

2.1 – Tariffs

ECON 324 • International Trade • Fall 2020

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 [ryansafner/tradeF20](https://github.com/ryansafner/tradeF20)

 tradeF20.classes.ryansafner.com



Outline



Tariffs

Effects of an Import Tariff in a Small Country.

Effects of an Import Tariff in a Large Country.

Optimal Tariff Theory.

The Effective Rate of Protection



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

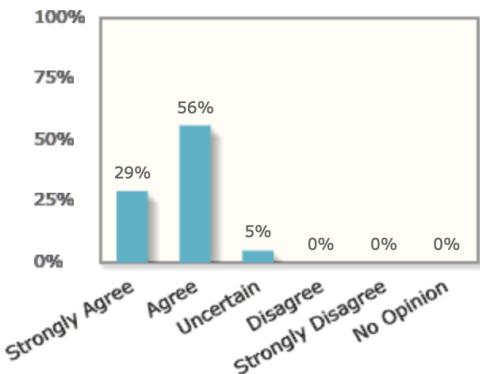


Tariffs, According to Professional Economists



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

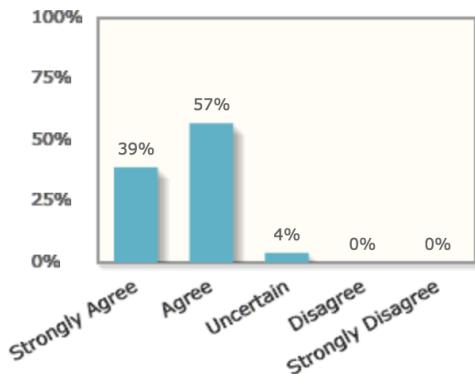
Responses



© 2017. Initiative on Global Markets.

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

Responses weighted by each expert's confidence



© 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



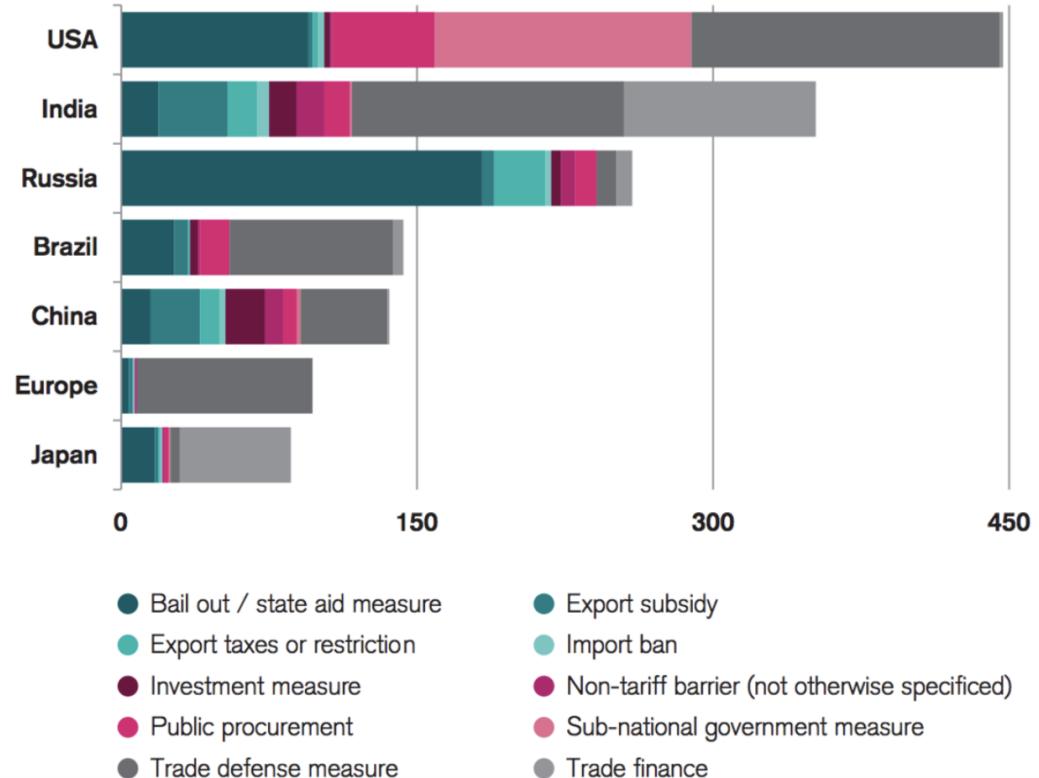
- Economists generally agree that free trade best enhances overall social welfare
- Yet free trade is rare in the world
- Two questions:
 1. Why is free trade rare? Or, why are trade restrictions common?
 2. What are the consequences of restricting trade?



International Trade Policies



The USA imposes the highest number of protectionist measures



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

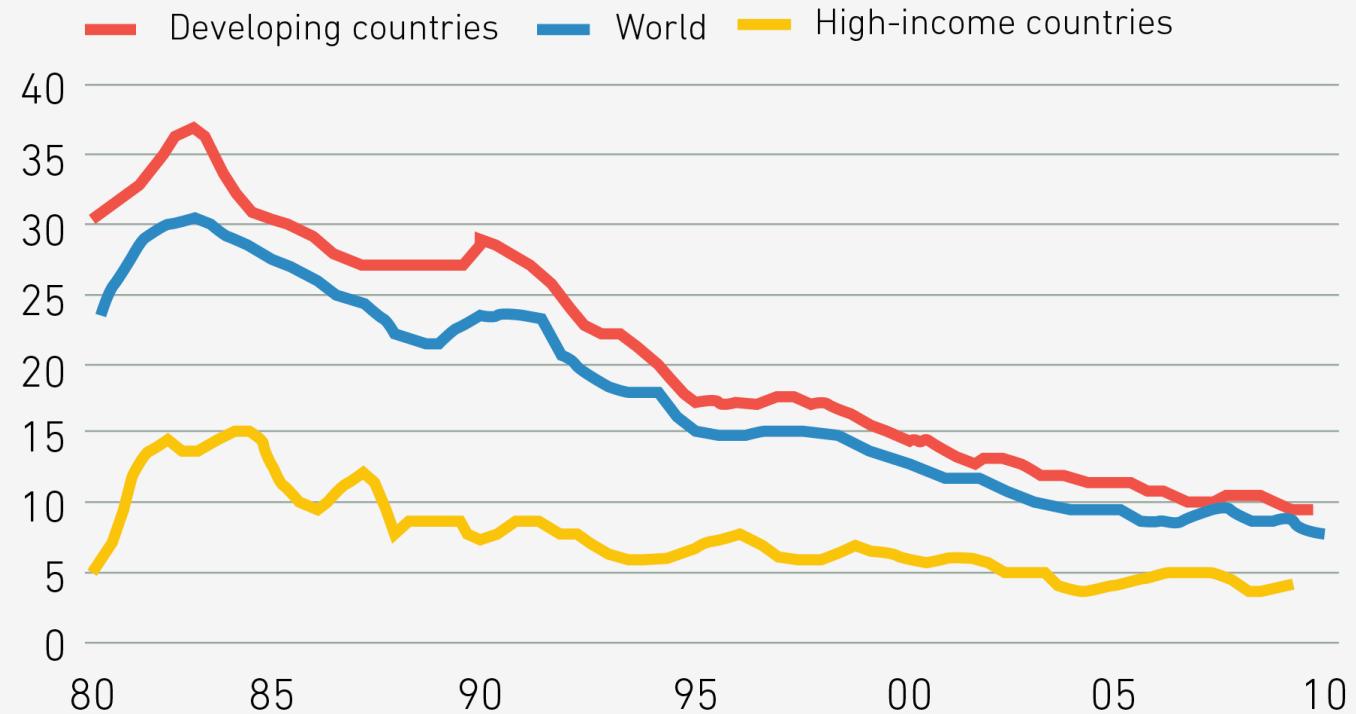
Heading/ Subheading	Stat. Suf- fix	Article Description	Unit of Quantity	Rates of Duty		
				General	1	2
5309		Woven fabrics of flax: Containing 85 percent or more by weight of flax:				
5309.11.00	10	Unbleached or bleached: Of a width exceeding 127 cm (810):	m ² kg	Free		40%
	90	Other (810):	m ² kg	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

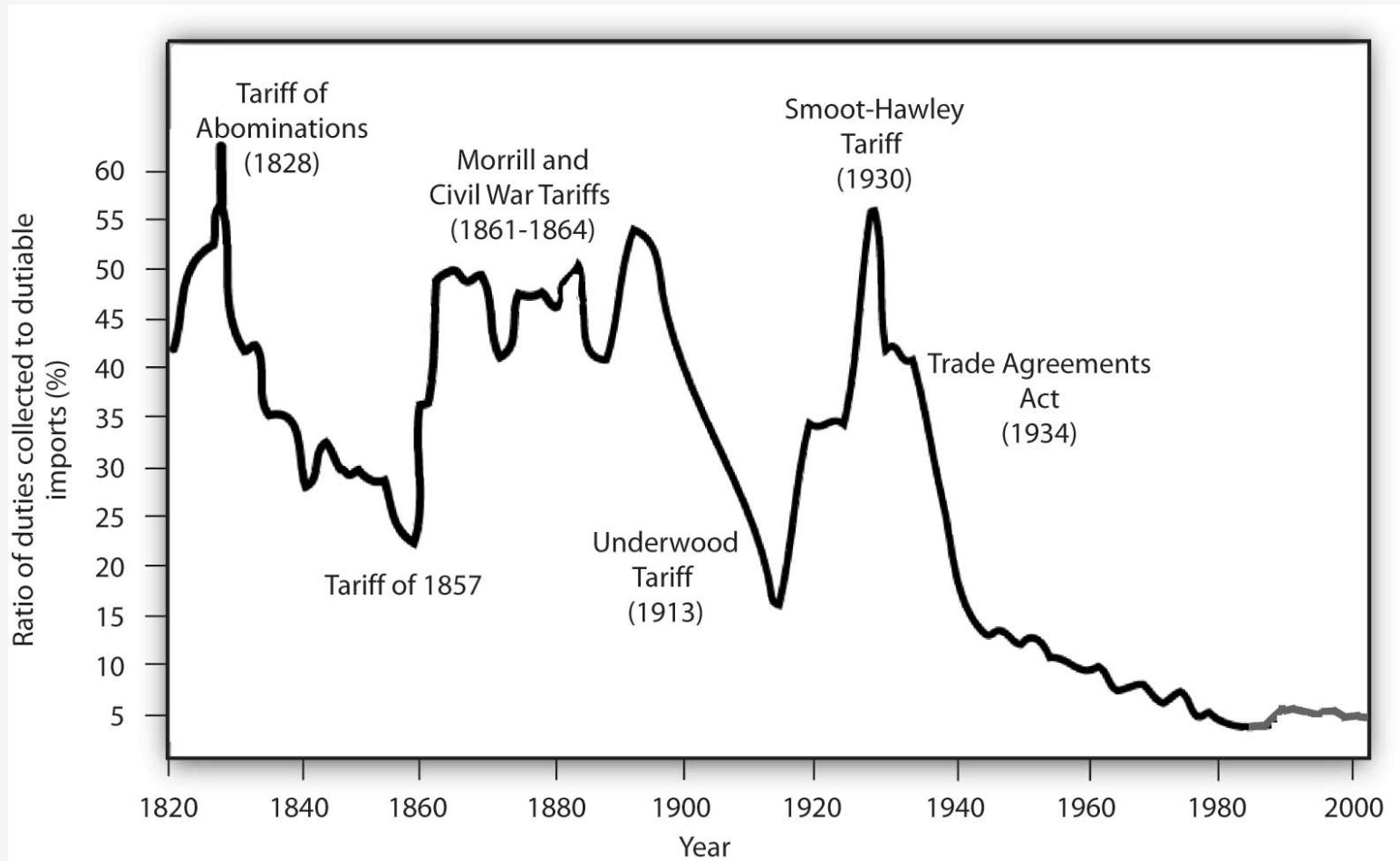


Trends in tariff rates (%)



Source: World Bank

Tariff History





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



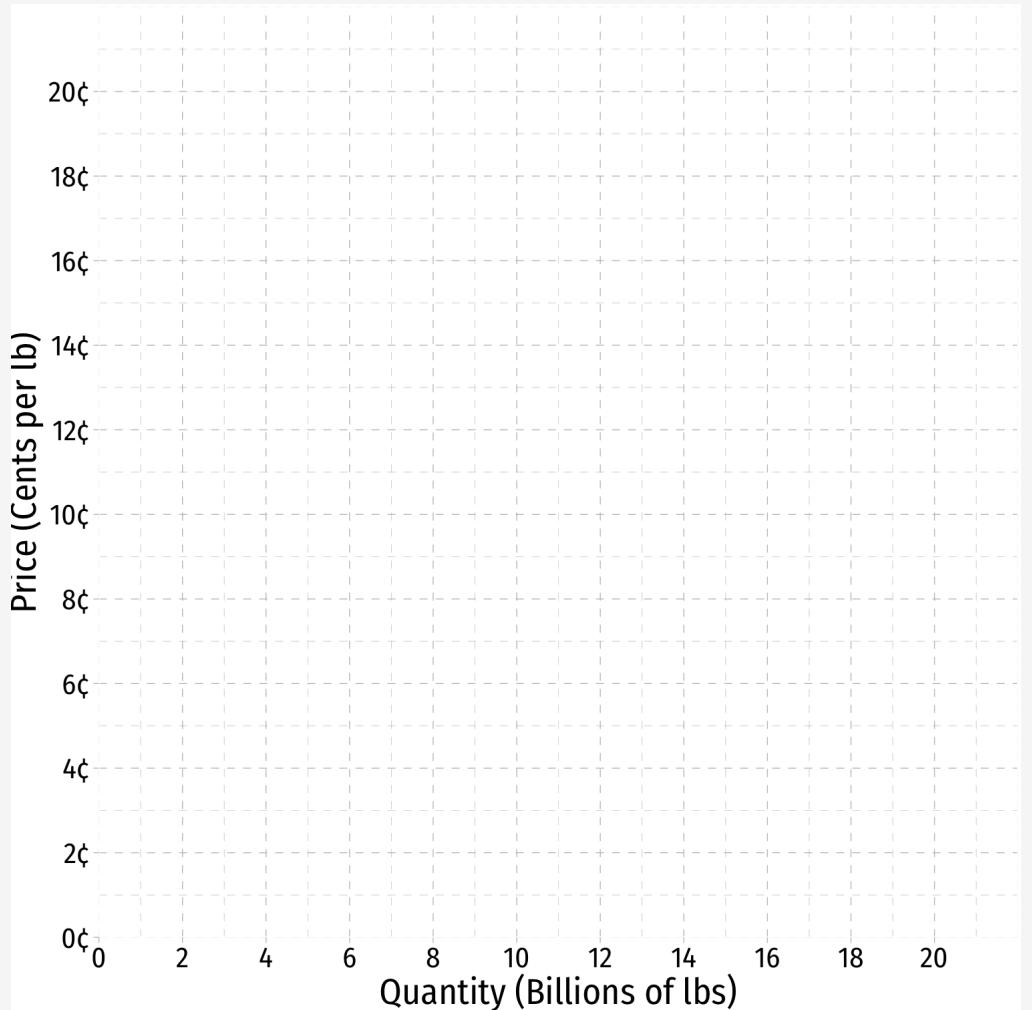
2. Effect of a tariff in a “large” nation

- “Large” \implies changes in the country’s domestic market *can* affect world prices

Import Tariff Effects in a Small Country



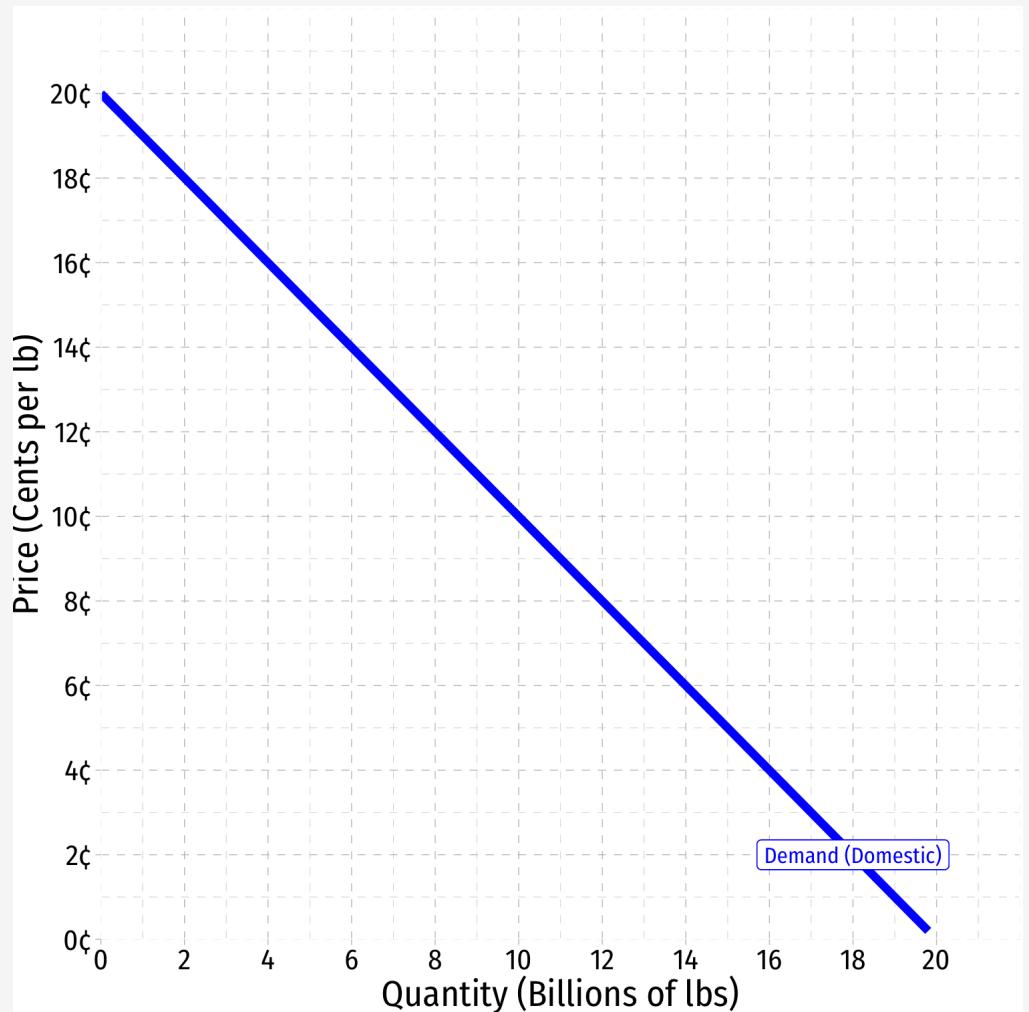
- Consider, for example, the sugar market in Belgium



Import Tariff Effects in a Small Country



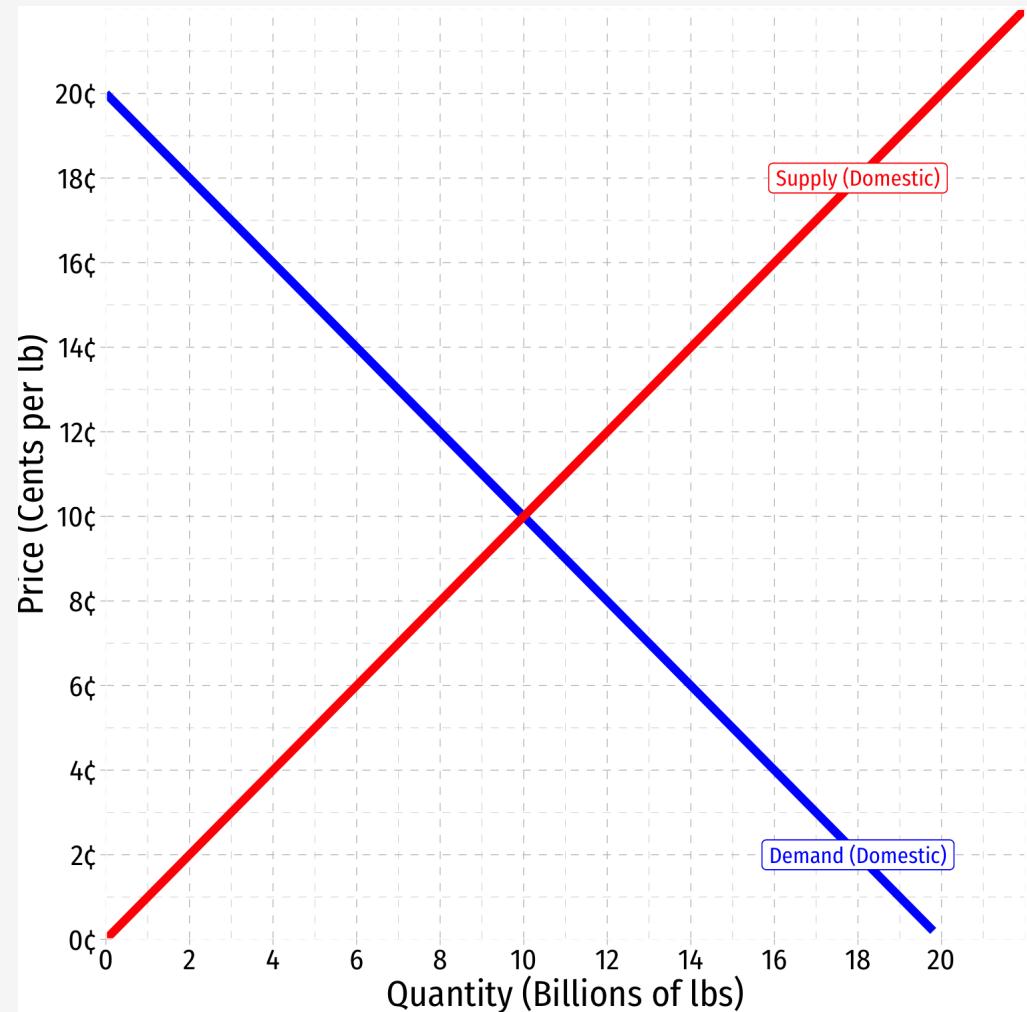
- Consider, for example, the sugar market in Belgium
- **Domestic Demand** for sugar in Belgium



