2.1 — Tariffs

ECON 324 • International Trade • Fall 2020

Ryan Safner

Assistant Professor of Economics

✈ safner@hood.edu

○ ryansafner/tradeF20

🌐 tradeF20.classes.ryansafner.com

Outline

Tariffs

Tariffs, According to the President of the United States

Donald J. Trump ✔
@realDonaldTrump
Following

Tariffs are the greatest! Either a country which has treated the United States unfairly on Trade negotiates a fair deal, or it gets hit with Tariffs. It's as simple as that - and everybody's talking! Remember, we are the "piggy bank" that's being robbed. All will be Great!

7:29 AM - 24 Jul 2018

20,852 Retweets **92,362** Likes

Donald J. Trump ✔
@realDonaldTrump
Following

When a country (USA) is losing many billions of dollars on trade with virtually every country it does business with, trade wars are good, and easy to win. Example, when we are down $100 billion with a certain country and they get cute, don't trade anymore-we win big. It's easy!

5:50 AM - 2 Mar 2018

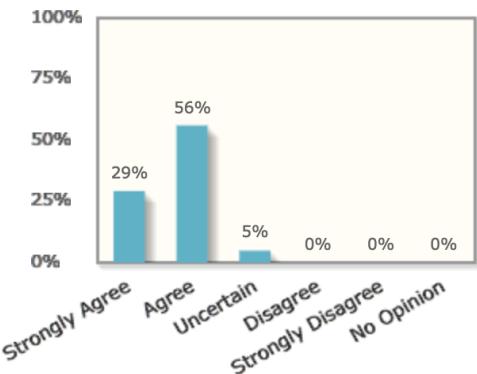**21,405** Retweets **96,736** Likes

Tariffs, According to Professional Economists

Question A: Freer trade improves productive efficiency and offers consumers better choices, and in the long run these gains are much larger than any effects on employment.
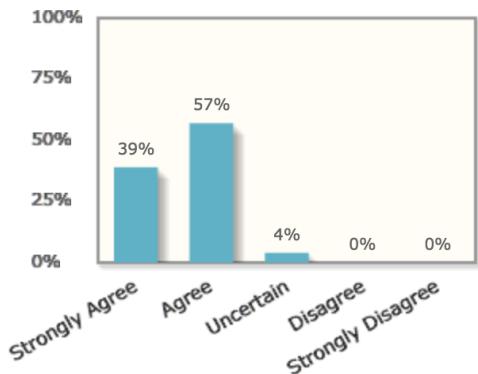
Responses

100%
75%
50% — 56%
25% — 29%
0% — 5% 0% 0% 0%

Strongly Agree / Agree / Uncertain / Disagree / Strongly Disagree / No Opinion

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Source: IGM Economic Experts Panel
www.igmchicago.org/igm-economic-experts-panel

Responses weighted by each expert's confidence

100%
75%
50% — 57%
25% — 39%
0% — 4% 0% 0%

Strongly Agree / Agree / Uncertain / Disagree / Strongly Disagree

© 2017. Initiative on Global Markets.
Source: IGM Economic Experts Panel
www.igmchicago.org/igm-economic-experts-panel

Source: IGA Experts Poll (2012)
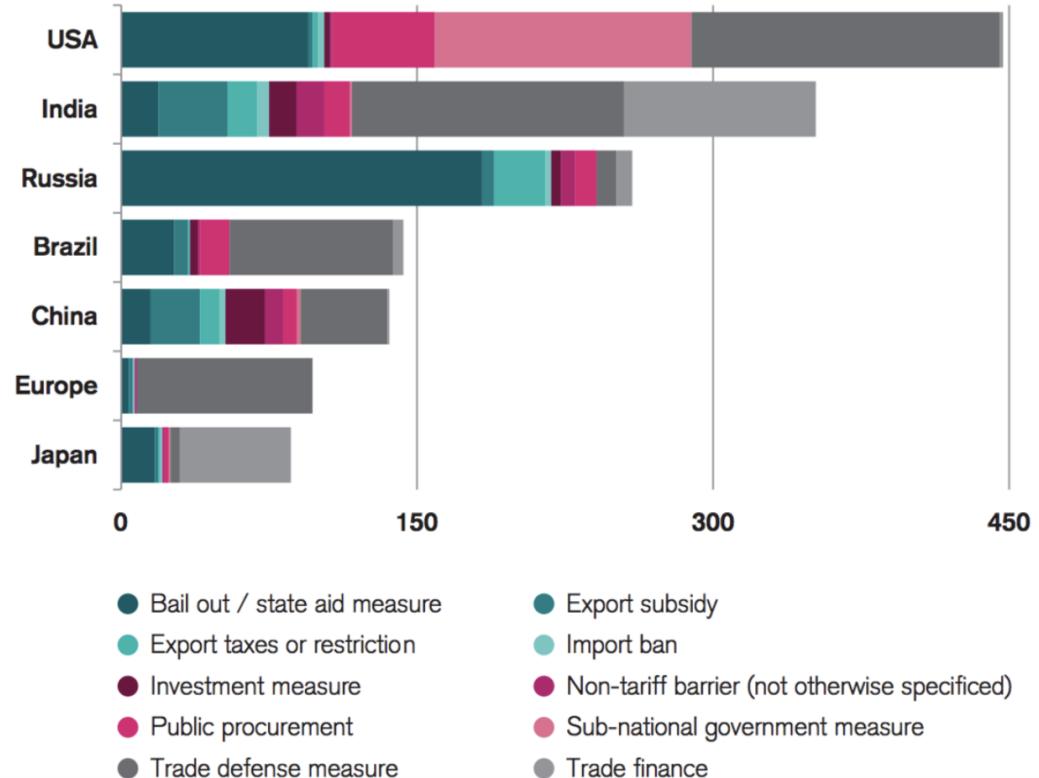
International Trade Policies

- Economists generally agree that free trade best enhances overall social welfare

- Yet free trade is rare in the world

- Two questions:

  1. Why is free trade rare? Or, why are trade restrictions common?
  2. What are the consequences of restricting trade?

International Trade Policies

The USA imposes the highest number of protectionist measures

Legend:
- Bail out / state aid measure
- Export subsidy
- Export taxes or restriction
- Import ban
- Investment measure
- Non-tariff barrier (not otherwise specified)
- Public procurement
- Sub-national government measure
- Trade defense measure
- Trade finance

Source: Global Trade Alert, Credit Suisse

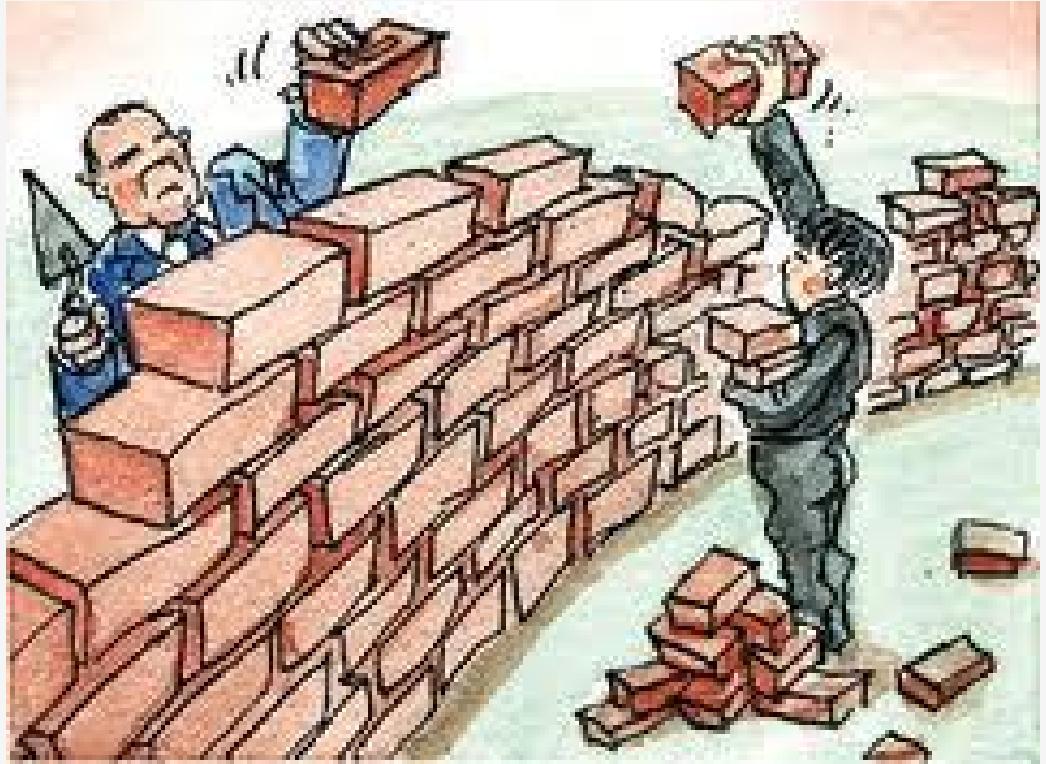This was in 2015, before the Trump Administration!

Tariffs

Tariffs

- Most common way to restrict trade is through a **tariff** (historically called a **"duty"**), a tax specifically targeted towards internationally-traded goods

- **Import tariff**: tax on imported goods

    - This is by far the most common type of trade restriction

- **Export tariff**: tax on exported goods

    - Rare in developed countries but sometimes occurs in developing countries as a way to generate government revenue

Types of Tariffs

- **Ad valorem tariff** taxes a fixed percentage of the value of a good

  - e.g. 25% U.S. tariff on (prices of) imported trucks

- **Specific tariff** taxes a fixed sum per unit of a good

  - e.g. $3/barrel of oil

- **Compound tariff** combines ad valorem and specific tariffs

  - Rare in developed countries but sometimes occurs in developing countries as a way to generate government revenue

Tariff Schedule

Harmonized Tariff Schedule of the United States (2016) Supplement-1
Annotated for Statistical Reporting Purposes

XI
53-4
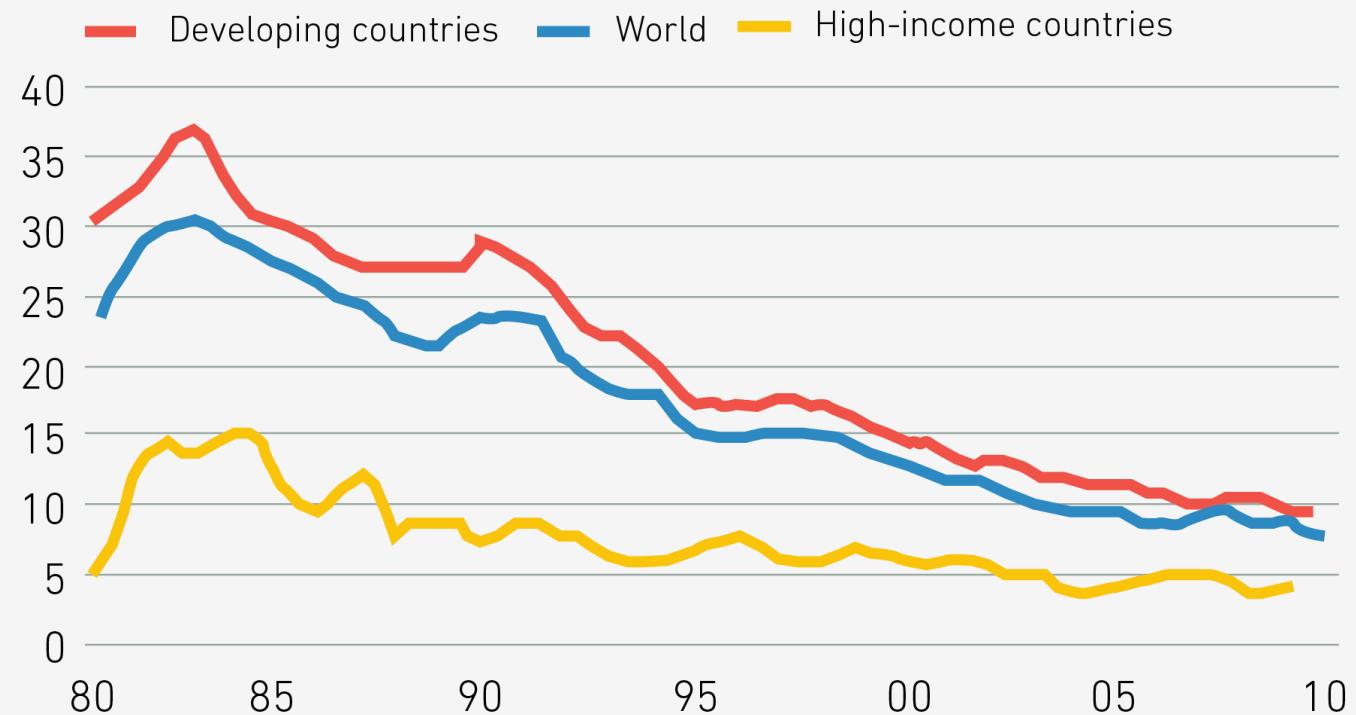
Heading/ Subheading	Stat. Suf- fix	Article Description	Unit of Quantity	Rates of Duty		2
				1		
				General	Special	
5309		Woven fabrics of flax:				
		Containing 85 percent or more by weight of flax:				
5309.11.00		Unbleached or bleached............................	....	Free		40%
	10	Of a width exceeding 127 cm (810)..............	m² kg			
	90	Other (810)..................................	m² kg			
5309.19.00		Other....................................		Free		40%
	10	Of a width exceeding 127 cm (810)..............	m² kg			
	90	Other (810)..................................	m² kg			
		Containing less than 85 percent by weight of flax:				
5309.21		Unbleached or bleached:				
5309.21.20	00	Containing more than 17 percent by weight of wool or fine animal hair (410)...........................	m² kg	14.5%	Free (AU, BH, CA, CL, CO, IL, JO, KR, MA, MX, OM, P, PA, PE, SG)	90%
5309.21.30		Other: Containing cotton and man-made fibers........	....	6.9%	Free (AU, BH, CA, CL, CO, E*, IL, JO, KR, MA, MX, OM, P, PA, PE, SG)	78%
		Subject to cotton restraints:				
	05	Poplin or broadcloth (314)................	m² kg			
	10	Sheeting (313)..........................	m² kg			
	15	Printcloth (315).........................	m² kg			
	20	Other (220)............................	m² kg			
		Subject to man-made fiber restraints:				
	55	Poplin or broadcloth (614)................	m² kg			
	60	Sheeting (613)..........................	m² kg			
	65	Printcloth (615).........................	m² kg			
	70	Other (220)............................	m² kg			
	90	Other (810)............................	m² kg			

U.S. tariff schedule on imported woven flax fabrics, Harmonized Tariff Schedule, United States International Trade Commission Chapter 53, p. 53-4
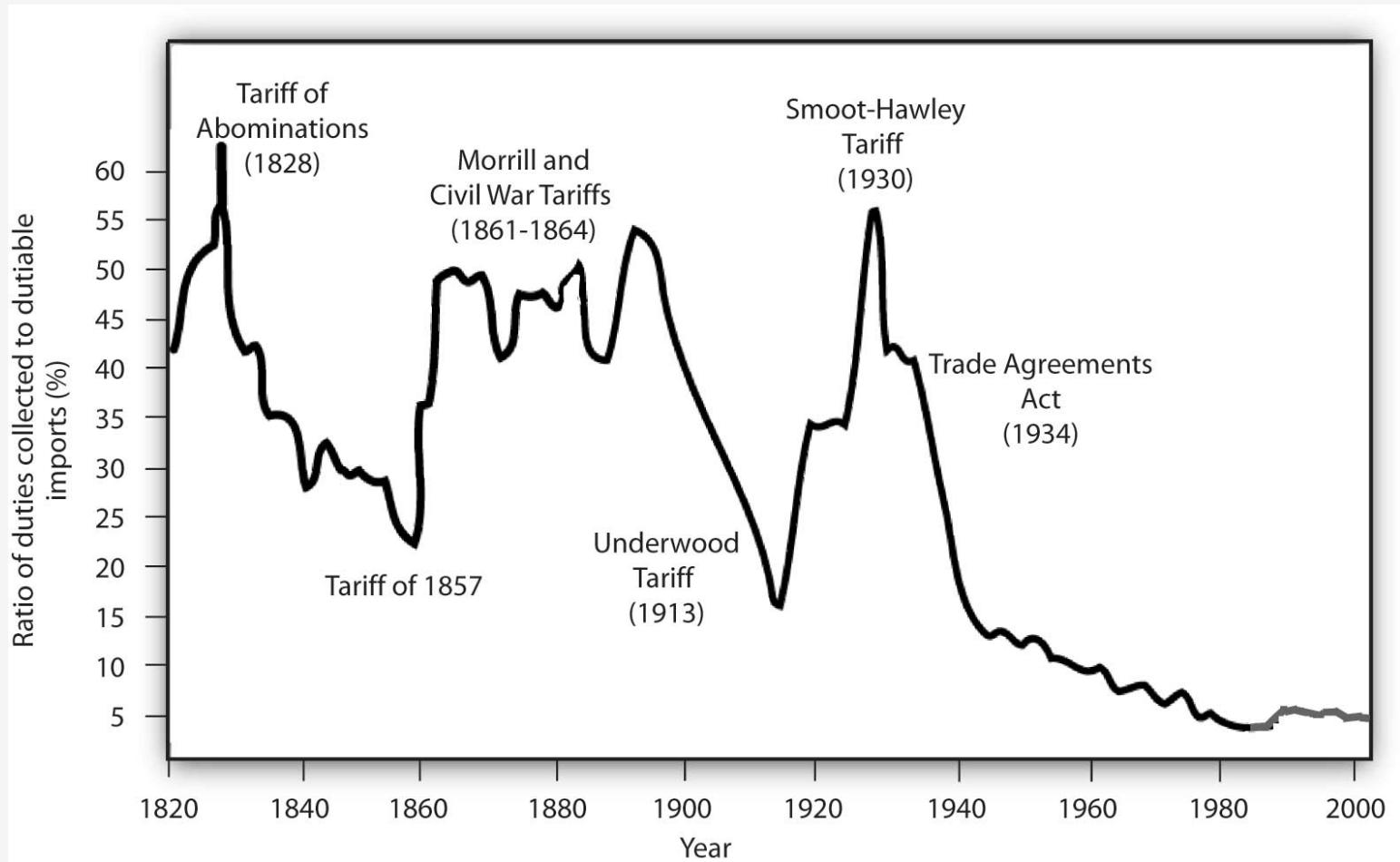
Tariff History

Trends in tariff rates (%)

Legend: Developing countries (red) — World (blue) — High-income countries (yellow)

Source: World Bank

Tariff History

Figure: Ratio of duties collected to dutiable imports (%) versus Year (1820–2000), annotated with Tariff of Abominations (1828), Morrill and Civil War Tariffs (1861-1864), Tariff of 1857, Underwood Tariff (1913), Smoot-Hawley Tariff (1930), and Trade Agreements Act (1934).

Effects of an Import Tariff in a Small Country

Import Tariff Effects in a Small Country

- To analyze effects of a tariff (on imports), need to compare two cases:

1. Effect of a tariff in a **"small" country**

    - "Small" $\implies$ its domestic market is too small to affect world prices
    - Effectively, it is a **price-taker**: it can import as much as it wants and not drive up the price
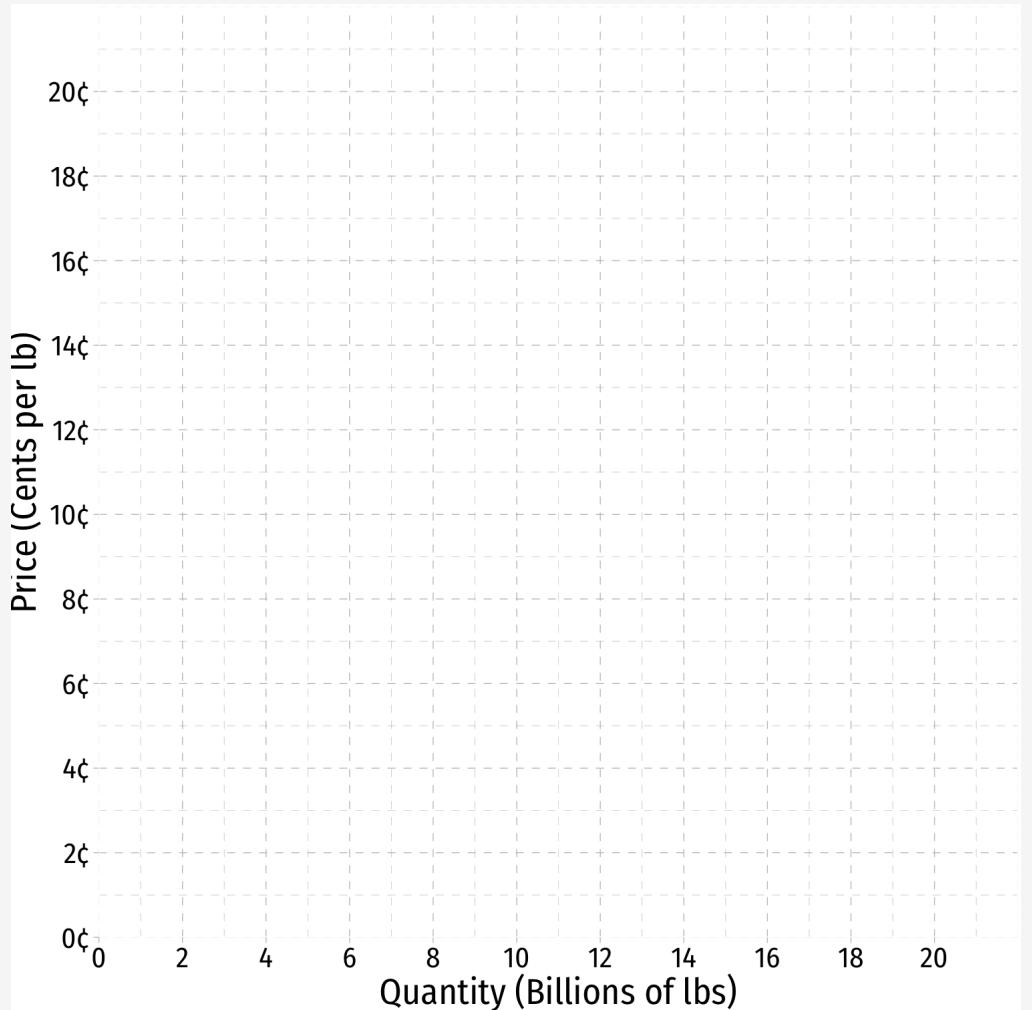
2. Effect of a tariff in a **"large" nation**

    - "Large" $\implies$ changes in the country's domestic market *can* affect world prices

