

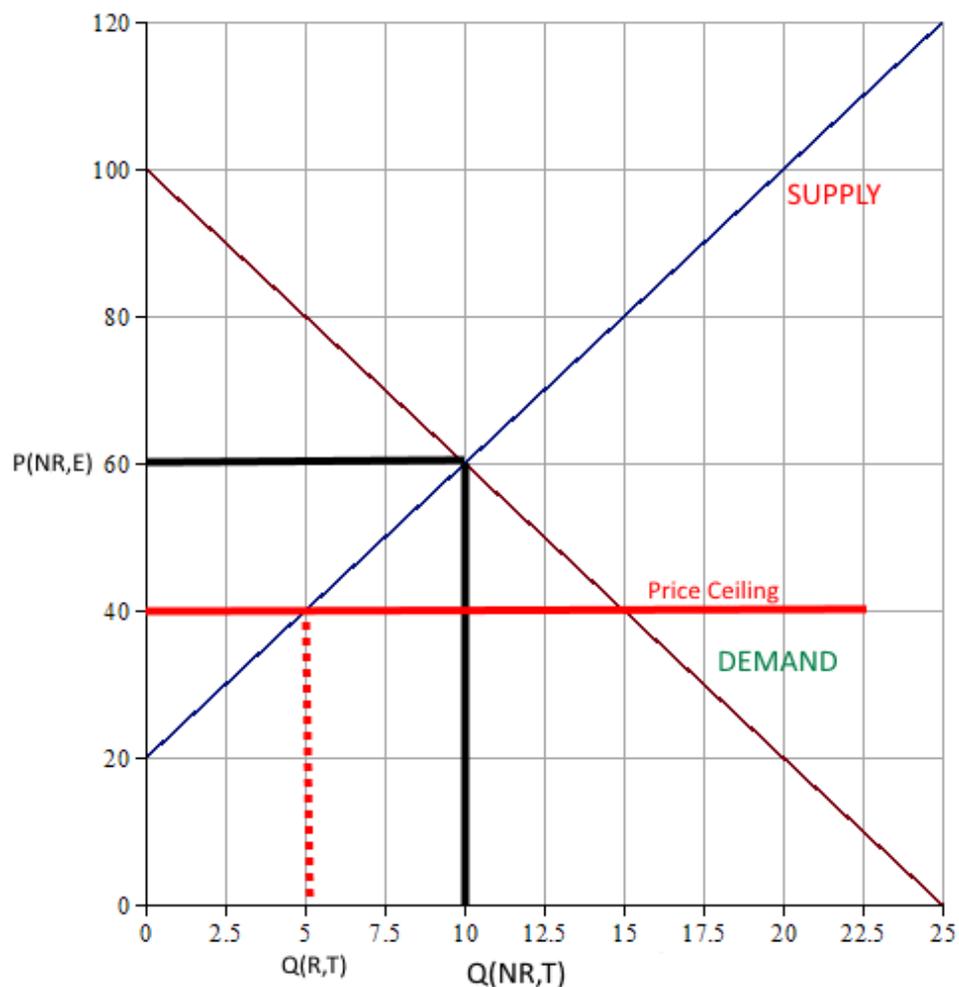
ECO 182: Summer 2015

Market III : Restrictions

- Different institutions participate in a market with an aim to regulate it.
- The reasons could be to improve efficiency or to achieve a particular outcome.
- Example: The government might legislate a *Minimum Wage*. This ensures a bottom limit on how much a worker can be paid.
- Example: Rent Control – Government might set the maximum rent that a landlord can charge the tenant.
- Example: A country might impose a tax on imports. This is typically done to protect the domestic industry.
- Example: A country might impose a tax on income or a tax on goods traded in the market.
- Example: Governments sometimes limit the quantity that can be bought or sold in the market.
- Motivations behind a regulation depends on the type of market and which institution is initiating the regulation. So the motives of a labor union lobbying for a minimum wage can be different from a government trying to pass a minimum wage law.
- A regulation/restriction generates a distortion in the market, away from the unrestricted equilibrium.