Import Tariff Effects in a Small Country



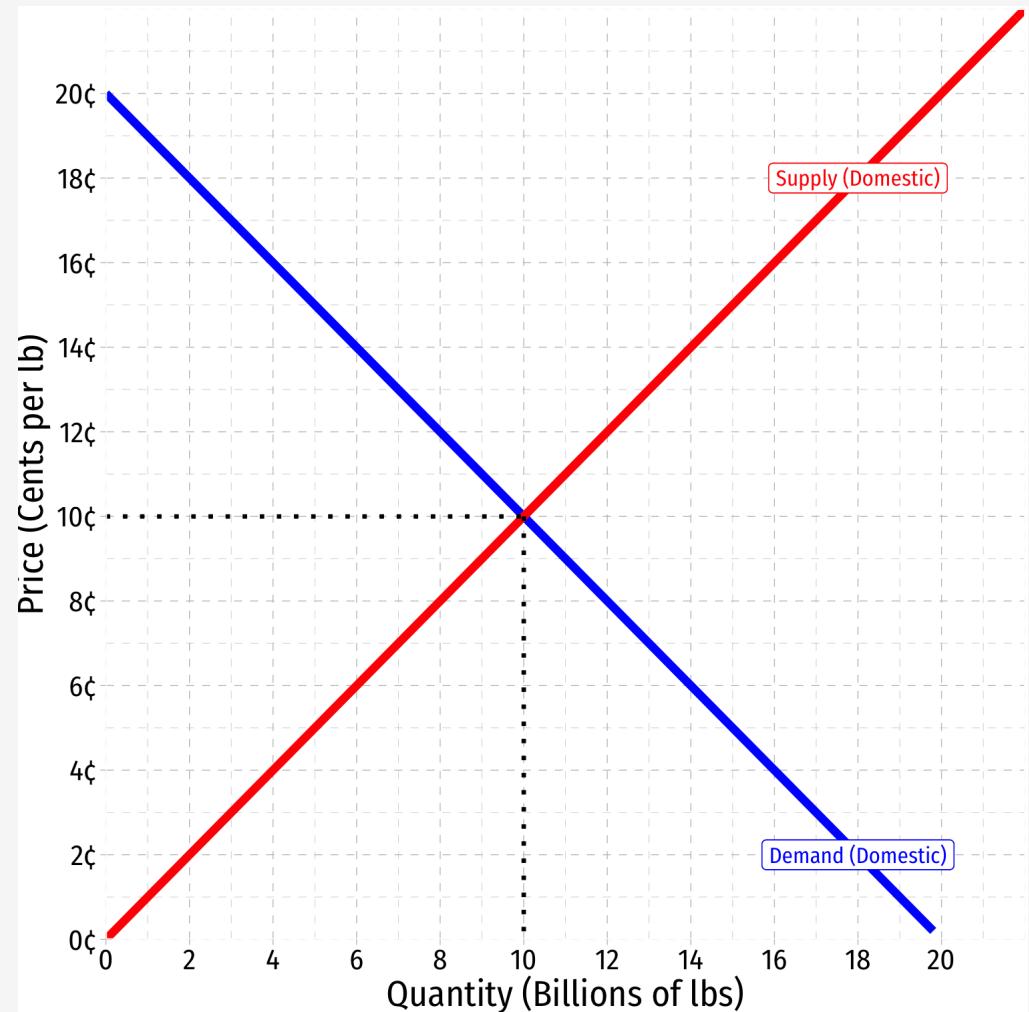
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- **Domestic Demand** for sugar in Belgium
- **Domestic Supply** of sugar in Belgium



Import Tariff Effects in a Small Country



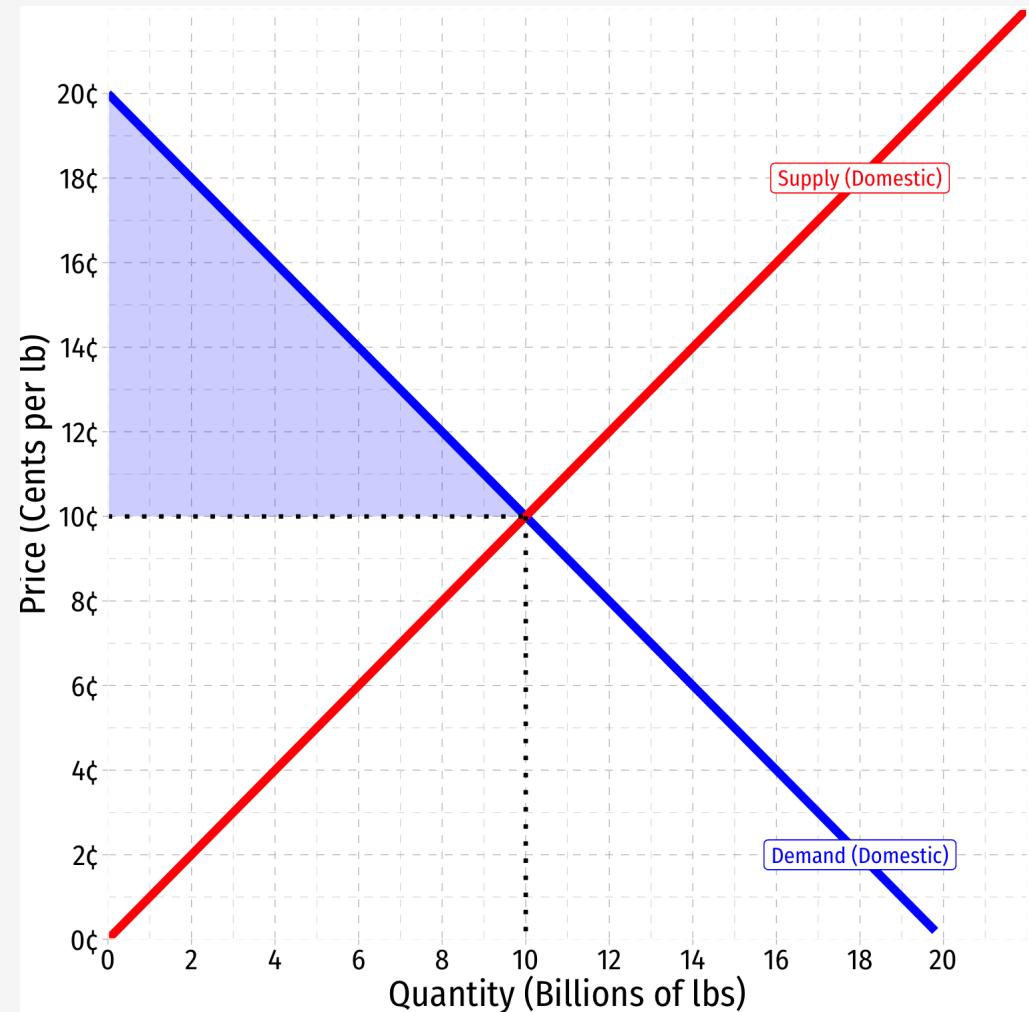
- Consider, for example, the sugar market in Belgium
- **Domestic Demand** for sugar in Belgium
- **Domestic Supply** of sugar in Belgium
- Autarky price: 10¢/lb, 10 billion lbs exchanged within Belgium



Import Tariff Effects in a Small Country



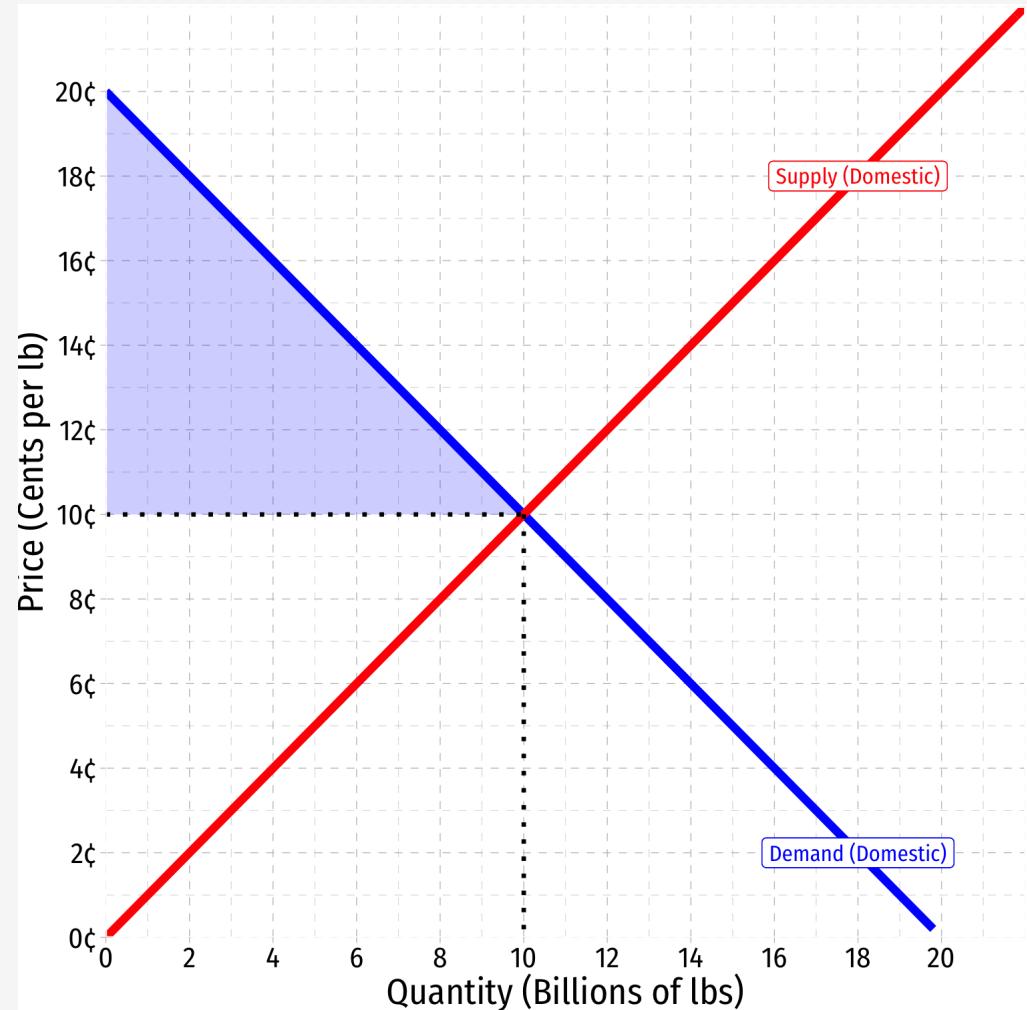
- Consider, for example, the sugar market in Belgium
- **Domestic Demand** for sugar in Belgium
 - Consumer surplus = WTP - p^*
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Import Tariff Effects in a Small Country



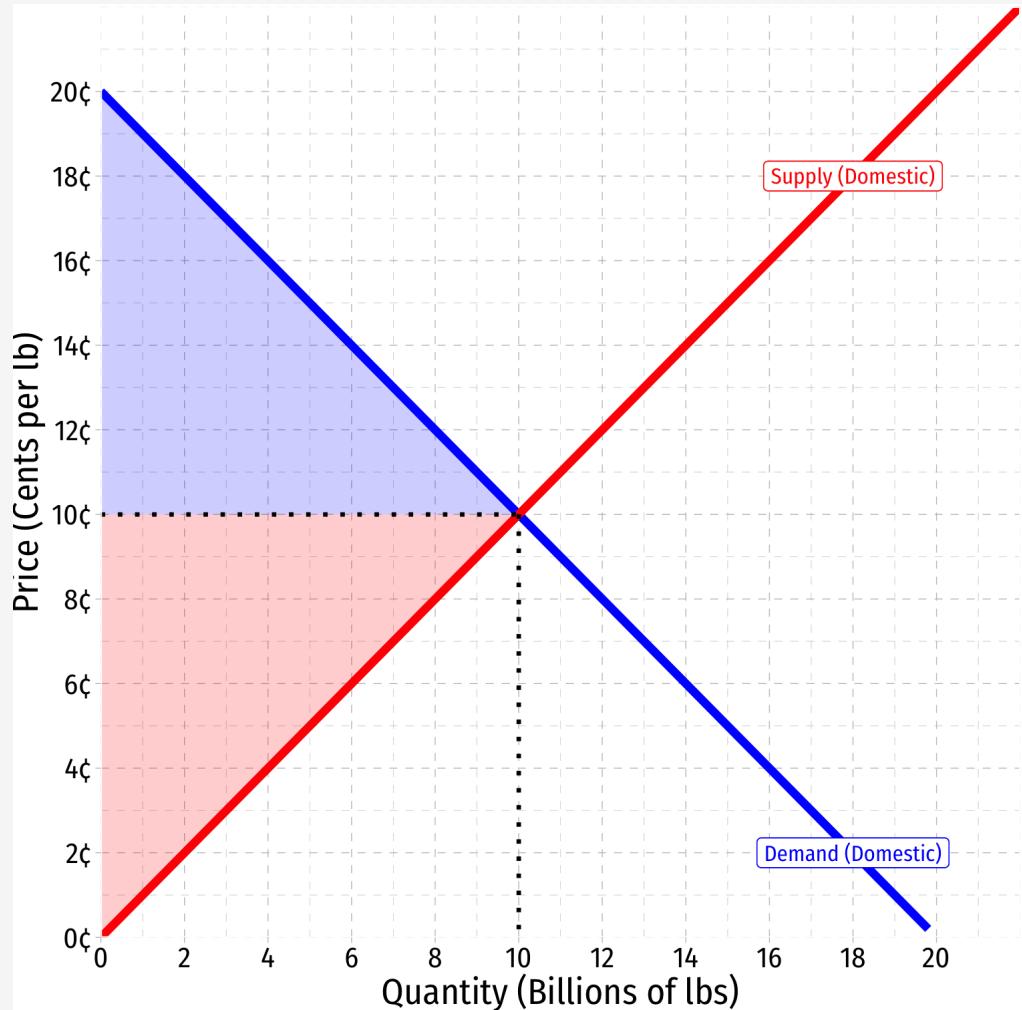
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- **Domestic Demand** for sugar in Belgium
 - Consumer surplus = WTP - p^*
 - $= 0.5(10-0)(\$0.20-\$0.10) = \$0.5 \text{ billion}$
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Import Tariff Effects in a Small Country



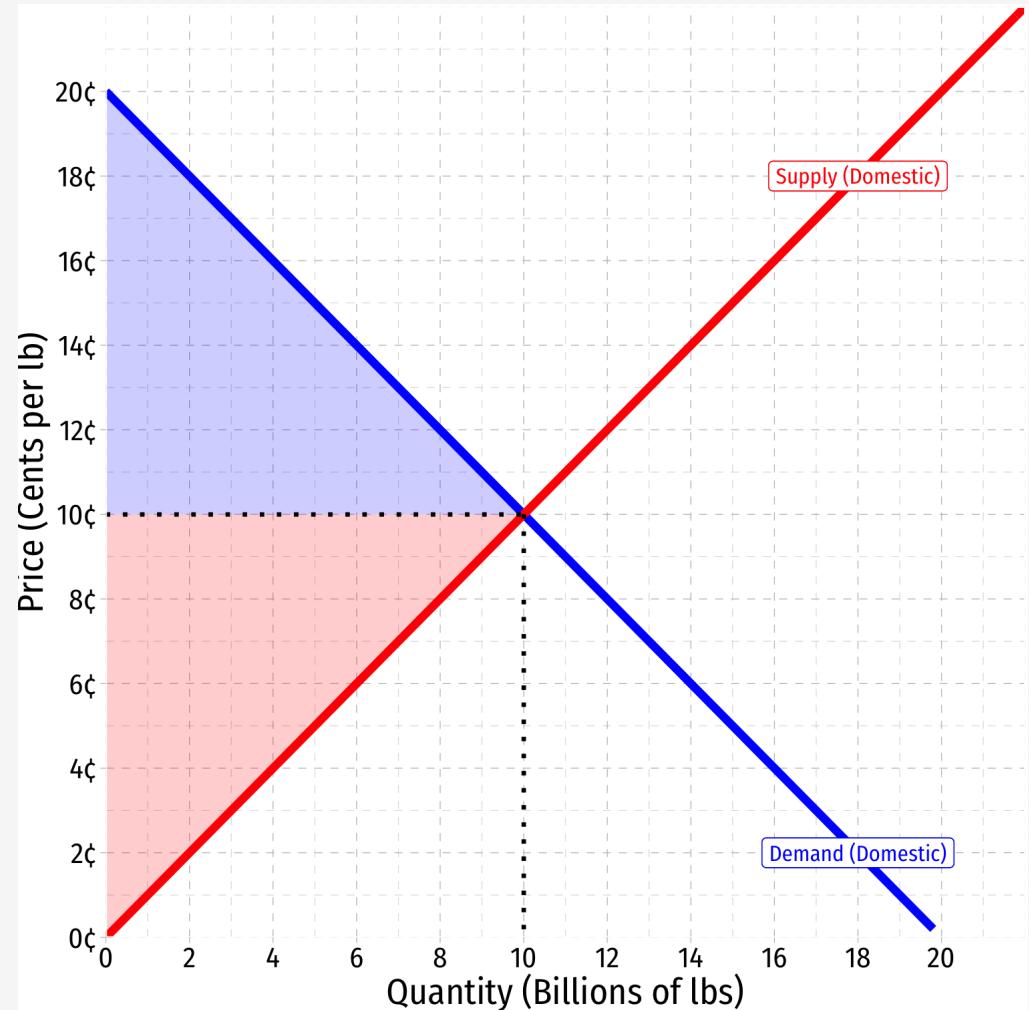
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Import Tariff Effects in a Small Country



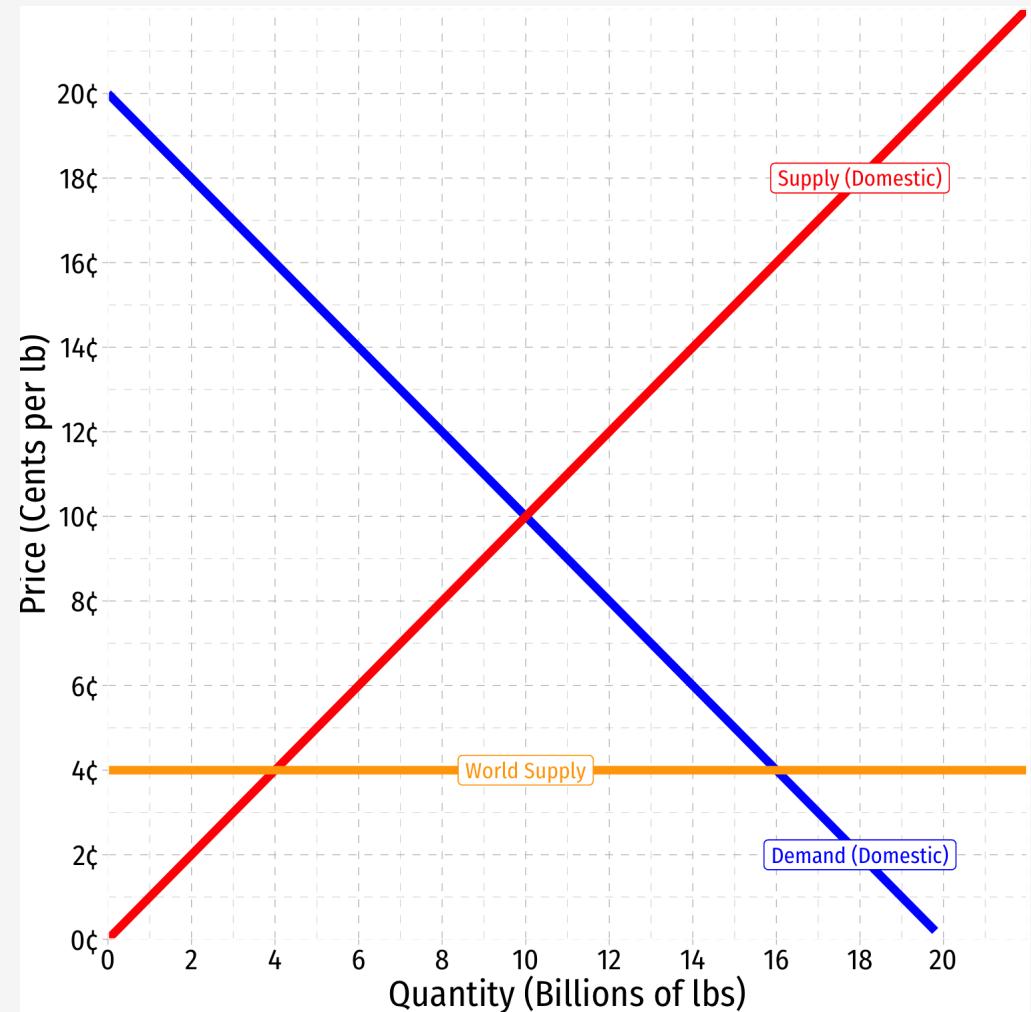
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Import Tariff Effects in a Small Country



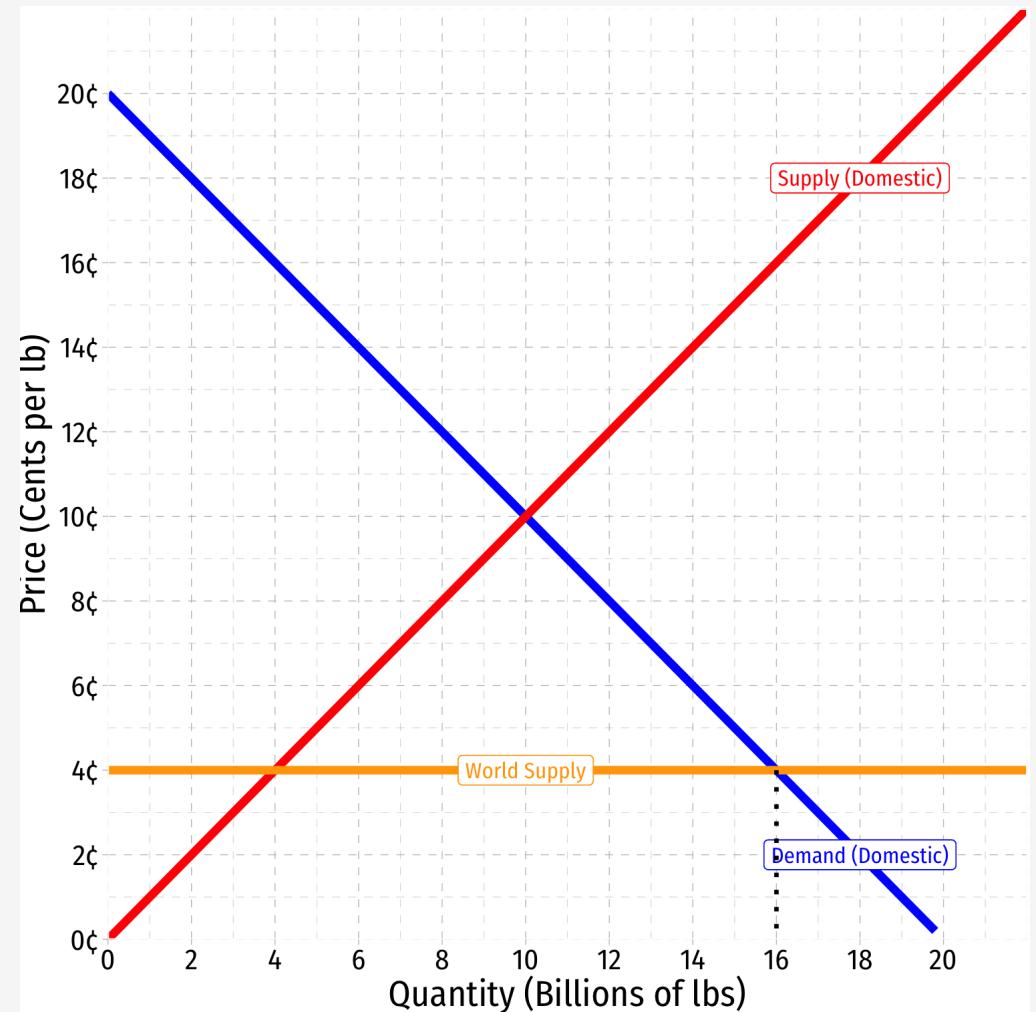
- Consider, for example, the sugar market in Belgium
- **Domestic Demand** for sugar in Belgium
- **Domestic Supply** of sugar in Belgium
- Suppose Belgium opens up to international trade
- **World Supply** of sugar at 4¢/lb