Import Tariff Effects in a Small Country
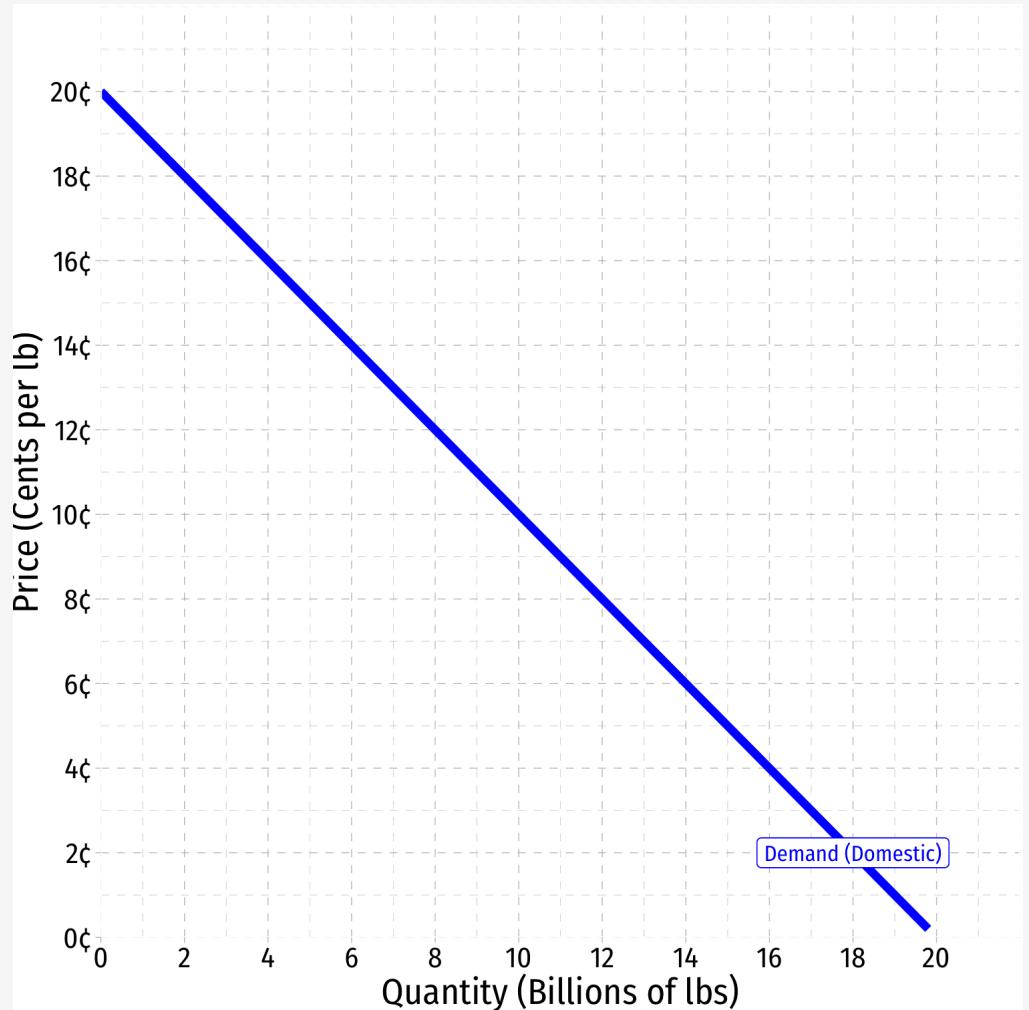
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Import Tariff Effects in a Small Country

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- **Domestic Demand** for sugar in Belgium

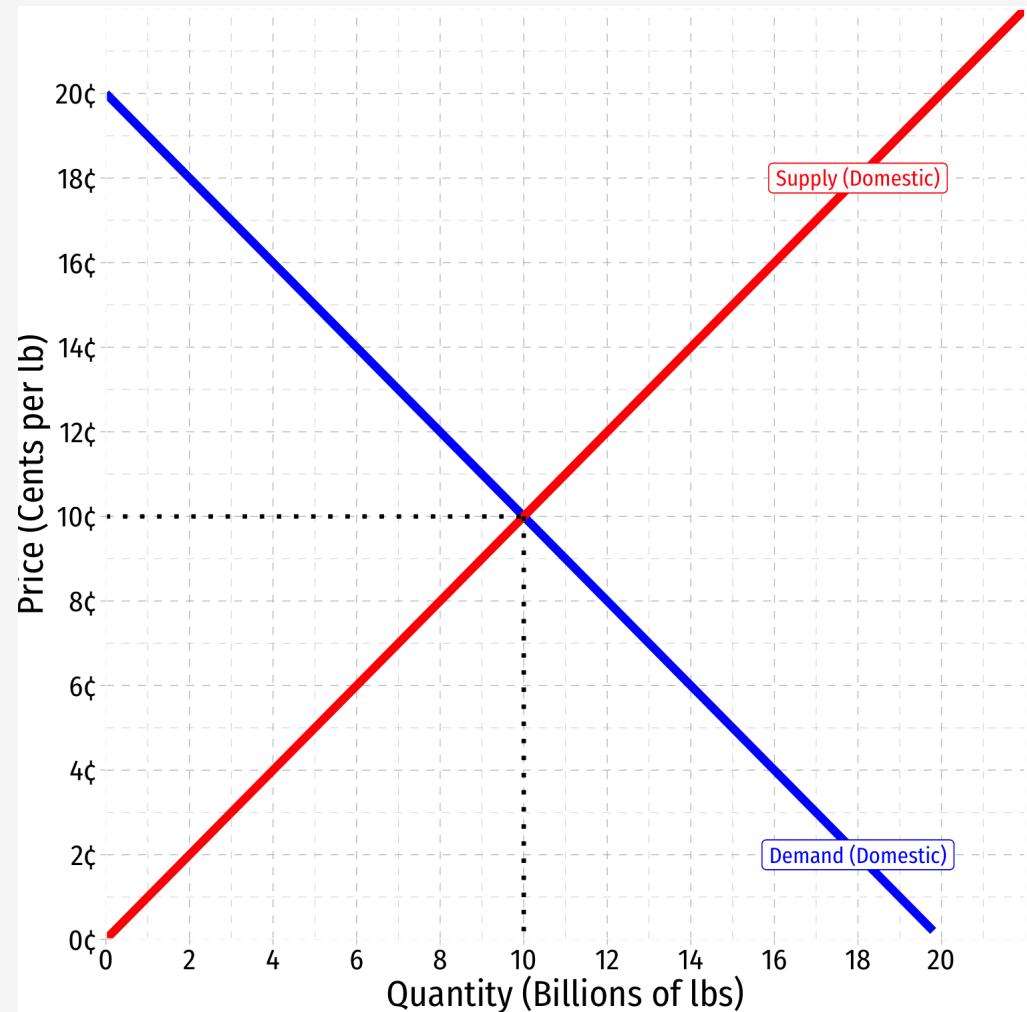# Import Tariff Effects in a Small Country

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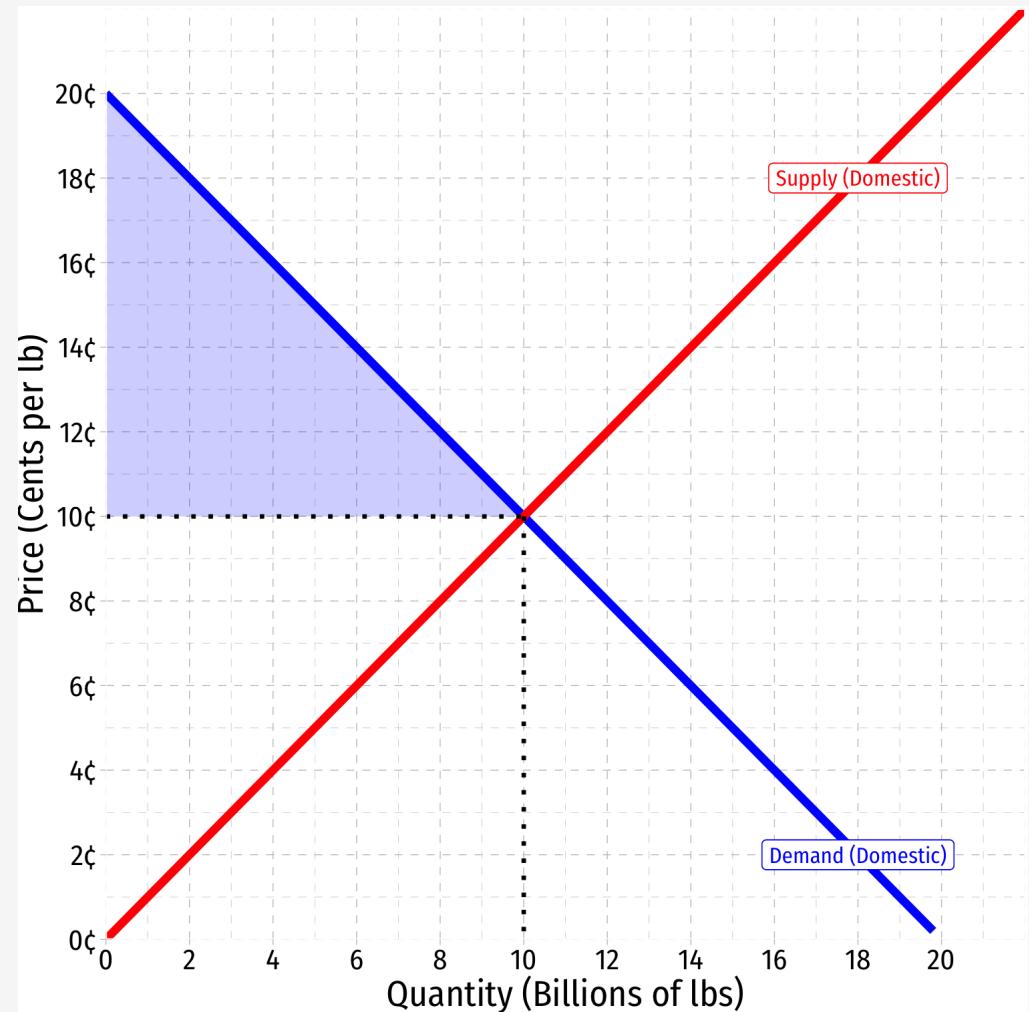
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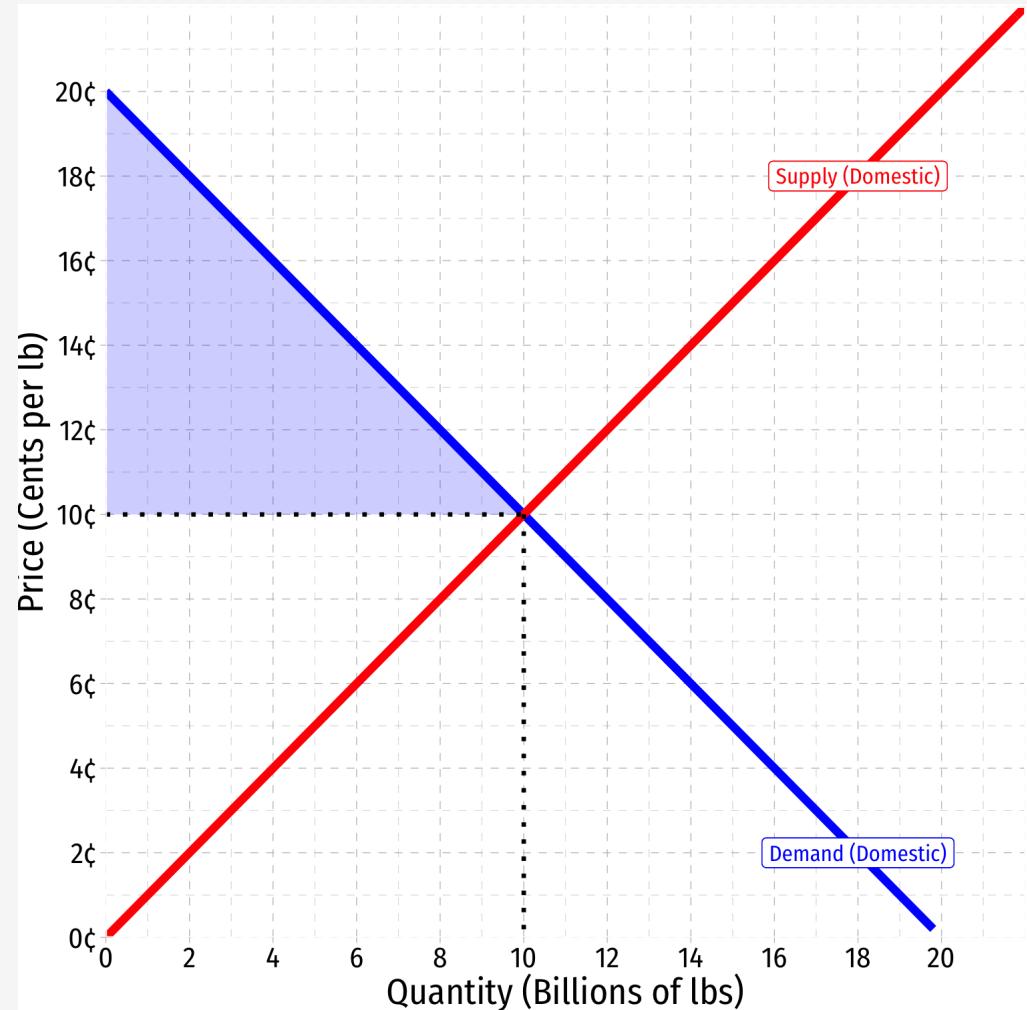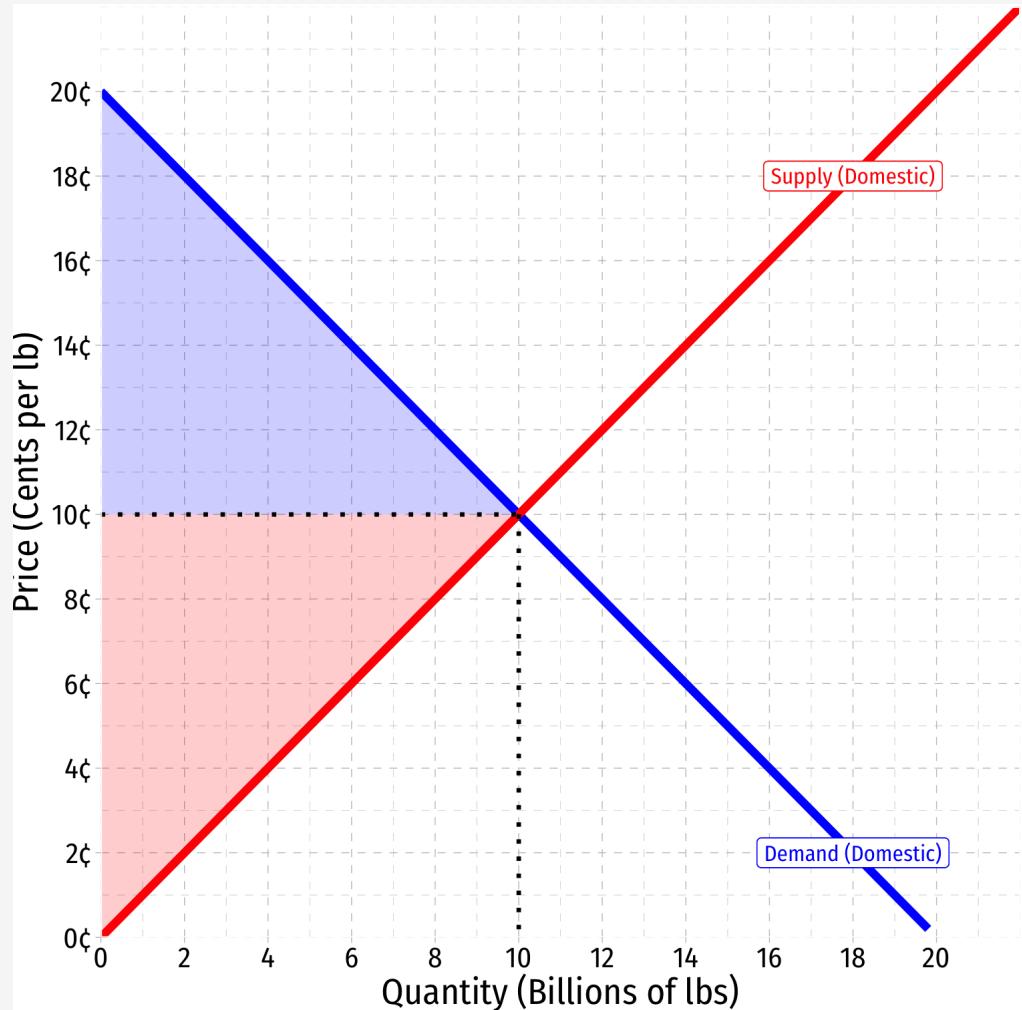# Import Tariff Effects in a Small Country

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  - = 0.5(10–0)($0.20–$0.10) = $0.5 billion

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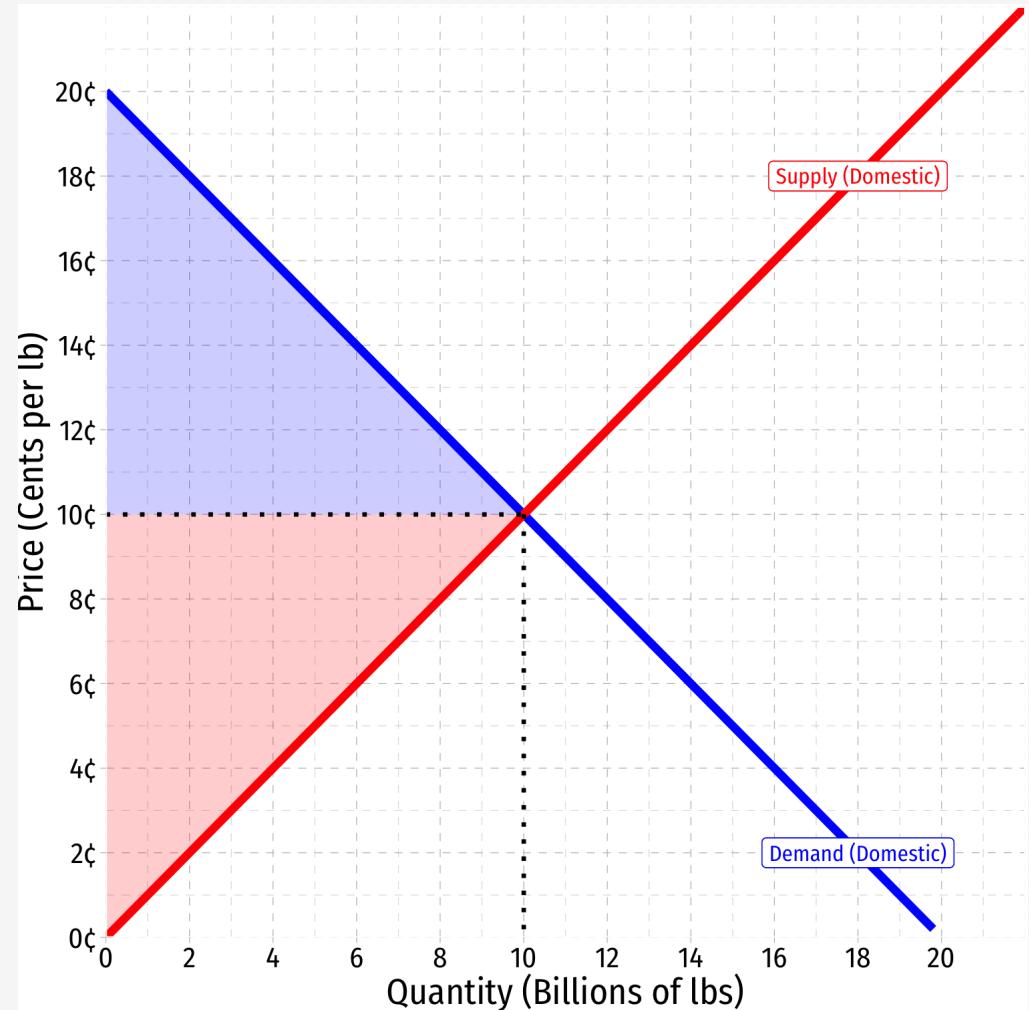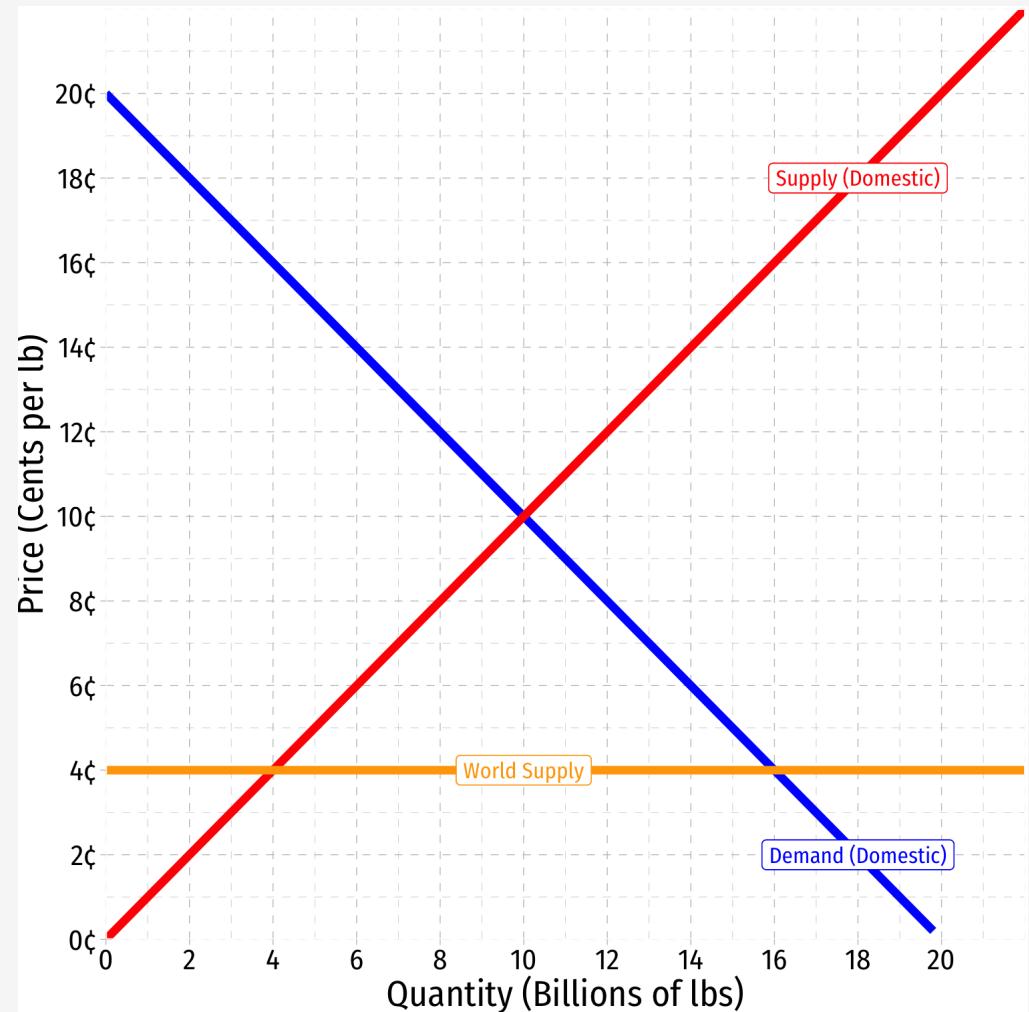
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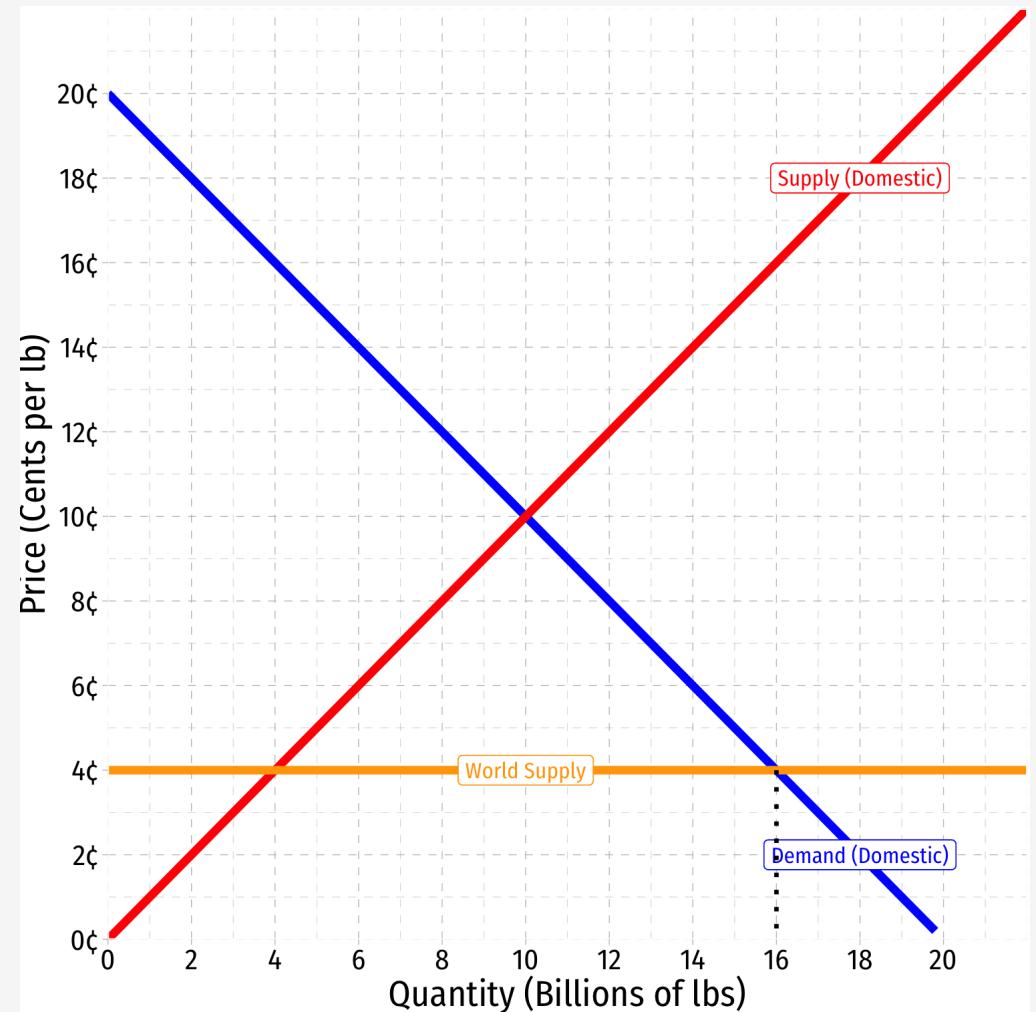# Import Tariff Effects in a Small Country