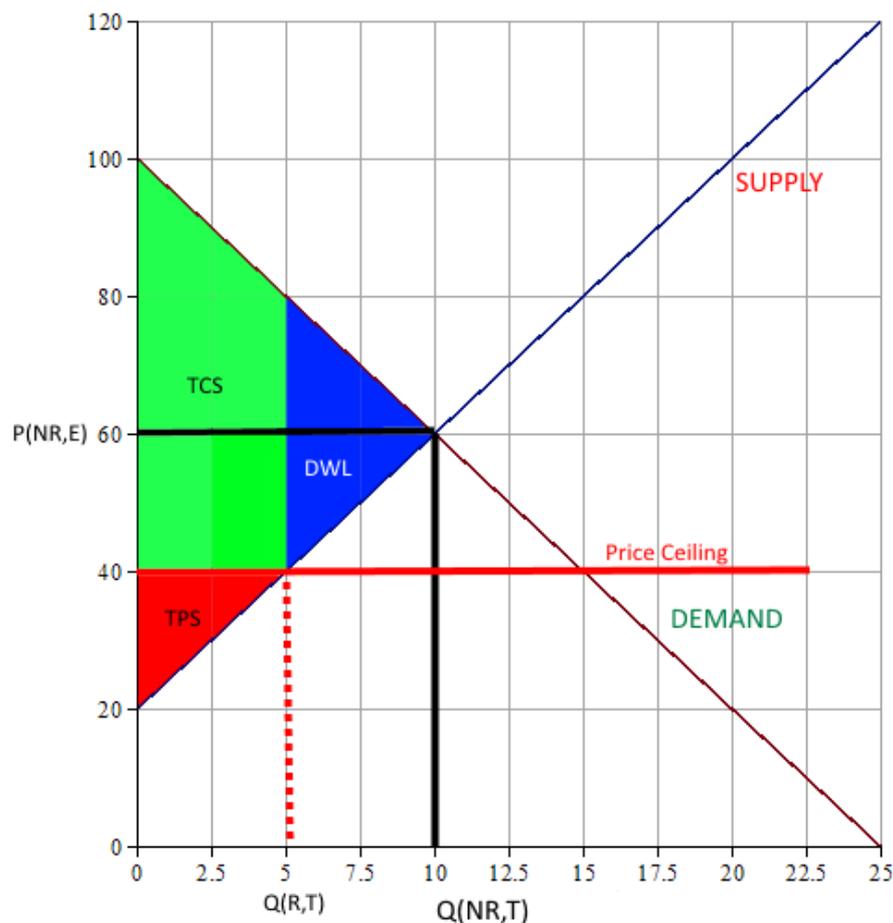
- A **Price Ceiling** is imposed on a market to cap the price at which trade takes place.
- Rationale behind a price ceiling would be to prevent the market from reaching the usual *equilibrium price*, because the equilibrium price might be too high. Alternatively, the price ceiling's aim is to restrict the amount of goods traded in the market.
- Rent Control is an example of a price ceiling.
- The following example is for a typical good. This analysis can be extended to any other types of markets/goods.
- To simplify we will work with perfectly competitive markets.
- Suppose the demand for oil is : $P = 100 - 4Q$. Supply for oil is given by: $P = 20 + 4Q$.
- Before restriction, $P_{NR}^e = \$60$ and $Q_{NR}^T = 10$ units.
- Now suppose there is a Price ceiling = \$40.
- At \$40 $Q_d = 15$ units and $Q_s = 5$ units. So we have excess demand.
- Since the Price ceiling ensures that no price above \$40 may be charged in the market, the excess demand is not eliminated by a rise in price and the quantity traded under restriction is given by: $Q_T^R = Q_s = 5$.