Import Tariff Effects in a Small Country



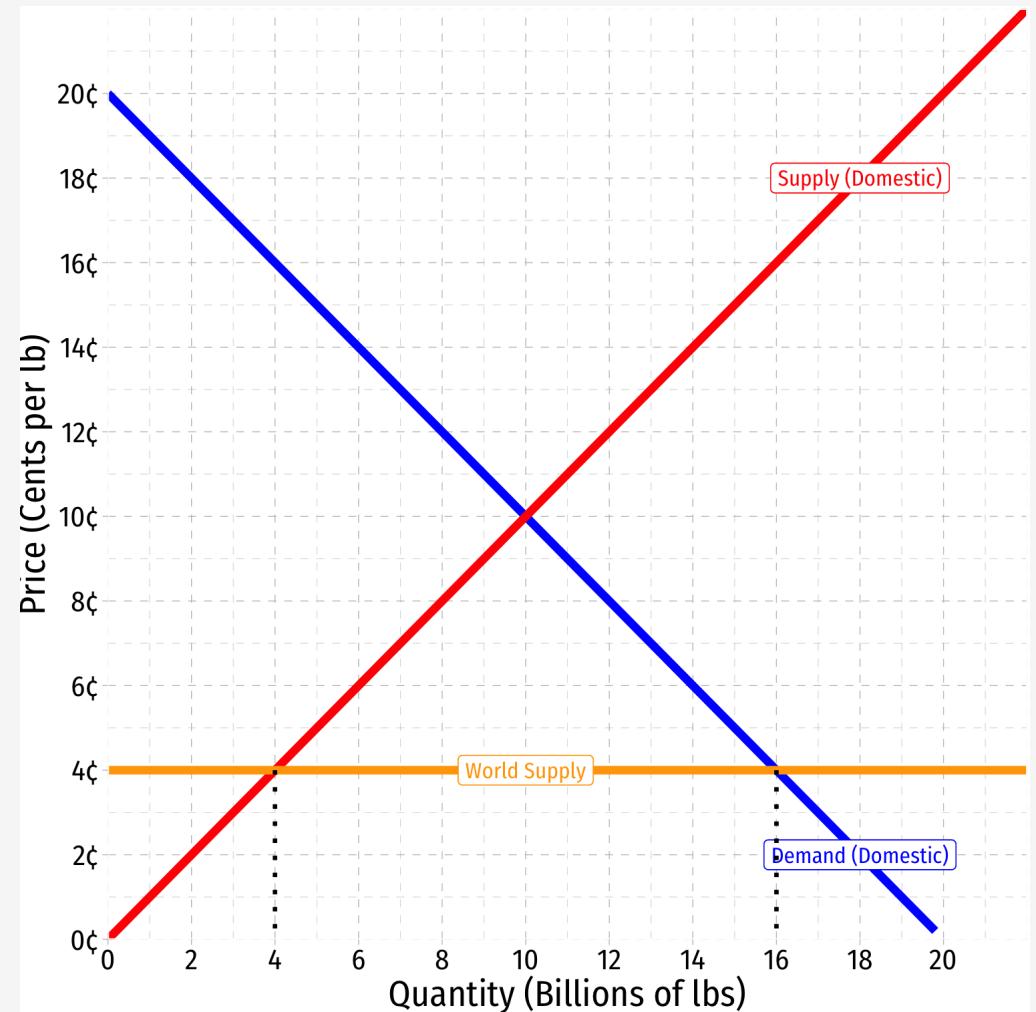
- At 4¢/lb:
 - Belgian consumers want to consume 16 bn lbs



Import Tariff Effects in a Small Country



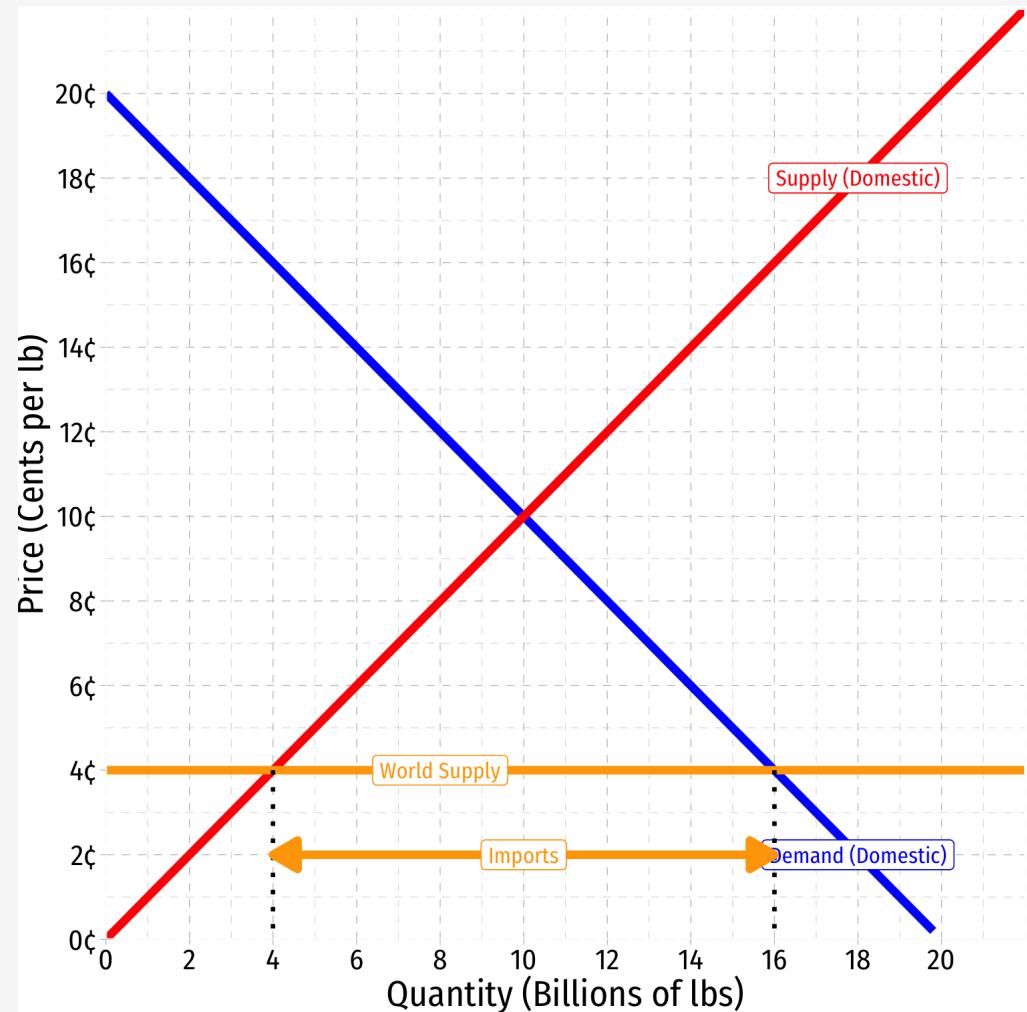
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Import Tariff Effects in a Small Country



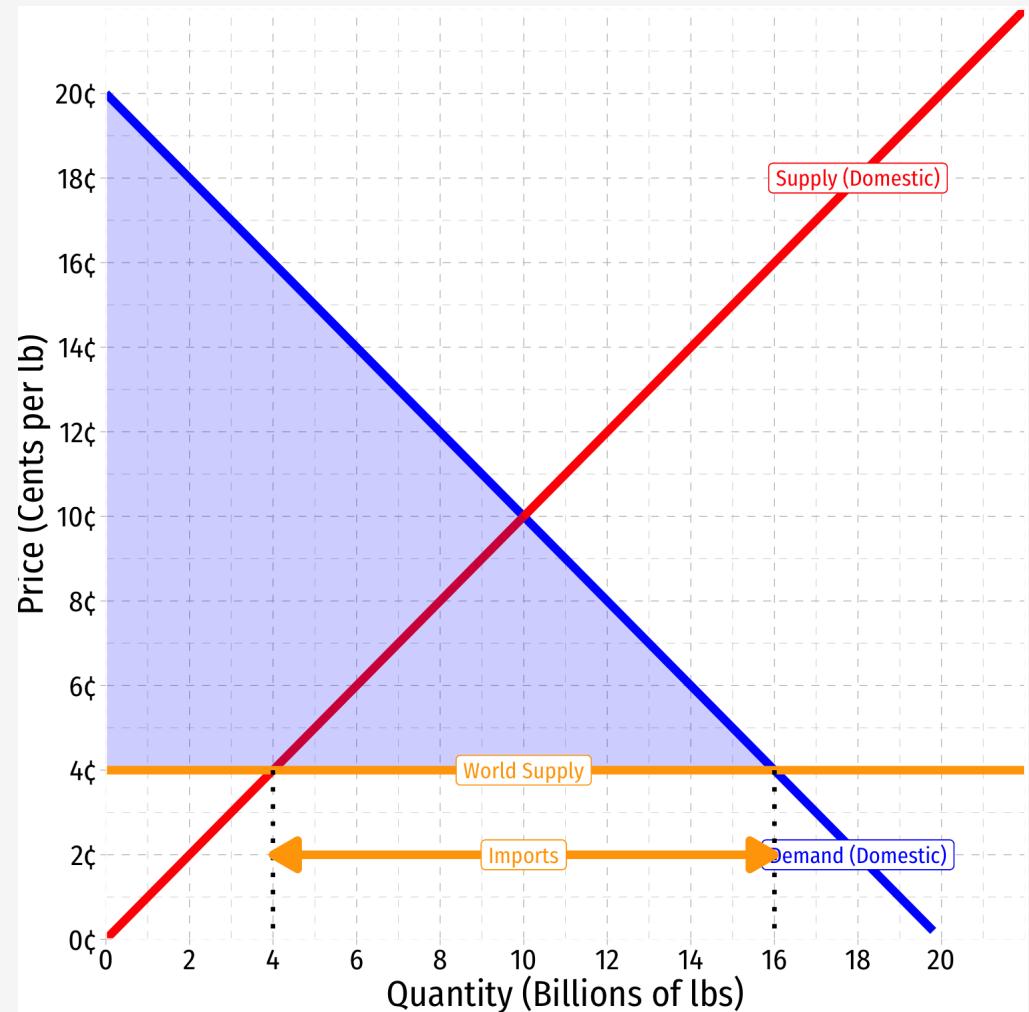
- At 4¢/lb:
 - Belgian consumers want to consume 16 bn lbs
 - Belgian producers will produce 4 bn lbs
 - Belgium will import 12 bn lbs from the rest of the world



Import Tariff Effects in a Small Country



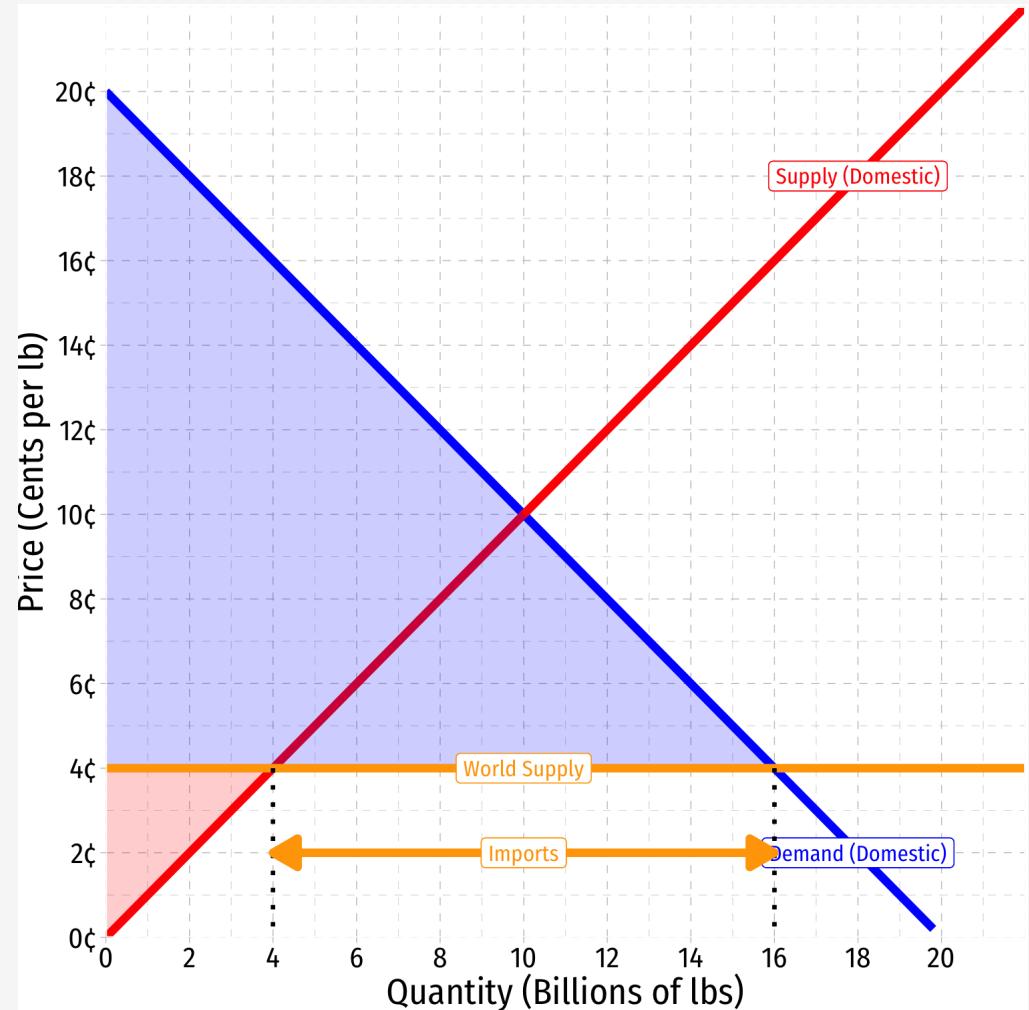
- Under international trade:
- Consumer surplus = WTP - p*
 - $= 0.5(16-0)(\$0.20-\$0.04) = \$1.280 \text{ billion}$



Import Tariff Effects in a Small Country



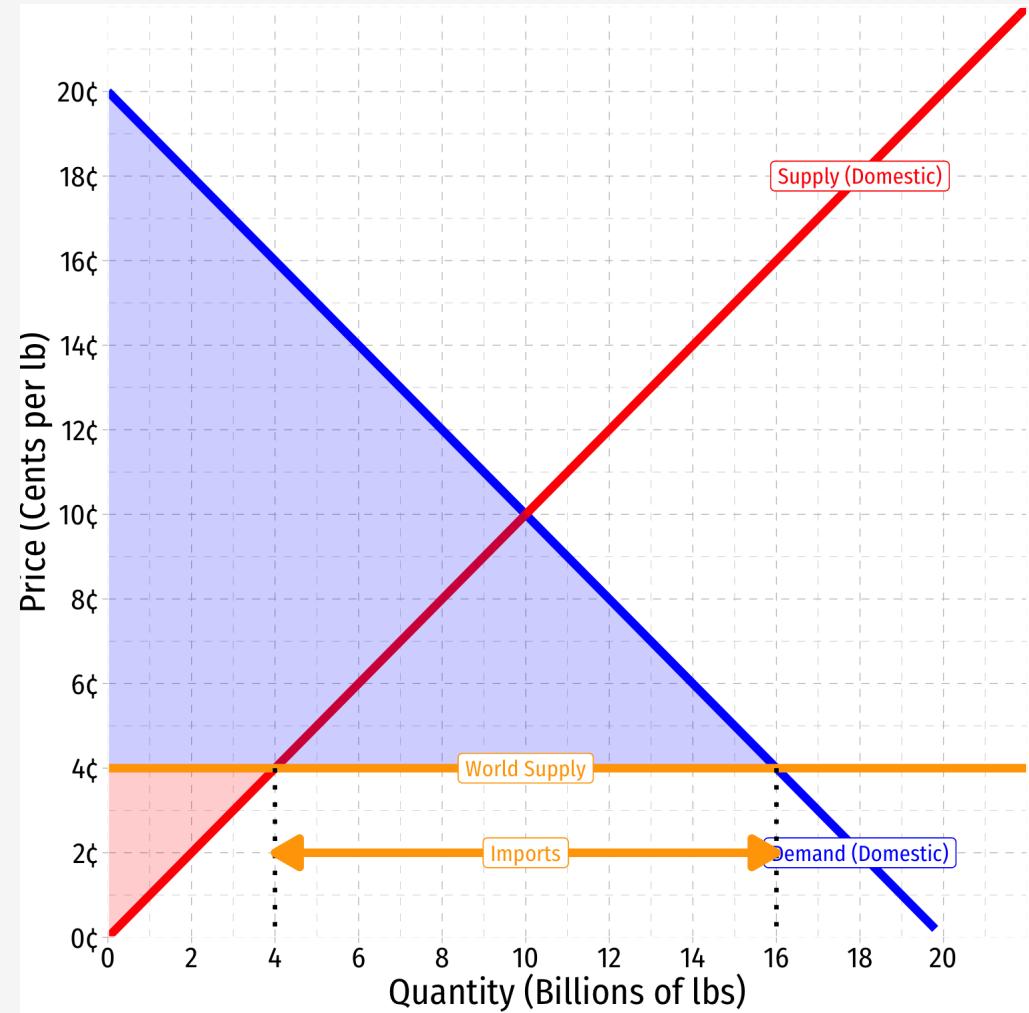
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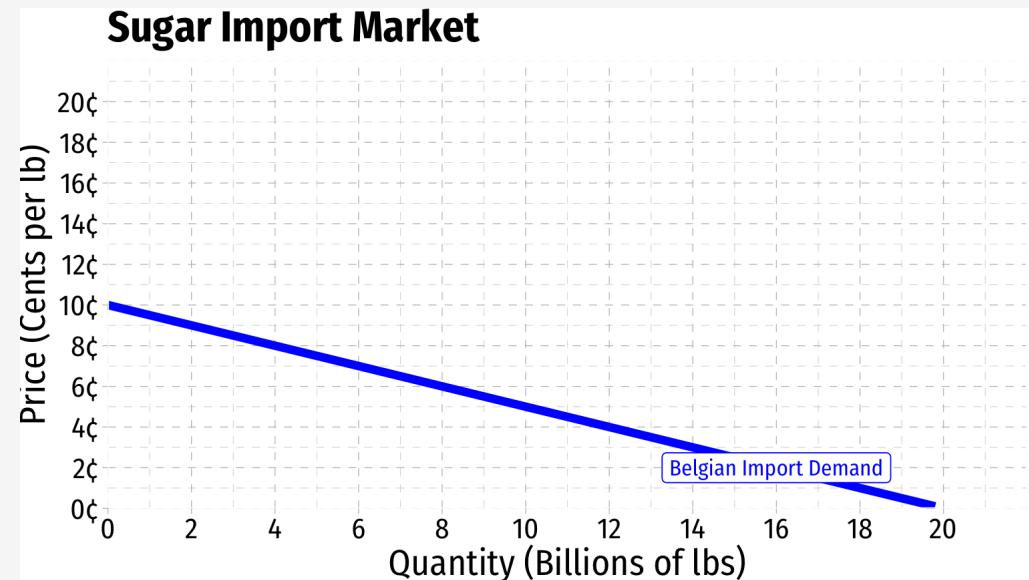
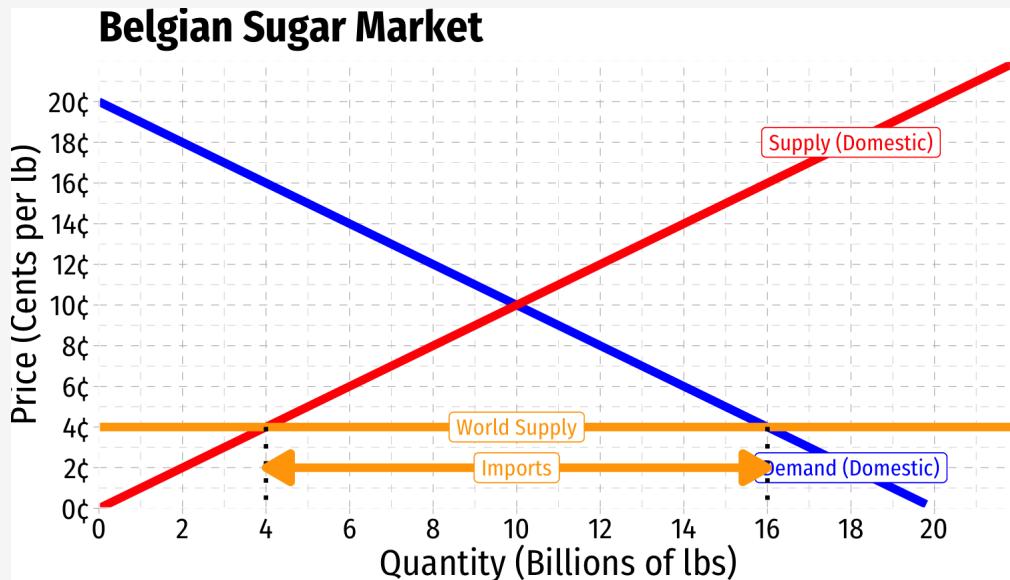
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- Trade benefits Belgian consumers at expense of Belgian sugar producers
 - But gain is much bigger than loss!