- Consider, for example, the sugar market in Belgium

- **Domestic Demand** for sugar in Belgium

- **Domestic Supply** of sugar in Belgium

- Suppose Belgium opens up to international trade

- **World Supply** of sugar at 4¢/lb

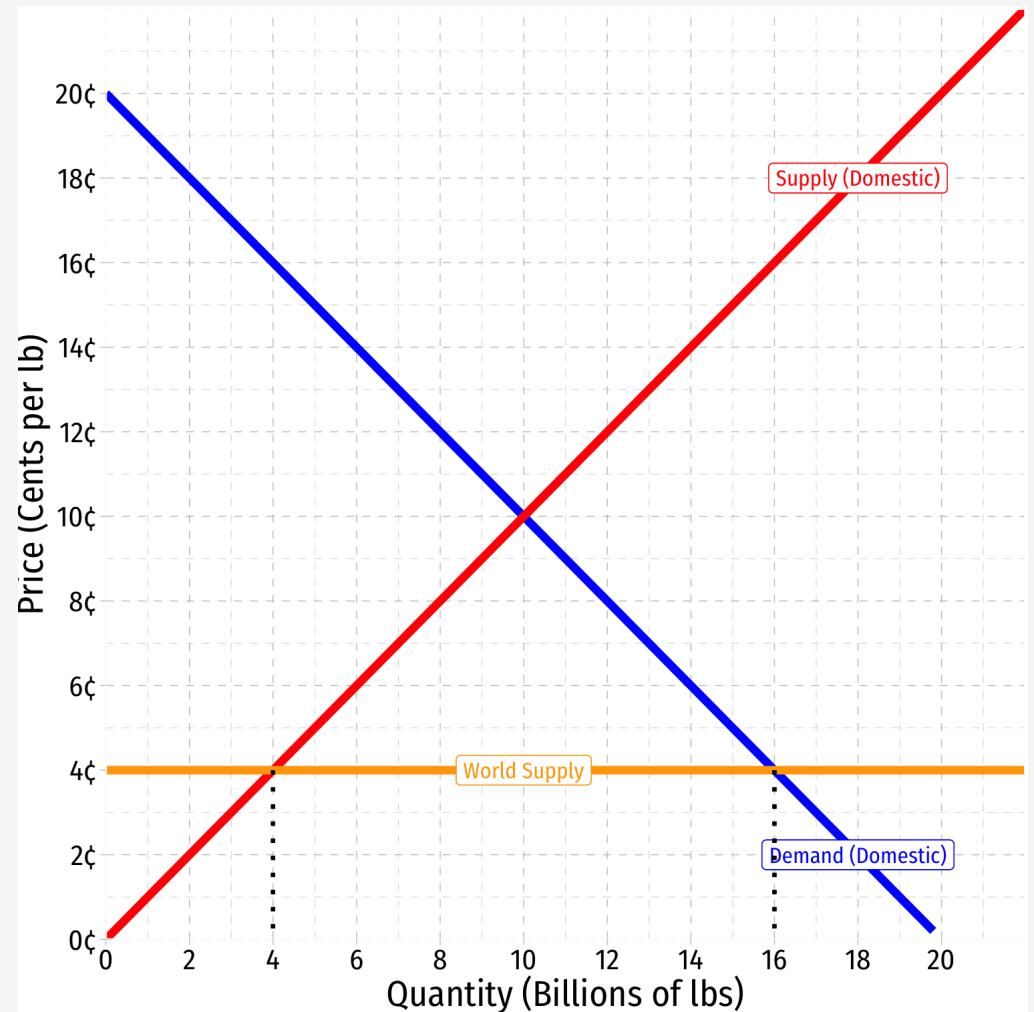# Import Tariff Effects in a Small Country

- At 4¢/lb:
  - Belgian consumers want to consume 16 bn lbs

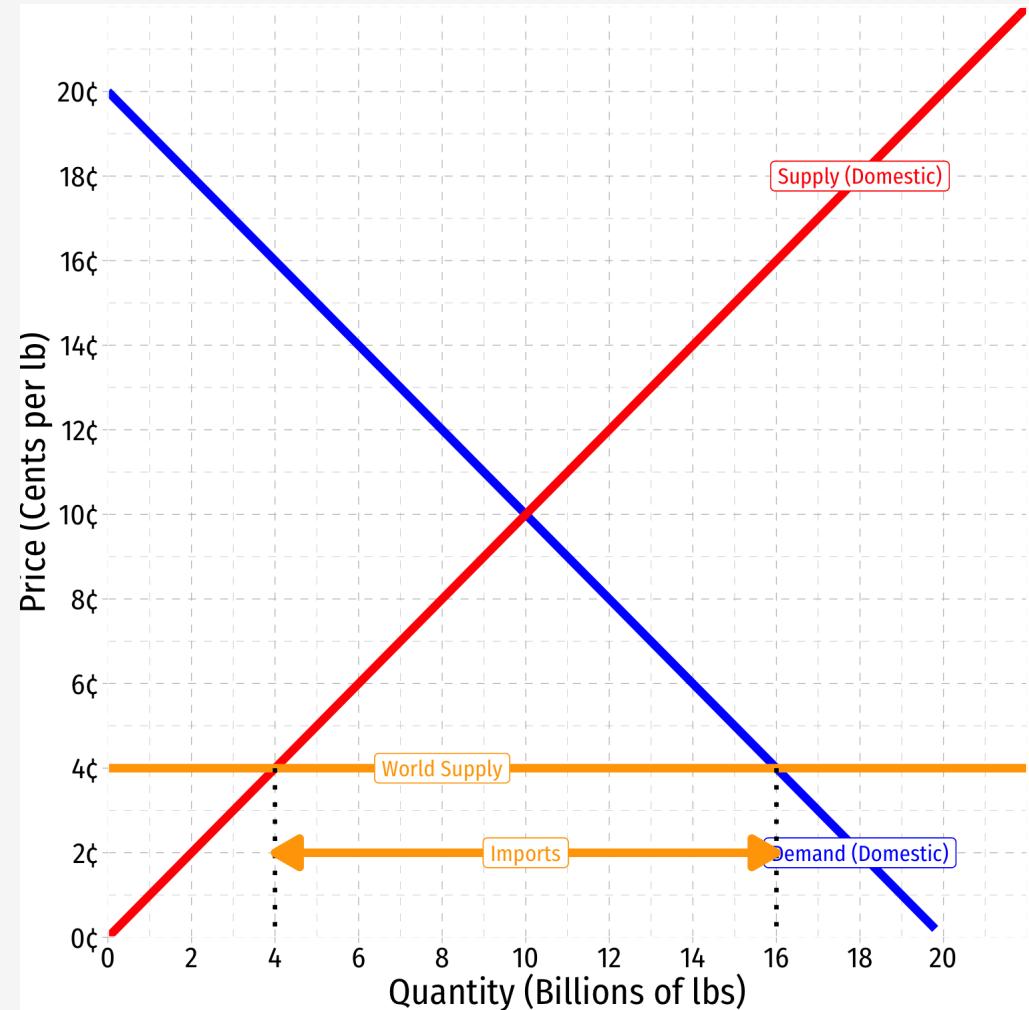# Import Tariff Effects in a Small Country

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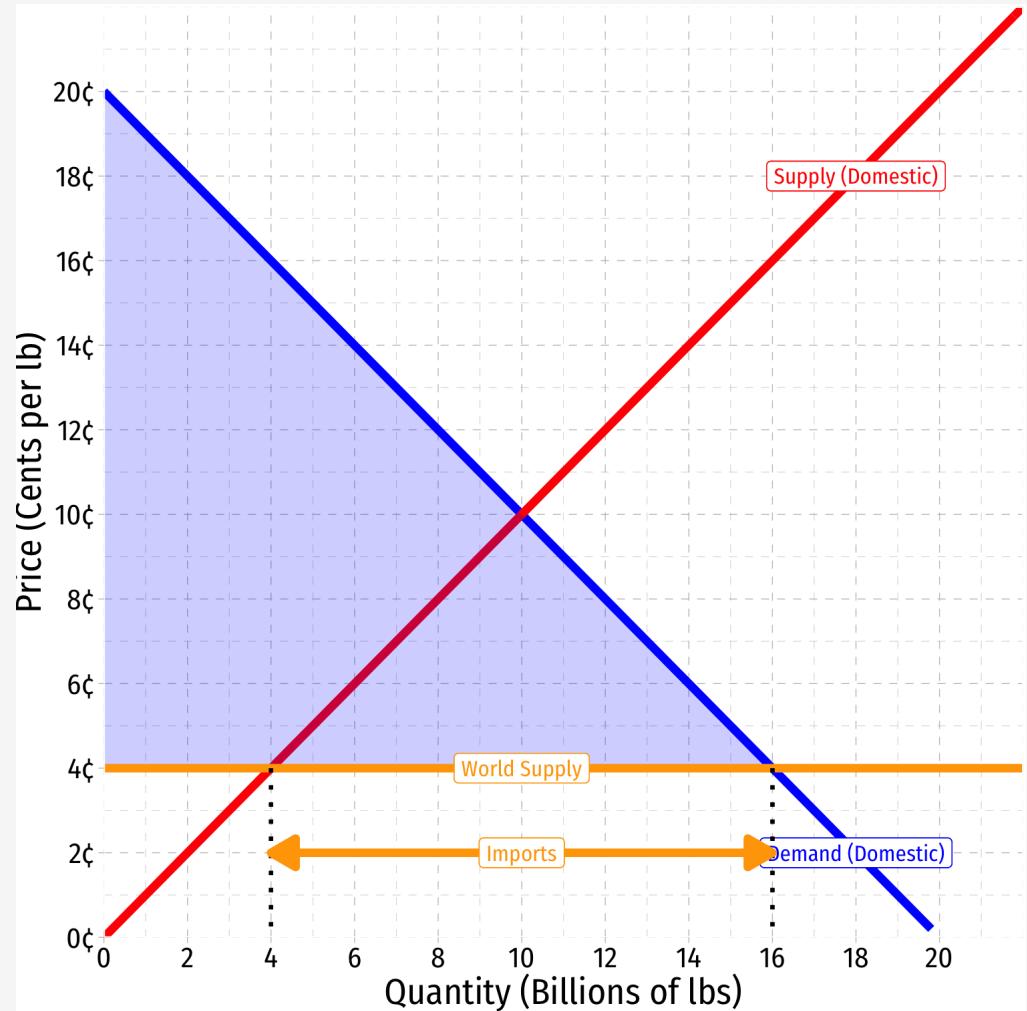
Import Tariff Effects in a Small Country

- At 4¢/lb:
  - Belgian consumers want to consume 16 bn lbs
  - Belgian producers will produce 4 bn lbs
  - Belgium will import 12 bn lbs from the rest of the world
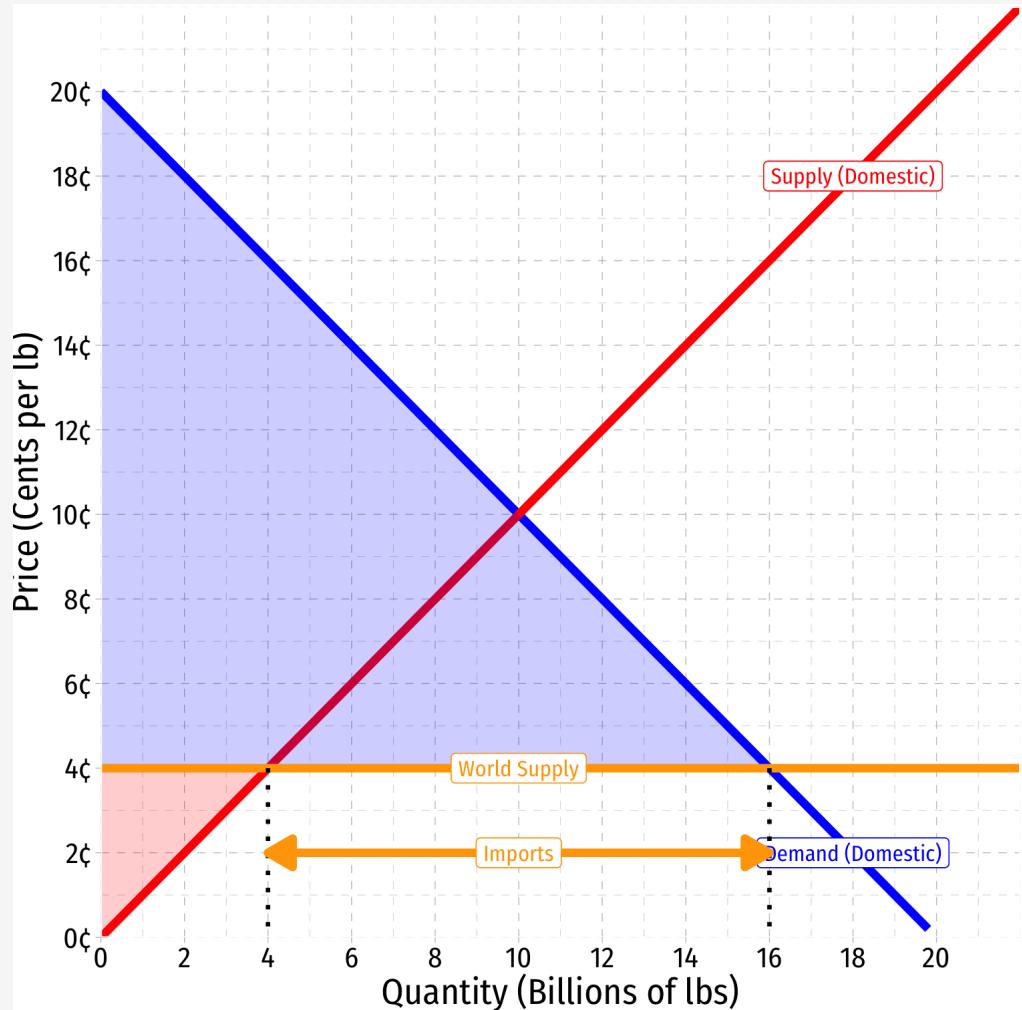
Import Tariff Effects in a Small Country

- Under international trade:

- Consumer surplus = WTP – p*

    - = 0.5(16-0)($0.20-$0.04) = $1.280 billion

Import Tariff Effects in a Small Country

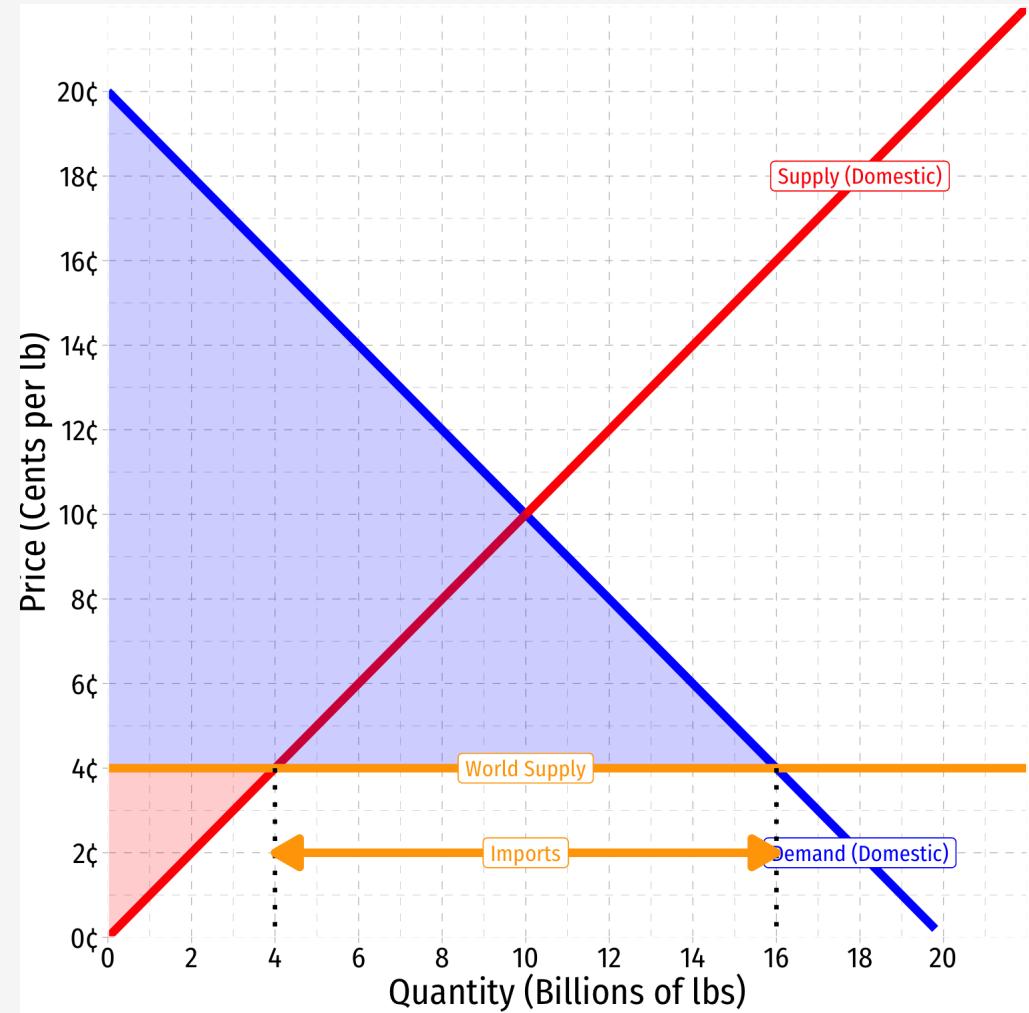- Under international trade:

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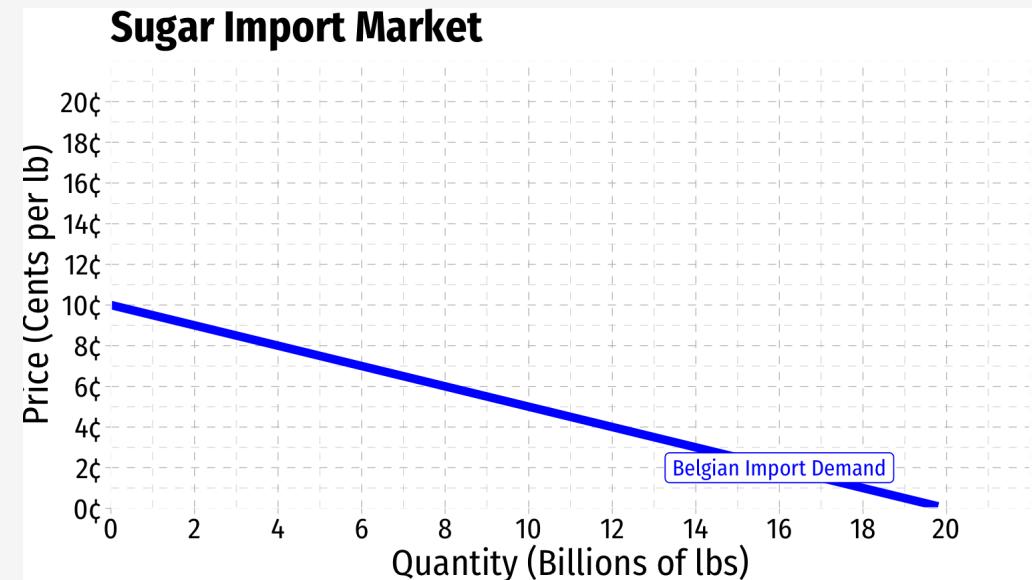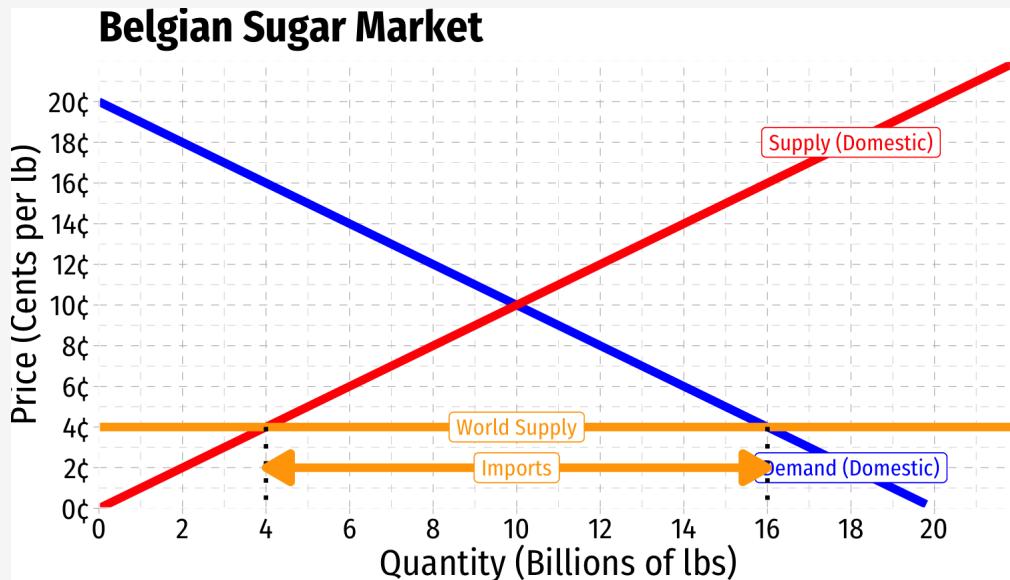- Producer surplus = p* – WTA

  - = 0.5(4–0)($0.04–$0.00) = $0.080 billion

Import Tariff Effects in a Small Country

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  - = 0.5(4-0)($0.04-$0.00) = $0.080 billion

- Trade benefits Belgian consumers at expense of Belgian sugar producers
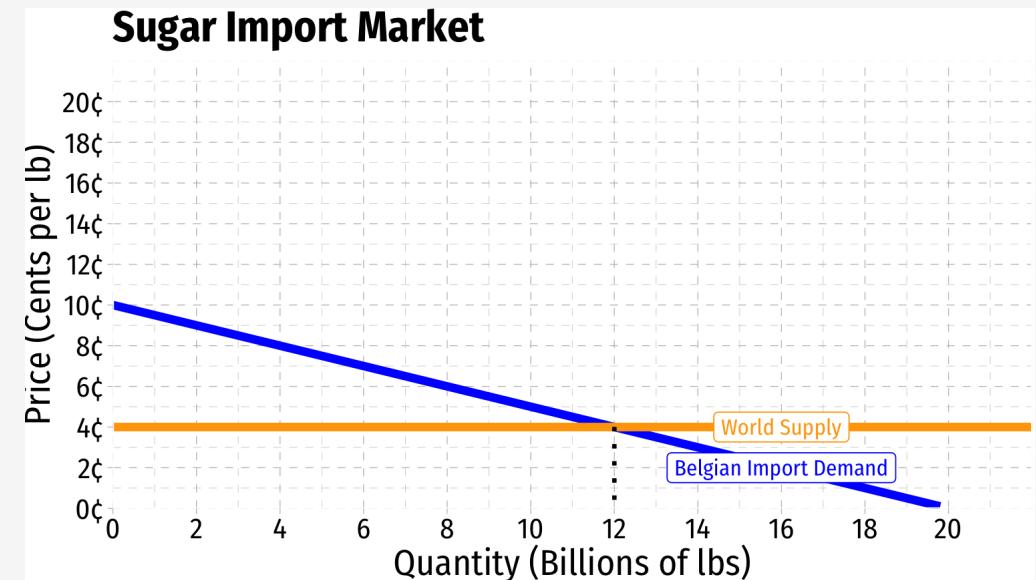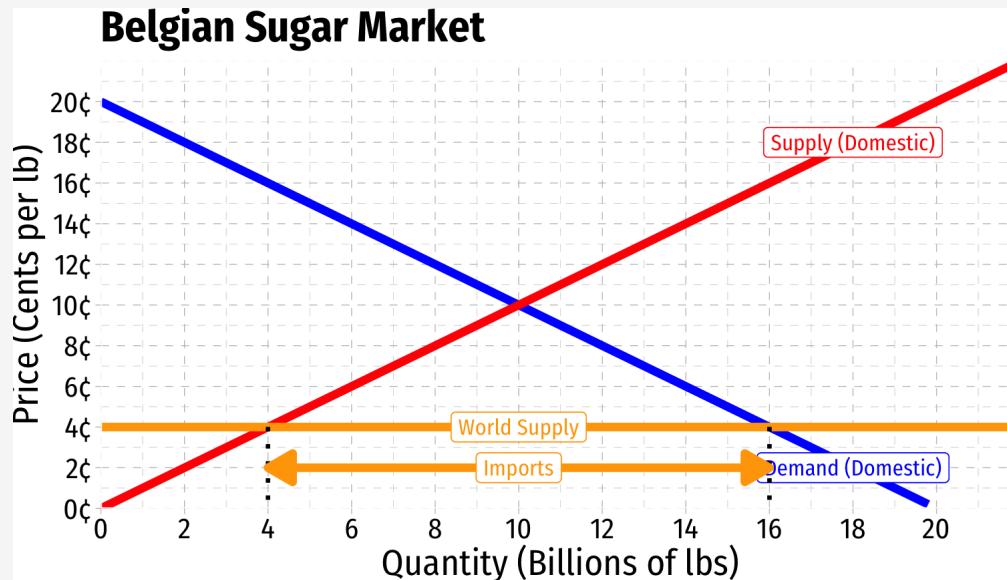
  - But gain is much bigger than loss!