Price Ceiling - Outcome



- For positive quantity traded, the price ceiling, to be effective, must lie above the minimum price on the supply curve and below the no-restriction equilibrium price $[P(NR,E)]$.
- Example: The price ceiling legislated to be $> \$20$ and $< \$60$ will be a **BINDING** Price Ceiling. In this case the binding price ceiling is $\$40$.
- A price ceiling set above the no-restriction equilibrium price is ineffective. Market price will come down to the no-restriction equilibrium price.
- The price ceiling legislated to lie $> \$60$ will be a **NON-BINDING** Price Ceiling.
- Non-binding Price ceilings are ineffective as they defeat the purpose of a ceiling : controlling the market outcome. So, a non-binding price ceiling will generate the no-restriction equilibrium price $P(NR,E)$ and no-restriction quantity traded $Q(NR,T)$.

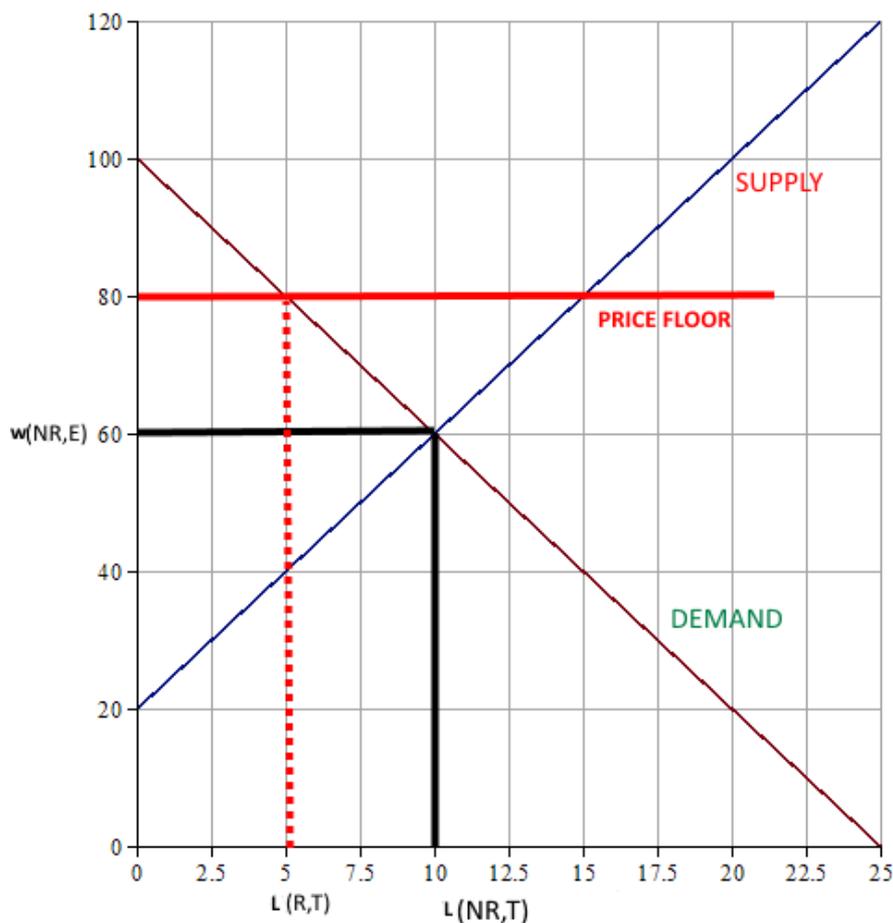
Price Ceiling-Welfare



- Compared to the no-restriction case, a binding price ceiling generates,
 - i. Dead Weight loss
 - ii. Lower producer surplus
 - iii. Consumer Surplus may or may not rise
- In this example, $DWL = \$100$.
- Keeping no-restriction equilibrium unchanged, if the demand curve is steeper than the supply curve, then the consumer's proportion of the $DWL >$ producer's proportion.
- Here, the green area is TCS, the red area is TPS and the blue area is DWL, after the price ceiling.
- Q: Are binding price ceilings efficient?

