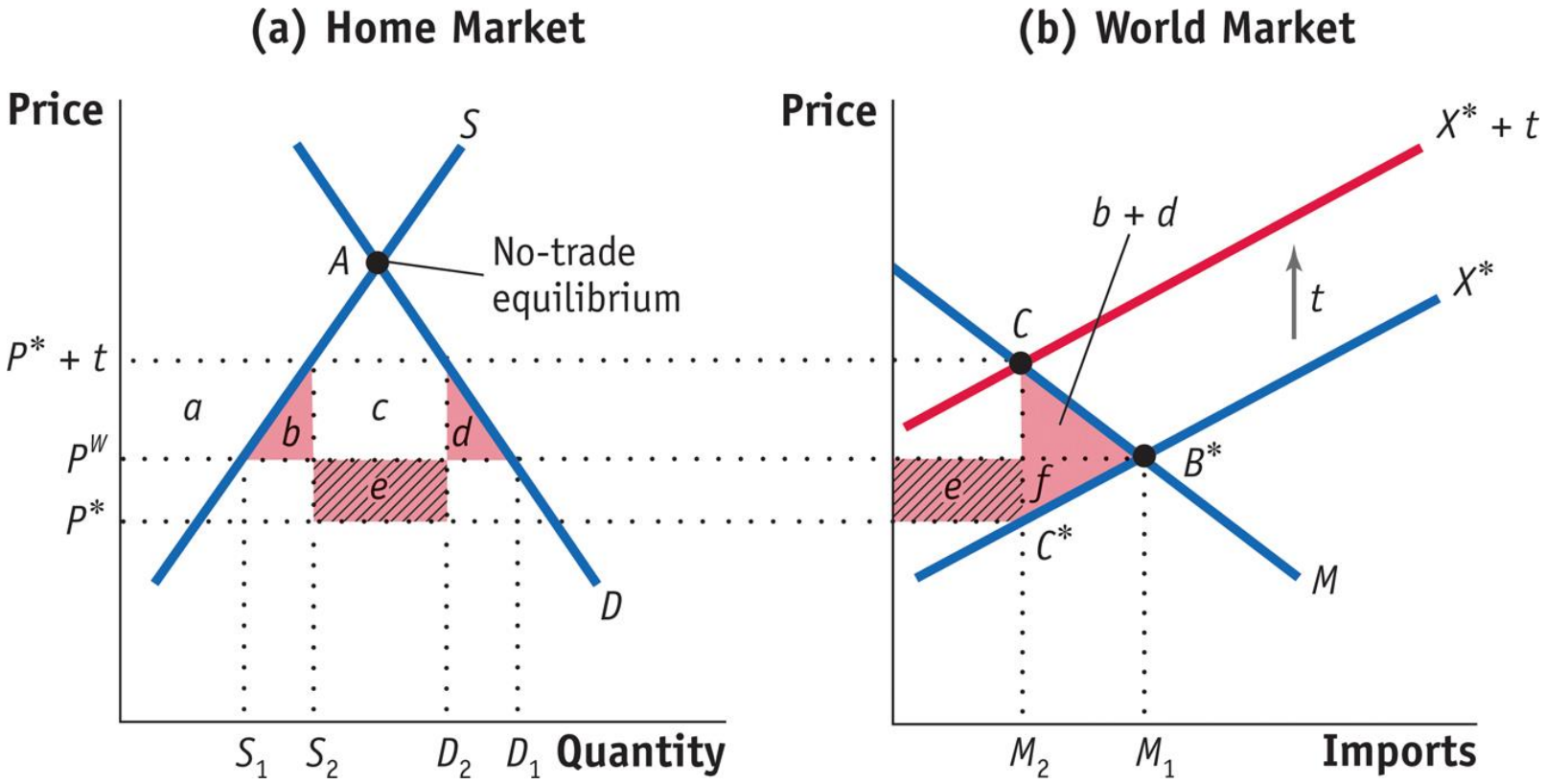


Tariffs in a large economy

- For **consumers**:

→ price goes from P^W to P*+t

→ Consumer surplus decreases by **(a+b+c+d)**

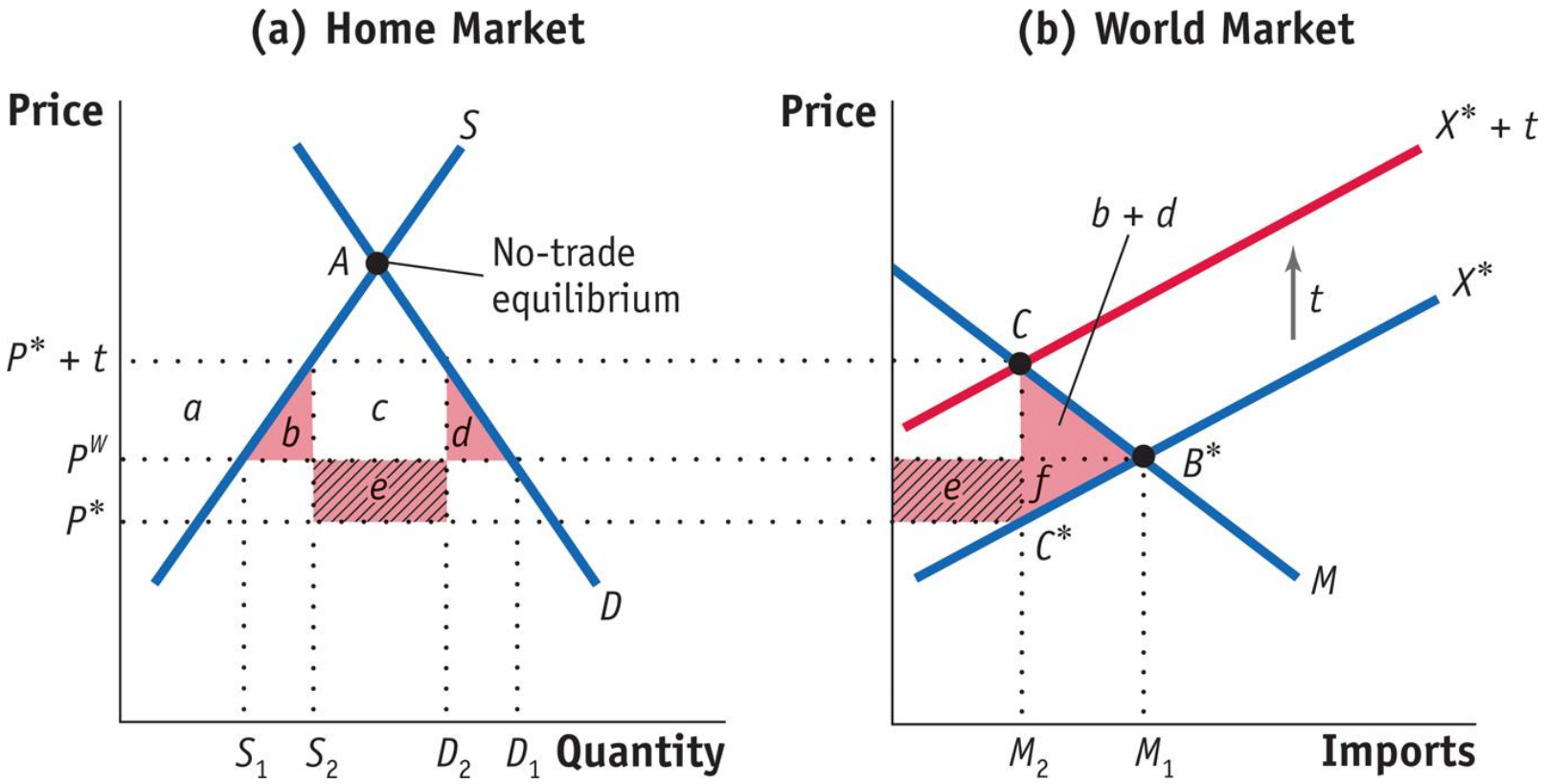


Tariffs in a large economy

- For local **producers**:

→ price goes from P^W to P*+t

→ Producer surplus increases by: **a**

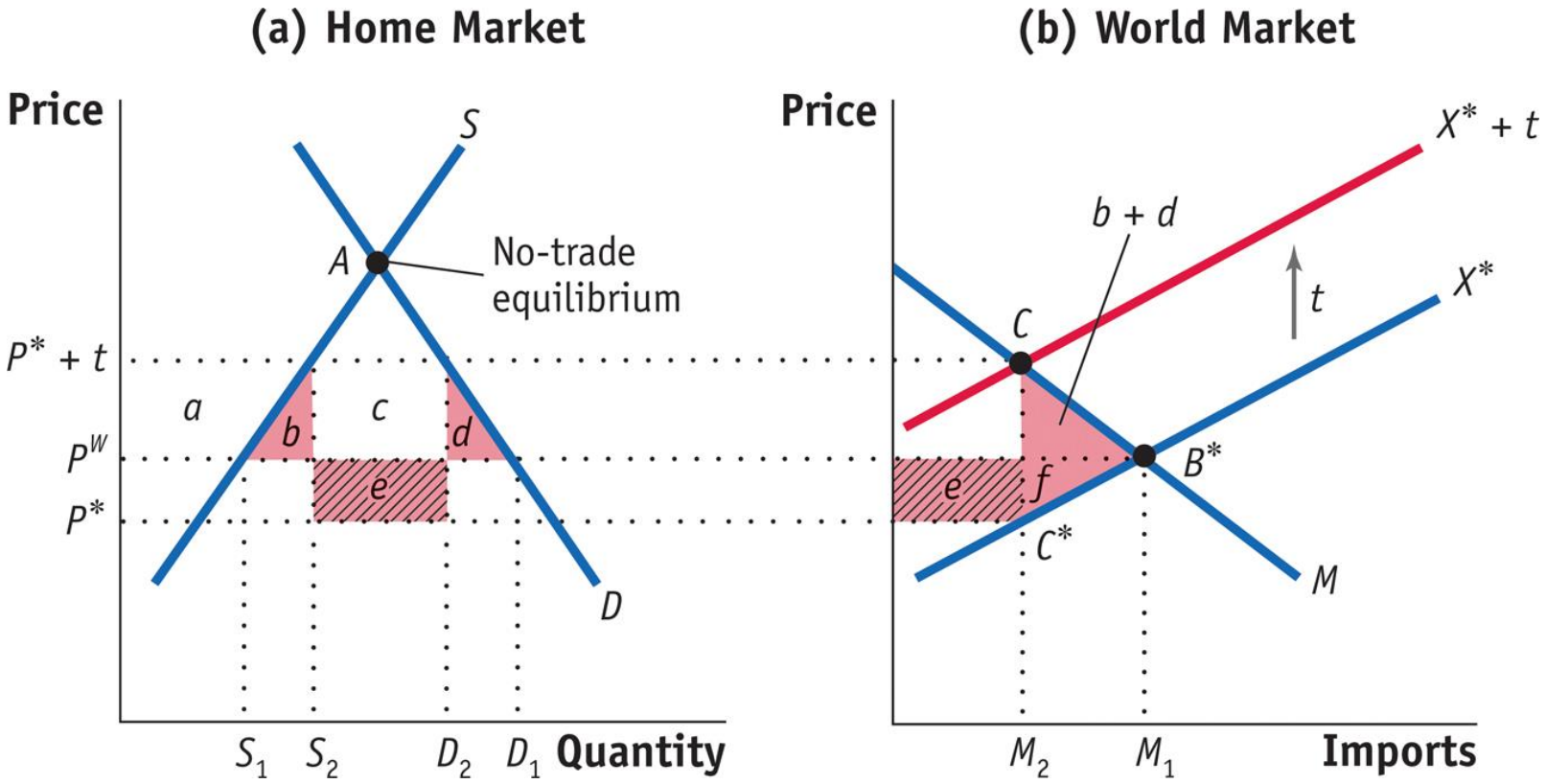


Tariffs in a large economy

- Tariff revenues?