Import Tariff Effects in a Small Country

Belgian Sugar Market

Price (Cents per lb)

20¢, 18¢, 16¢, 14¢, 12¢, 10¢, 8¢, 6¢, 4¢, 2¢, 0¢

Supply (Domestic)

World Supply

Imports

Demand (Domestic)

Quantity (Billions of lbs)

0 2 4 6 8 10 12 14 16 18 20

Sugar Import Market

Price (Cents per lb)

20¢, 18¢, 16¢, 14¢, 12¢, 10¢, 8¢, 6¢, 4¢, 2¢, 0¢

Belgian Import Demand

Quantity (Billions of lbs)
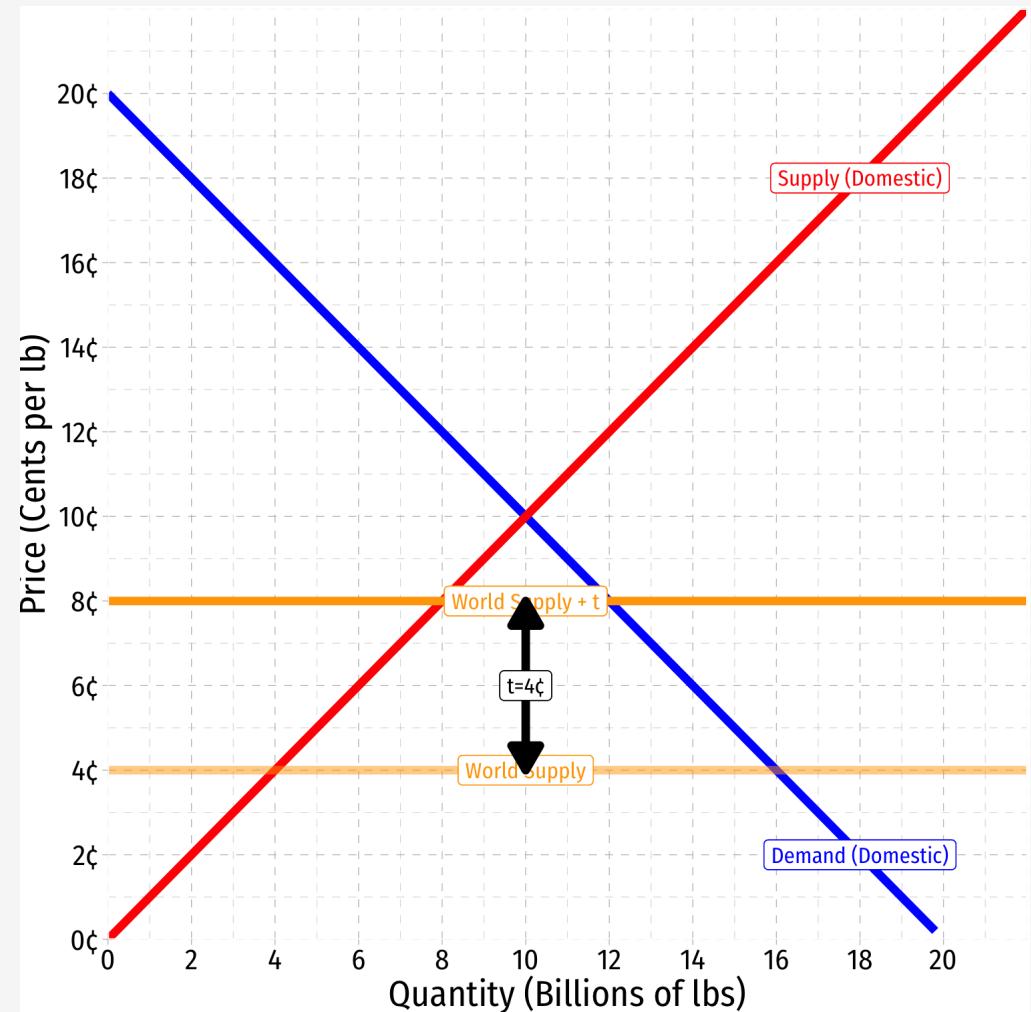
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- We can trace Belgium's import demand from the world based on the world price

- Note at a price of ¢10 there is no import demand, all sugar can be produced in Belgium

Import Tariff Effects in a Small Country

Belgian Sugar Market

(chart: Price (Cents per lb) on y-axis from 0¢ to 20¢; Quantity (Billions of lbs) on x-axis from 0 to 20. Supply (Domestic) red line rising, Demand (Domestic) blue line falling, World Supply orange horizontal line at 4¢, Imports arrow spanning from 4 to 16)

Sugar Import Market

(chart: Price (Cents per lb) on y-axis from 0¢ to 20¢; Quantity (Billions of lbs) on x-axis from 0 to 20. Belgian Import Demand blue line falling from 10¢, World Supply orange horizontal line at 4¢)

- We can trace Belgium's import demand from the world based on the world price

- Note at a price of ¢10 there is no import demand, all sugar can be produced in Belgium

- We have been assuming the world supply of sugar is perfectly elastic at 4¢

- Sets equilibrium amount of imports in Belgium, 12 bn lbs imported

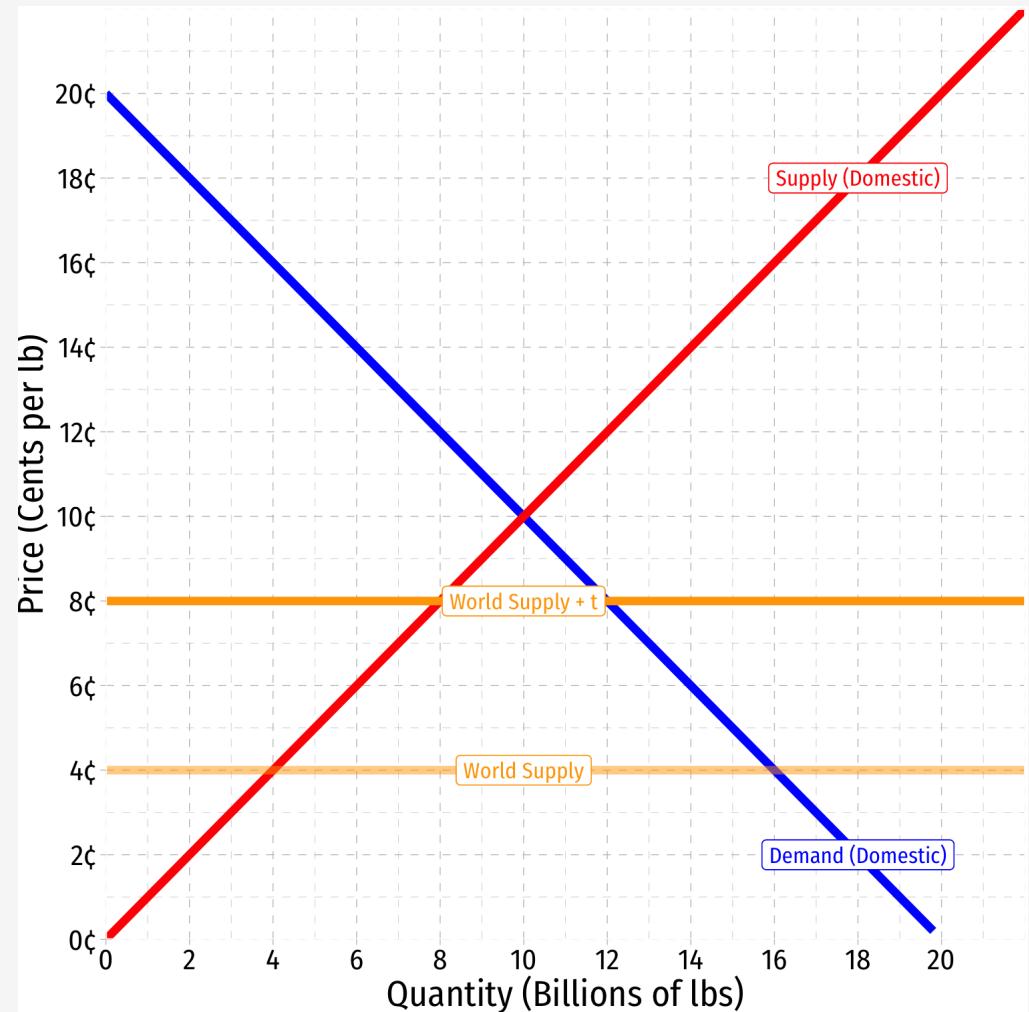# Import Tariff Effects in a Small Country

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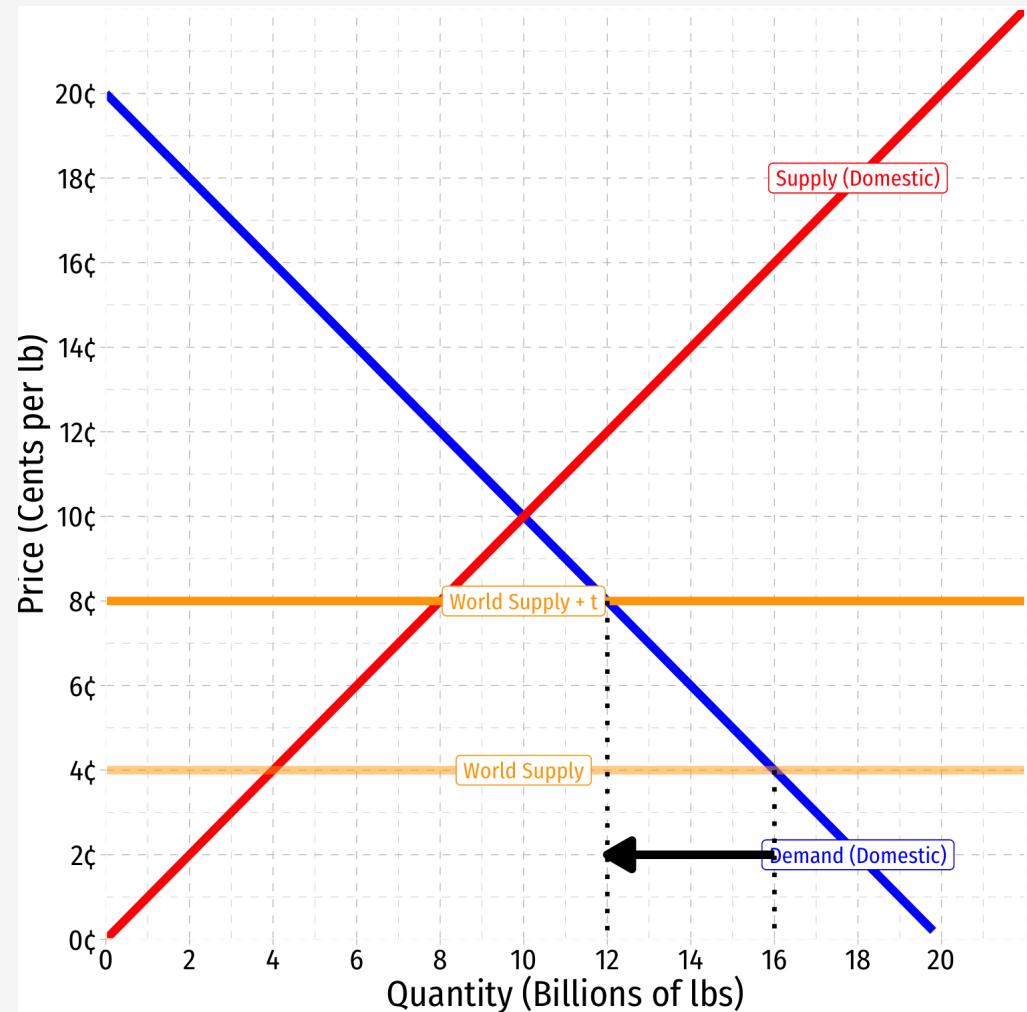
Import Tariff Effects in a Small Country

- Suppose the government levies a 4¢/lb **tariff** on sugar imports

- At new domestic sugar price of 8¢/lb
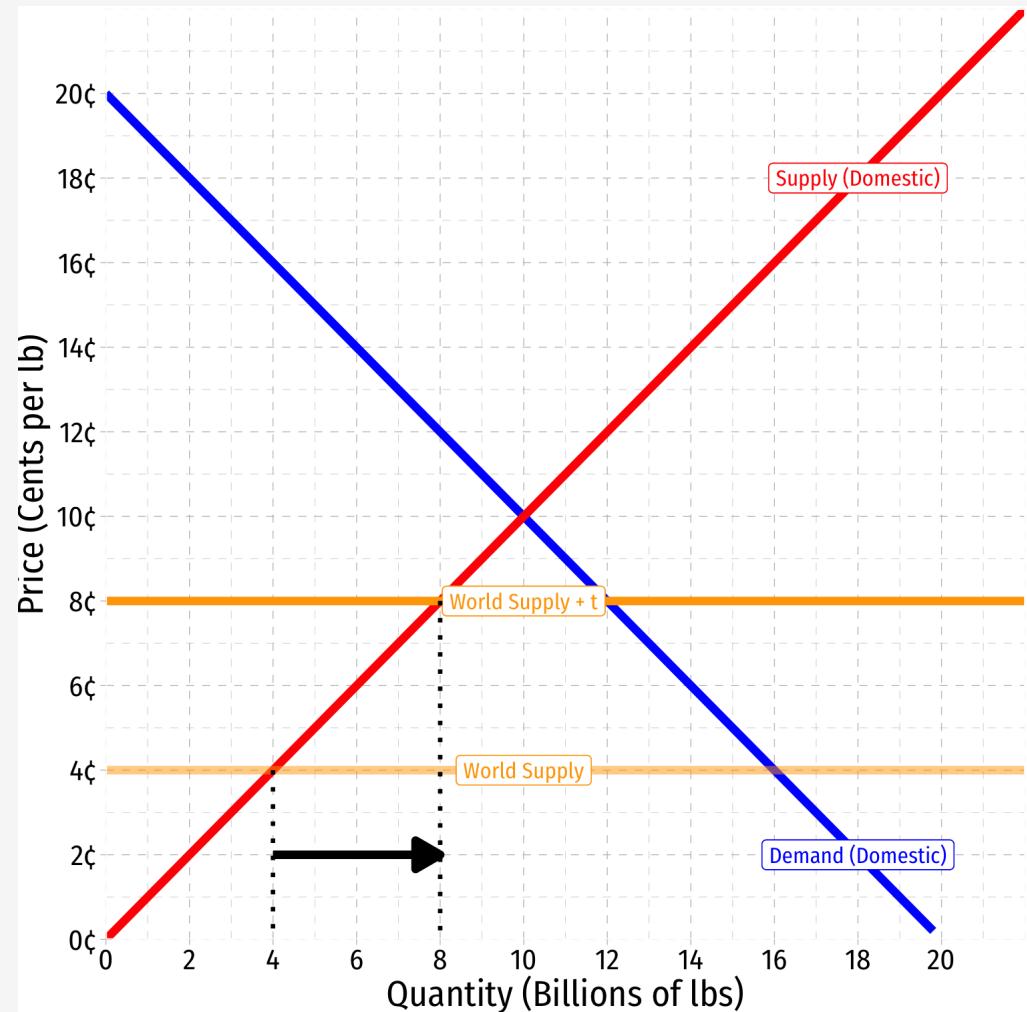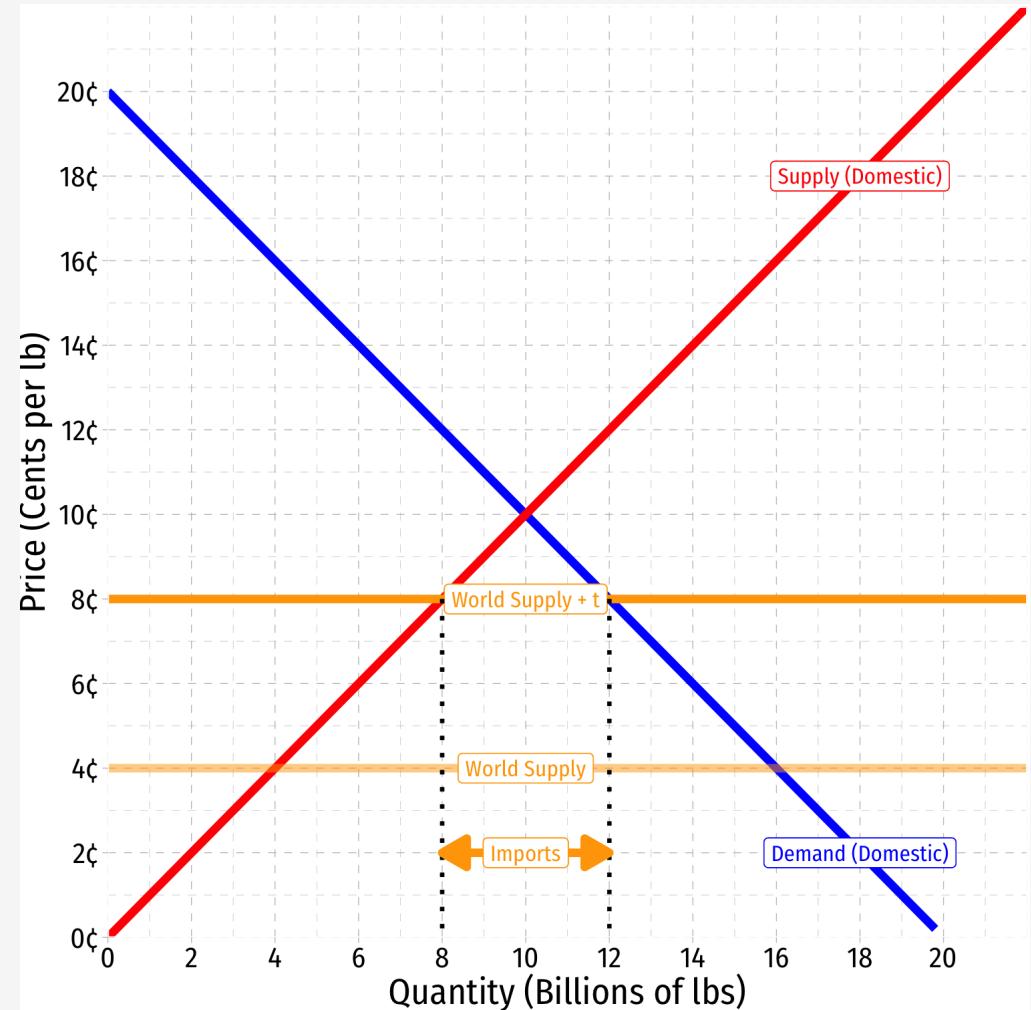
Import Tariff Effects in a Small Country

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  - **Belgian consumers** want to consume 12 bn lbs (less than before)

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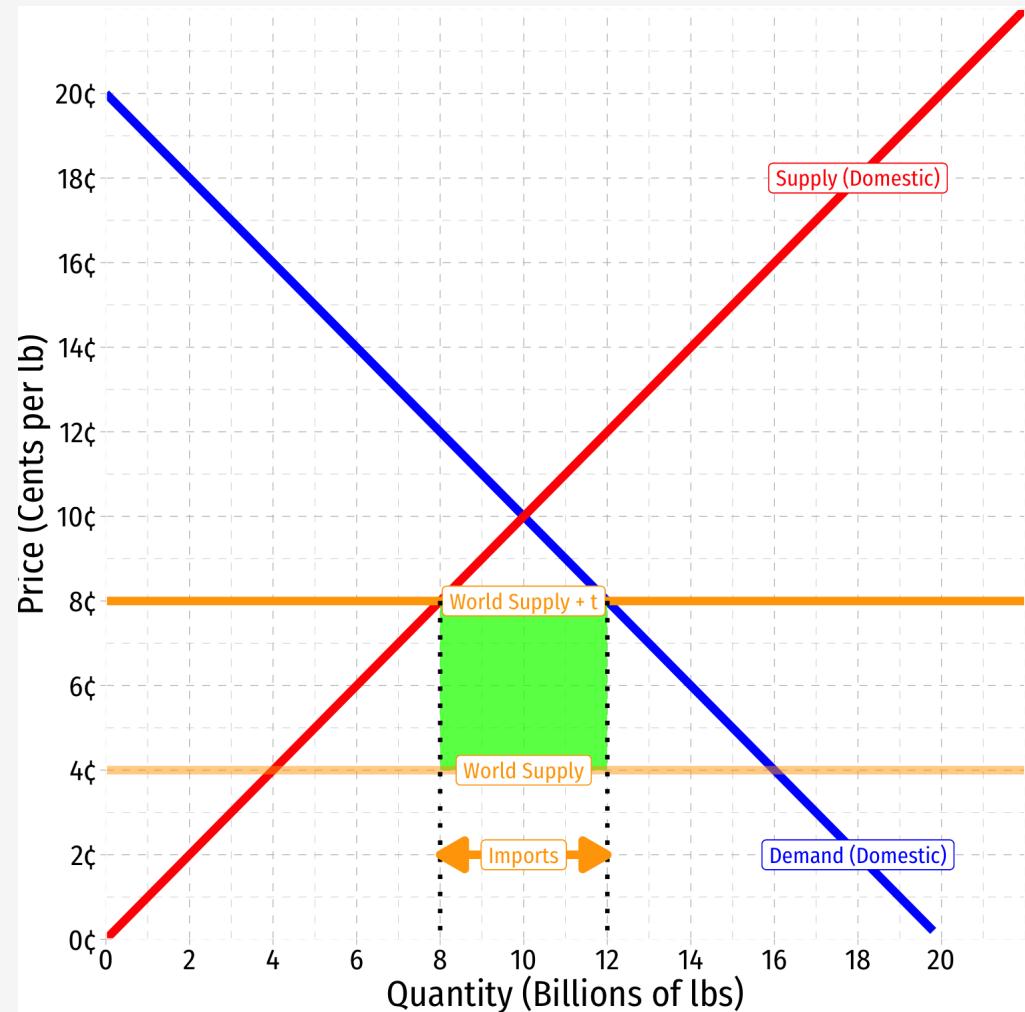# Import Tariff Effects in a Small Country