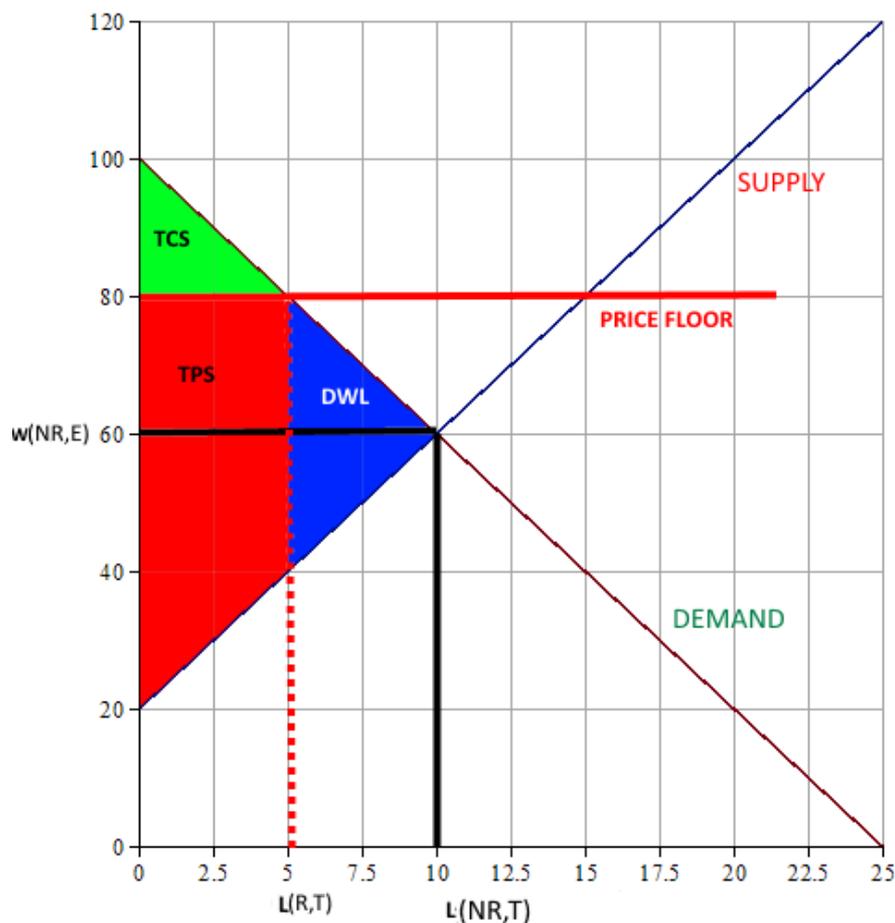
- A **Price Floor** is imposed on a market to bottom or support the price at which trade takes place.
- Rationale behind a price floor would be to prevent the market from reaching the usual *equilibrium price*, because the equilibrium price might be too low. Alternatively, the price floor's aim is to just restrict the amount of goods traded in the market.
- Minimum Wage is an example of a price floor.
- The following example is for labor market. This analysis can be extended to any other types of markets/goods. To simplify we will work with perfectly competitive markets.
- Suppose the demand for labor is : $W = 100 - 4L$. Supply for labor is given by: $W = 20 + 4L$.
- Before restriction, $W_{NR}^e = \$60$ and $L_{NR}^T = 10$ units.
- Now suppose there is a Price floor = \$80.
- At \$80, $L_d = 5$ units and $L_s = 15$ units. So we have excess supply.
- Since the Price floor ensures that no price(wage) below \$80 may be given in the market, the excess supply is not eliminated by a fall in price and the labor traded under restriction is given by: $L_T^R = L_d = 5$.

Price Floor - Outcome



- For positive labor employment, the price floor, to be effective, must lie below the maximum MWP and above the no-restriction equilibrium wage [$W(NR,E)$].
- Example - The price floor legislated to be $> \$60$ and $< \$100$ will be a **BINDING** Price Floor. In this case the binding price floor is $\$80$.
- A price floor set below the no-restriction equilibrium price is ineffective. Market price will come up to the no-restriction equilibrium price.
- The price floor legislated to lie $< \$60$ will be a **NON-BINDING** Price floor.
- Non-binding Price floors are ineffective as they defeat the purpose of a floor : controlling the market outcome. So, a non-binding price floor will generate the no-restriction equilibrium wage $W(NR,E)$ and no-restriction labor employment $L(NR,T)$.
- Specifically for a labor market, the excess is called “unemployment”. So here the unemployment is $15 - 5$ units = 10 units.