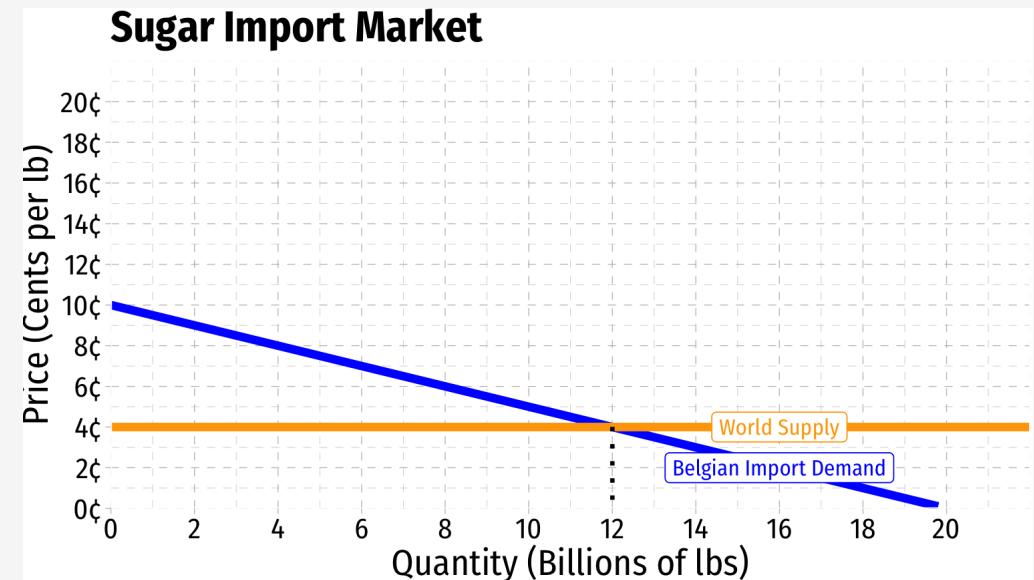
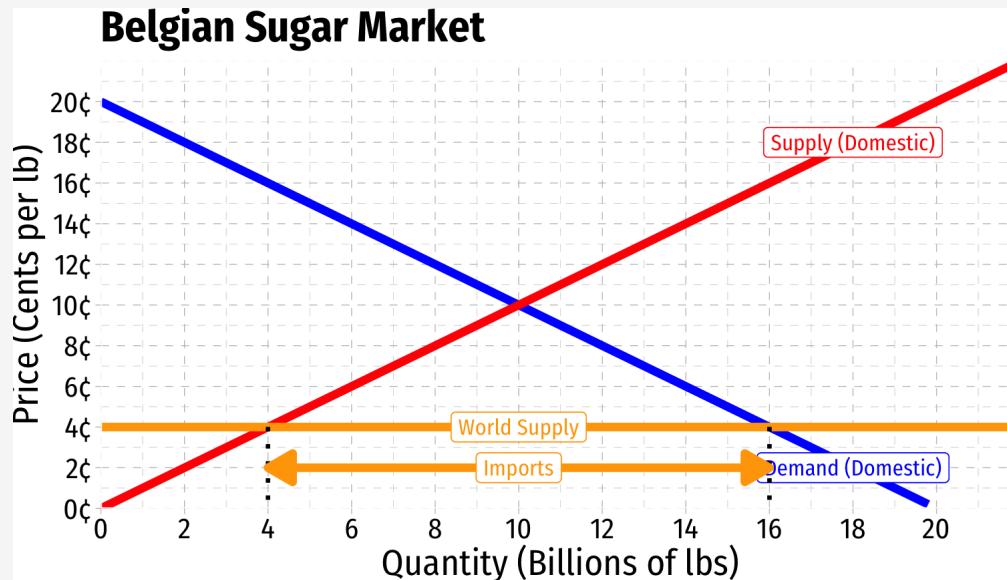


Import Tariff Effects in a Small Country



- 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

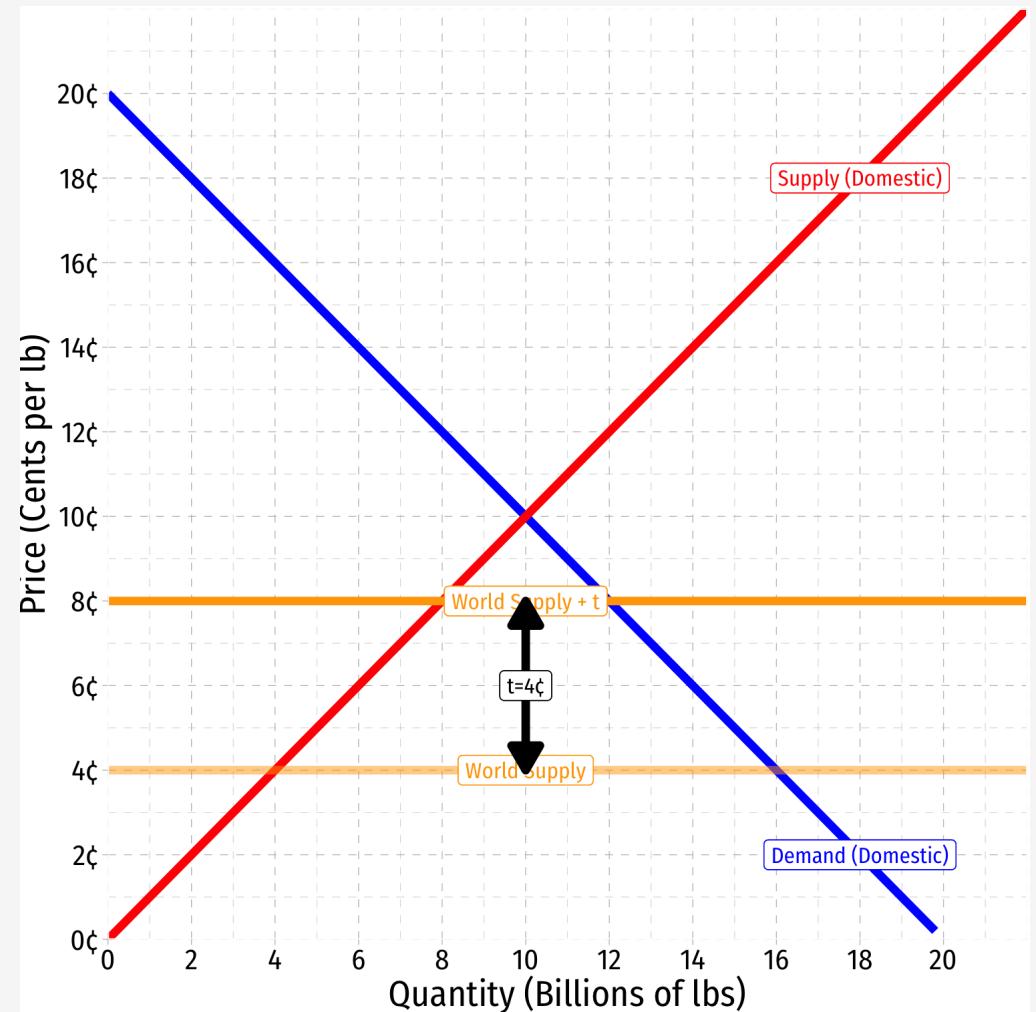


- We can trace Belgium's import demand from the world based on the world price
- Note at a price of ¢10 there is no import demand, all sugar can be produced in Belgium
- We have been assuming the world supply of sugar is perfectly elastic at 4¢
- Sets equilibrium amount of imports in Belgium, 12 bn lbs imported

Import Tariff Effects in a Small Country



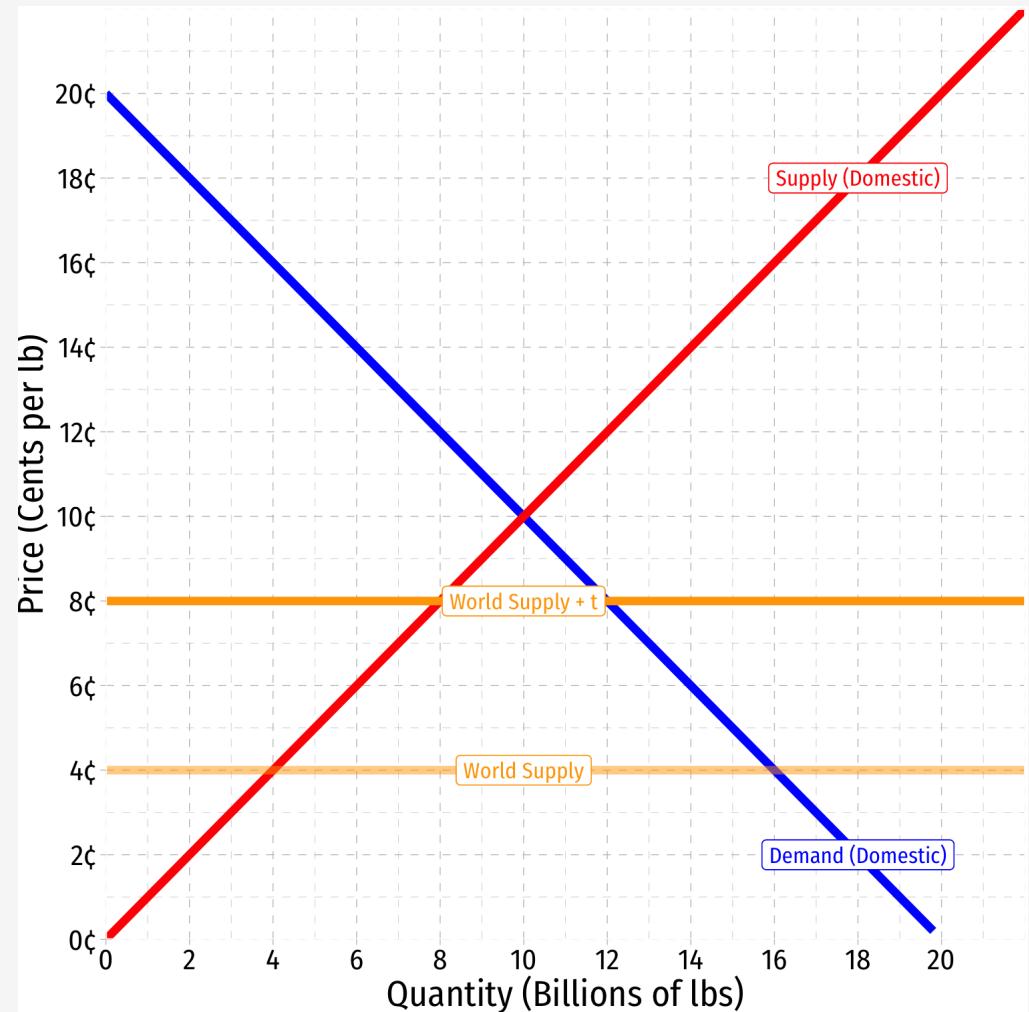
- Suppose the government levies a 4¢/lb **tariff** on sugar imports



Import Tariff Effects in a Small Country



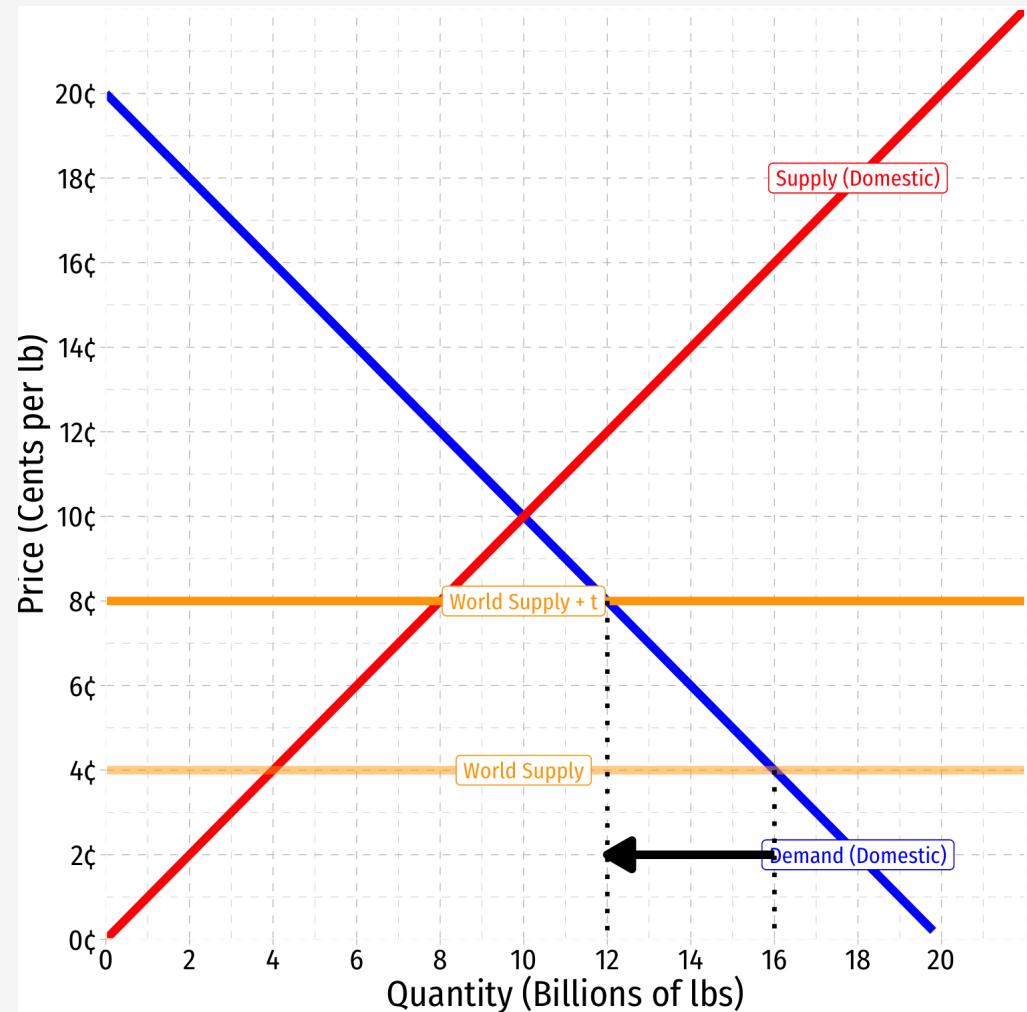
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- At new domestic sugar price of 8¢/lb



Import Tariff Effects in a Small Country



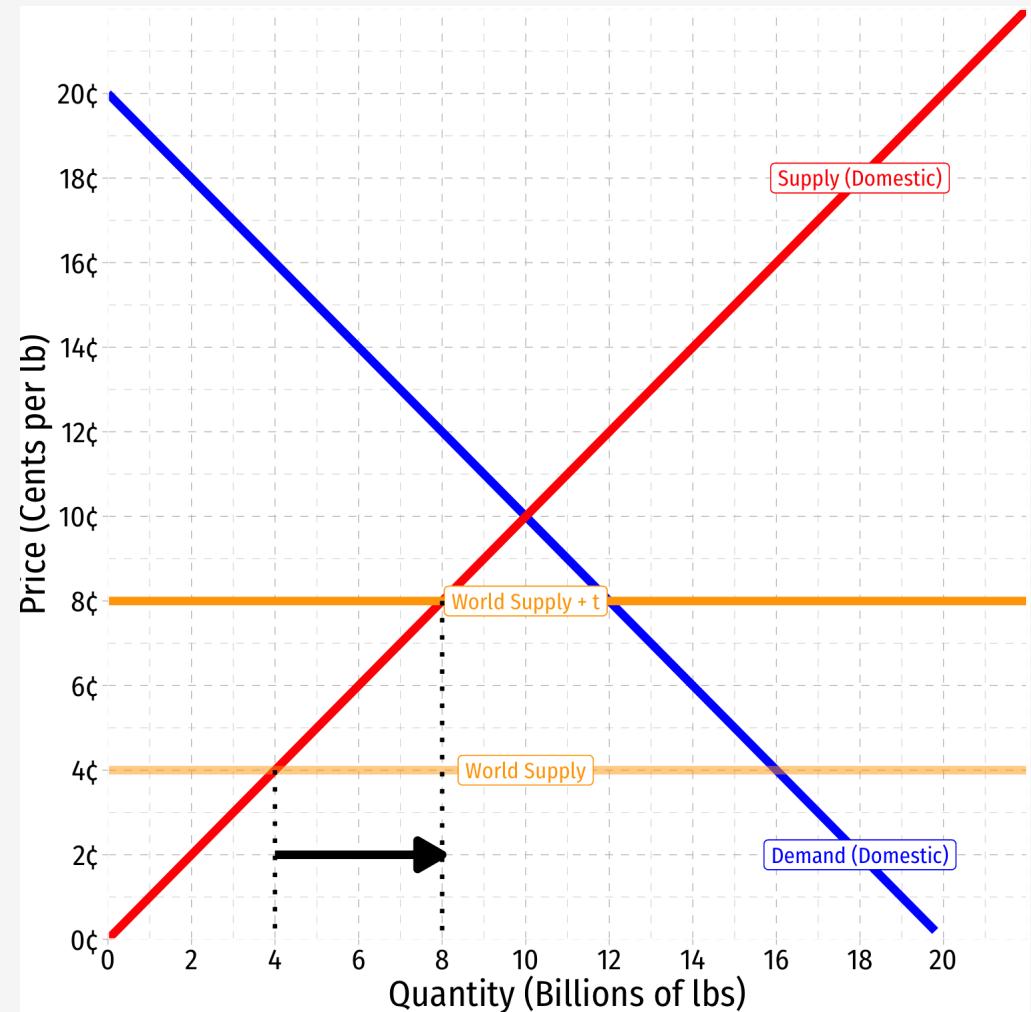
- Suppose the government levies a 4¢/lb **tariff** on sugar imports
- At new domestic sugar price of 8¢/lb
 - Belgian consumers want to consume 12 bn lbs (less than before)



Import Tariff Effects in a Small Country



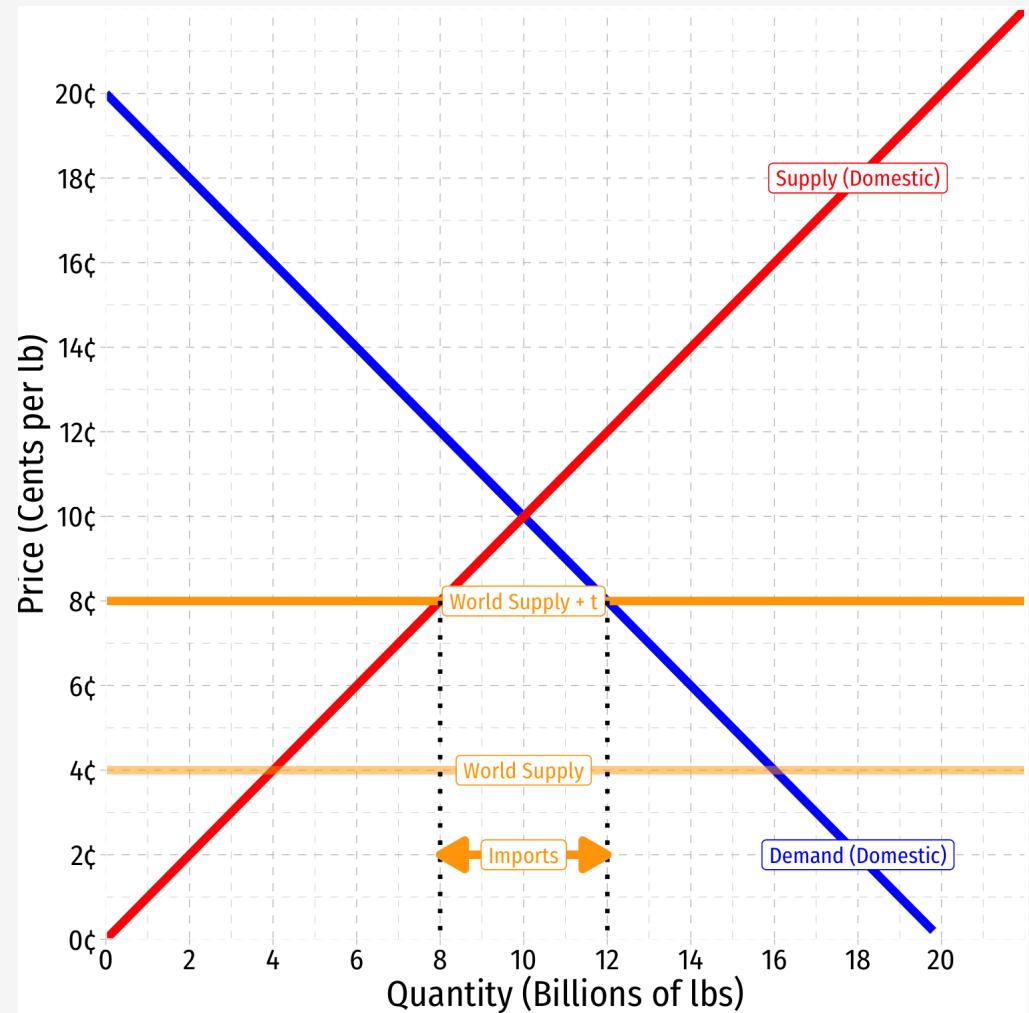
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Import Tariff Effects in a Small Country



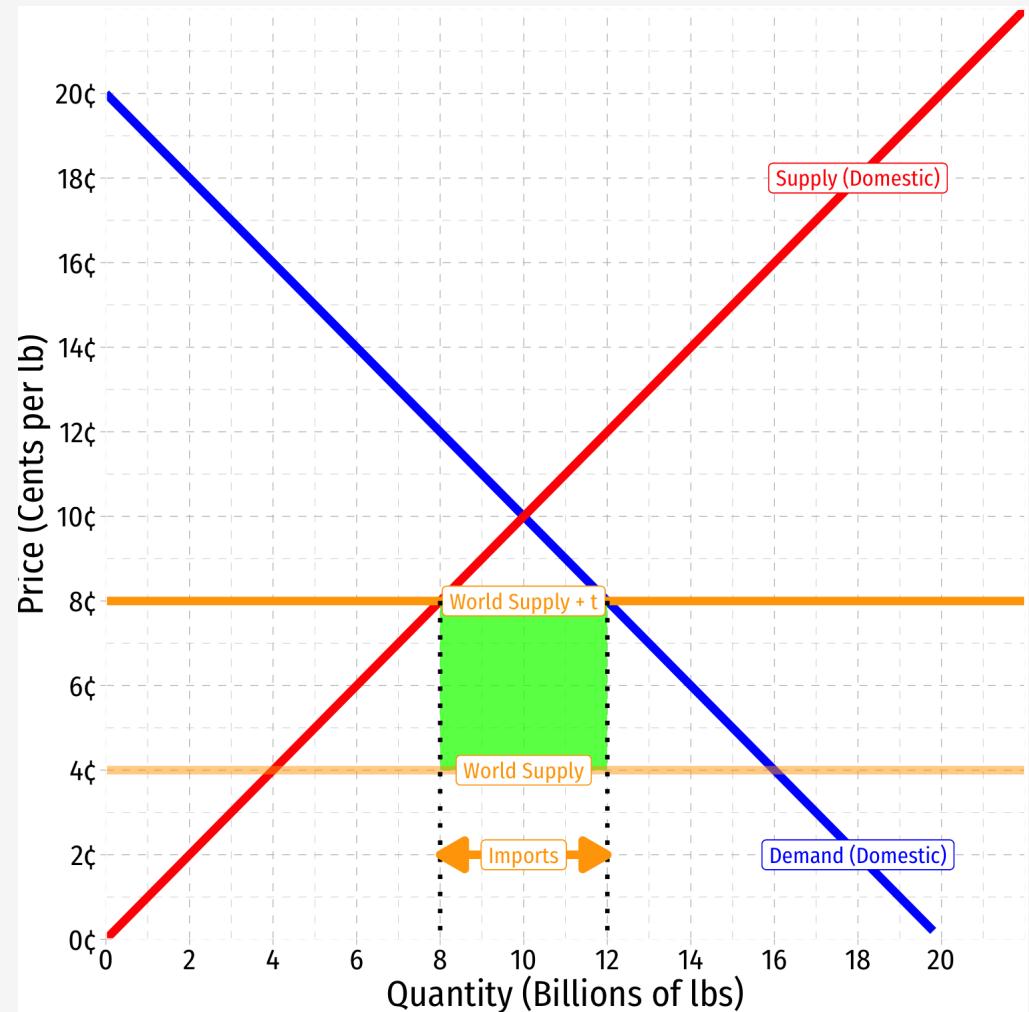
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Import Tariff Effects in a Small Country