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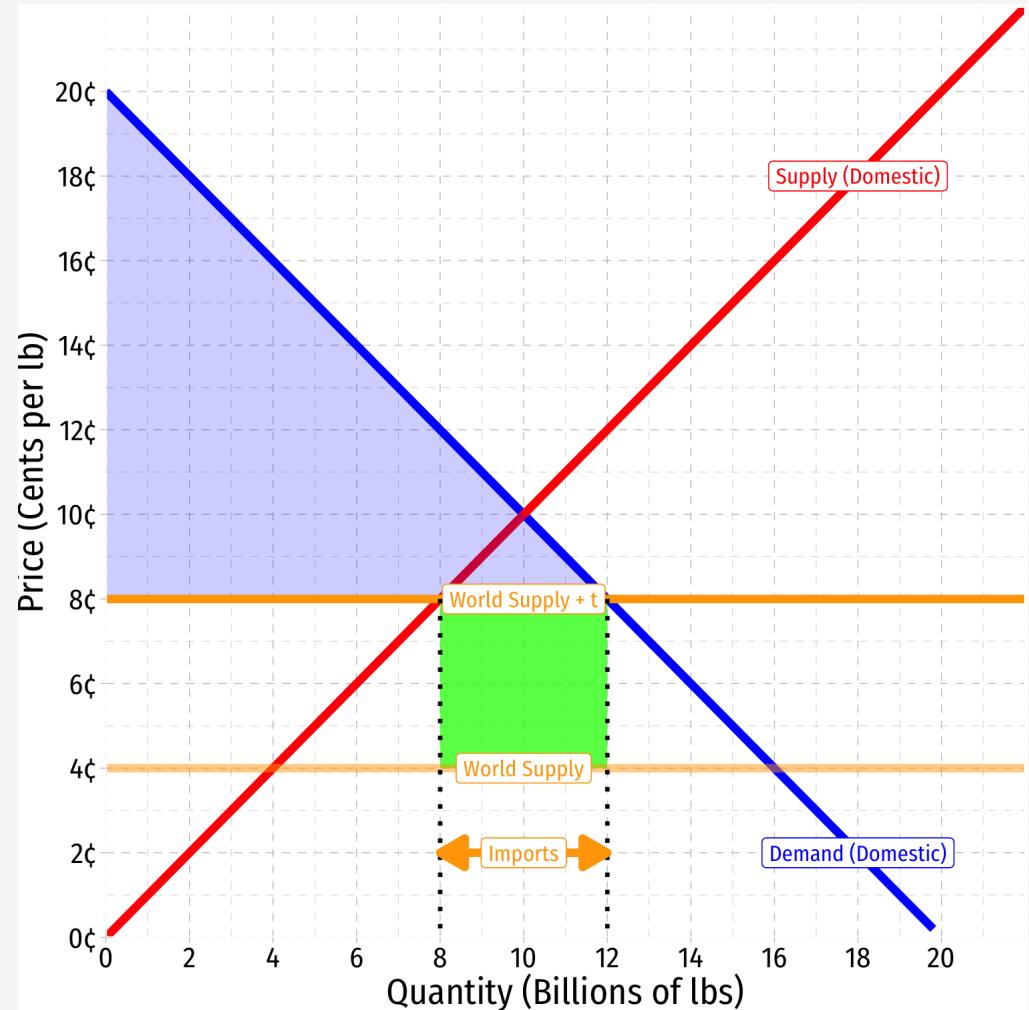
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- Tariff is a tax, so government earns revenue:
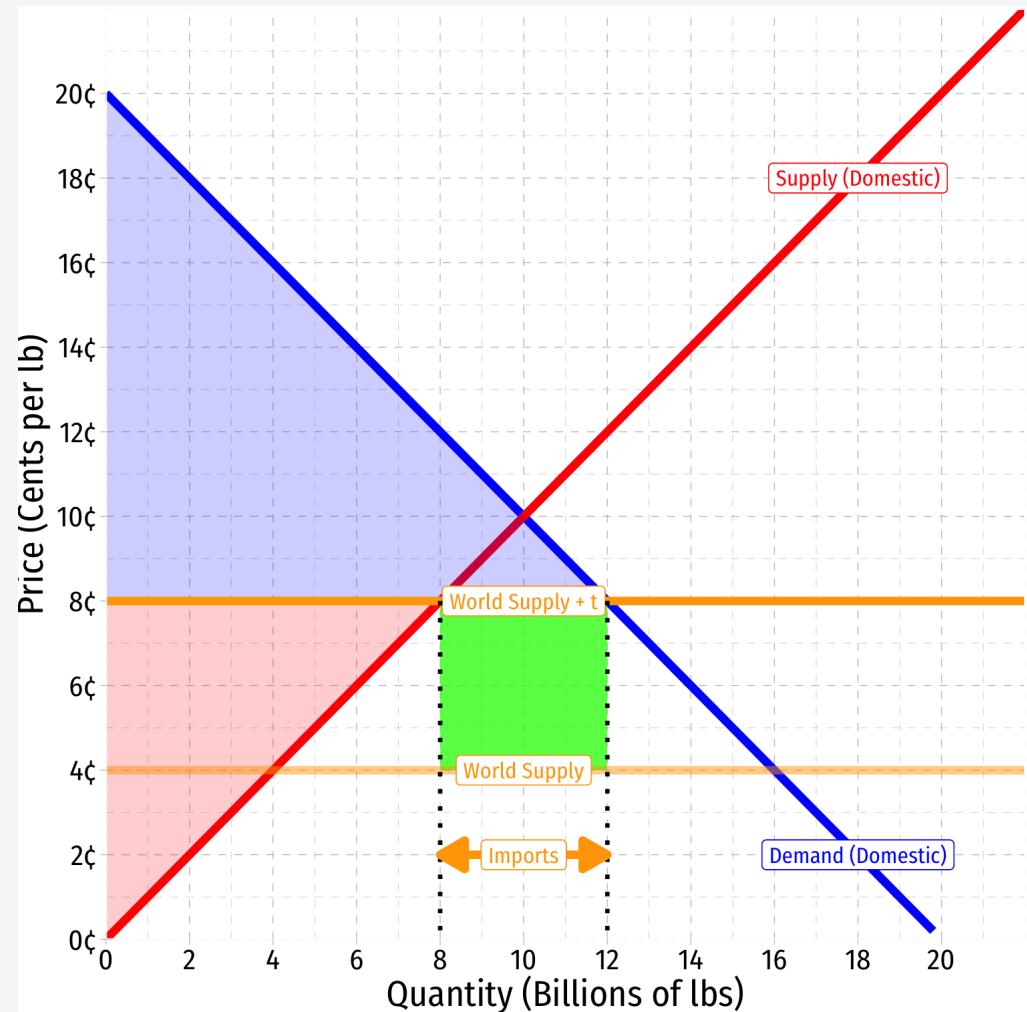
Import Tariff Effects in a Small Country

- Under the tariff:

- Consumer surplus = WTP – p*

  - = 0.5(12-0)($0.20-$0.08) = $0.720 billion
  - Less than before (free trade)

Import Tariff Effects in a Small Country
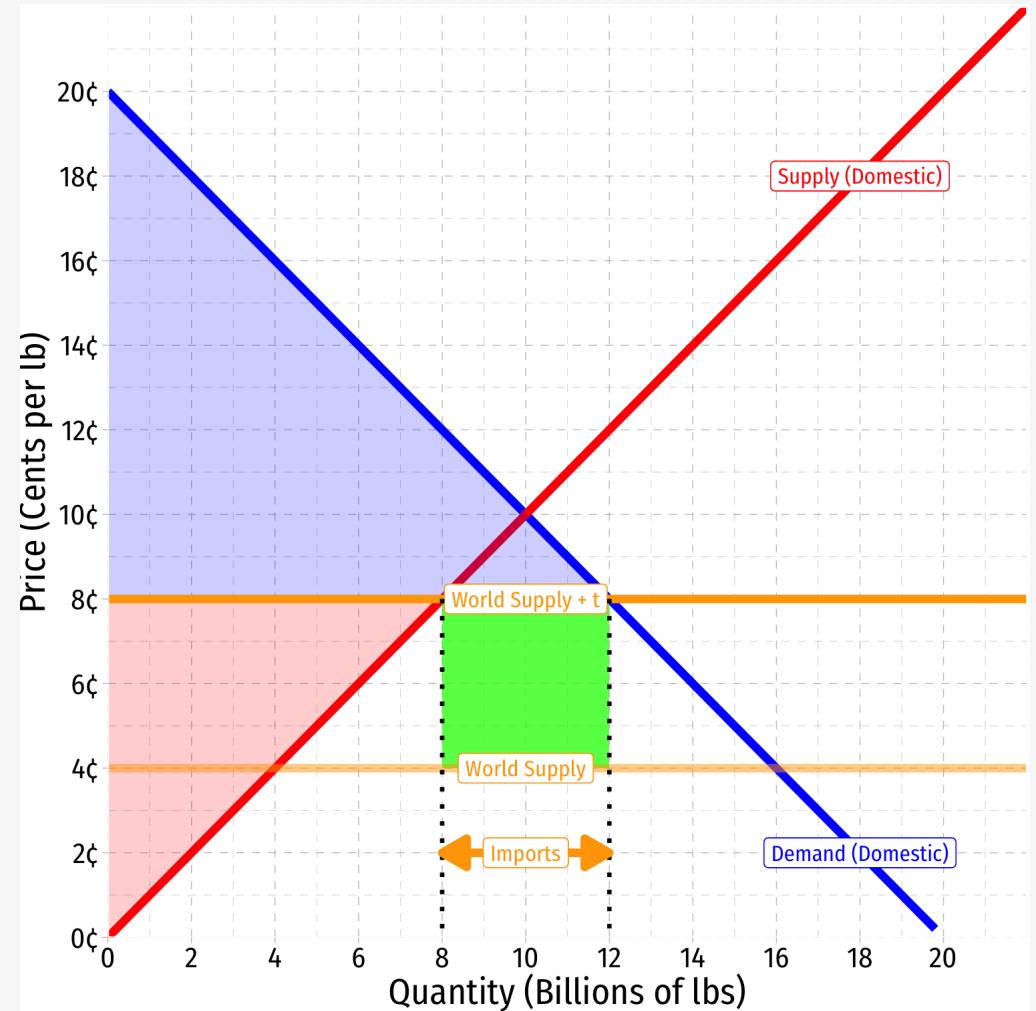
- Under the tariff:

- Consumer surplus = WTP – p*

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  - Less than before (free trade)

- Producer surplus = p* – WTA

  - = 0.5(8-0)($0.08-$0.00) = $0.320 billion
  - More than before (free trade)
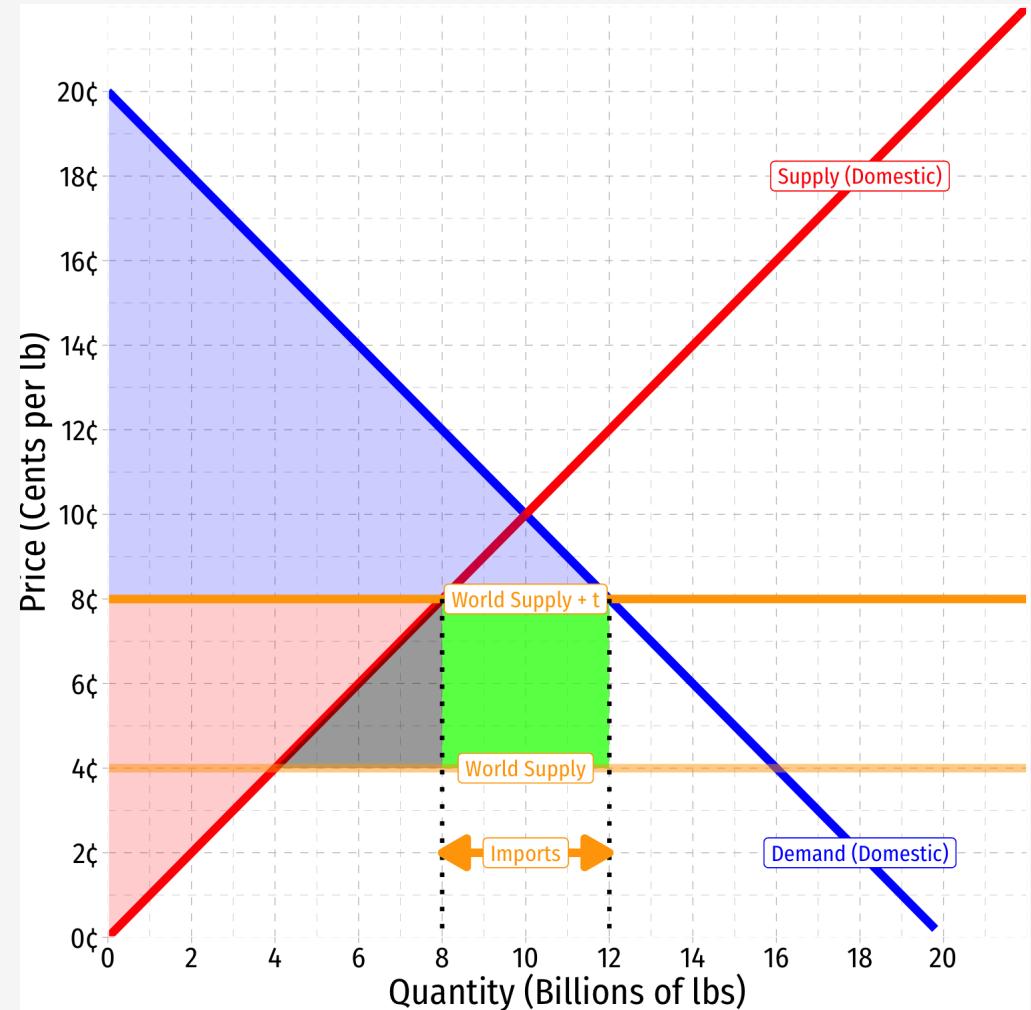
Import Tariff Effects in a Small Country

- Under the tariff:

- Two new sources of market inefficiency created, **"deadweight loss (DWL)"**

Import Tariff Effects in a Small Country

- Under the tariff:

- Two new sources of market inefficiency created, **"deadweight loss (DWL)"**

    1. Inefficient domestic production (cheaper for foreigners to produce sugar)
        - 0.5(8-4)($0.08-$0.04) = $0.080 Billion

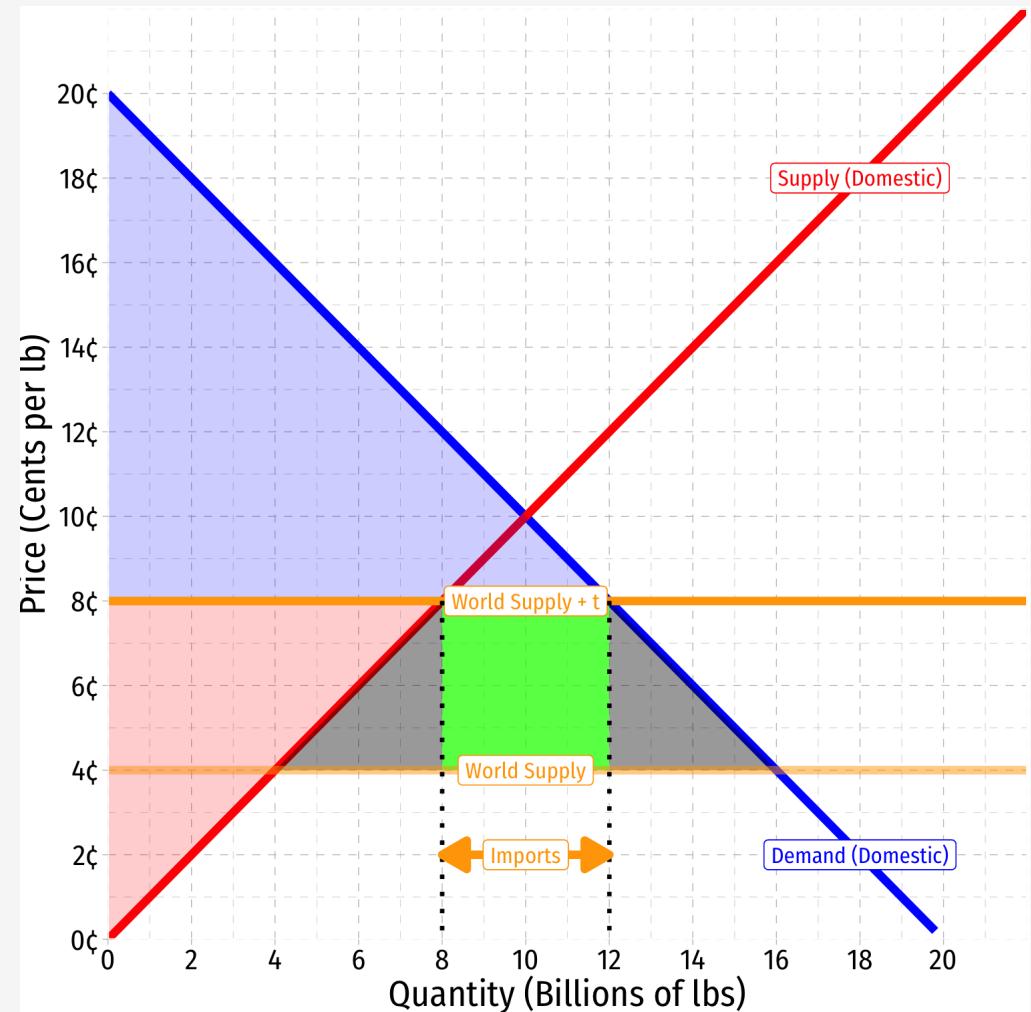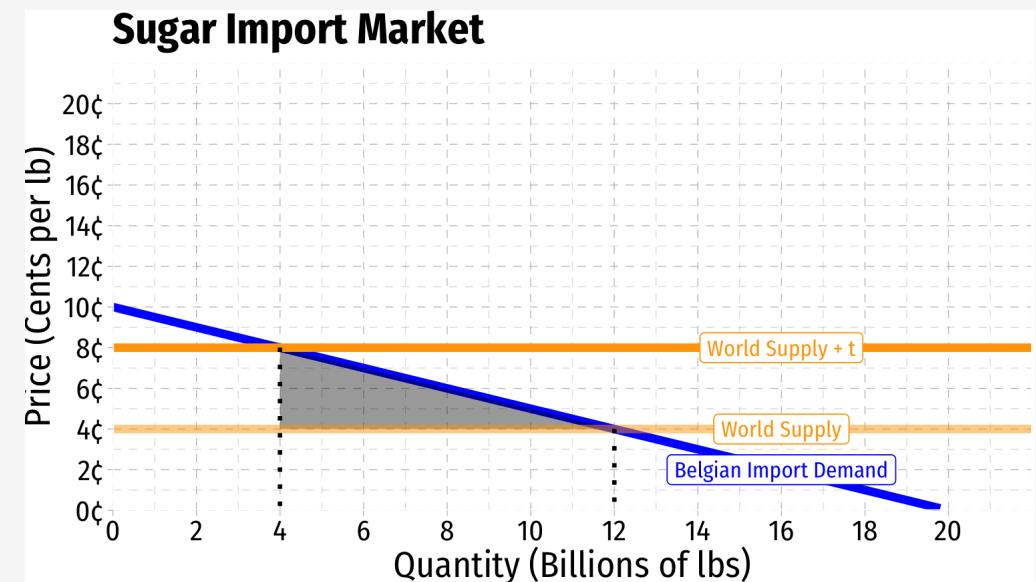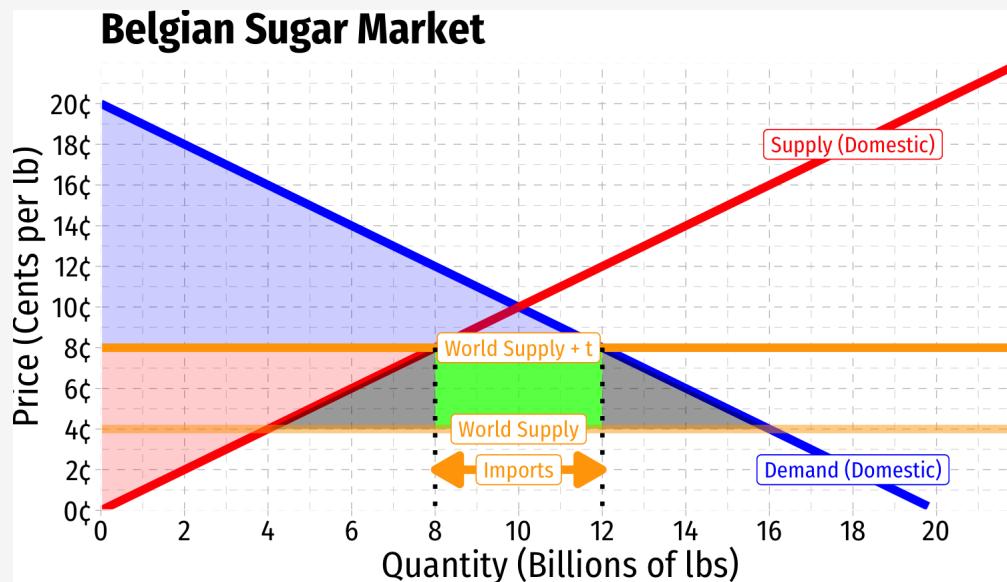# Import Tariff Effects in a Small Country

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  1. Inefficient domestic production (cheaper for foreigners to produce sugar)
     - 0.5(8-4)($0.08-$0.04) = $0.080 Billion
  1. Lost gains from exchange (consumers wanted to buy more from world)
     - 0.5(16-12)($0.08-$0.04) = $0.080 Billion

Import Tariff Effects in a Small Country

Belgian Sugar Market

Sugar Import Market

- Can also see this in the import market

- Decline of imports at higher price in Belgium

- Size of DWL in import market = sum of both DWL triangles in Belgian market ($0.160 bn)

Import Tariff Effects in a Small Country

- Domestic consequences of tariff:

1. Decrease in consumer surplus:

    ○ $0.720 bn-$1.280 bn = -$0.460 bn

2. Increase in producer surplus:

    ○ $0.320 bn-$0.080 bn = $0.240 bn
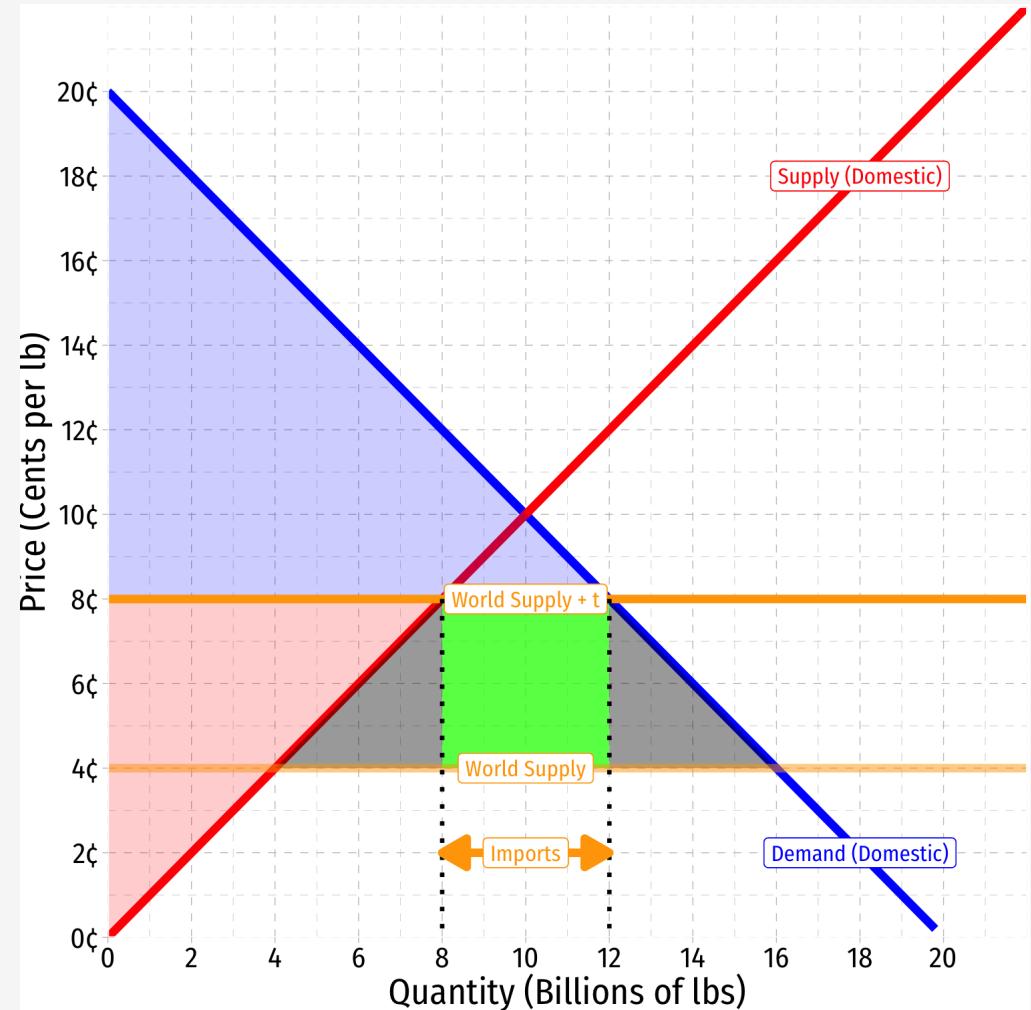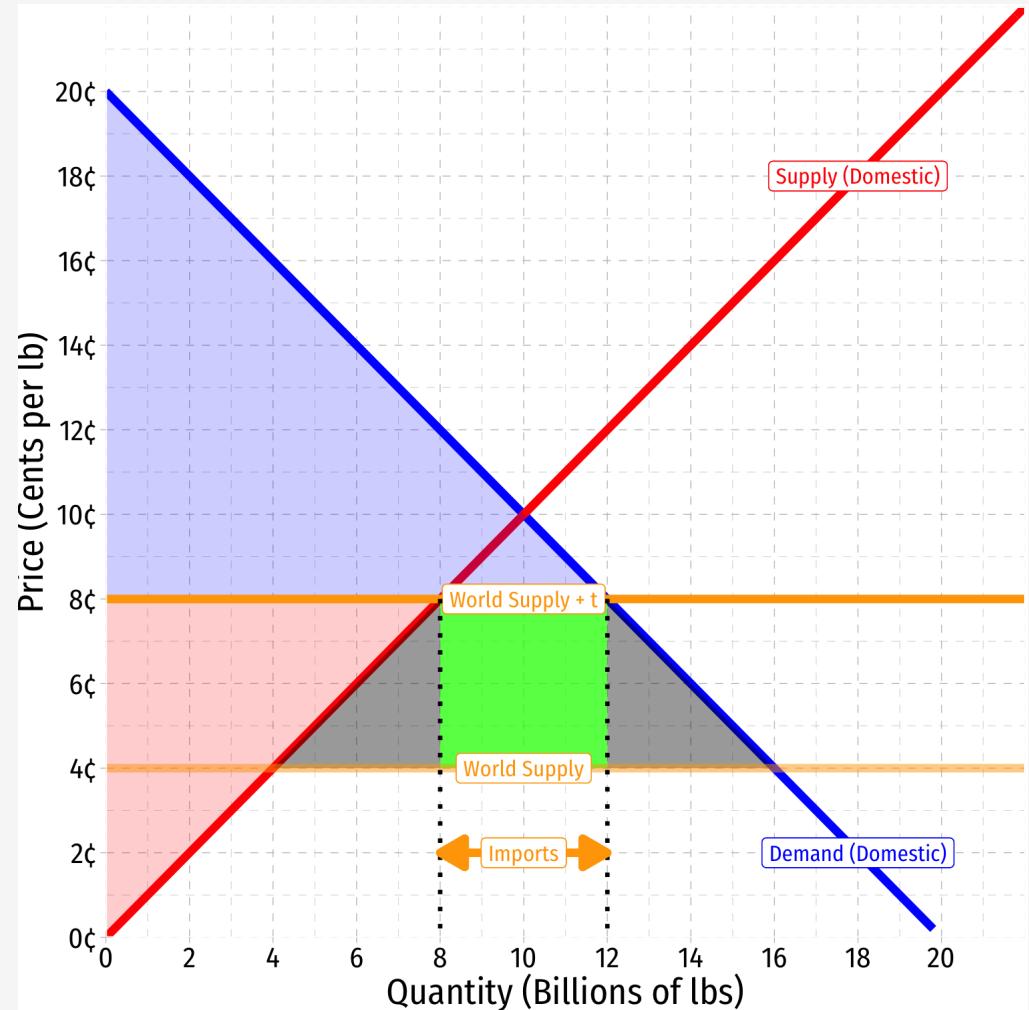
3. Government tax revenue:

    ○ $0.160 bn

4. **Deadweight losses**

    ○ $-0.080 bn - $0.080 bn = **-$0.160 bn**

Import Tariff Effects in a Small Country

- Domestic consequences of tariff:

- A $240m gain to a small group of domestic sugar producers at a $460m expense to consumers

- Concentrated benefit, dispersed cost each consumer pays $0.04/lb more for sugar

- Harm to foreigners: hurts exporters and consumers in other countries from lost trade

Tariff Effects in a Large Country
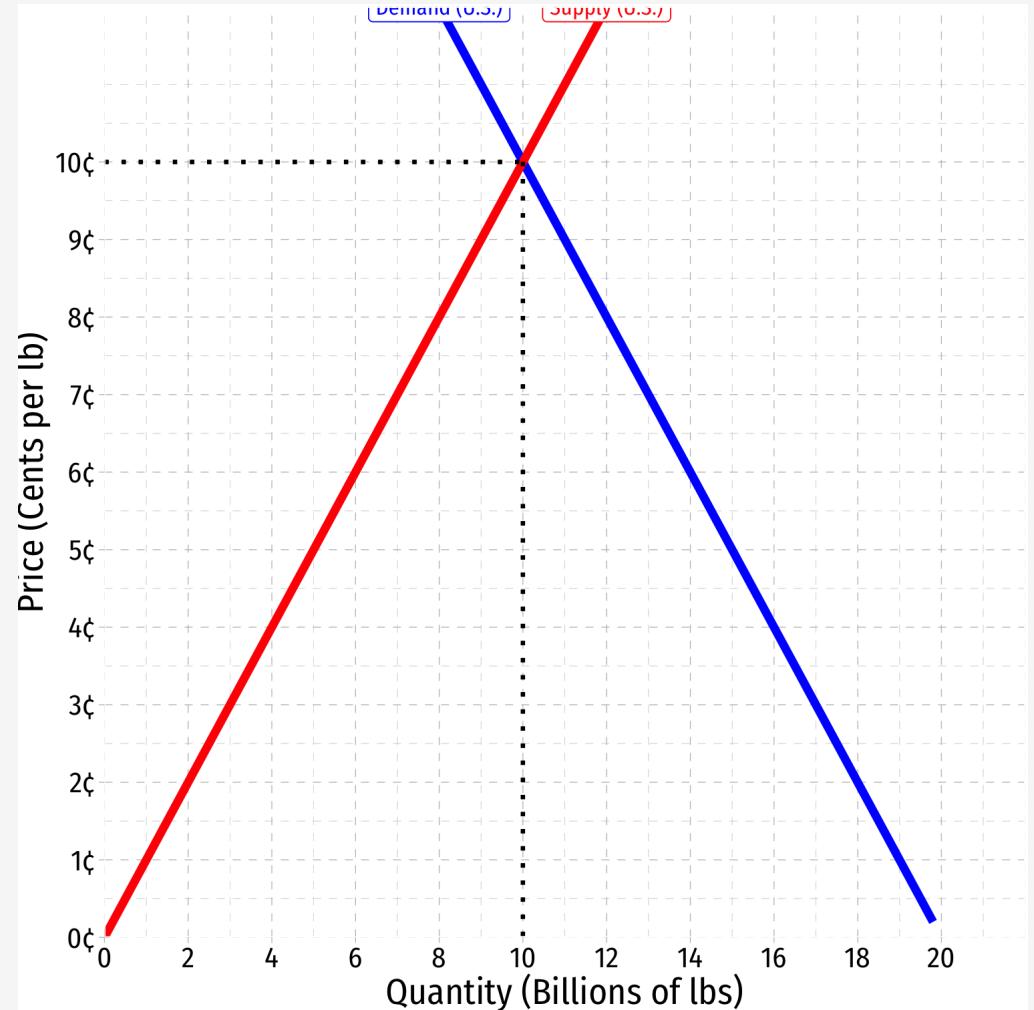
Large Countries in International Trade

- A **"large country"** has a sufficiently large domestic demand to affect international prices

- The decrease in domestic demand from an import tariff (from higher import price) is sufficiently large to **lower the world price of the good**

- This is called the **"terms of trade effect"** of a tariff

  - can provide a *benefit* to domestic country
  - harms foreign exporters due to lower world price

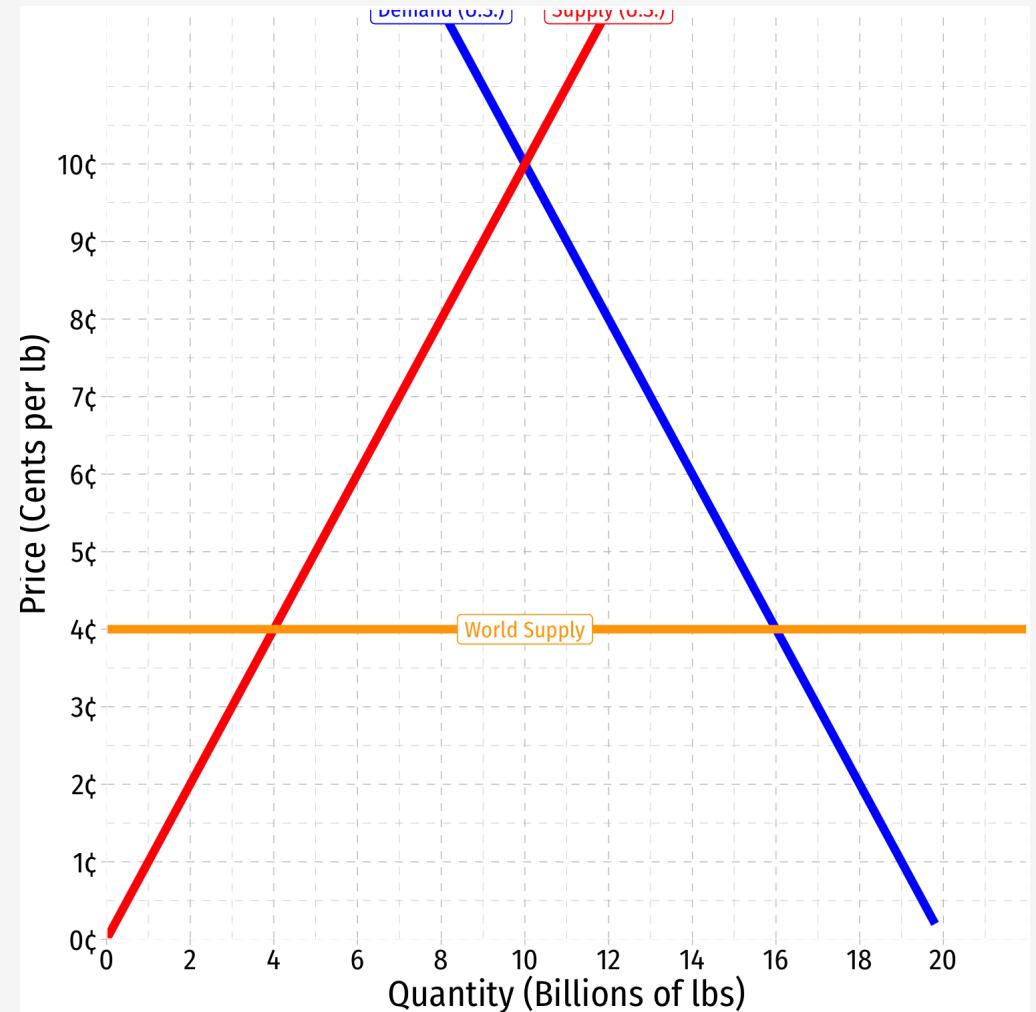# Import Tariff Effects in a Large Country

- Consider, for example, the sugar market in the U.S.

- Autarky price: 10¢/lb, 10 billion lbs exchanged within U.S.

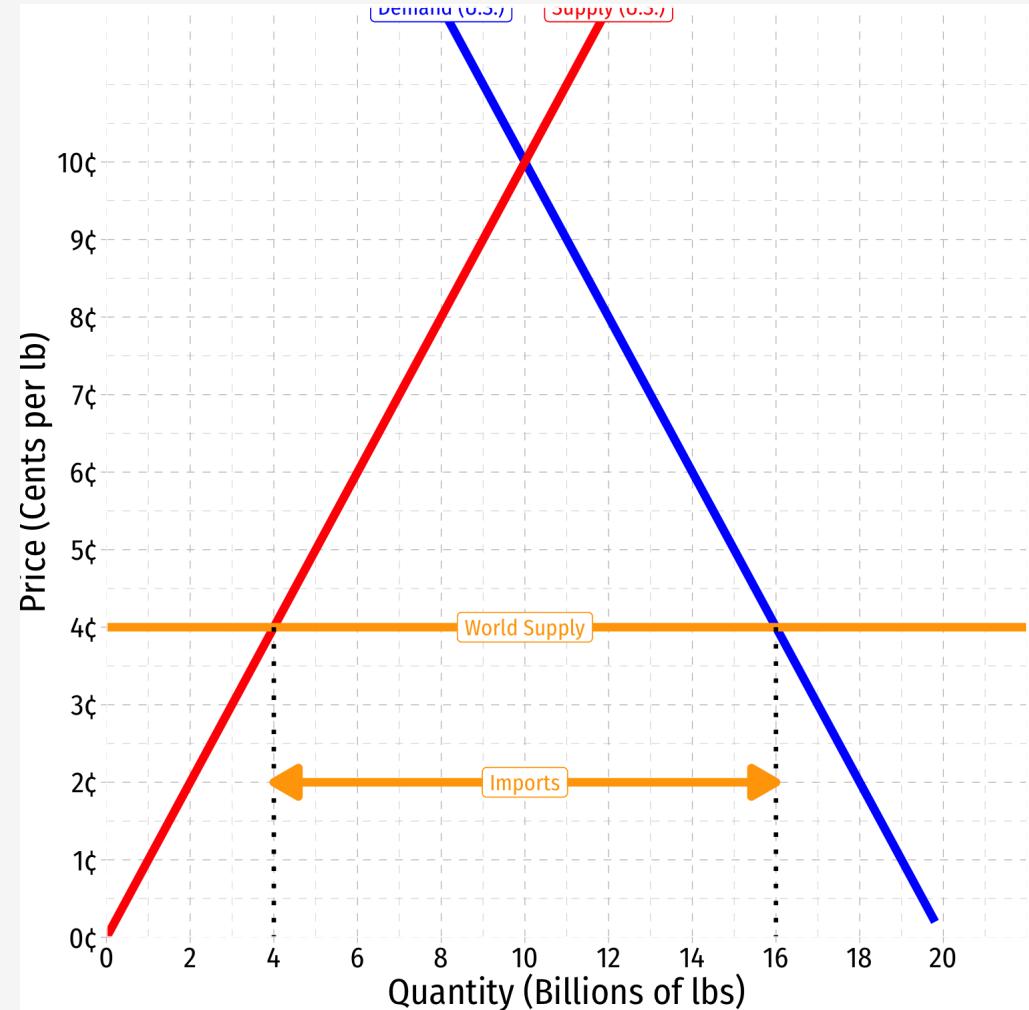# Import Tariff Effects in a Large Country

- Suppose U.S. opens up to international trade

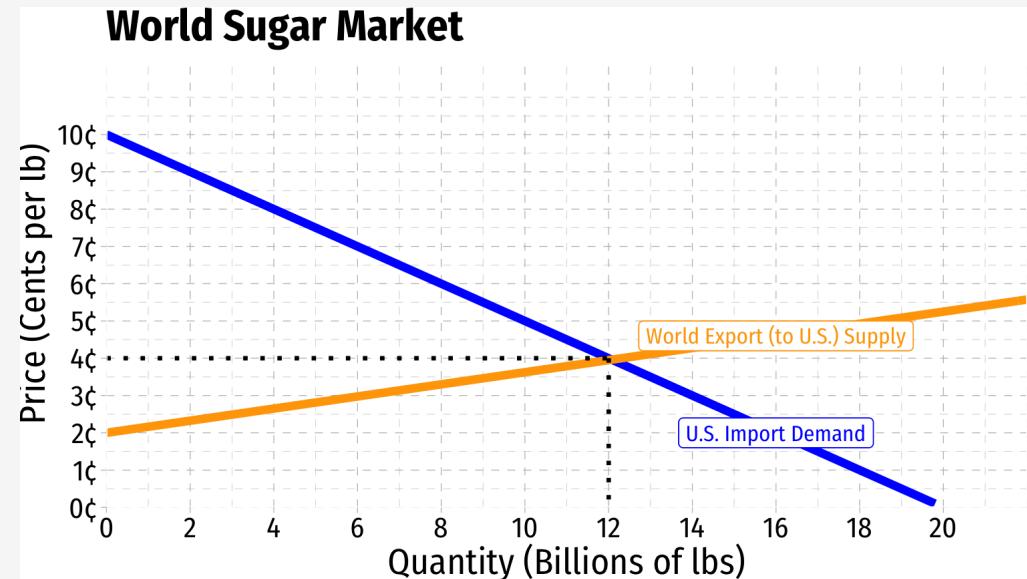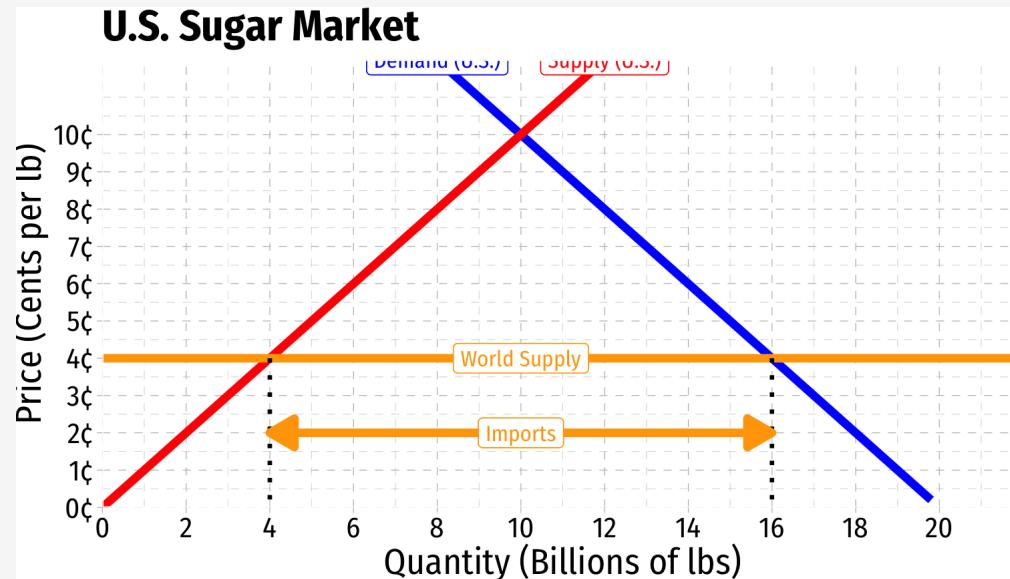- **World Supply** of sugar at 4¢/lb:

Import Tariff Effects in a Large Country

- Suppose U.S. opens up to international trade

- **World Supply** of sugar at 4¢/lb:

  - U.S. consumers want to consume 16 bn lbs
  - U.S. producers will produce 4 bn lbs
  - U.S. will import 12 bn lbs from the rest of the world

Import Tariff Effects in a Large Country

U.S. Sugar Market

World Sugar Market
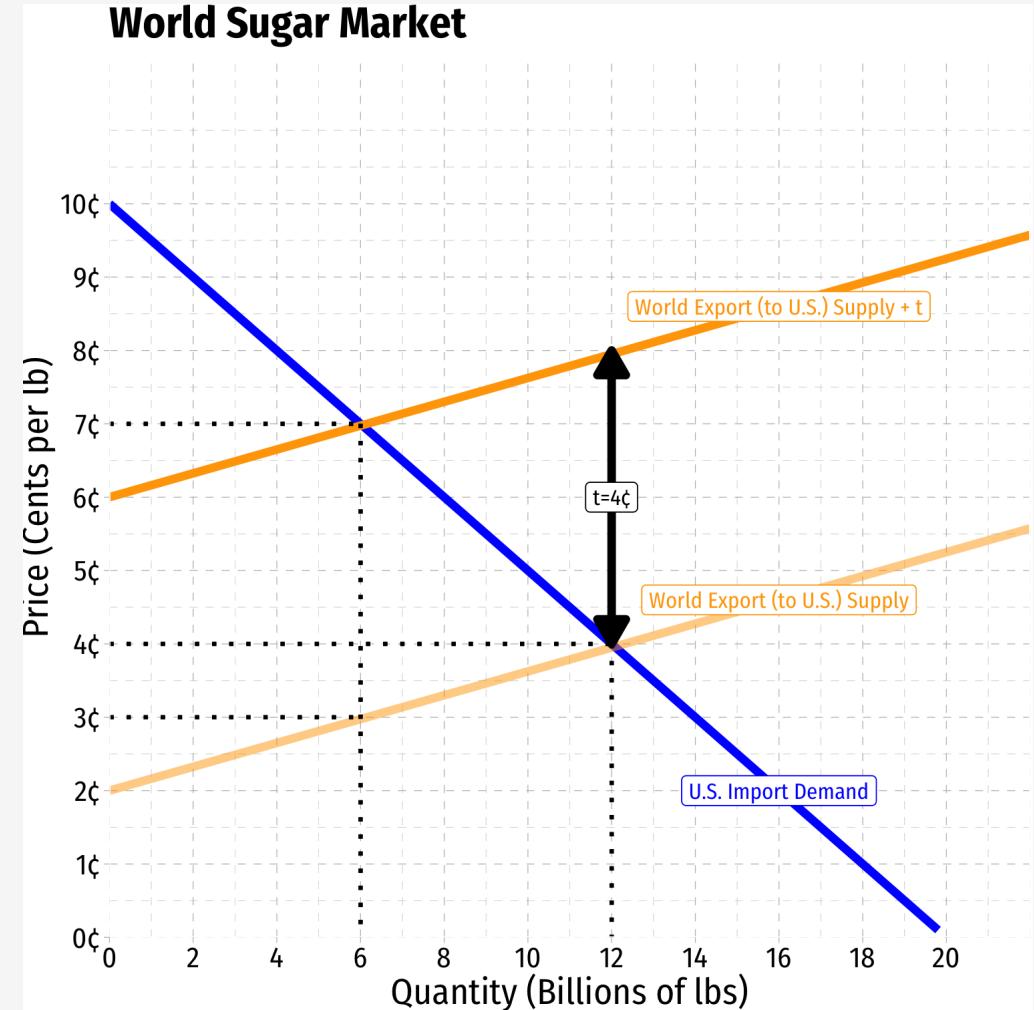
- We can trace U.S.'s import demand from the world based on the world price

- Because U.S. is a large country, the world supply curve (exports from other countries) to U.S. is *upward* sloping

  - sufficiently high demand from U.S. stimulates production abroad for export to U.S.