Price Floor - Welfare



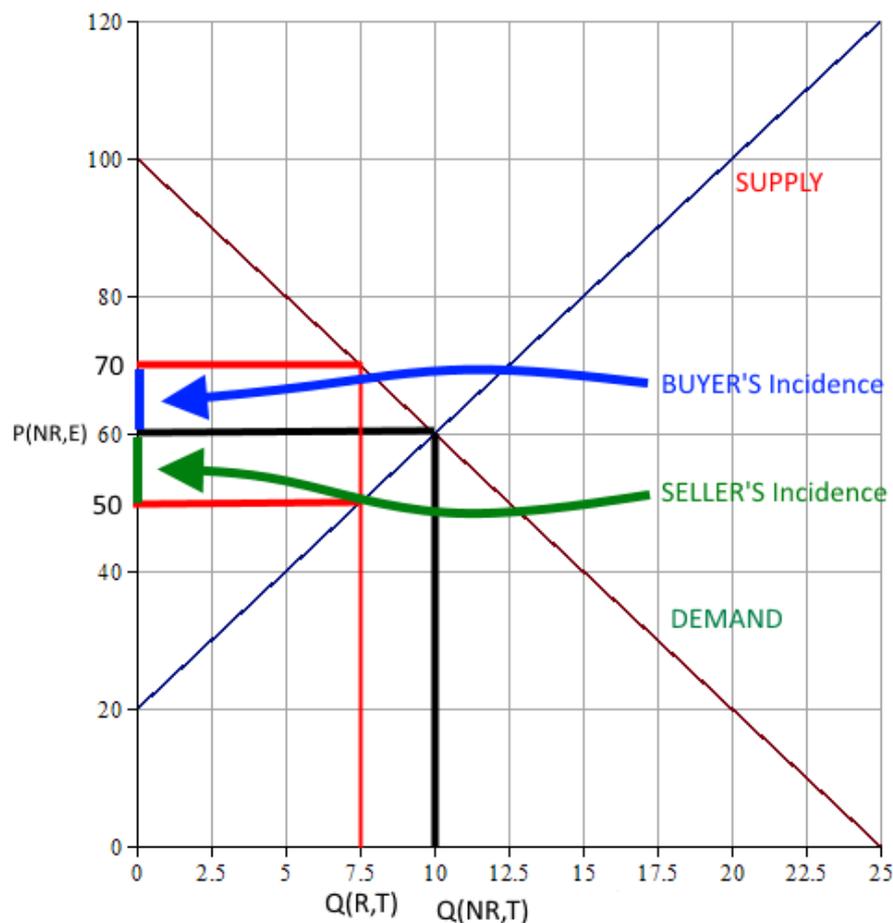
- Compared to the no-restriction case, a binding price floor generates,
 - i. Dead Weight loss
 - ii. Lower consumer surplus
 - iii. Producer Surplus may or may not rise
- $DWL = \$100$.
- Keeping no-restriction equilibrium unchanged, if the demand curve is steeper than the supply curve, then the consumer's proportion of the $DWL >$ producer's proportion.
- Here, the green area is TCS, the red area is TPS and the blue area is DWL, after the price ceiling.
- Q: Are binding price floors efficient?
- Q: In the context of labor markets, are Minimum Wages helpful?

- Excise Taxes are taxes on sale. If you are buying or selling something in the market, you pay an excise tax.
- An excise tax can be levied on the buyer or the seller. Irrespective on who the tax is levied on, both buyers and sellers pay a part of the tax. This is tax incidence on buyer or seller.
- Excise taxes will generate a DWL. But they also generate a Tax Revenue, which is collected by the government.
- If the government chooses to redistribute the tax revenue, it can improve welfare ***compared to no redistribution***.
- The following example is for a typical good. This analysis can be extended to any other types of markets/goods.
- To simplify we will work with perfectly competitive markets.
- Suppose the demand for oil is : $P = 100 - 4Q$. Supply for oil is given by: $P = 20 + 4Q$.
- Before restriction, $P_{NR}^e = \$60$ and $Q_{NR}^T = 10$ units.
- Now suppose the government imposes a tax of \$20 per unit sold.