→ Revenues = t x (D2 – S2) = t x M2

→ area: **(c + e)**



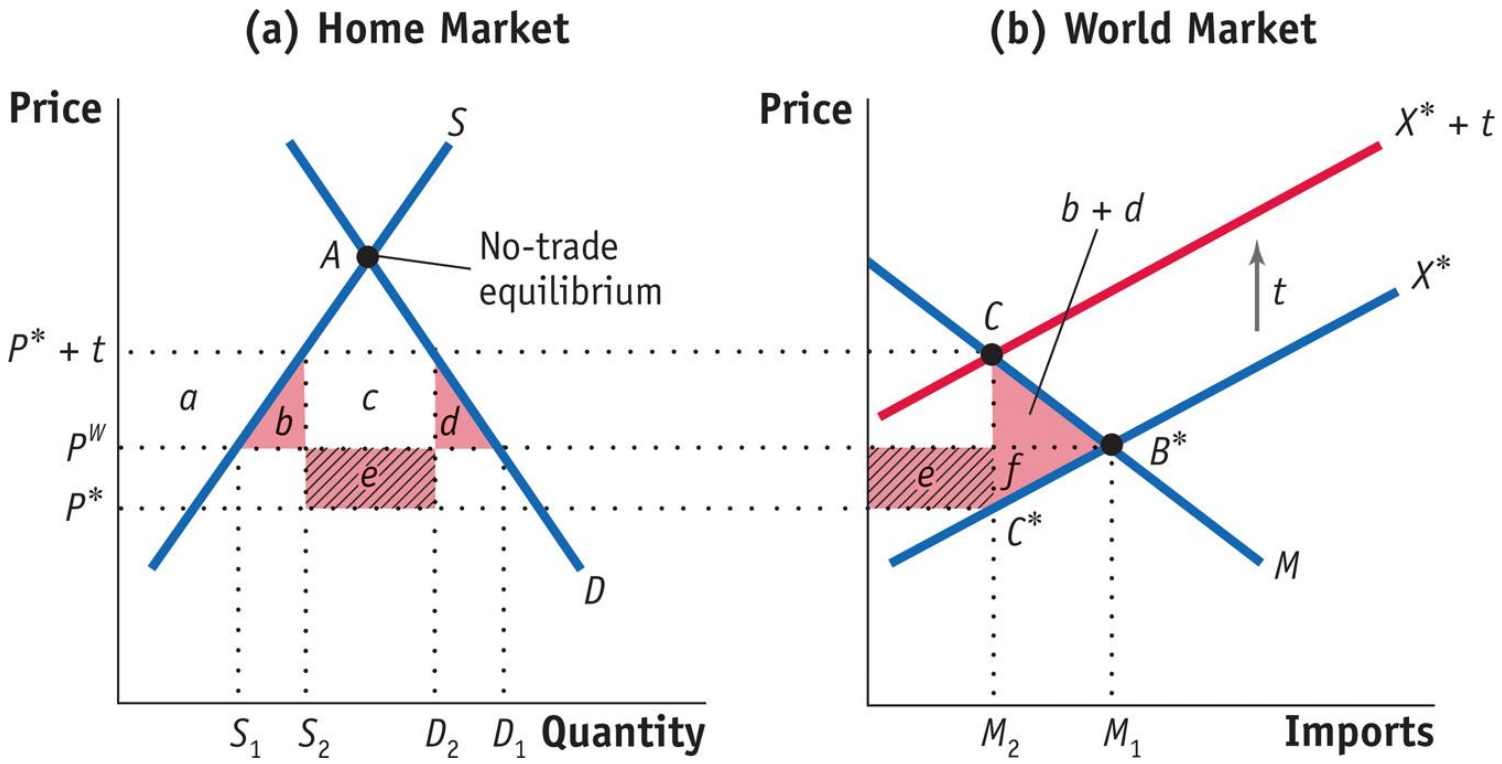
Tariffs in a large economy

Consumer loss: **- (a+b+c+d)**

Producer gain: **+ a**

Tariff revenues: **+ (c + e)**

→ Net effect on Home = **e – (b+d)**



Tariffs in a large economy

"Large" economy

Effect of a tariffs on prices:

- Deadweight loss "b+d" as in a small economy
- But terms of trade gain "e" dues to change in world price
- Which one wins?