- Imagine autarky equilibrium price in exporting countries is 2¢; once they can get higher price in U.S., start exporting

- Sets equilibrium amount of imports in U.S., 12 bn lbs imported at 4¢

Import Tariff Effects in a Large Country

- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar

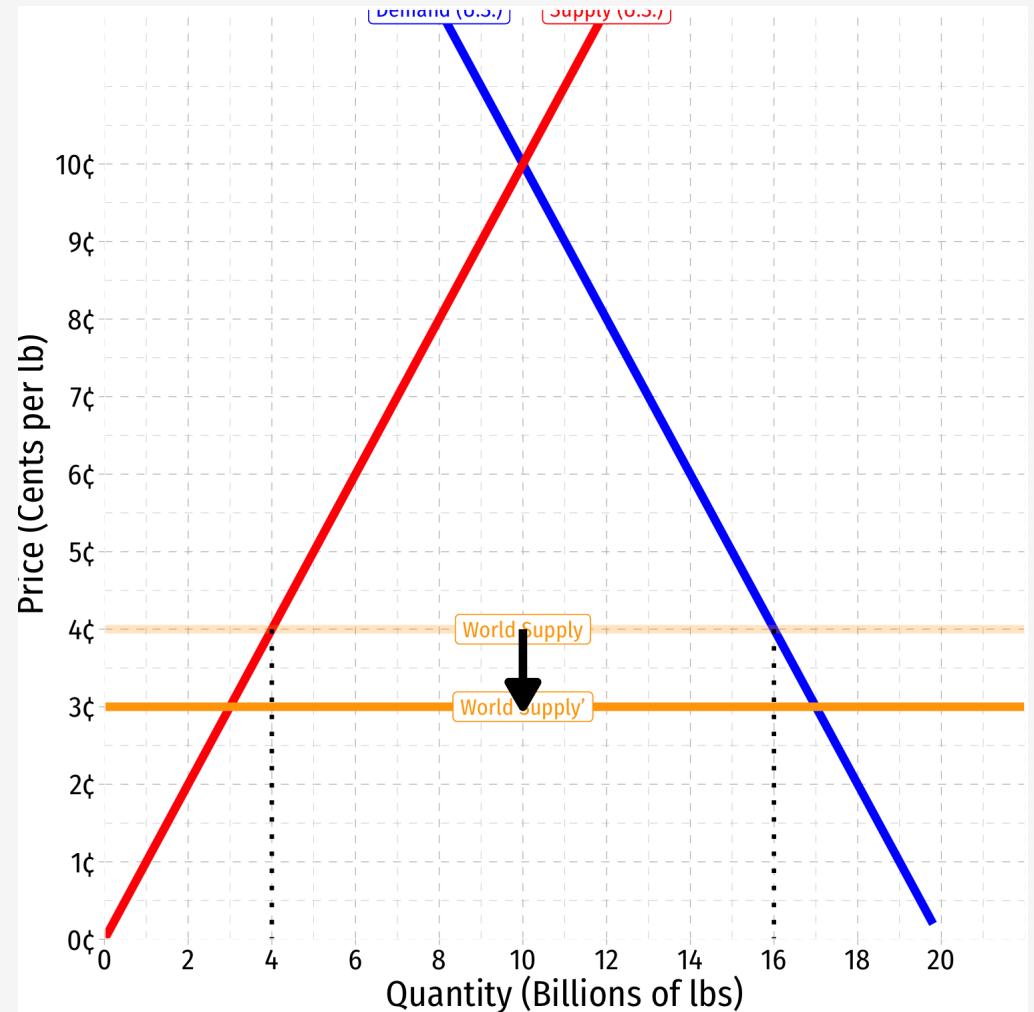- Increase in costs to world sugar exporters decreases world export supply by 4¢/lb

- New equilibrium is for U.S. to import 6 bn lbs at 7¢/lb

  - But 4¢/lb of the imports are paid to U.S. government as tariffs

- Exporters to U.S. recieve *net price* (after taxes) of 3¢/lb

- Important: raise in price to U.S. consumers is less than the full 4¢/lb!

  - Tariff on the massive U.S. market has lowered the *world* price of sugar because of decreased world supply, the **terms of trade effect**

World Sugar Market

World Export (to U.S.) Supply + t

t=4¢

World Export (to U.S.) Supply

U.S. Import Demand

Import Tariff Effects in a Large Country

- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar

- Due to the terms of trade effect, world price of sugar will fall from less U.S. demand (to 3¢/lb)
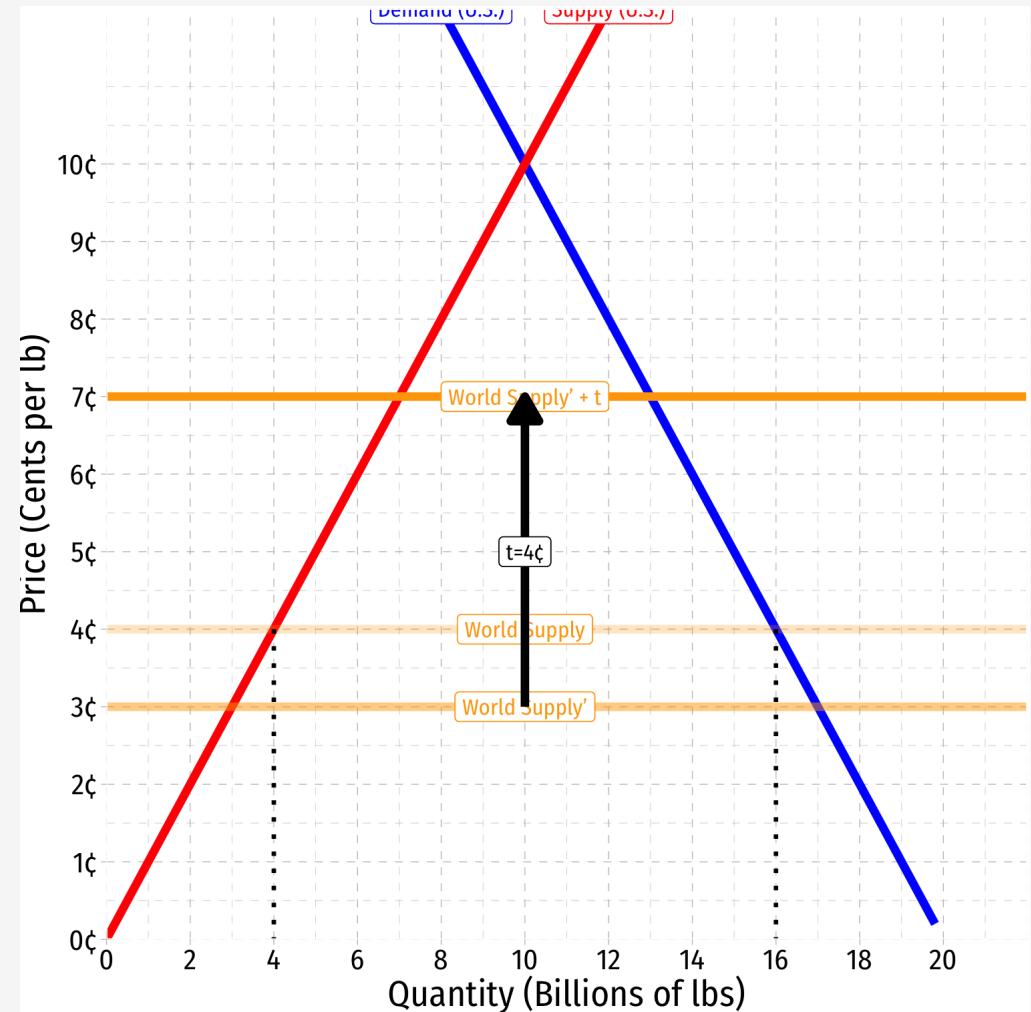
Import Tariff Effects in a Large Country

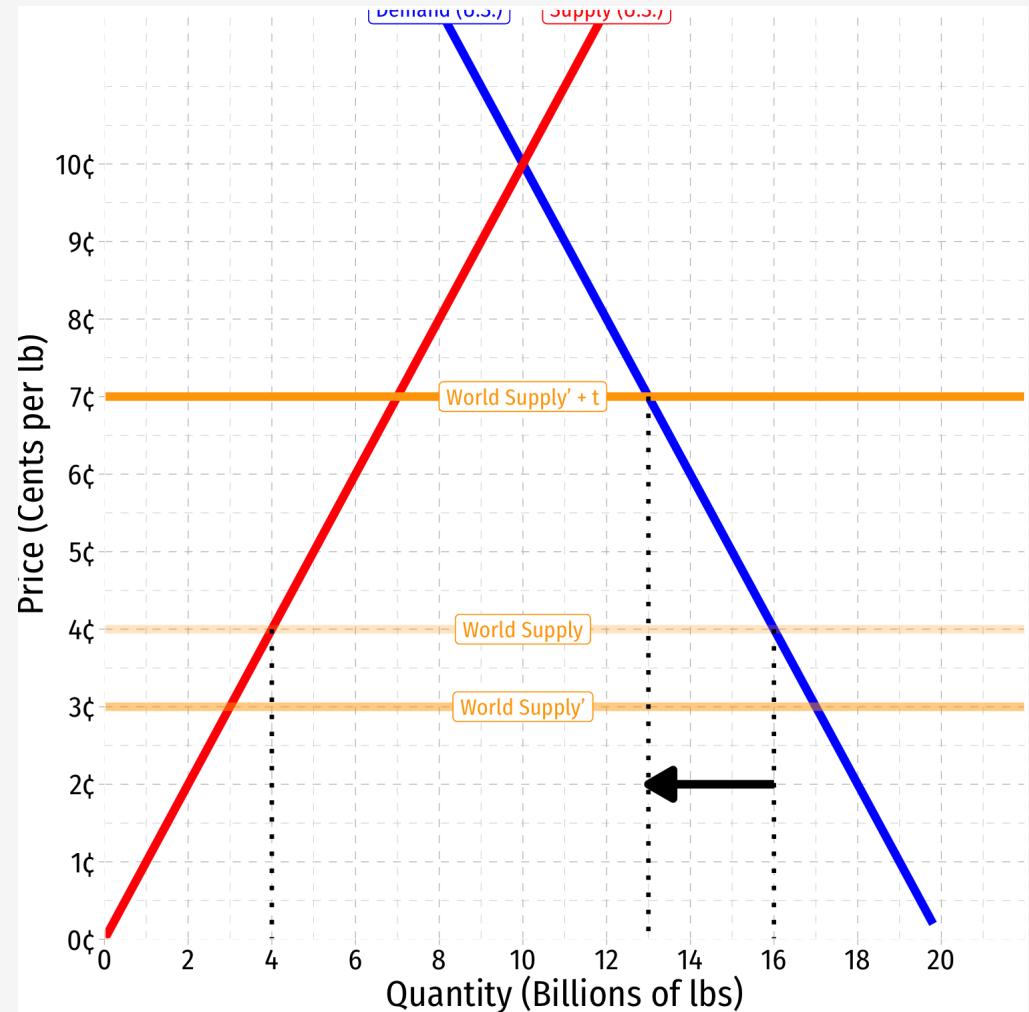- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar

- Due to the terms of trade effect, world price of sugar will fall from less U.S. demand (to 3¢/lb)

- The 4¢/lb is levied on this *new, lower* world price of sugar, raising price of sugar in U.S. to 7¢/lb

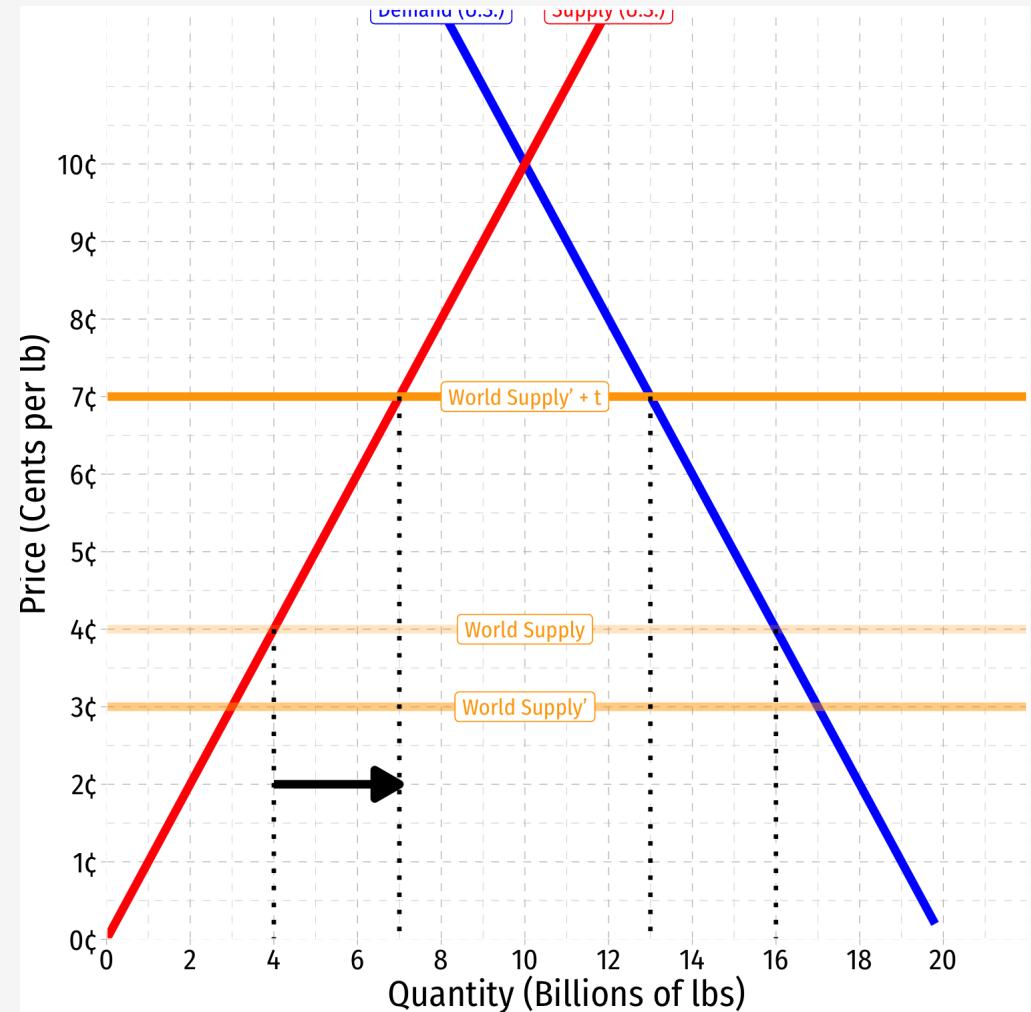# Import Tariff Effects in a Large Country

- At new domestic price of 7¢/lb:
  - U.S. consumers want to consume 13 bn lbs (less than before)

Import Tariff Effects in a Large Country

- At new domestic price of 7¢/lb:
    - U.S. consumers want to consume 13 bn lbs (less than before)
    - U.S. producers will produce 7 bn lbs (more than before)
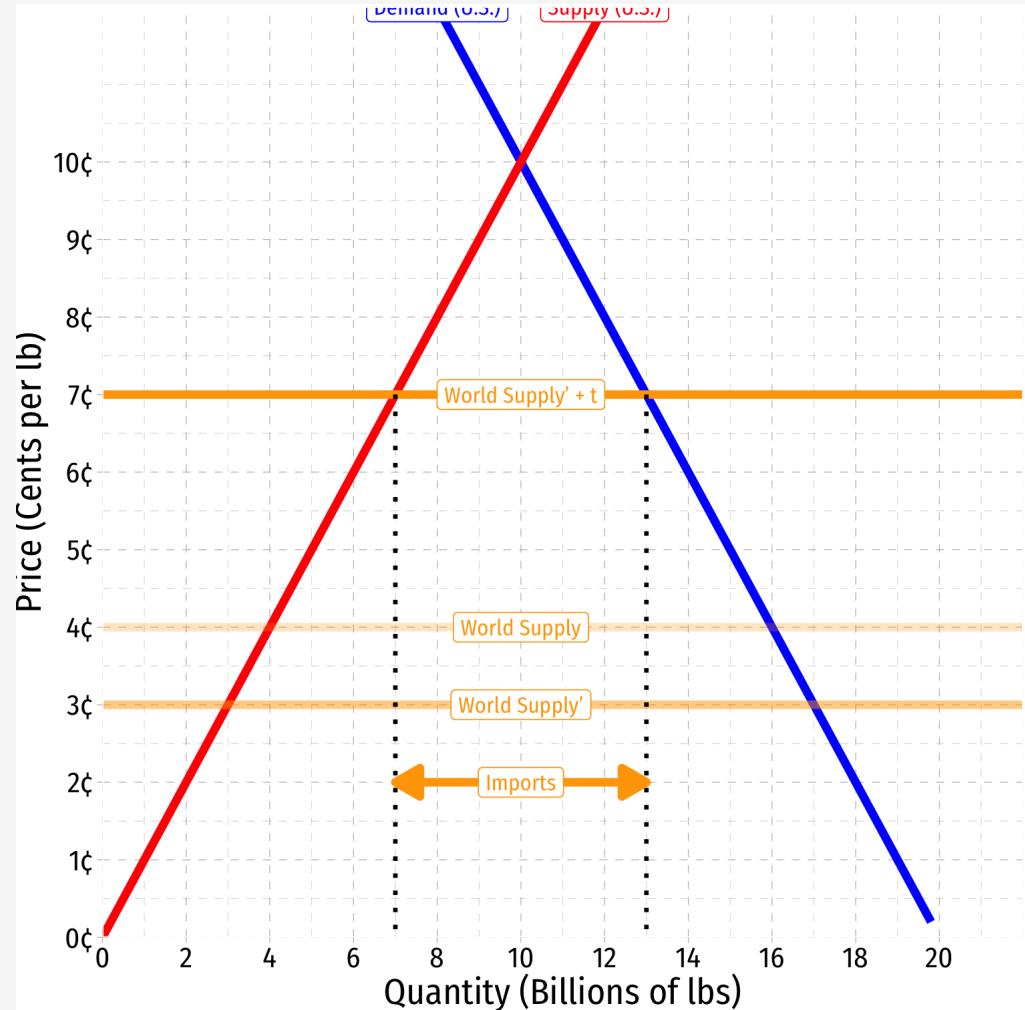
Import Tariff Effects in a Large Country
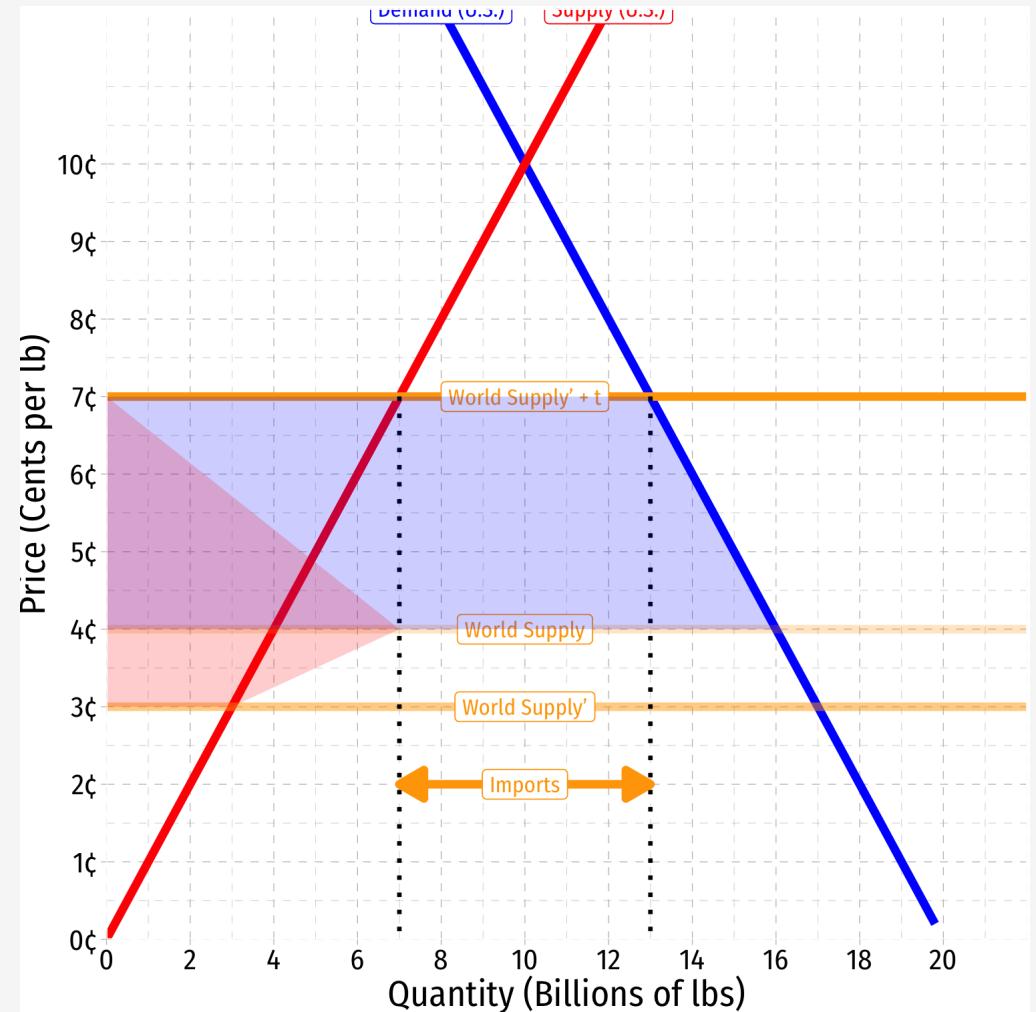
- At new domestic price of 7¢/lb:

  - U.S. consumers want to consume 13 bn lbs (less than before)
  - U.S. producers will produce 7 bn lbs (more than before)
  - U.S. will import 6 bn lbs from rest of the world (less than before)

- Note the changes are not as much as it was to the small country

  - U.S. "market power" forces down world price

Import Tariff Effects in a Large Country
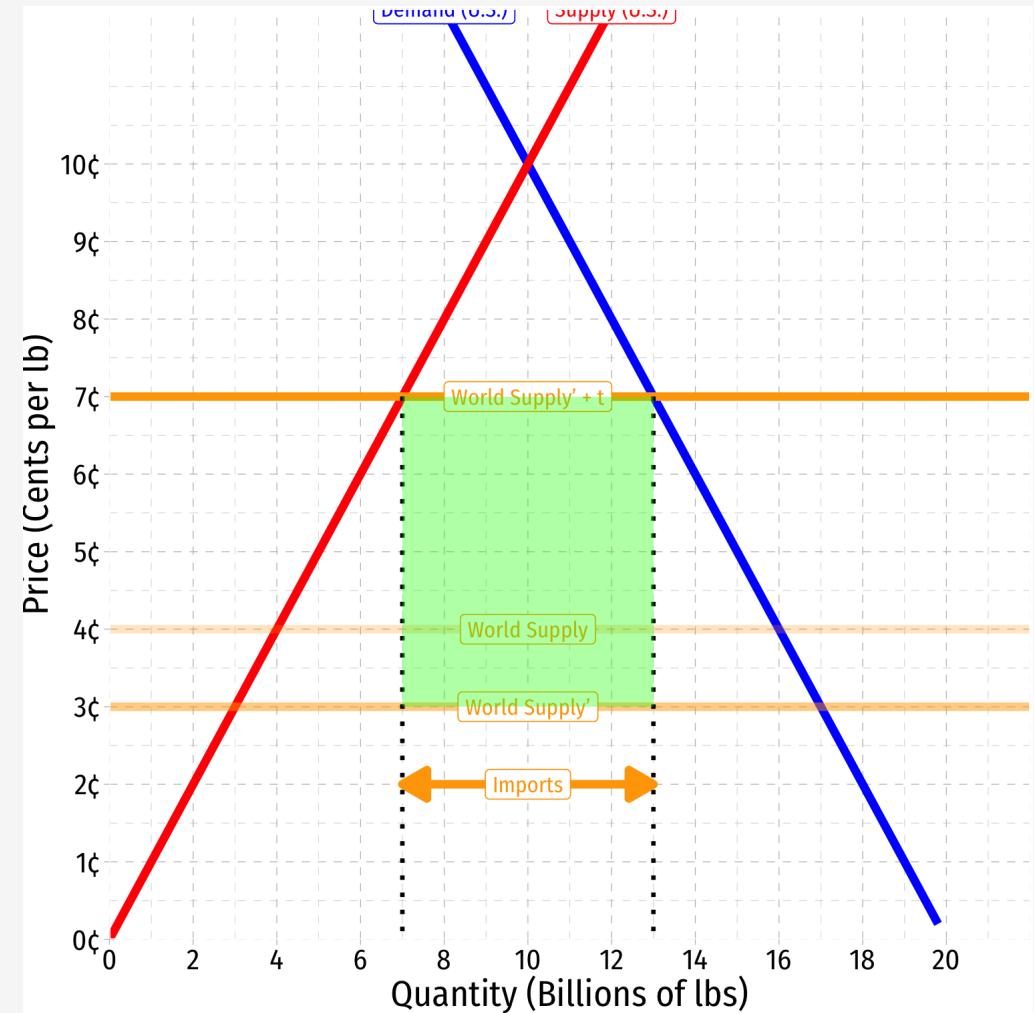
- Loss to U.S. consumer surplus (but less than for small country)