Excise Tax - Calculations

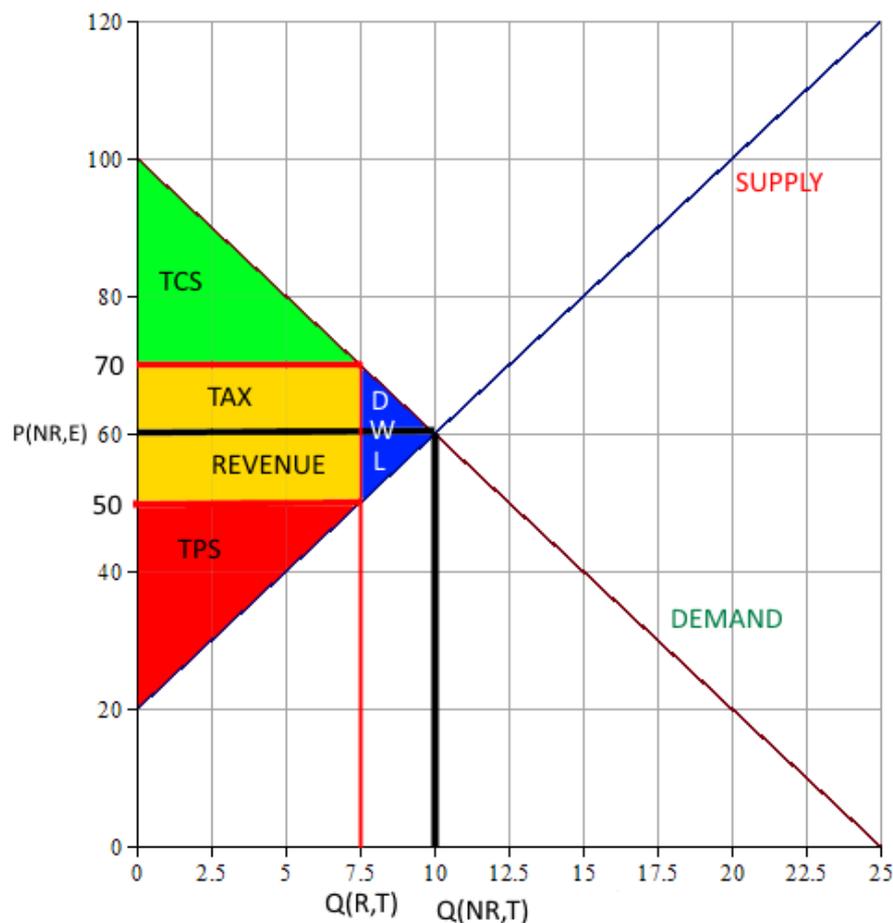
- If the tax is \$ t per unit sold, when the tax is levied on the buyers we can say for every unit of quantity traded: $P_b - t = P_s$.
- If the tax is \$ t per unit sold, when the tax is levied on the sellers we can say for every unit of quantity traded: $P_b = P_s + t$.
- Clearly, it doesn't matter who the tax is levied on; the outcome will be the same.
- Under tax, we find the quantity traded by setting $P_b = P_s + t$, and replace the expressions for P_b from the demand curve and P_s from the supply curve.
- Then we find the quantity traded after restriction by putting the P_b (P_s) we just calculated in the demand(supply) curve.
- For our example, this will be 7.5 units.
- At 7.5 units, from the demand curve, we have the Price the buyer pays = \$70 and from the supply curve, we have the Price the seller receives = \$ 50.
- At 7.5 units, the government collects a Tax Revenue of \$ $(7.5 \times 20) = \$ 150$.
- The incidence of Tax for the buyer is $\$(70-60) = \10 . See how this is with respect to the no restriction equilibrium price.
- The incidence of Tax for the seller is $\$(60-50) = \10 . See how this is with respect to the no restriction equilibrium price.