Tariffs in a large economy

"Large" economy

Effect of a tariffs on prices:

When "t" is small:

- Terms of trade gain are proportional to "t" (product of "t" and current imports)
- Deadweight loss proportional to "t^2" (product of "t" and the *change* in imports)

→ Terms of trade wins when t is small
→ Gains from having a small tariff

Tariffs in a large economy

"Large" economy

Effect of a tariffs on prices:

When "t" is large:

- If price is now back to autarky:
  → Terms of trade gains are zero!
  (No imports! No tariff revenues)
- Large deadweight loss

→ Negative net effect

Tariffs in a large economy

"Large" economy

Optimal tariff:

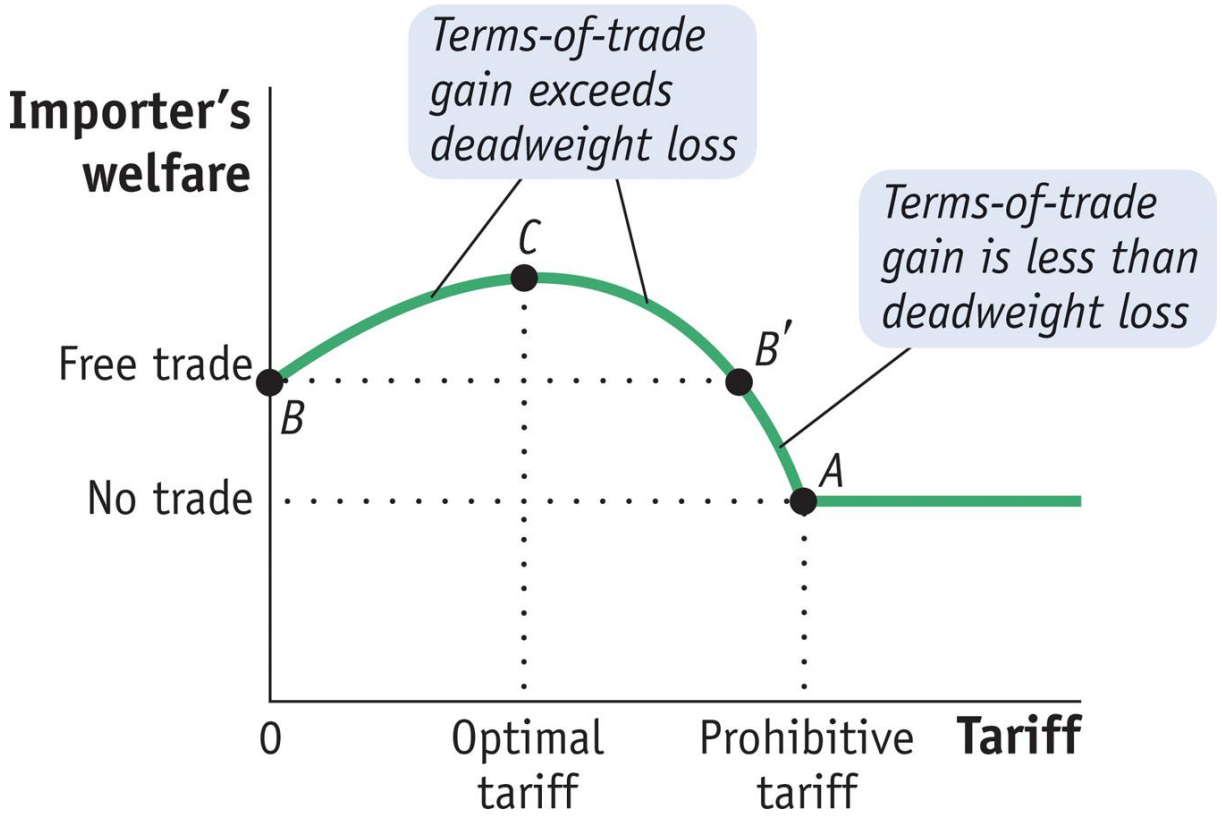
- Not zero, not too large either
- High elasticity of export supply → lower optimal tariff
- Formula: $$\text{Optimal tariff} = \frac{1}{E_X^*}$$