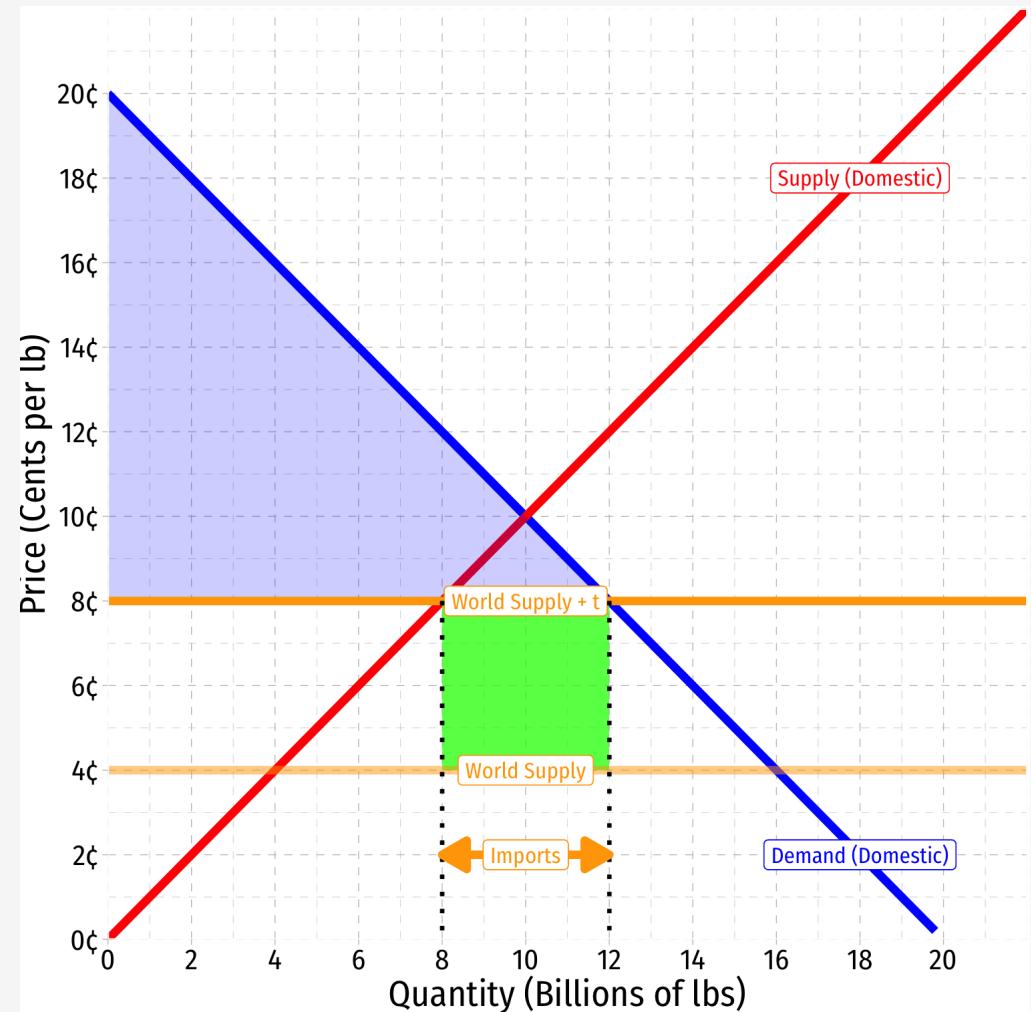
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- At new domestic sugar price of 8¢/lb
 - Belgian consumers want to consume 12 bn lbs (less than before)
 - Belgian producers will produce 8 bn lbs (more than before)
 - Belgium will **import** 4 bn lbs from the **rest of the world** (less than before)
- Tariff is a tax, so government earns revenue:



Import Tariff Effects in a Small Country



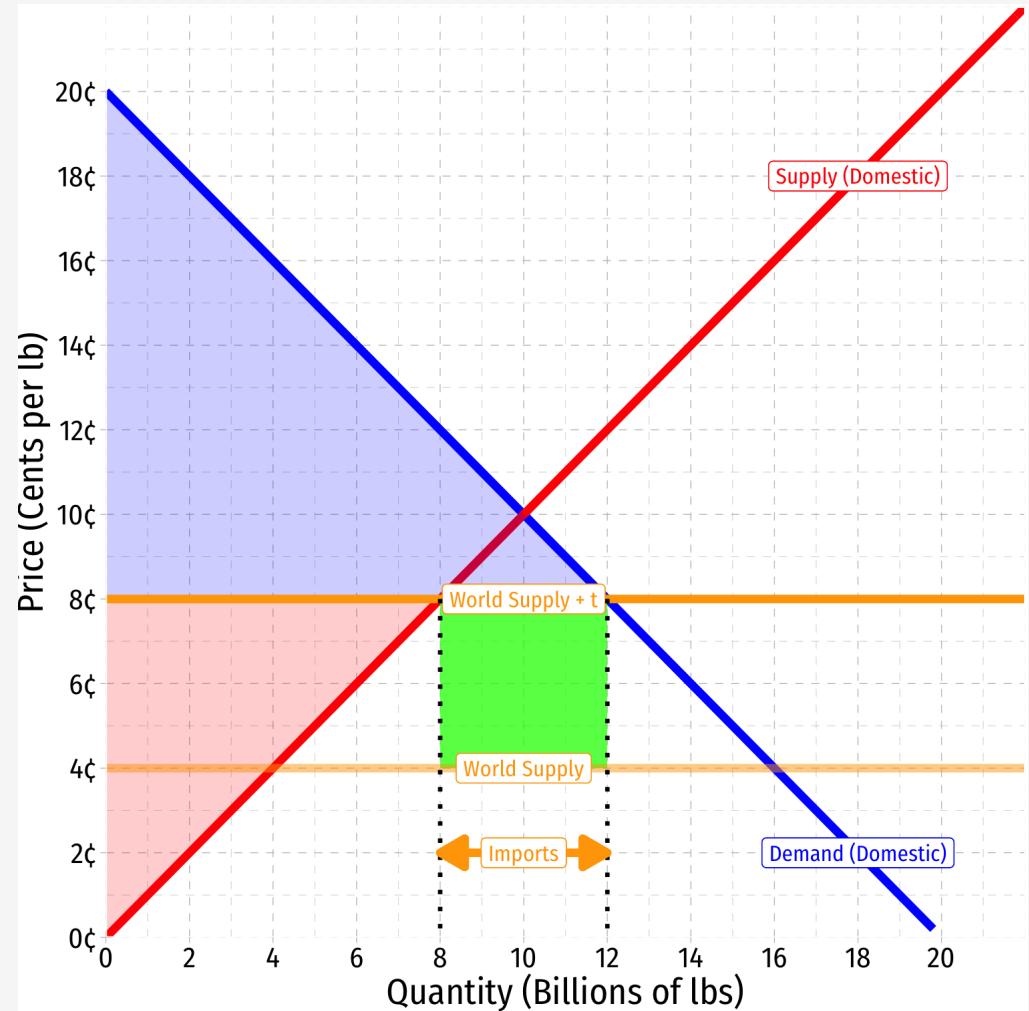
- Under the tariff:
- Consumer surplus = WTP - p*
 - $= 0.5(12-0)(\$0.20-\$0.08) = \$0.720 \text{ billion}$
 - Less than before (free trade)



Import Tariff Effects in a Small Country



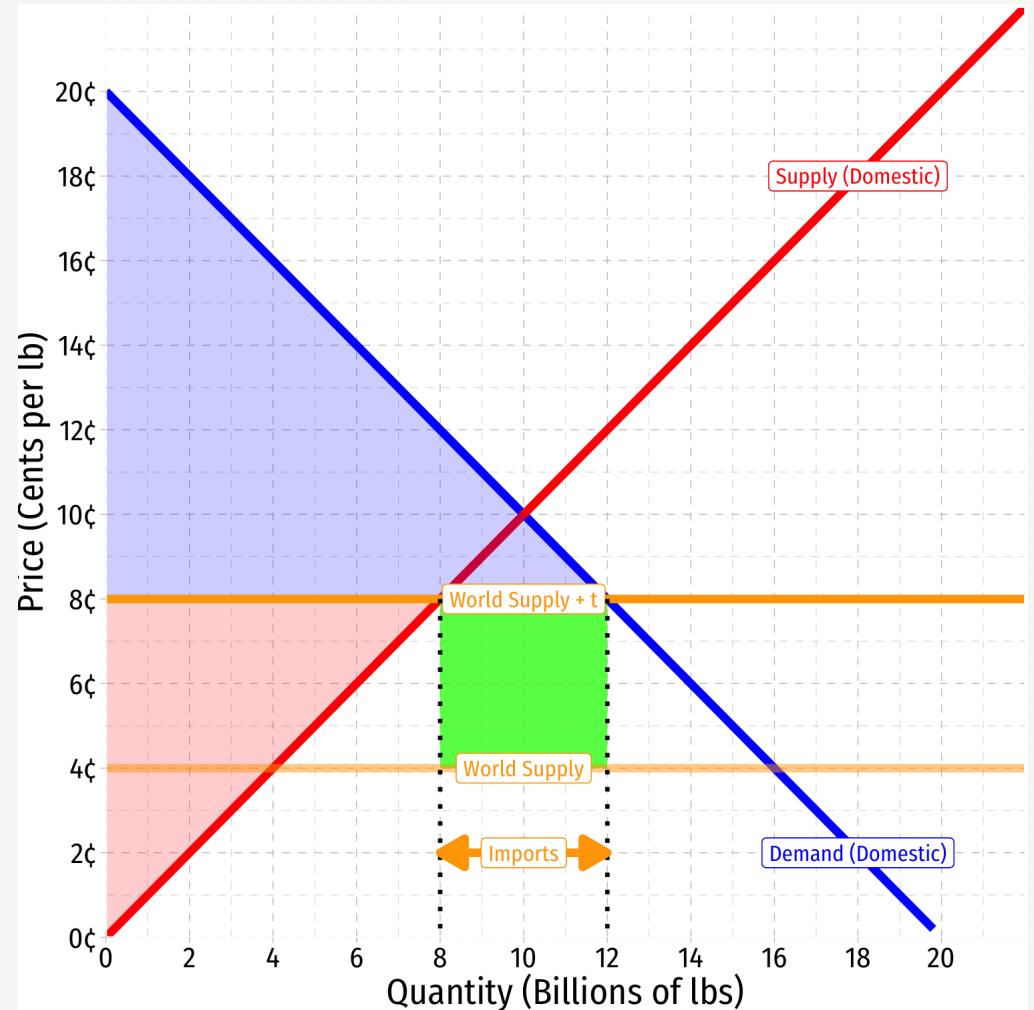
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 - Less than before (free trade)
 - Producer surplus = p* - WTA
 - $= 0.5(8-0)(\$0.08-\$0.00) = \$0.320 \text{ billion}$
 - More than before (free trade)



Import Tariff Effects in a Small Country



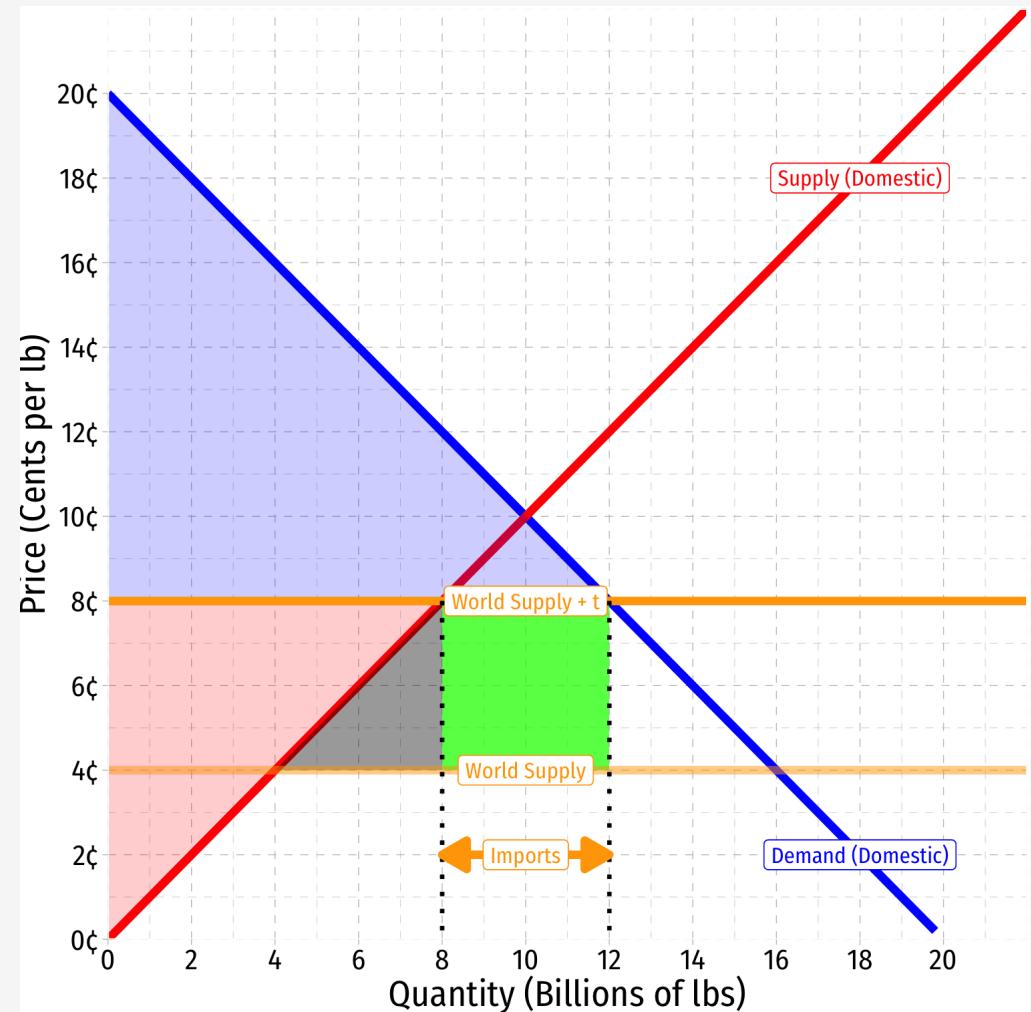
- Under the tariff:
- Two new sources of market inefficiency created, “**deadweight loss (DWL)**”



Import Tariff Effects in a Small Country



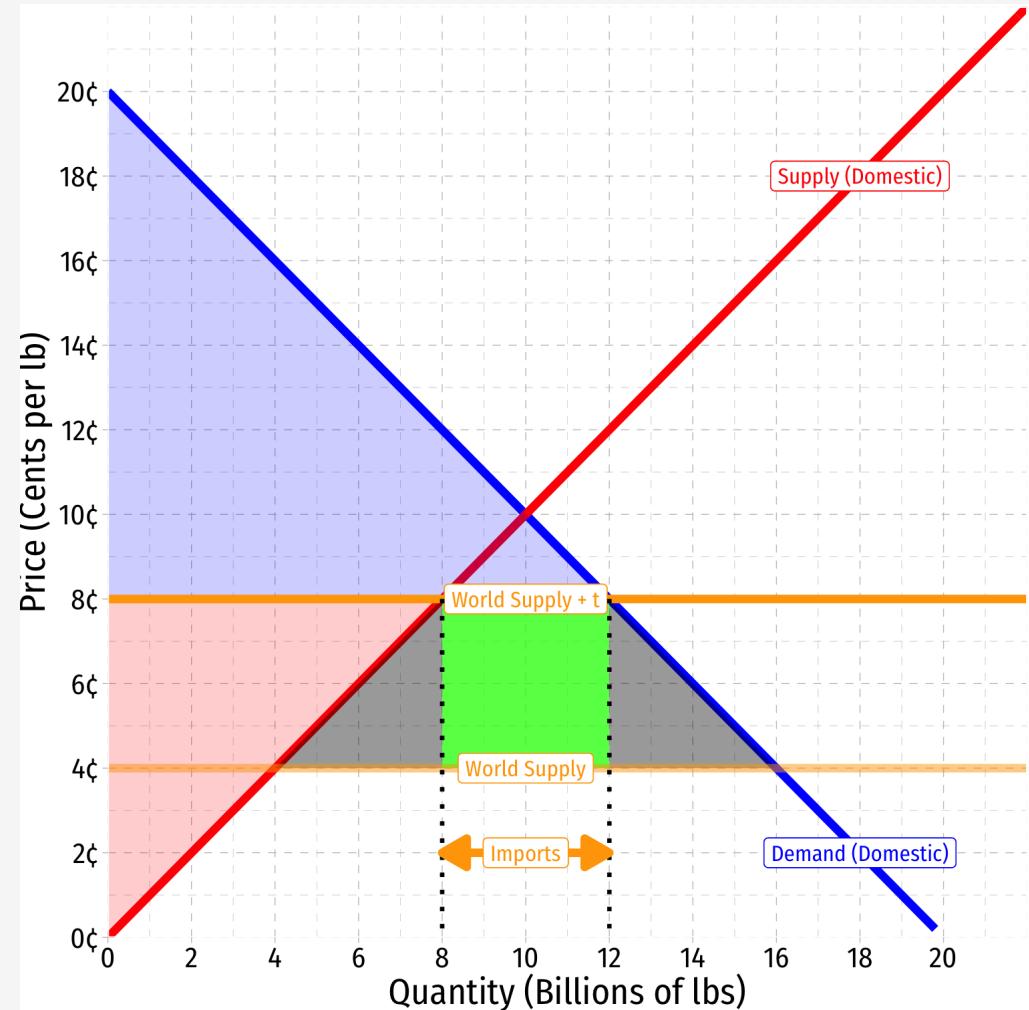
- Under the tariff:
- Two new sources of market inefficiency created, “**deadweight loss (DWL)**”
 1. Inefficient domestic production (cheaper for foreigners to produce sugar)
 - $0.5(8-4)(\$0.08-\$0.04) = \$0.080 \text{ Billion}$



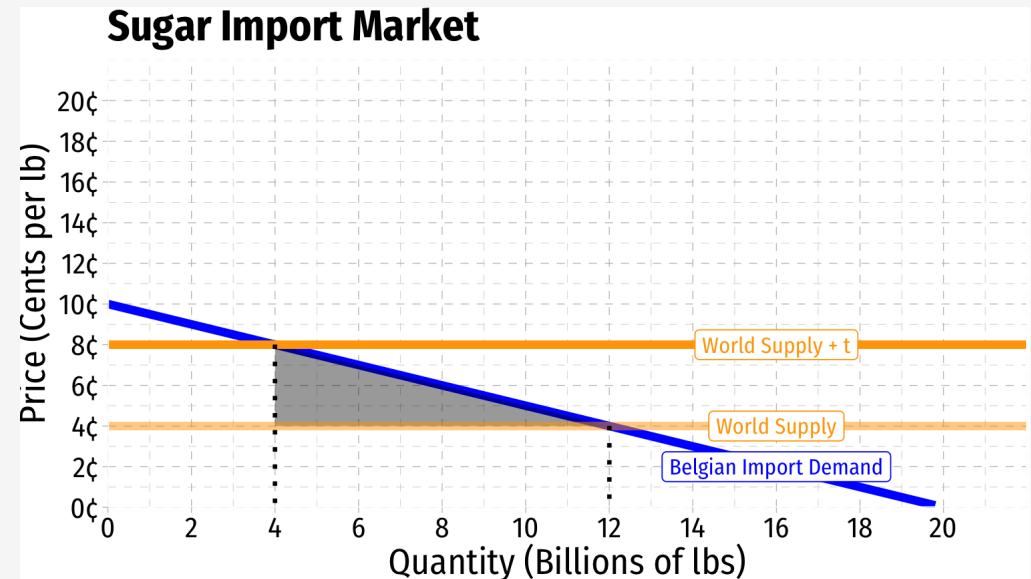
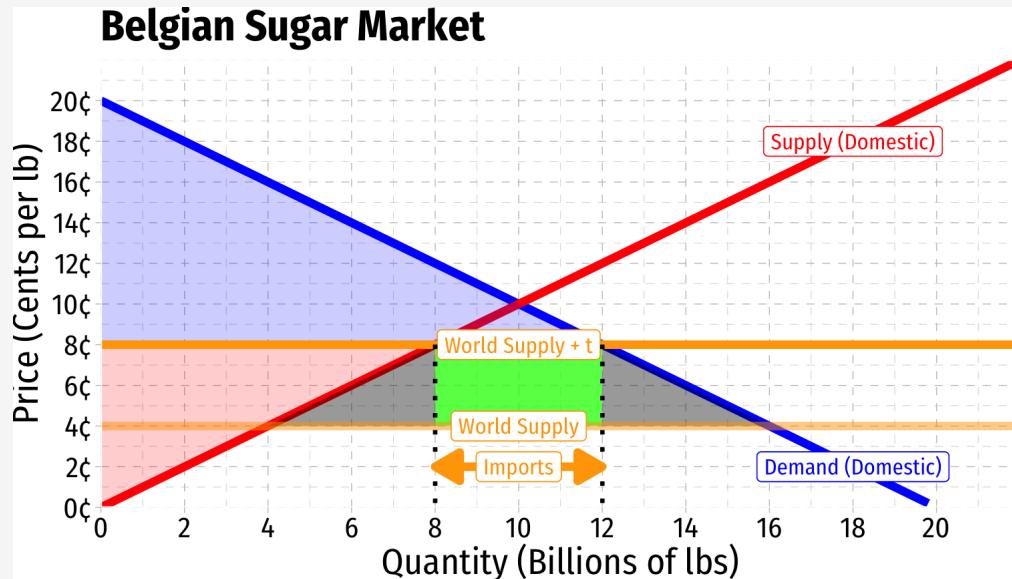
Import Tariff Effects in a Small Country



- 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
 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



- 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:

- $\circ \$0.720 \text{ bn} - \$1.280 \text{ bn} = -\$0.460 \text{ bn}$

2. Increase in producer surplus:

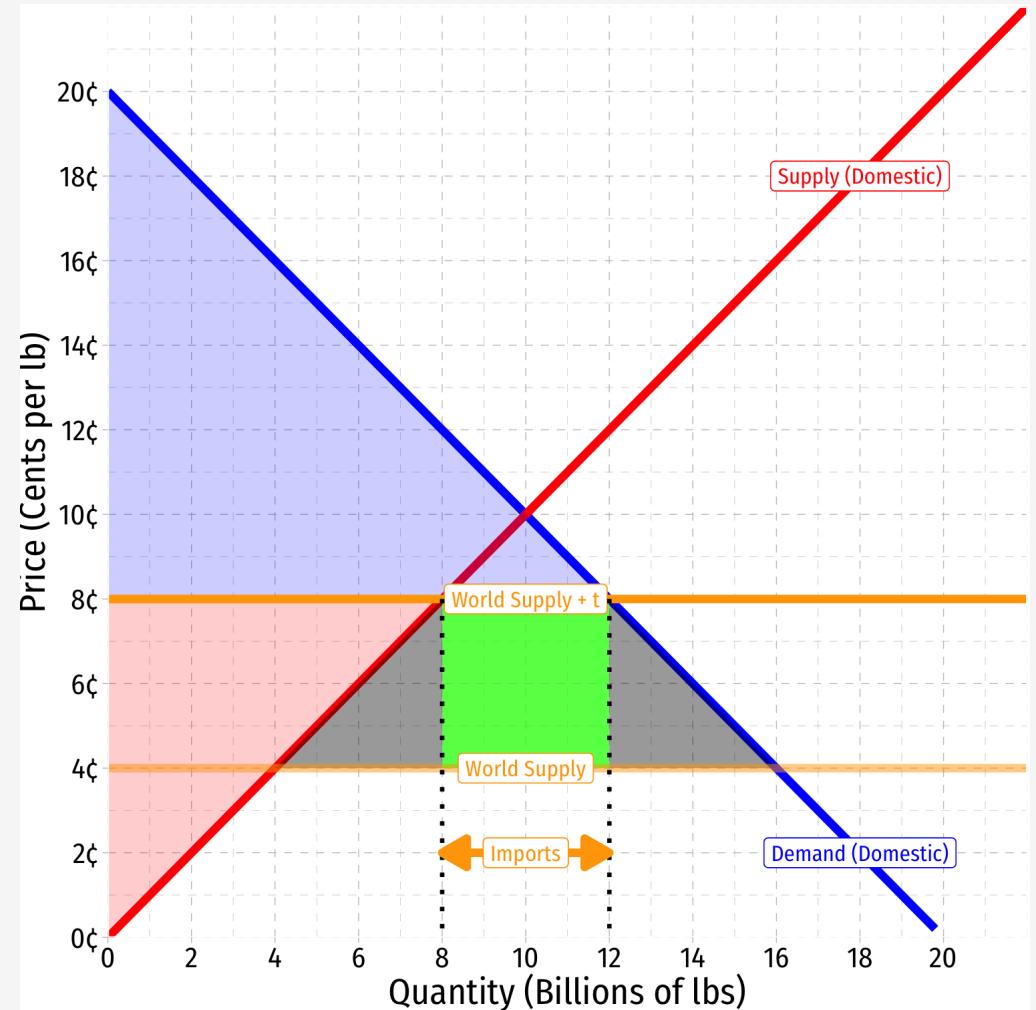
- $\circ \$0.320 \text{ bn} - \$0.080 \text{ bn} = \$0.240 \text{ bn}$

3. Government tax revenue:

- $\circ \$0.160 \text{ bn}$

4. Deadweight losses

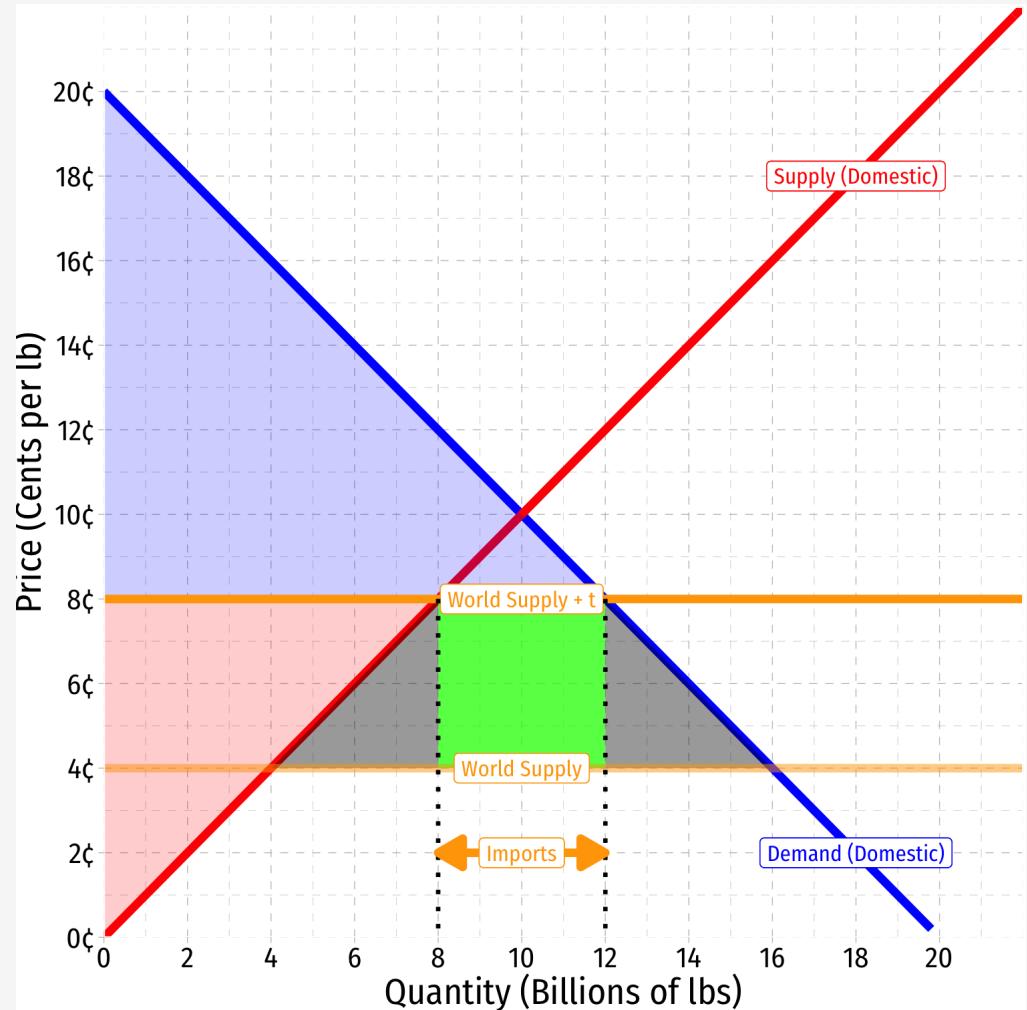
- $\circ \$-0.080 \text{ bn} - \$0.080 \text{ bn} = -\$0.160 \text{ bn}$



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



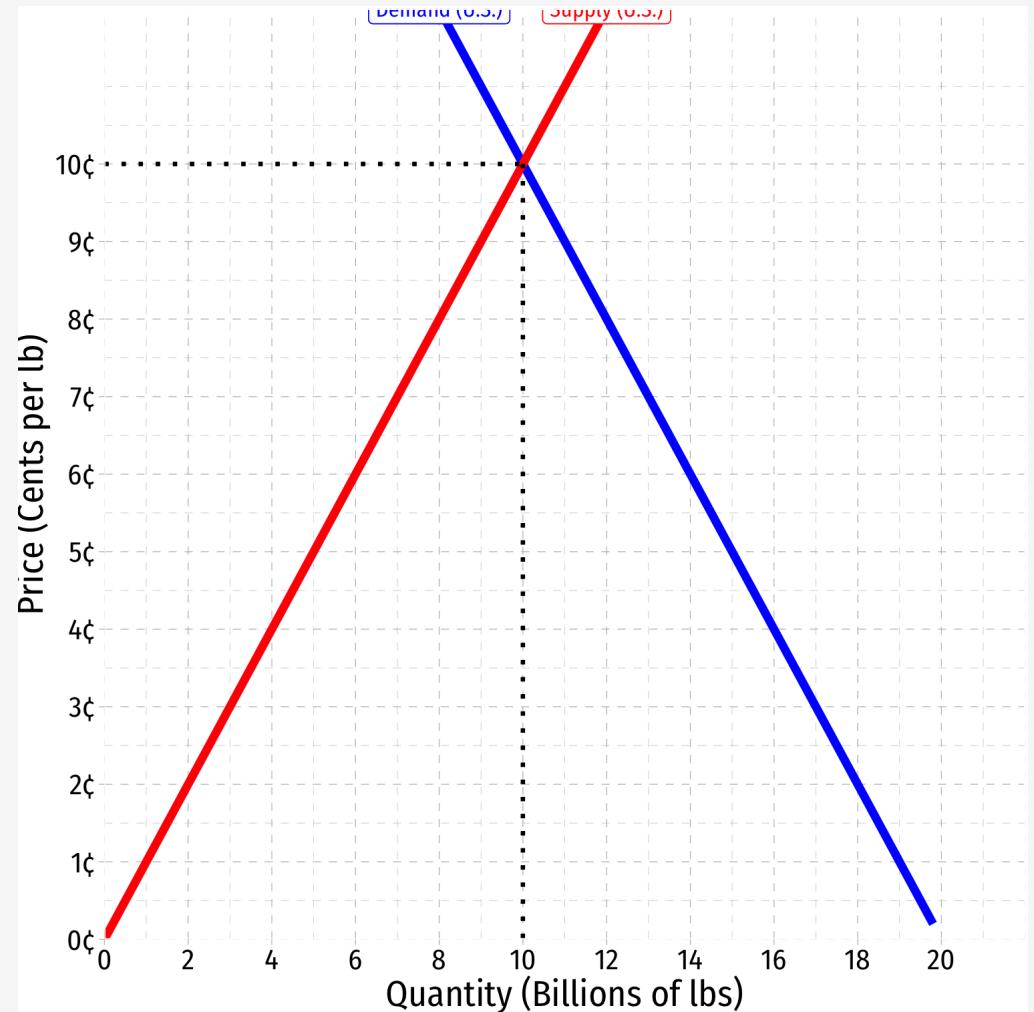
- A “**large country**” has a sufficiently large domestic demand to affect international prices
- The decrease in domestic demand from an import tariff (from higher import price) is sufficiently large to **lower the world price of the good**
- This is called the “**terms of trade effect**” of a tariff
 - can provide a *benefit* to domestic country
 - harms foreign exporters due to lower world price



Import Tariff Effects in a Large Country



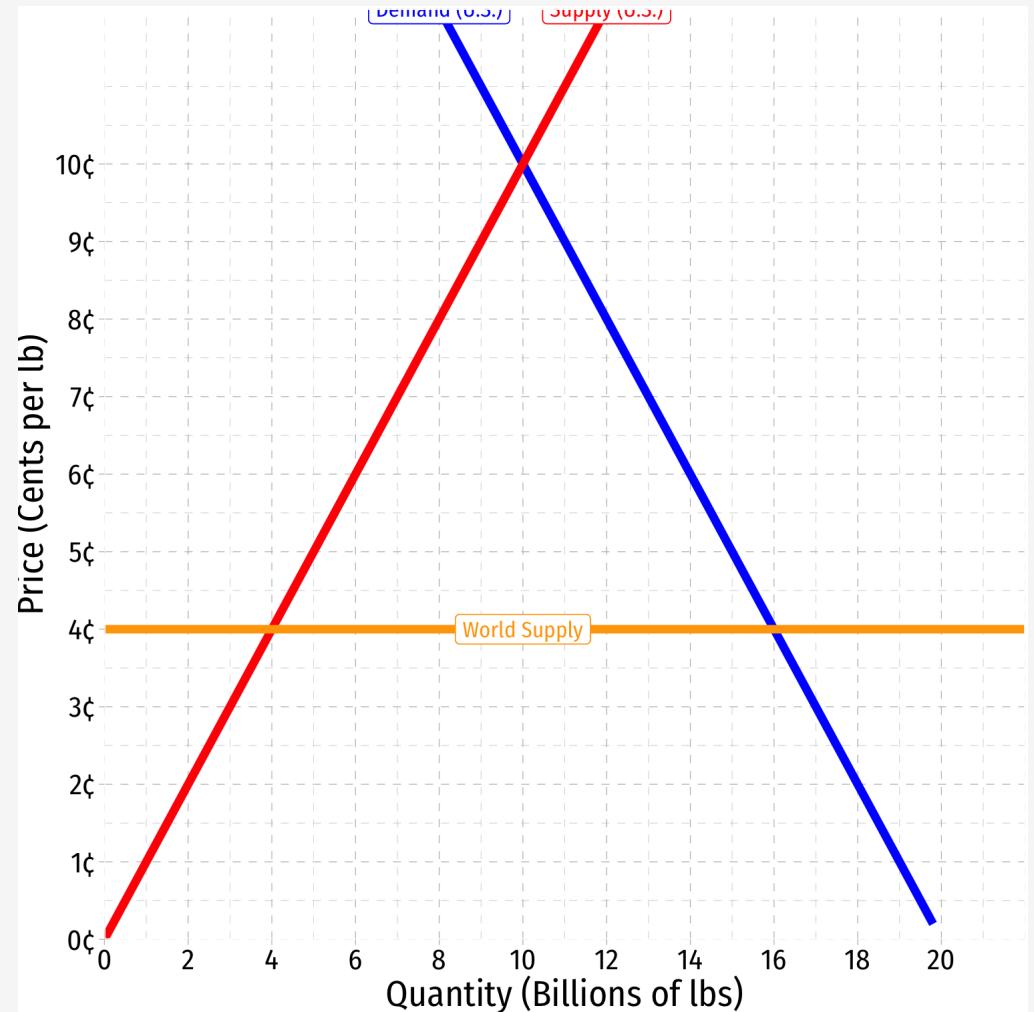
- Consider, for example, the sugar market in the U.S.
- Autarky price: 10¢/lb, 10 billion lbs exchanged within U.S.



Import Tariff Effects in a Large Country



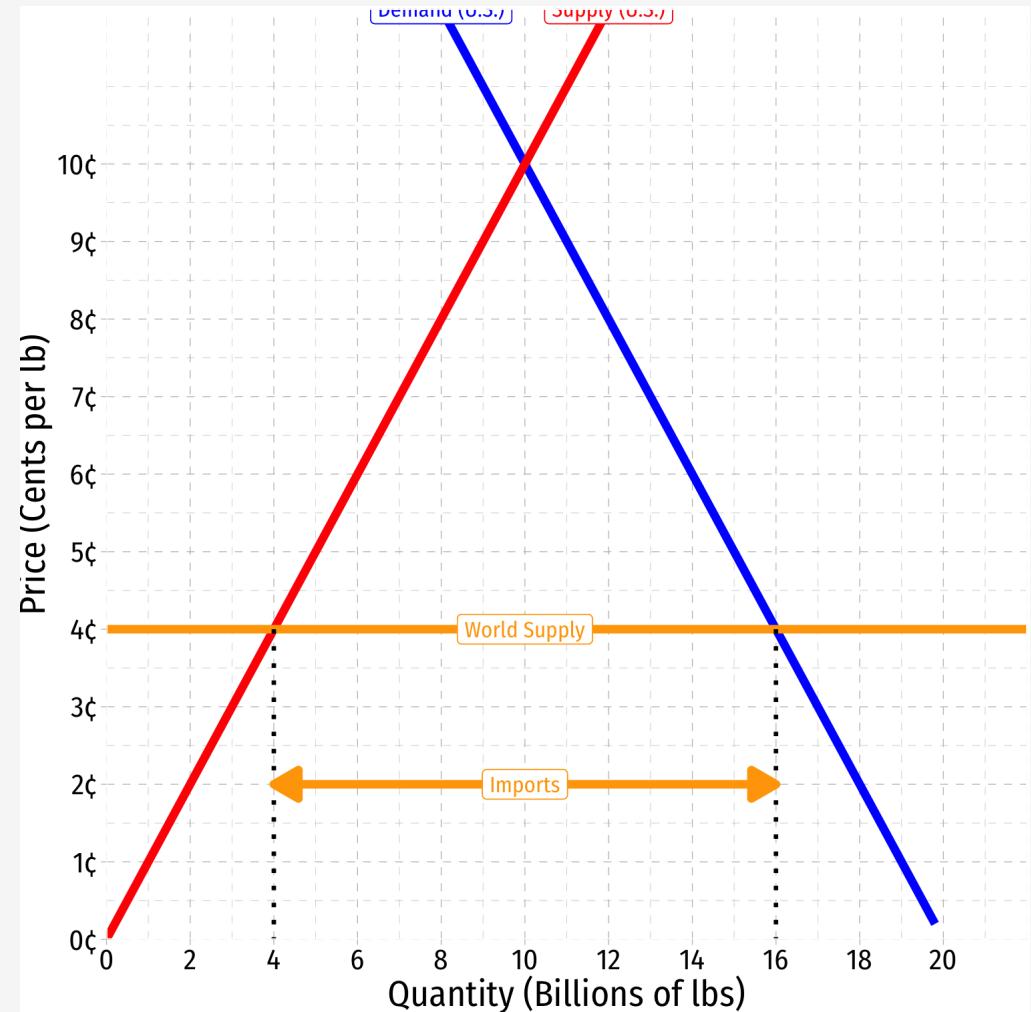
- Suppose U.S. opens up to international trade
- **World Supply** of sugar at 4¢/lb:



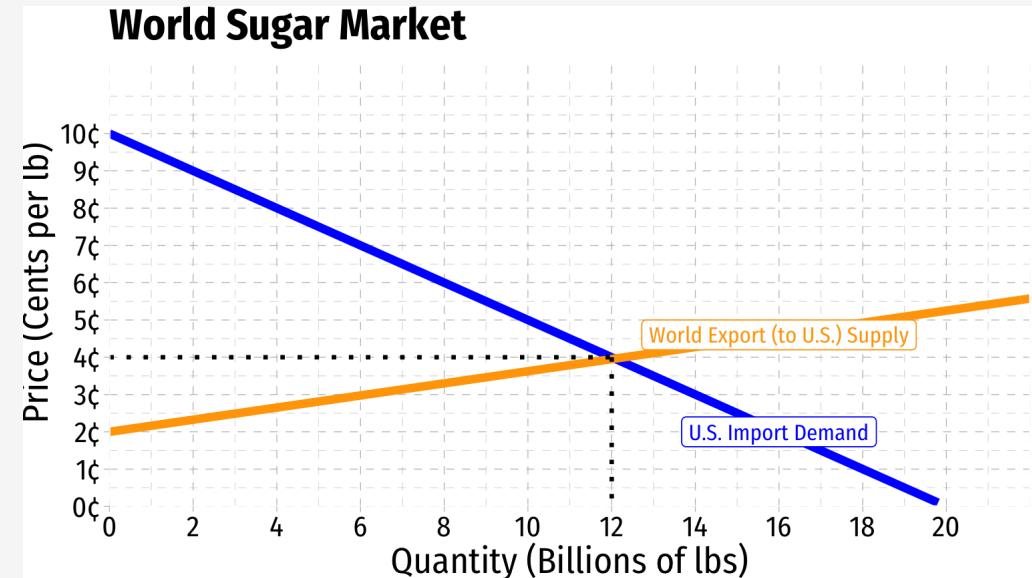
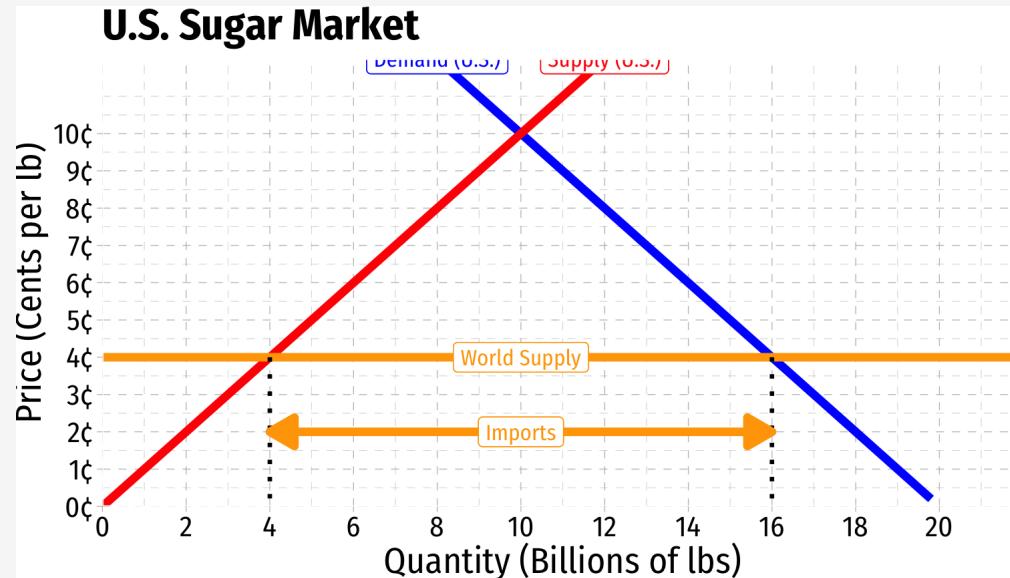
Import Tariff Effects in a Large Country