Excise Tax - Outcome



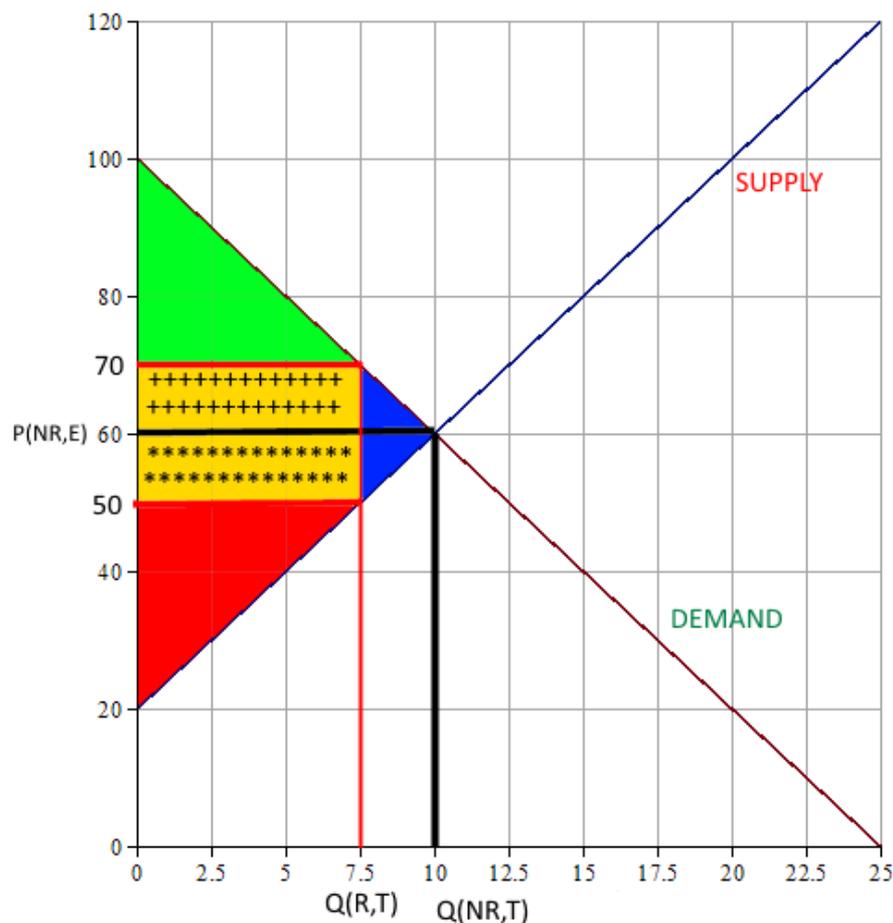
- Excise tax ensures that the quantity traded in the market goes down.
- The total tax rate can be computed from adding the buyer's incidence and the seller's incidence.
- Total tax rate = \$ 10 + \$ 10 = \$ 20.
- This means that the buyer's incidence is 50% and the seller's incidence is 50%.
- Keeping the no restriction equilibrium unchanged, if the demand curve is steeper than the supply curve, then the buyer's incidence is higher than the seller and the buyer pays the majority of the tax revenue.

Excise Tax – Welfare



- The tax revenue, if not distributed back to the economy would be counted as a welfare loss.
- No distribution : Welfare loss = Tax revenue + DWL
- Redistribution : Welfare loss = DWL
- Redistribution: Welfare(after tax) = TCS + Tax Revenue + TPS
- By now you must realize, the share of DWL borne by the buyer or seller depends on who has the steeper or flatter curve.
- DWL is smaller when either or both of Demand and Supply is more inelastic.
- Total Tax Revenue is smaller when either or both of Demand and Supply is more elastic.

Excise Tax - Burden



- The portion of Tax Revenue marked by “+++” is the buyer’s share of revenue.
- The portion of Tax Revenue marked by “***” is the seller’s share of revenue.
- Perfectly elastic curve for buyer(seller) means no tax burden for buyer(seller), full burden for seller(buyer).
- Q: What happens to revenue share, incidence when curves become inelastic?
- When the slopes of the demand and supply curves are same(in absolute terms), the tax revenue share, incidence are identical for the buyers and sellers.