depends on the inverse of the export supply elasticity

Tariffs in a large economy

"Large" economy

$$\text{Optimal tariff} = \frac{1}{E_X^*}$$



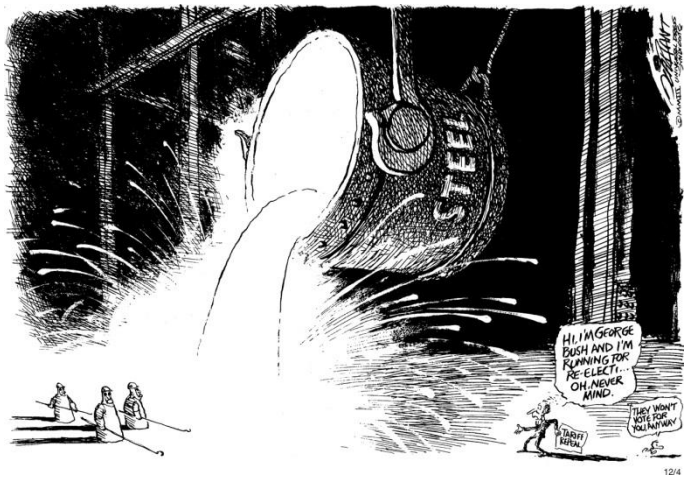
Tariffs in a large economy

"Large" economy

Link to monopsony pricing:

- a "small" buyer has no incentives to deviate from market price: it is "price taker" (=small country)
- A large buyer wants to limit its demand in order to lower the price = large economy which can affect P^W
- The smaller the price elasticity, the larger the distorsions

Tariffs in a large economy



Application to the steel industry in the US:

Tariffs imposed in 2002-03

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

Tariffs in a large economy

"Large" economy

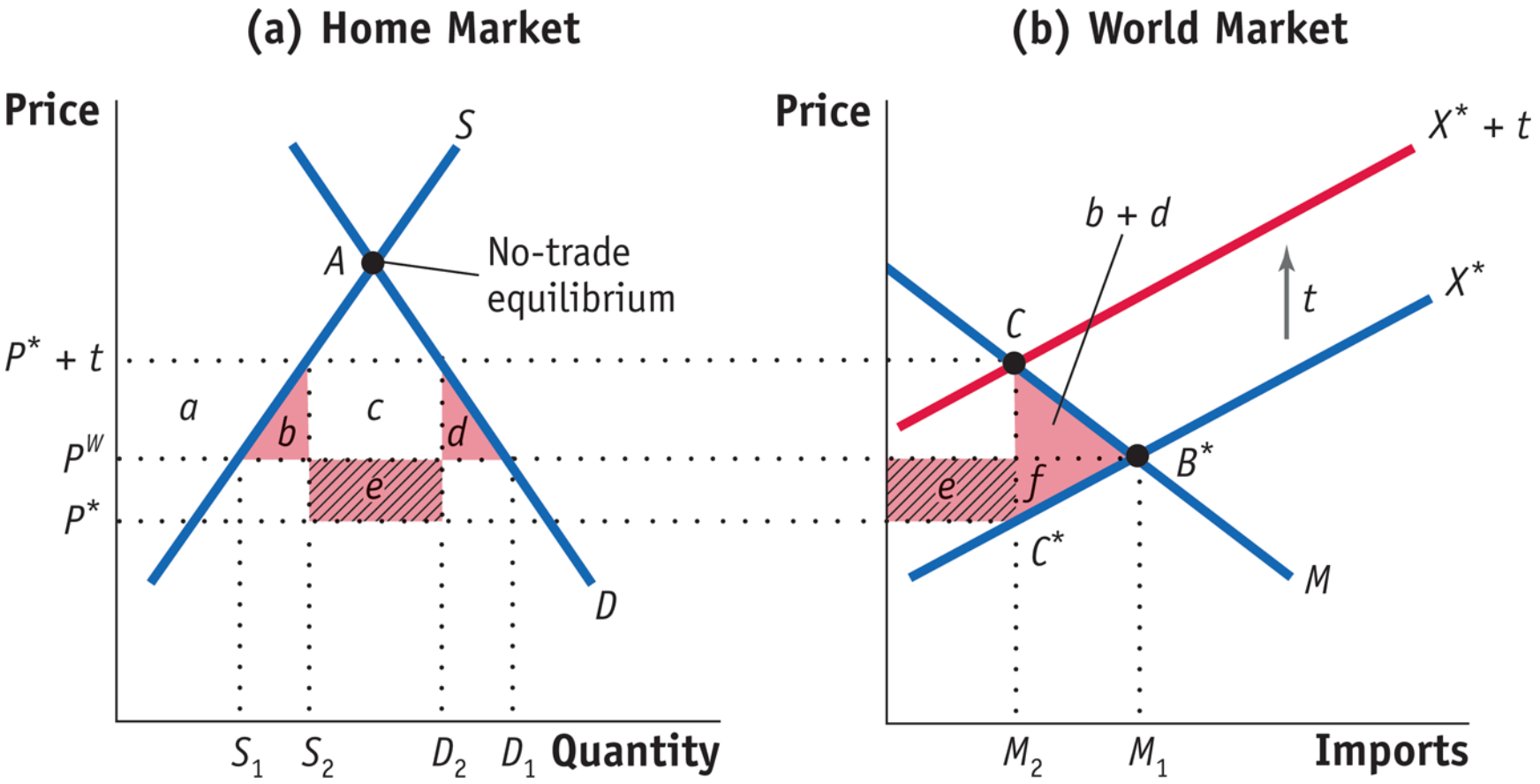
Effect on Foreign:

How do tariffs at home affect foreign economies?