- 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

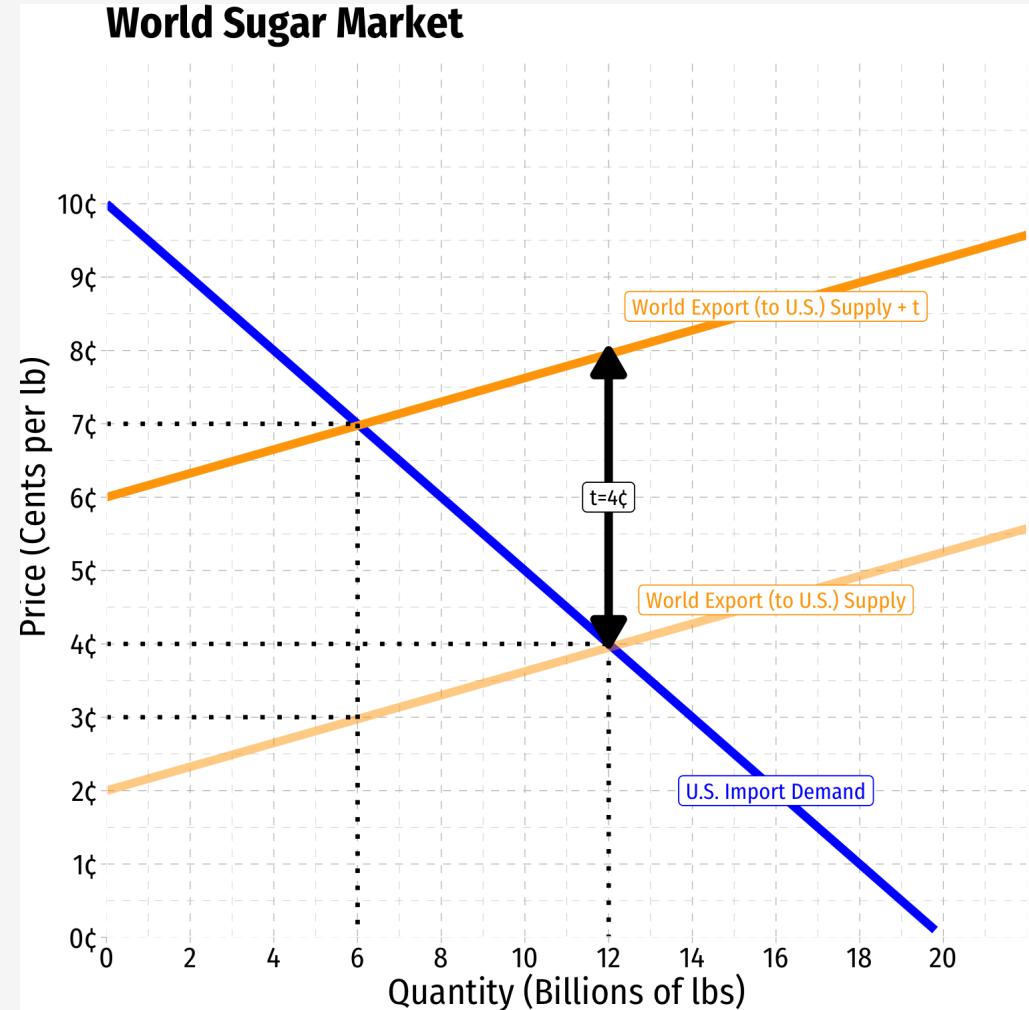


- We can trace U.S.'s import demand from the world based on the world price
- Because U.S. is a large country, the world supply curve (exports from other countries) to U.S. is *upward sloping*
 - sufficiently high demand from U.S. stimulates production abroad for export to U.S.
- Imagine autarky equilibrium 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



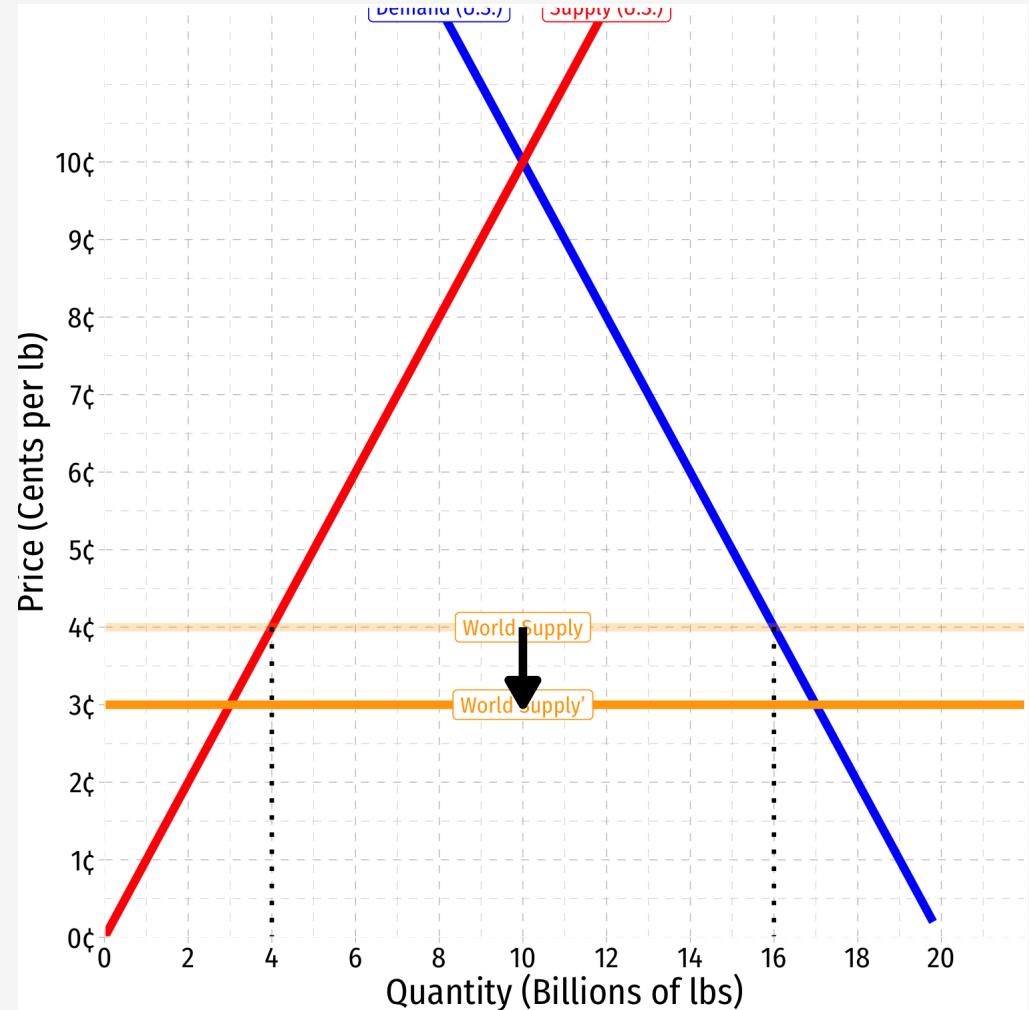
- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar
- Increase in costs to world sugar exporters decreases world export supply by 4¢/lb
- New equilibrium is for U.S. to import 6 bn lbs at 7¢/lb
 - But 4¢/lb of the imports are paid to U.S. government as tariffs
- Exporters to U.S. receive *net 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**



Import Tariff Effects in a Large Country



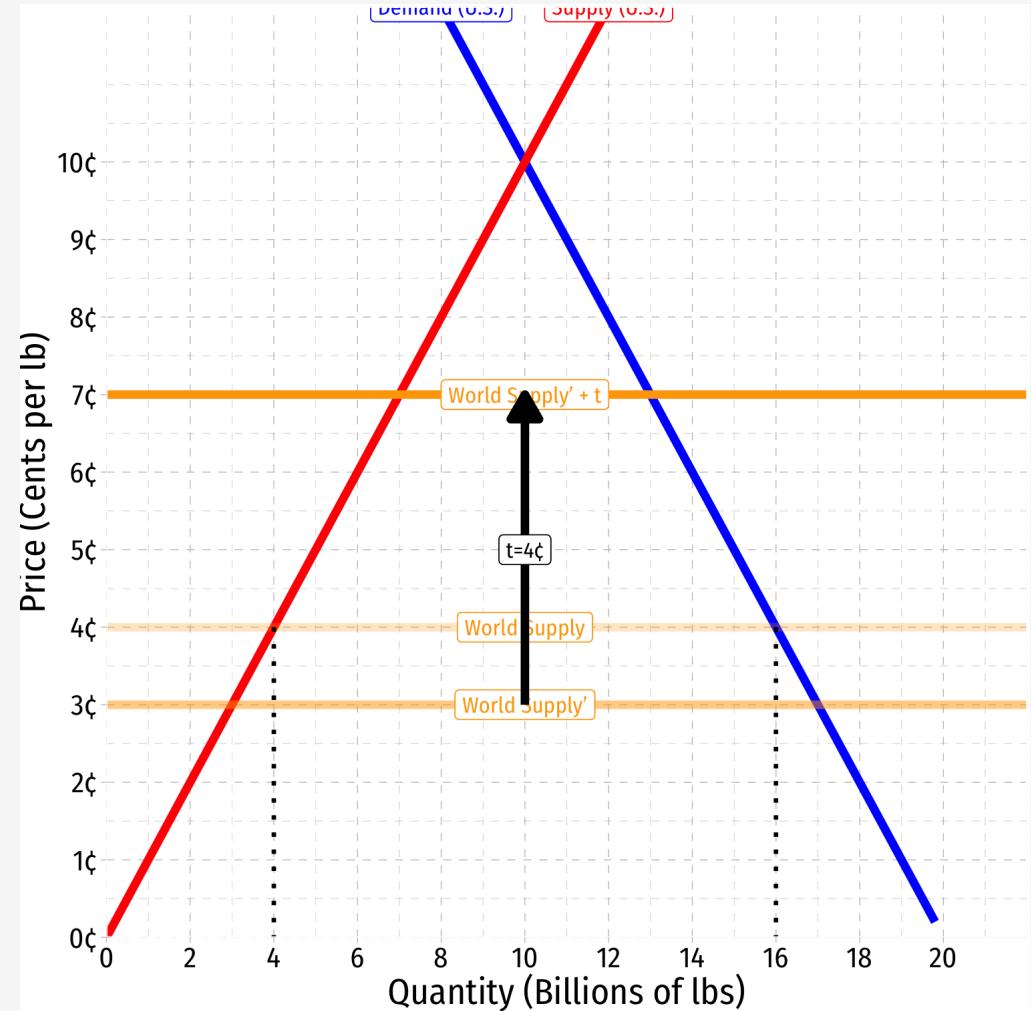
- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar
- Due to the terms of trade effect, world price of sugar will fall from less U.S. demand (to 3¢/lb)



Import Tariff Effects in a Large Country



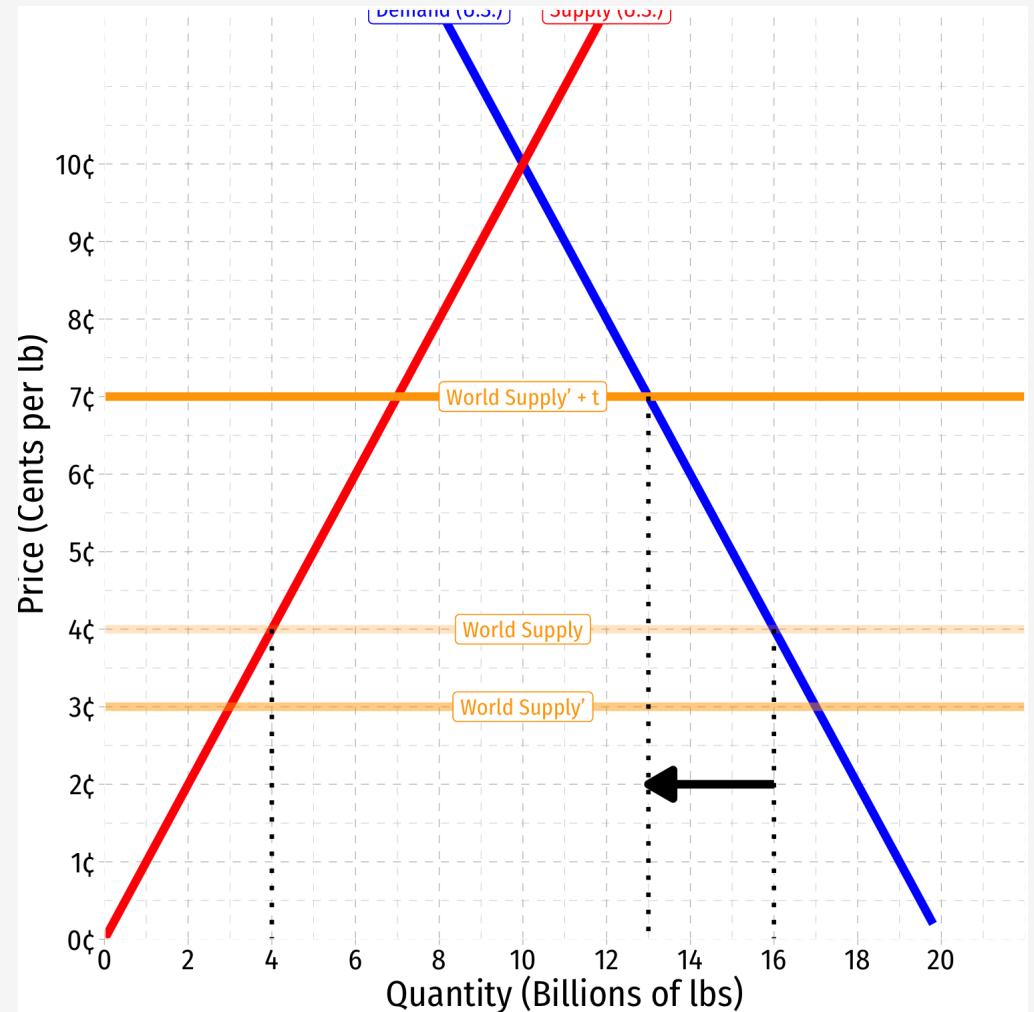
- Now suppose U.S. imposes a 4¢/lb tariff on imported sugar
- Due to the terms of trade effect, world price of sugar will fall from less U.S. demand (to 3¢/lb)
- The 4¢/lb is levied on this *new, lower* world price of sugar, raising price of sugar in U.S. to 7¢/lb



Import Tariff Effects in a Large Country



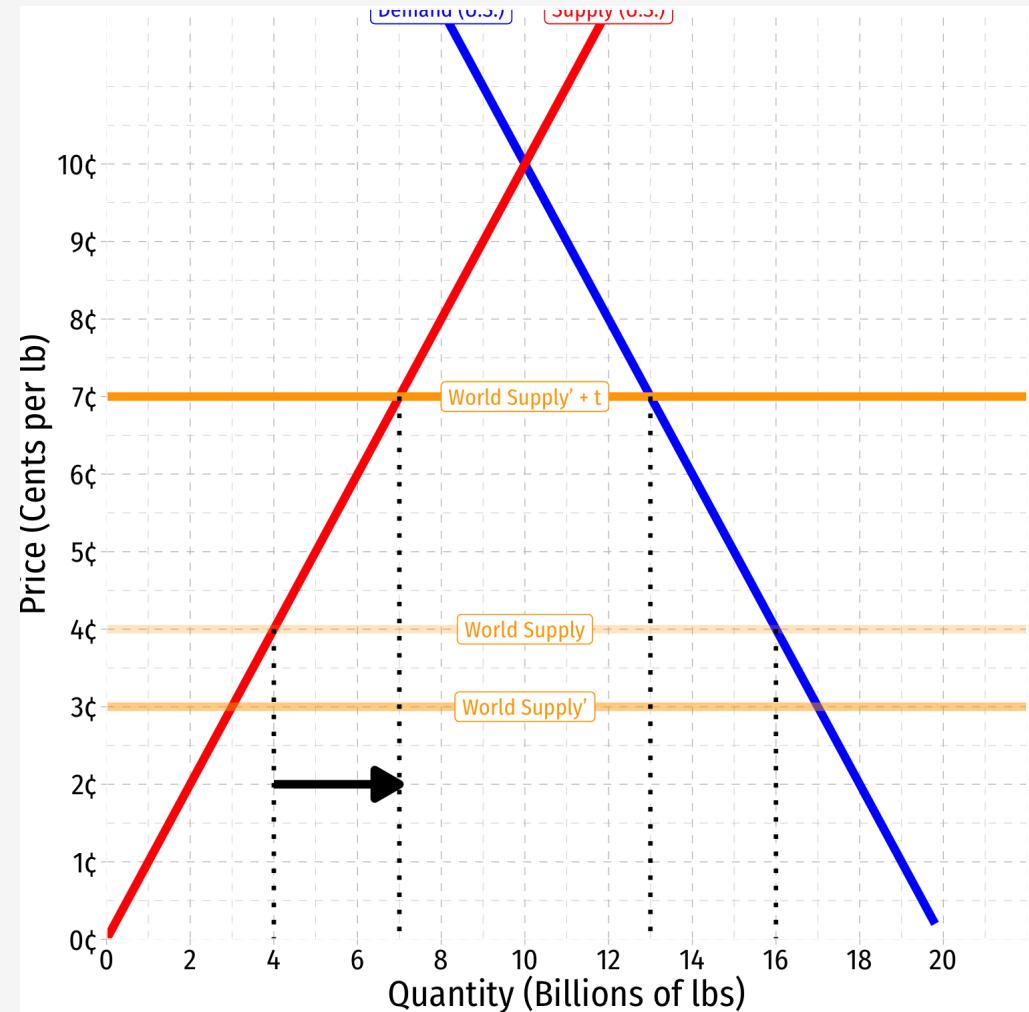
- At new domestic price of 7¢/lb:
 - U.S. consumers want to consume 13 bn lbs (less than before)



Import Tariff Effects in a Large Country



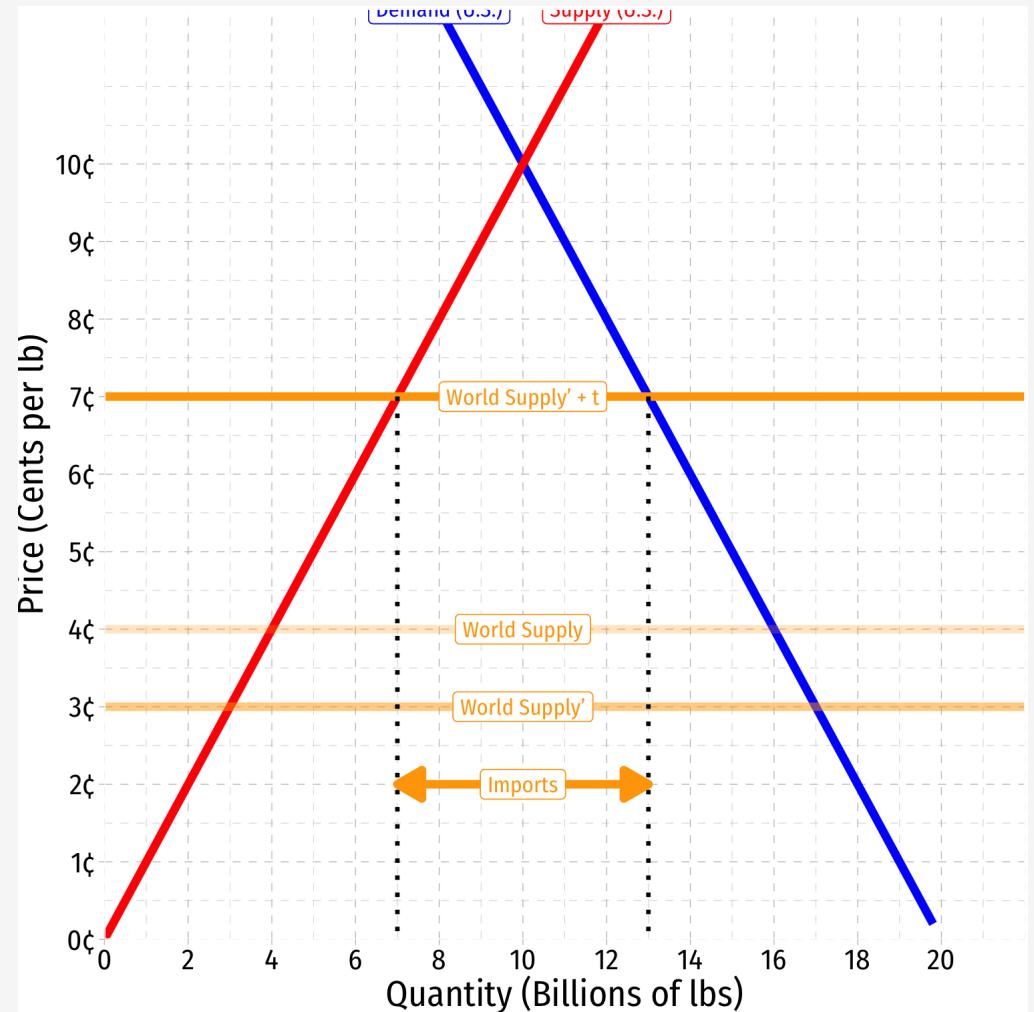
- At new domestic price of 7¢/lb:
 - **U.S. consumers** want to consume 13 bn lbs (less than before)
 - **U.S. producers** will produce 7 bn lbs (more than before)



Import Tariff Effects in a Large Country



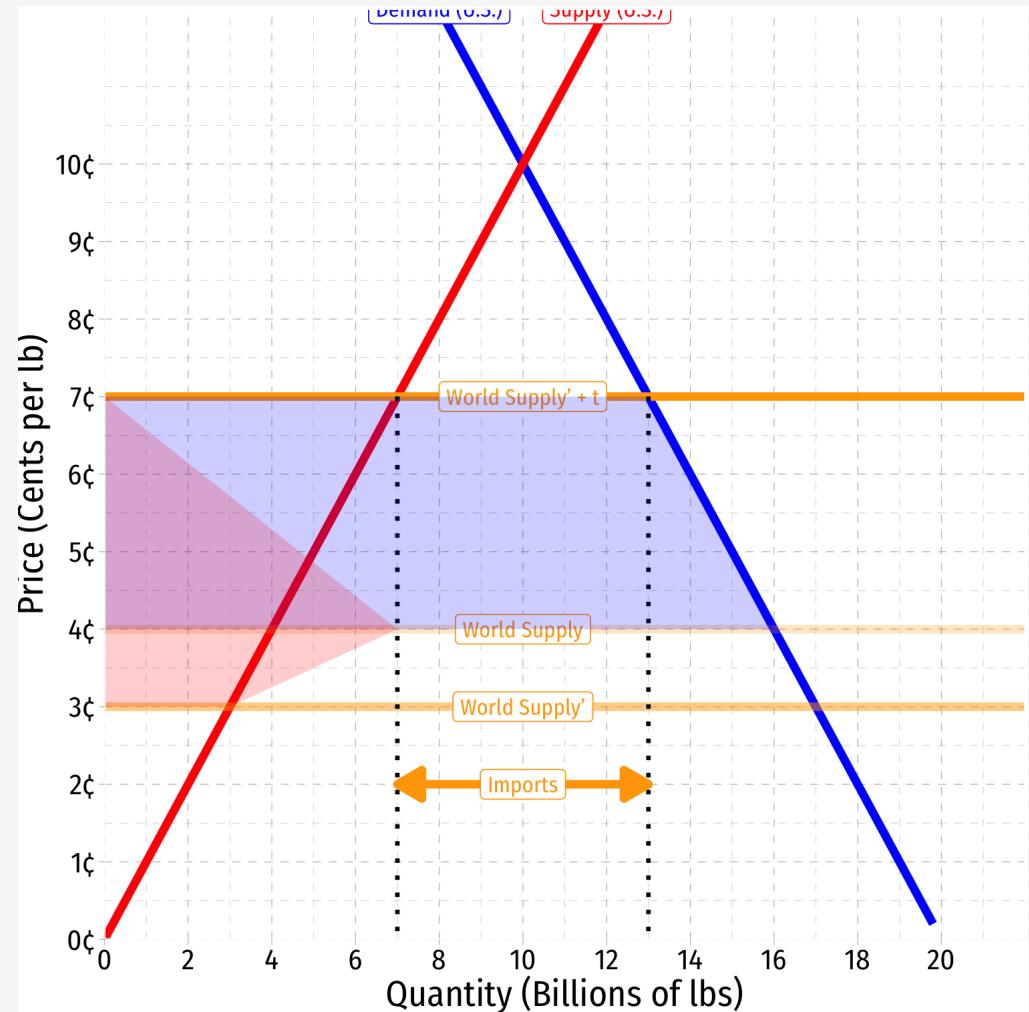
- At new domestic price of 7¢/lb:
 - U.S. consumers want to consume 13 bn lbs (less than before)
 - U.S. producers will produce 7 bn lbs (more than before)
 - U.S. will import 6 bn lbs from rest of the world (less than before)
- Note the changes are not as much as it was to the small country
 - U.S. “market power” forces down world price