- Gain to U.S. producer surplus (but less than for small country)

  - Transfer of CS to PS

Import Tariff Effects in a Large Country
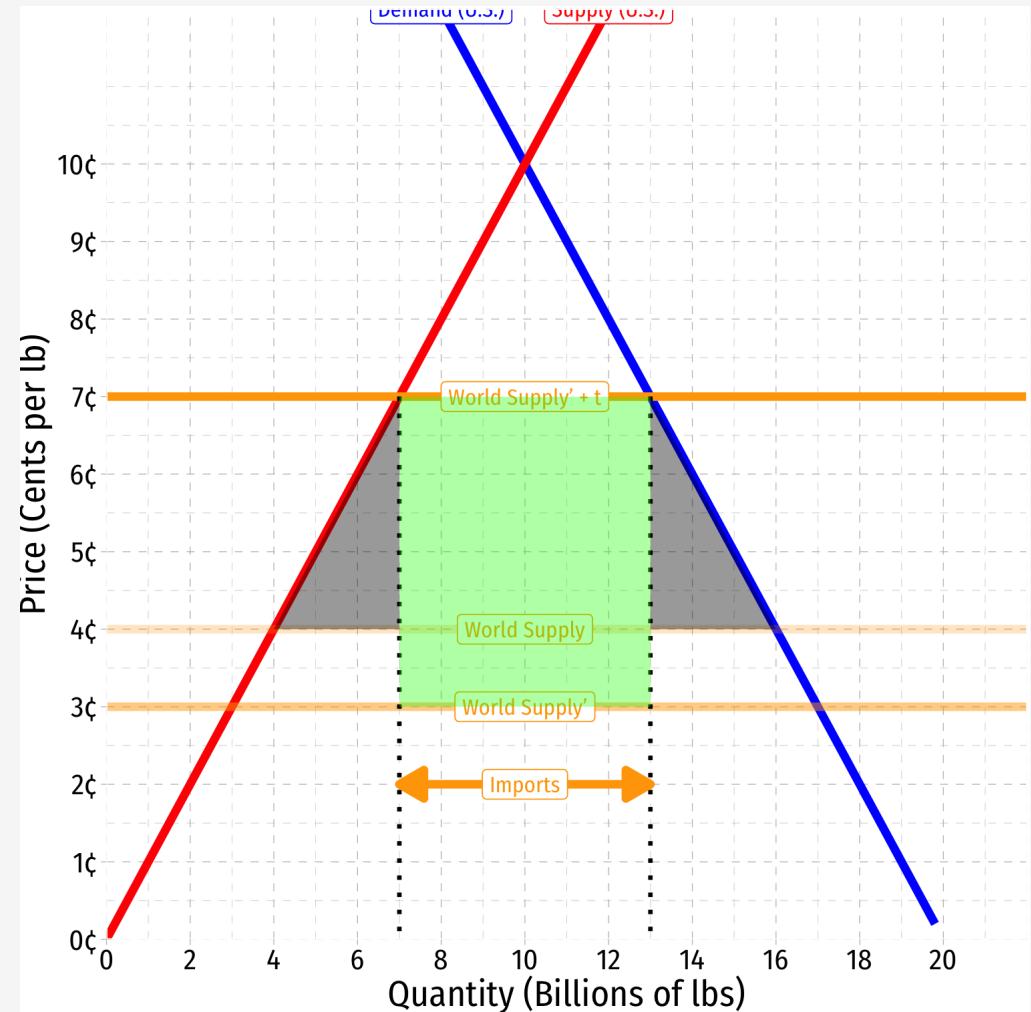
- Tariff will collect revenue for government
  - 4¢/lb ✕ 6 bn lbs = $0.240 bn

Import Tariff Effects in a Large Country
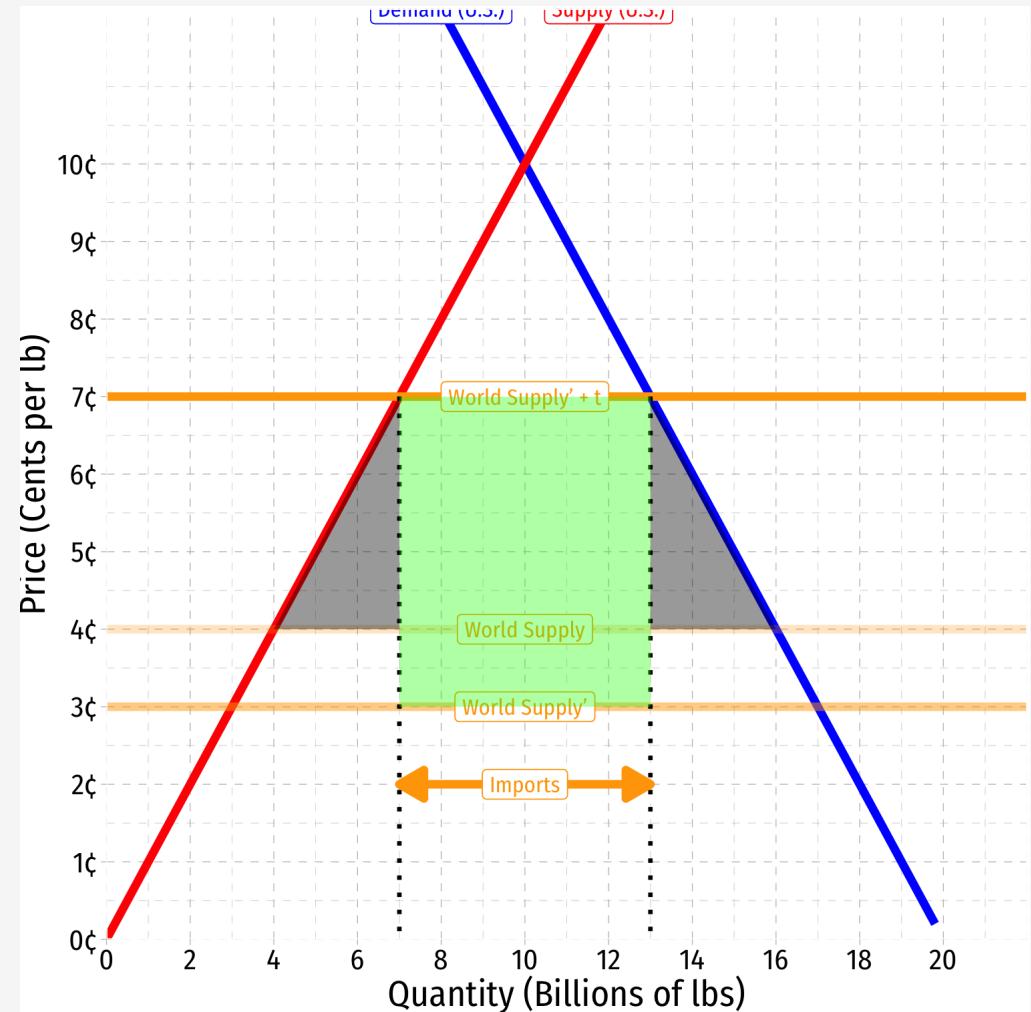
- Tariff will collect revenue for government

  - 4¢/lb $\times$ 6 bn lbs = $0.240 bn

- DWLs from productive and consumption inefficiencies
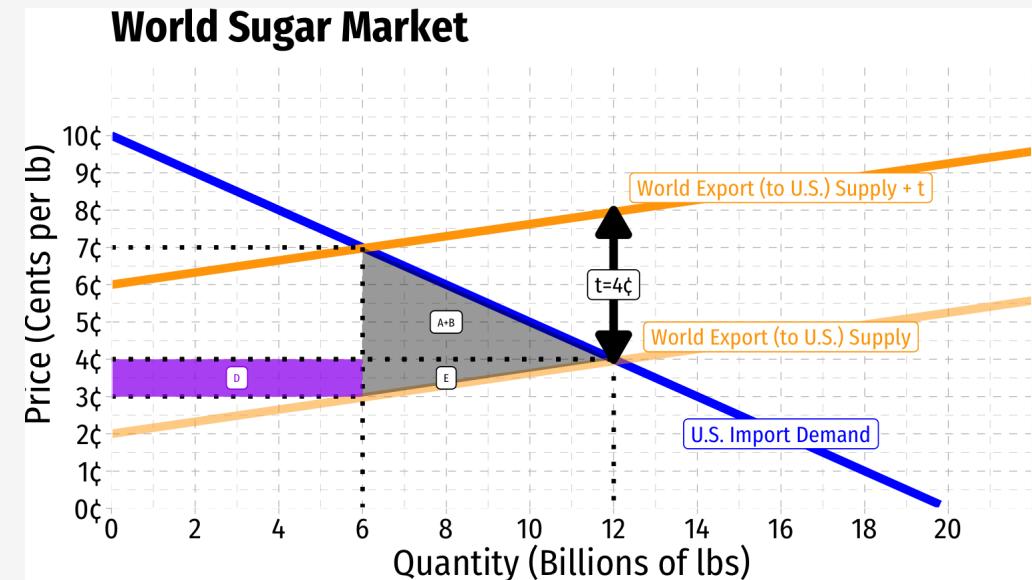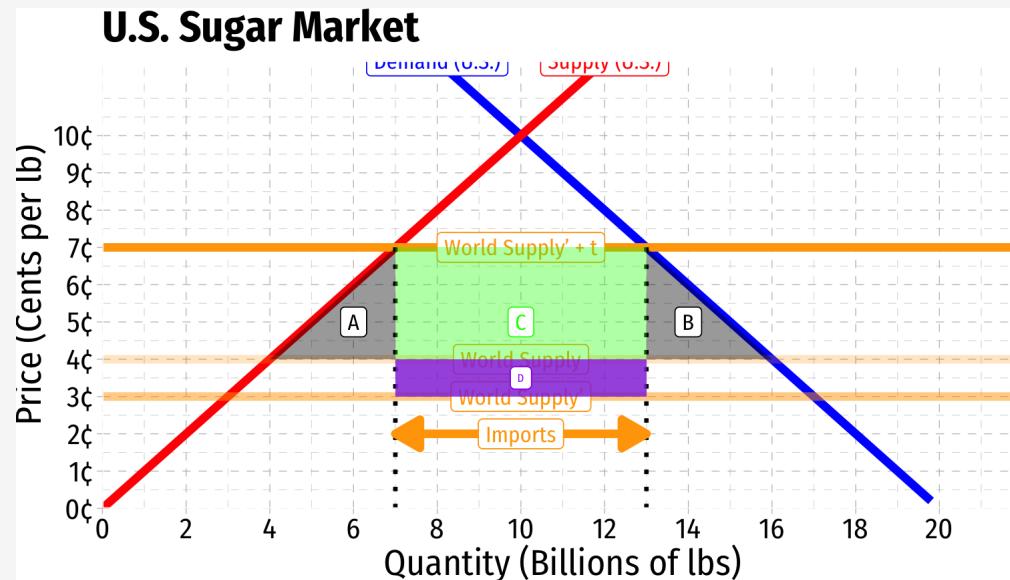
  - 2 $\times$ $-0.045 bn = **-$0.090 bn**

Import Tariff Effects in a Large Country

- Tariff will collect revenue for government

  - 4¢/lb $\times$ 6 bn lbs = $0.240 bn

- DWLs from productive and consumption inefficiencies

  - 2 $\times$ $-0.045 bn = **-$0.090 bn**

- But: **gain in tariff revenue exceeds inefficiency (DWL)!**

  - **Tariff brings a net increase in U.S. national welfare!**
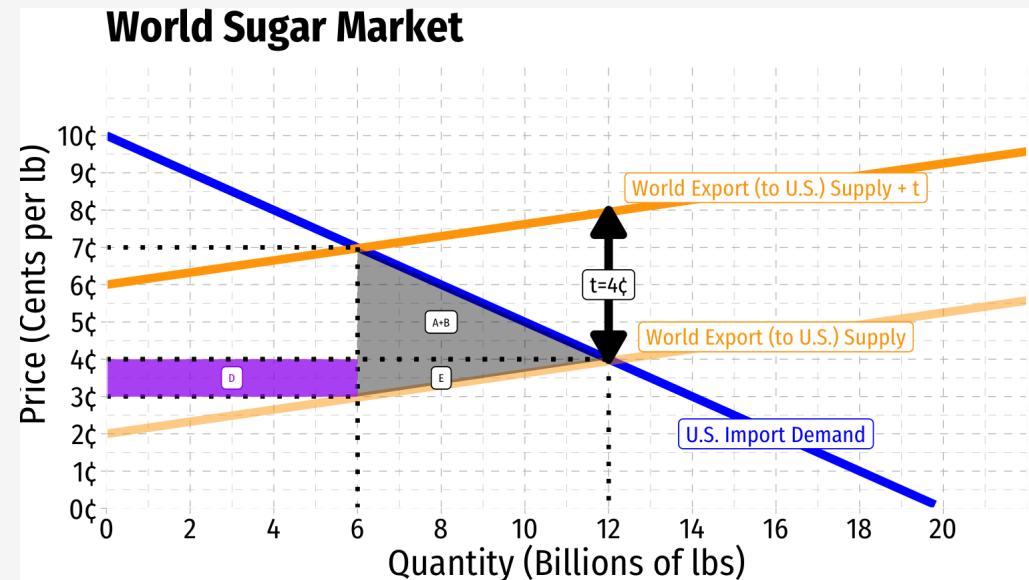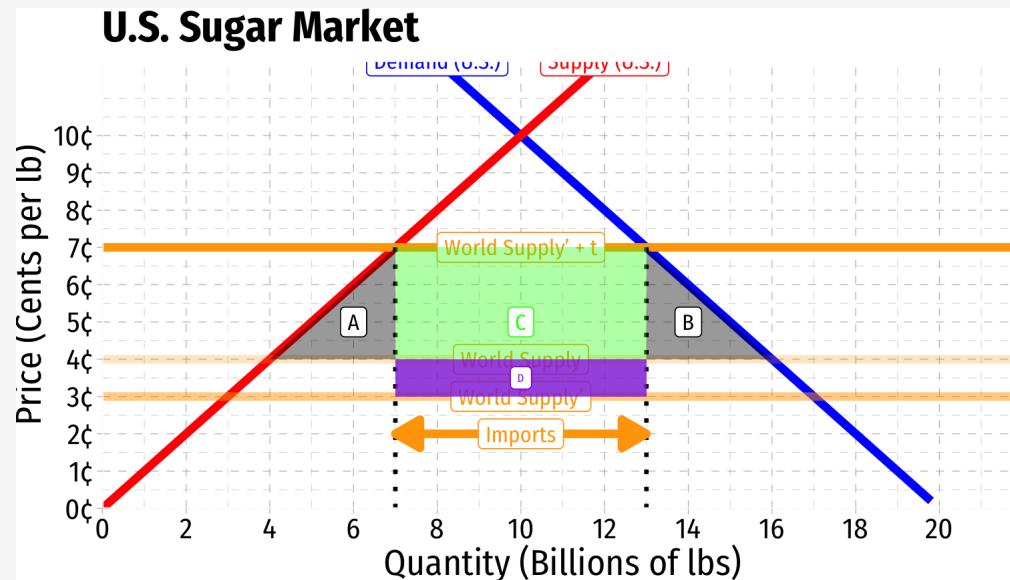
Import Tariff Effects in a Large Country

- Area **D** is the **Terms of trade** gain for U.S. (loss to world) due to tariff

- U.S. deadweight loss (A+B) < U.S. tariff revenue (C+D)

- Foreign loses deadweight loss (F) from lost export opportunities

Import Tariff Effects in a Large Country

U.S. Sugar Market

World Sugar Market

- Welfare changes:

  - To US: (C+D)–(A+B), net gain!
  - To Rest of World: -(D+E), net loss
  - Whole World: C-(A+B+E), net loss

- A "beggar thy neighbor" approach to increasing national welfare

Big vs. Small Comparisons

- Both countries start out with same world price, imports, domestic demand and supply

- With free trade:

Country	p^*	q^*	Domestic q	Imports	CS	PS	Tax Revenue	DWL
Small (Belgium)	$0.04	16 bn	4 bn	12 bn	$1.280 bn	$0.080 bn	$0	$0
Large (U.S.)	$0.04	16 bn	4 bn	12 bn	$1.280 bn	$0.080 bn	$0	$0

- With same 4¢ tariff on imports:

Country	p^*	q^*	Domestic q	Imports	Δ CS	Δ PS	Tax Revenue	DWL
Small (Belgium)	$0.08	12 bn	8 bn	4 bn	-$0.560 bn	$0.240 bn	$0.160 bn	-$0.160 bn
Large (U.S.)	$0.07	13 bn	7 bn	6 bn	-$0.435 bn	$0.035 bn	$0.240 bn	-$0.090 bn

Optimal Tariff Theory

Optimal Tariff Theory
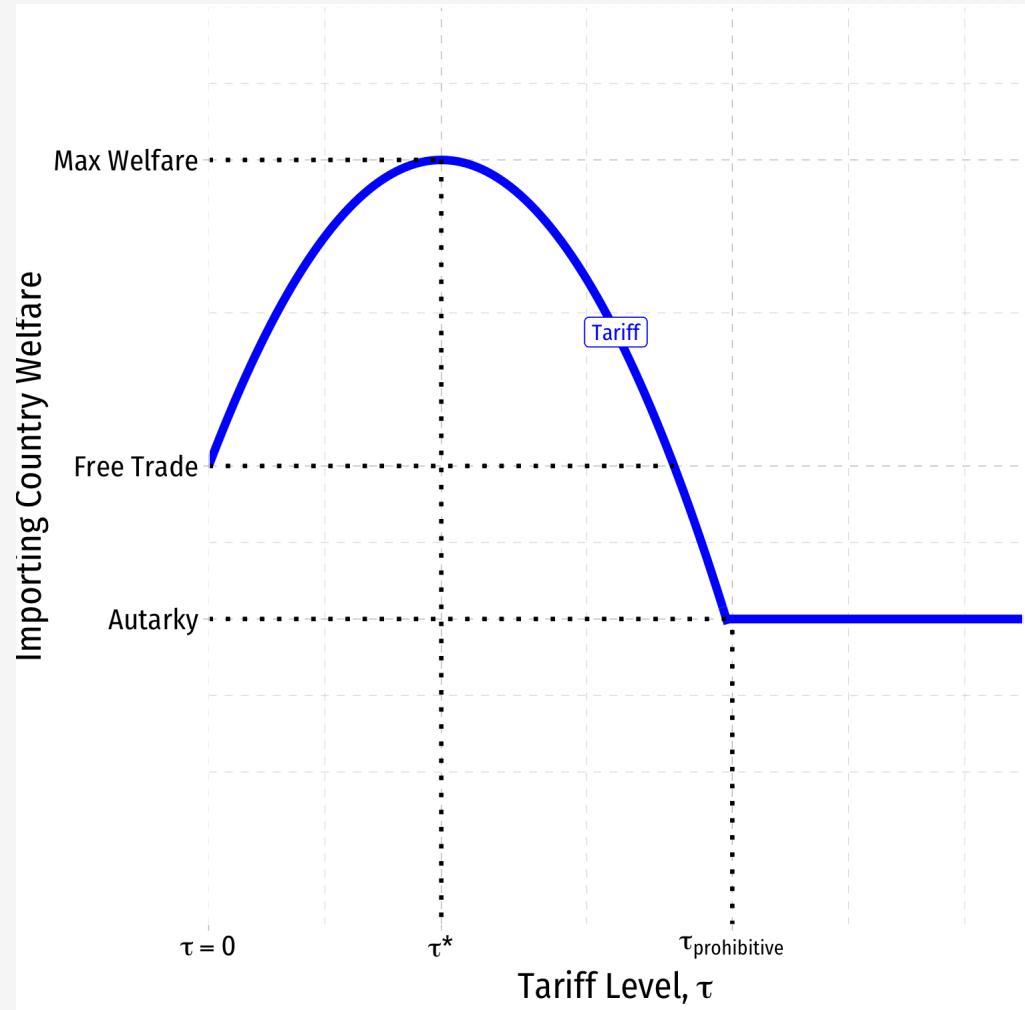
- For a large country, a tariff decreases volume of trade but improves country's terms of trade

  - Gain of tariff revenue (C+D)
  - Loss of deadweight loss (A+B)

- Net effect is a slight increase in (big) country's welfare

  - Note tariffs always are a net harm to a small nation!

- Thus, there exists some **optimal tariff** $\tau > 0$ that maximizes net gains from tradeoff between terms of trade improvements against decline in trade

Optimal Tariff Theory (in a Large Country)

- $\tau = 0$: free trade

- For low levels of τ, terms of trade gain exceed deadweight loss

  - (C+D) > (A+B)

- For high levels of τ, deadweight loss exceeds terms of trade gain

  - (C+D) < (A+B)

- Extremely high levels of τ will close off trade completely

- Some optimal $\tau^{\star}$ that maximizes welfare gain to importer

Optimal Tariff Theory vs. the Real World

- Economic theory shows the **theoretical possibility** of how tariffs might increase national welfare

- Regardless, tariffs harm welfare of trading partners (exporting countries)

- Politically and practically, trading partners might **retaliate** against tariffs with their own tariffs

  - Might degenerate into a **trade war** where potential gains from trade are lost

The Effective Rate of Protection

The Effective Rate of Protection

- **How much do tariffs protect domestic industry?**

- Seems logical to just count the percent an *ad valorem* tariff raises price over free trade price

    - This is the **nominal rate of protection**: the % increase in price
    - e.g. a 50% *ad valorem* tariff raises price 50%
    - for specific tariffs, divide

$$\frac{\text{price with tariff}}{\text{price without tariff}}$$

The Effective Rate of Protection

- Two problems with nominal rate of protection:

1. If the country is "large", part of the tariff's effect will be to *lower foreign export prices* rather than just raise domestic prices

2. Tariffs may have different effects on different *stages* of production for a good

The Effective Rate of Protection

- Better to think about the **effective rate of protection** as the percent change in **domestic value added**

- **Example**: Suppose **cars** sell on world market for $8,000, and **car parts** sell for $6,000. If a country buys car parts and assembles them into cars, the **domestic value added** is:

$$\$8,000 - \$6,000 = \$2,000$$

The Effective Rate of Protection: Example

- Suppose Home wants to develop a domestic **auto assembly** industry

  - Domestic value added from imports is:

    $$\$8,000 - \$6,000 = \$2,000$$

- Home places a **25% tariff** on **imported cars**, raising the price of cars in Home to $10,000

  - Domestic value added from imports is:

    $$\$10,000 - \$6,000 = \$4,000$$

- **Domestic value added** changes by:

  $$\frac{\$4,000 - \$2,000}{\$2,000} \times 100 = 100\%$$

The Effective Rate of Protection: Example

- Suppose Home instead wants to develop a domestic **car parts** industry

  - Domestic value added from imports is:

  $$\$8,000 - \$6,000 = \$2,000$$

- Home places a **25% tariff** on **imported car *parts***, raising the price of car parts in Home to $7,500

  - Domestic value added for **car parts manufacturers** is:

  $$\$\$7,500$$

- Changes by:

  $$\frac{\$7,500 - \$6,000}{\$6,000} \times 100$$

The Effective Rate of Protection: Example

- Suppose Home instead wants to develop a domestic **car parts** industry

    - Domestic value added from imports is:

$$\$8,000 - \$6,000 = \$2,000$$

- What about for **assemblers** of cars?

    - Domestic value added for **car assemblers** is:

$$\$8,000 - \$7,500 = \$500$$

- Changes by:

$$\frac{\$500 - \$2,000}{\$2,000} \times 100$$

The Effective Rate of Protection: Example

- We can see that the **structure of tariffs** often impact different stages of the production process differently

- Here, a tariff on car parts gave 25% more protection to domestic car parts producers, at the expense of a 75% loss to domestic car assemblers

The Effective Rate of Protection

- In general, we see that effective rate of protection ≠ nominal tariff rate

  - May be higher or lower, or even negative

- Tariffs on foreign inputs generate *negative* effective rates of protection, and tariffs on final products generate *positive* eeffective rates of protection for a country's domestic industry