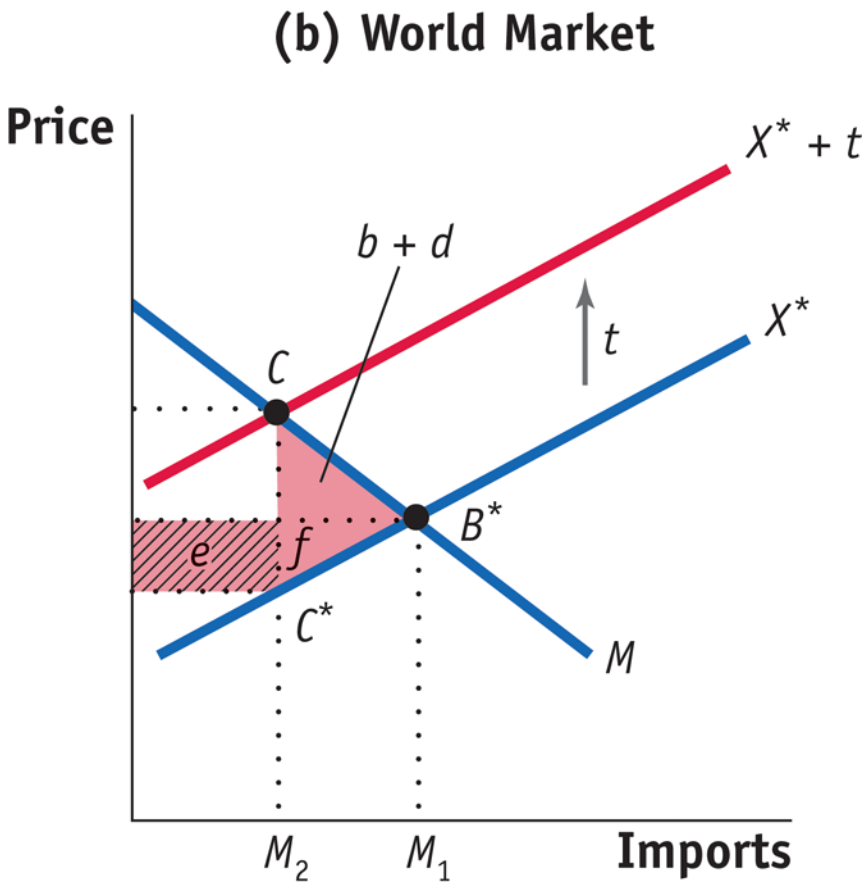
a) Gains for Foreign

b) Loss for Foreign, smaller than gains at Home

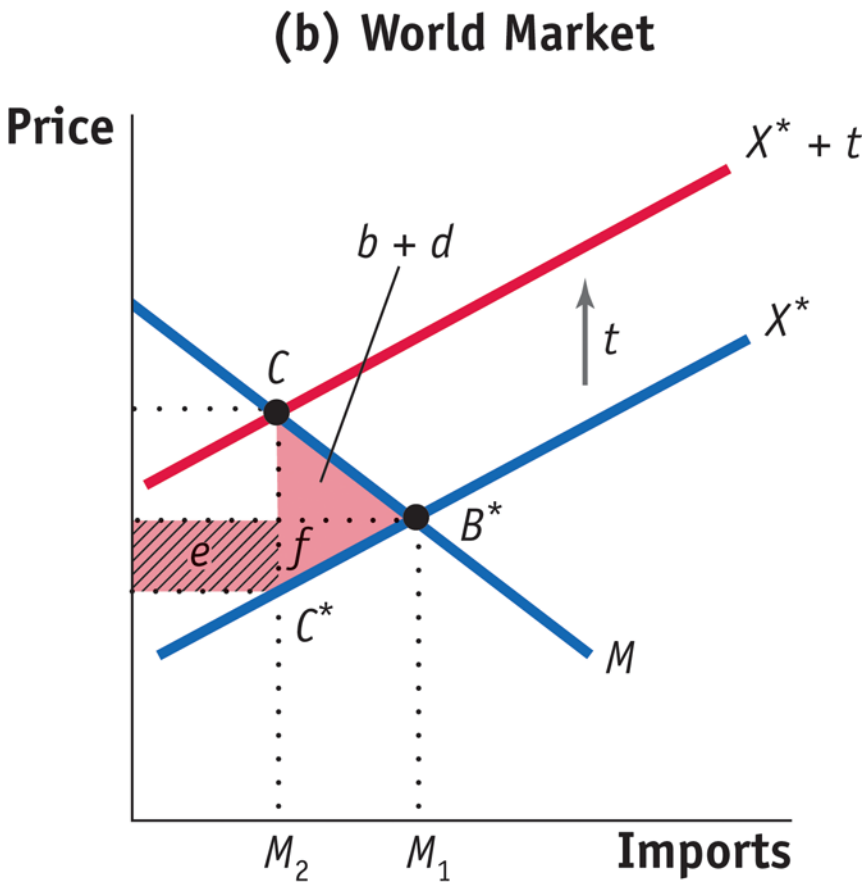
c) Loss for Foreign exceeds gains at Home



Home gains = e - (b + d)



Foreign gains?



Foreign gains = - (e + f) < 0

(i.e. loss: decrease in <u>exporter</u> surplus!)

Tariffs in a large economy

Effect of tariff:

- Home gains:
  = e - (b + d)

- Foreign loss:
  = - (e + f)

- Net GLOBAL gains if both apply tariffs on imports:
  = - (f + b + d) < 0

Tariffs in a large economy

"Large" economy

Effect on Foreign:

How do tariffs at home affect foreign economies?

Large losses: the loss for foreign economies exceed the gains for the home country

➔Overall gains from reducing tariffs on a bilateral or multilateral basis