Import Tariff Effects in a Large Country



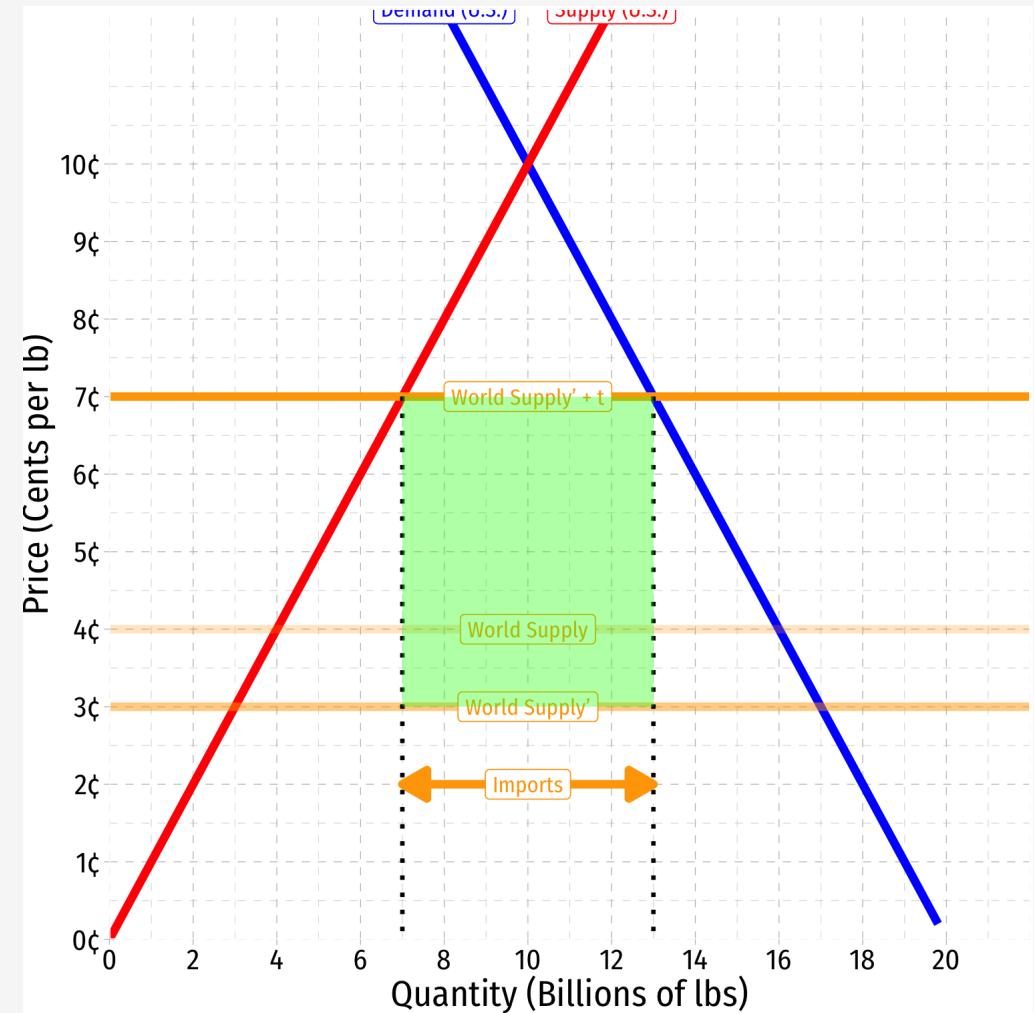
- Loss to U.S. consumer surplus (but less than for small country)
- Gain to U.S. producer surplus (but less than for small country)
 - Transfer of CS to PS



Import Tariff Effects in a Large Country



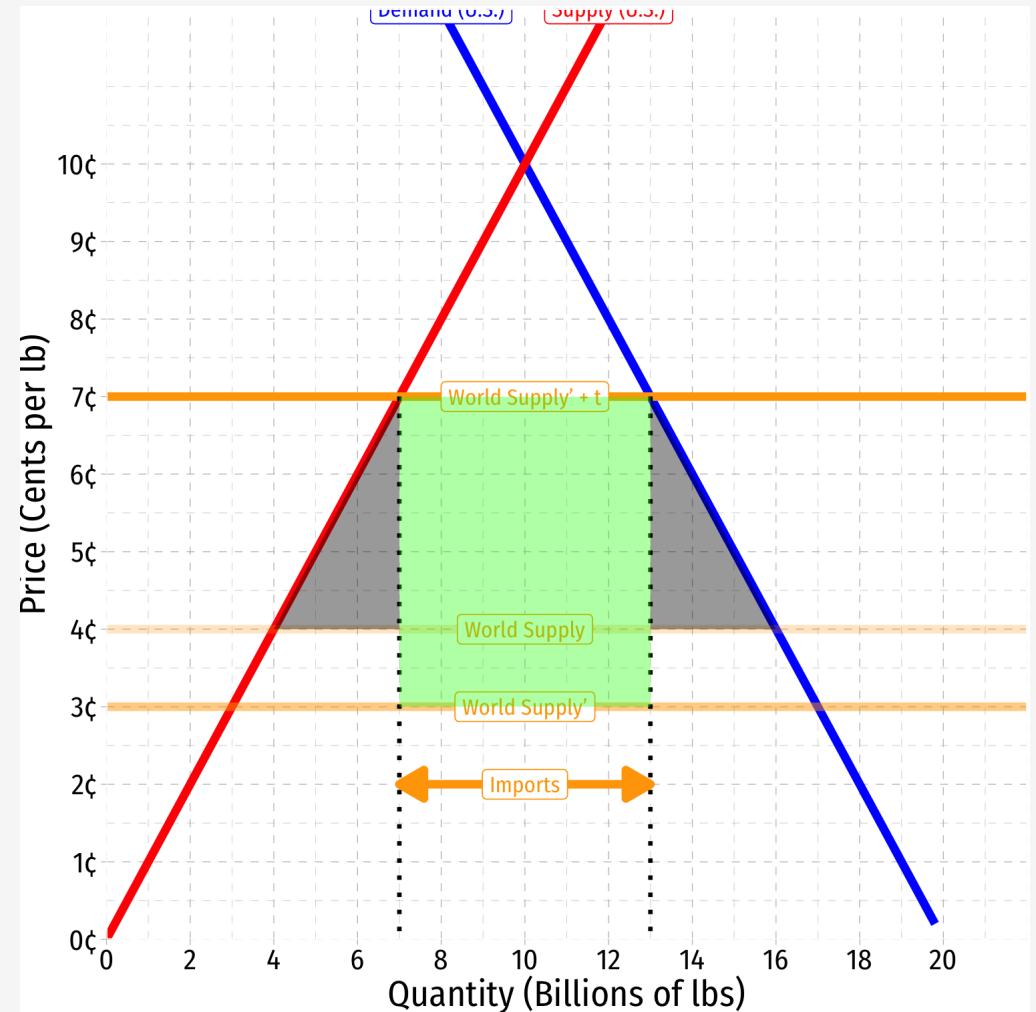
- Tariff will collect revenue for government
 - $4\text{¢}/\text{lb} \times 6 \text{ bn lbs} = \0.240 bn



Import Tariff Effects in a Large Country



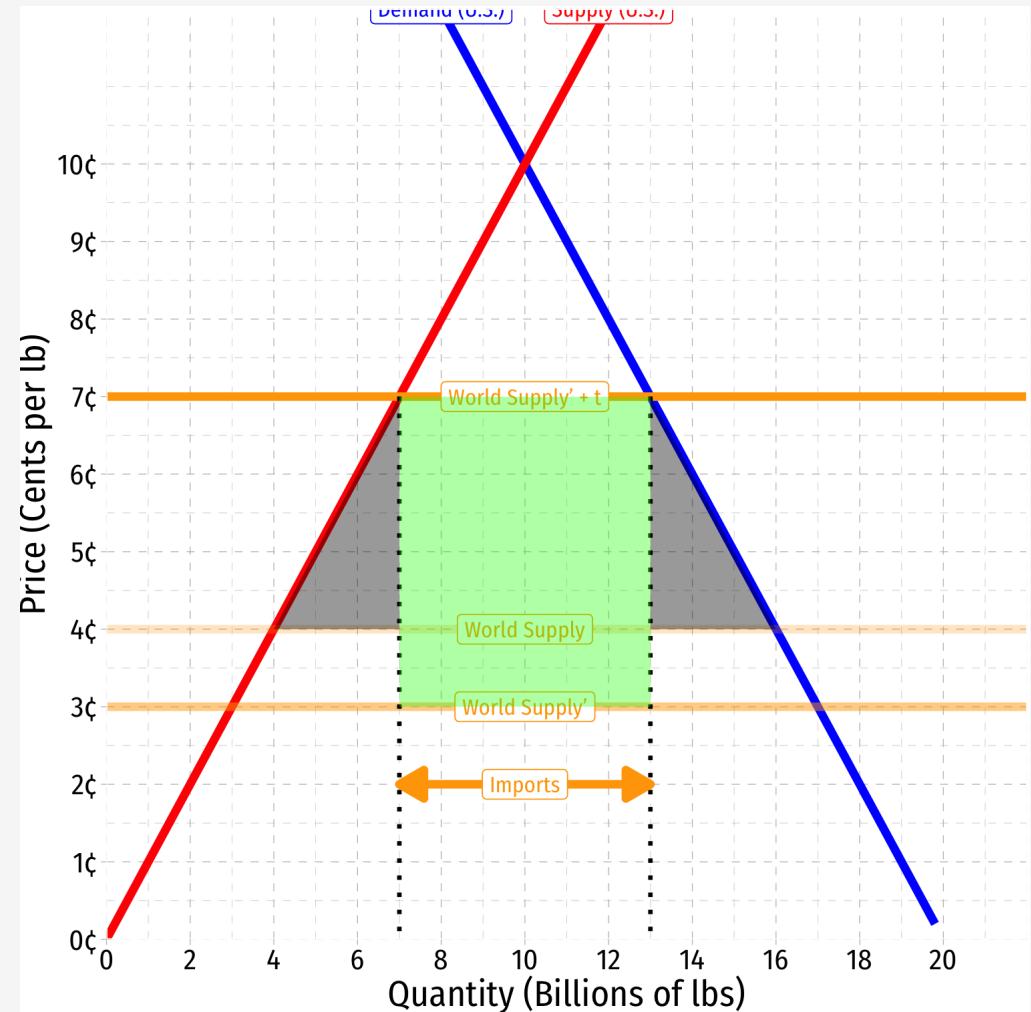
- Tariff will collect revenue for government
 - $4\text{¢}/\text{lb} \times 6 \text{ bn lbs} = \0.240 bn
- DWLs from productive and consumption inefficiencies
 - $2 \times \$-0.045 \text{ bn} = -\0.090 bn



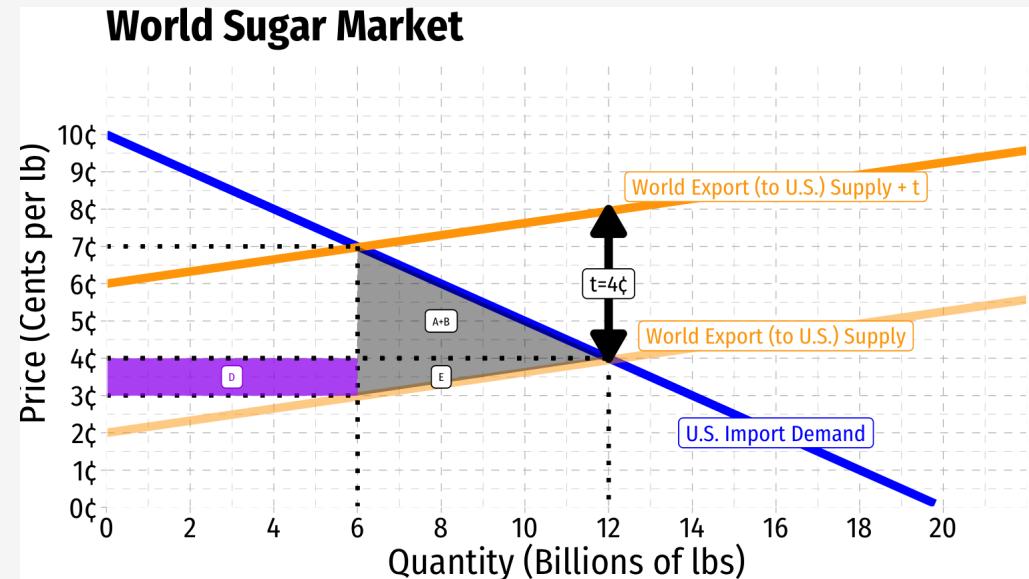
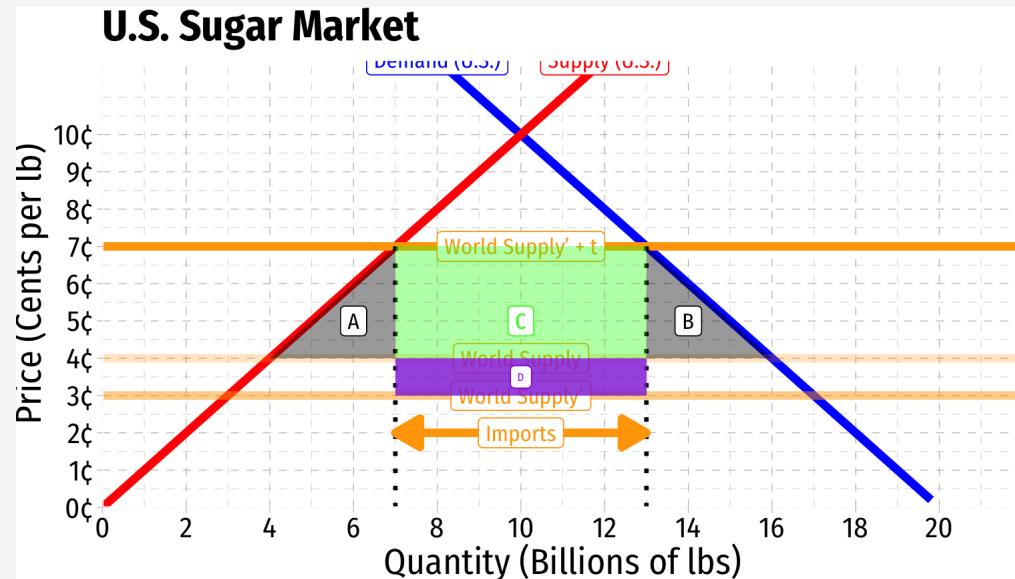
Import Tariff Effects in a Large Country



- Tariff will collect revenue for government
 - $4\text{¢}/\text{lb} \times 6 \text{ bn lbs} = \0.240 bn
- DWLs from productive and consumption inefficiencies
 - $2 \times \$-0.045 \text{ bn} = -\0.900 bn
- But: **gain in tariff revenue exceeds inefficiency (DWL)!**
 - **Tariff brings a net increase in U.S. national welfare!**

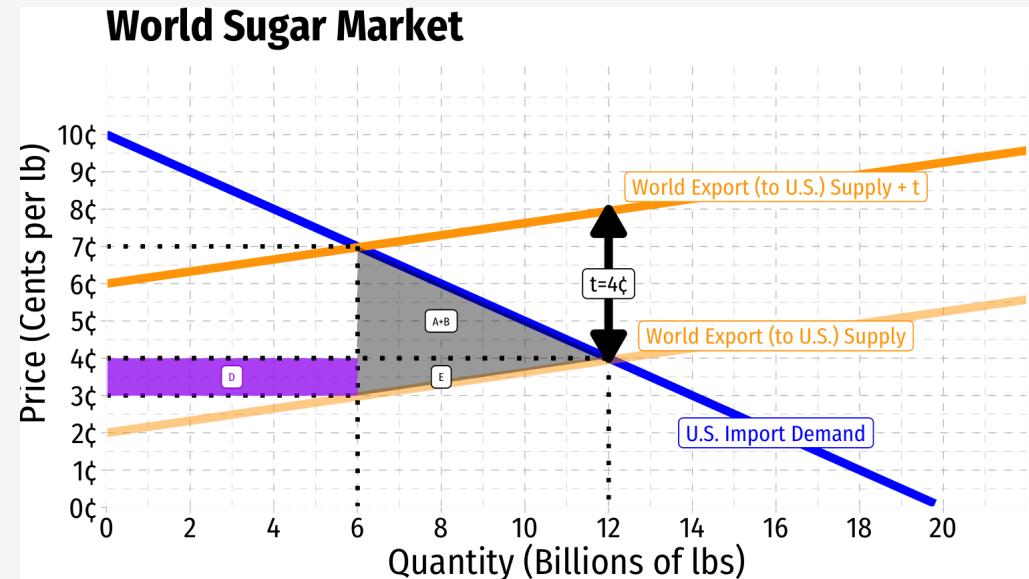
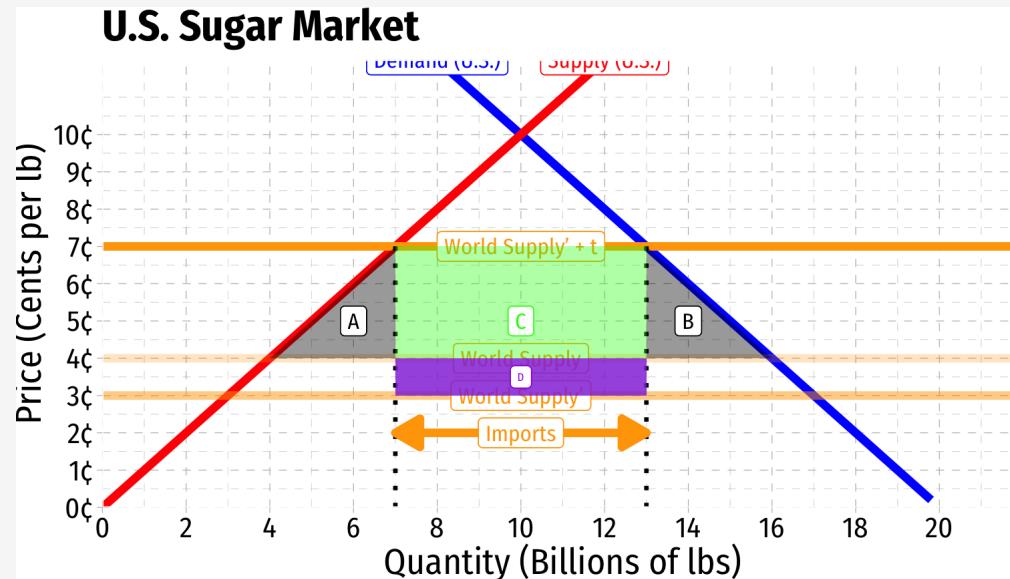


Import Tariff Effects in a Large Country



- 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



- 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	-\$0.900 bn



Optimal Tariff Theory

Optimal Tariff Theory



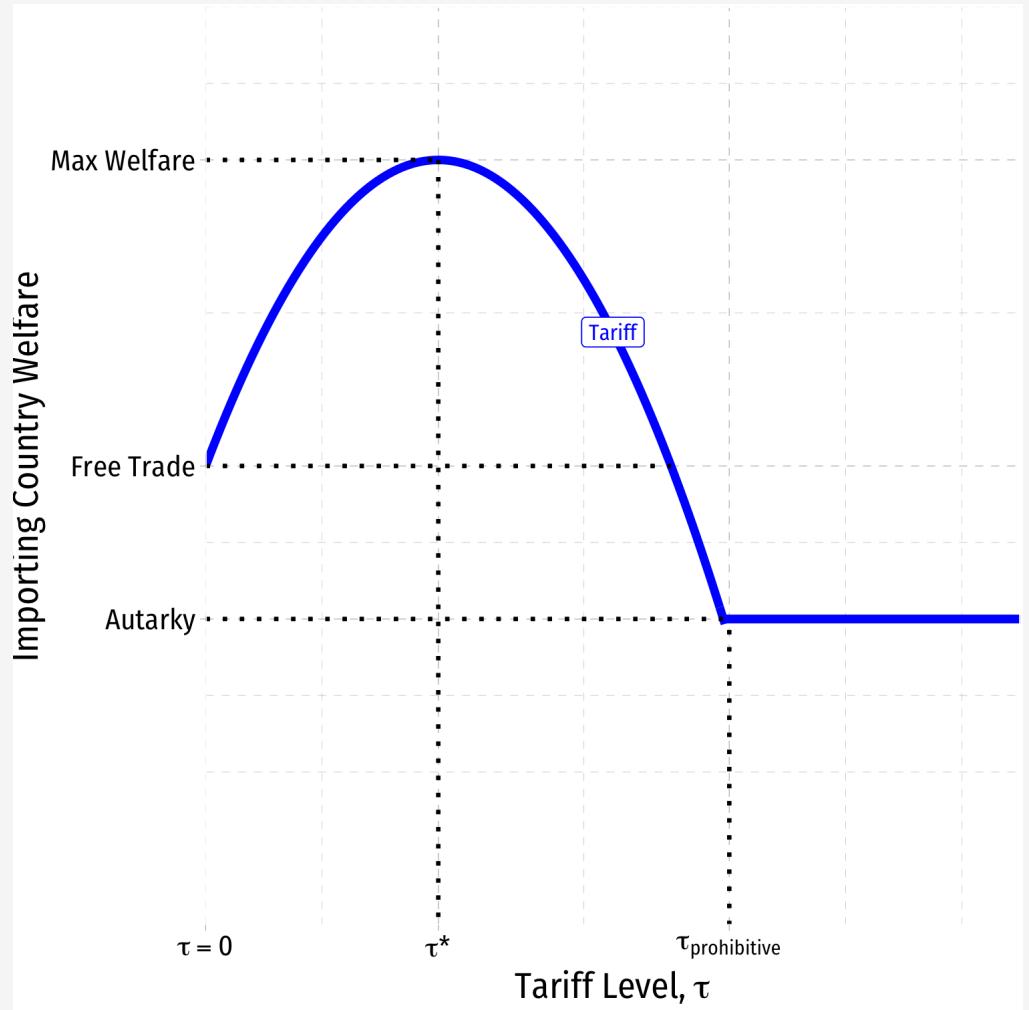
- For a large country, a tariff decreases volume of trade but improves country's terms of trade
 - Gain of tariff revenue ($C+D$)
 - Loss of deadweight loss ($A+B$)
- Net effect is a slight increase in (big) country's welfare
 - Note tariffs always are a net harm to a small nation!
- Thus, there exists 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 τ^* 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