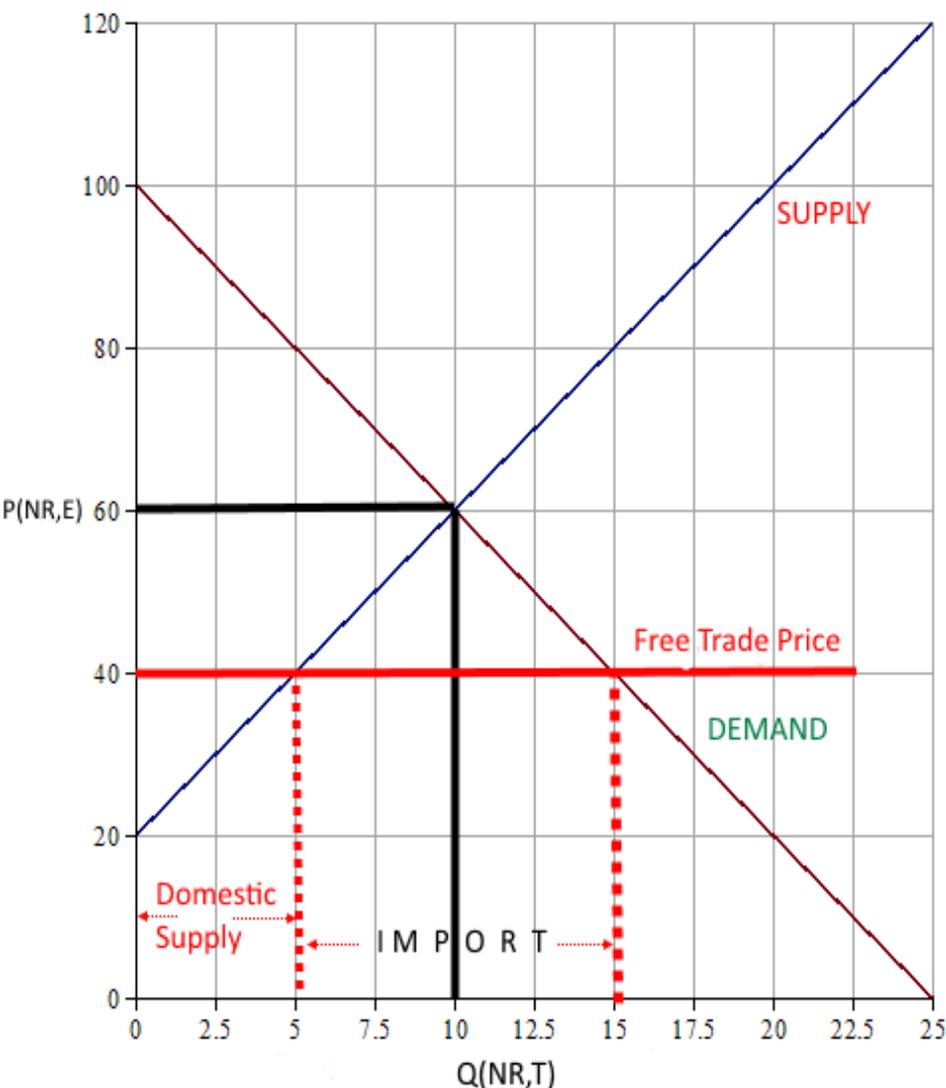
Concluding Comments

- For excise taxes, if the government redistributes only to the sellers, the welfare distribution will match that of a binding price floor.
- For excise taxes, if the government redistributes only to the buyers, the welfare distribution will match that of a binding price ceiling.
- Q: Can you say why?
- Instead of a tax on quantity sold, what if there is a tax on income?
- You know how to analyze this already. Income tax shifts the budget line in, and this shifts the demand curve to the left.
- Remember, for all these restrictions, it would be pointless if they did not bind.
- Not binding means that the no restriction equilibrium is reached even under restriction.

Should you open the Economy?

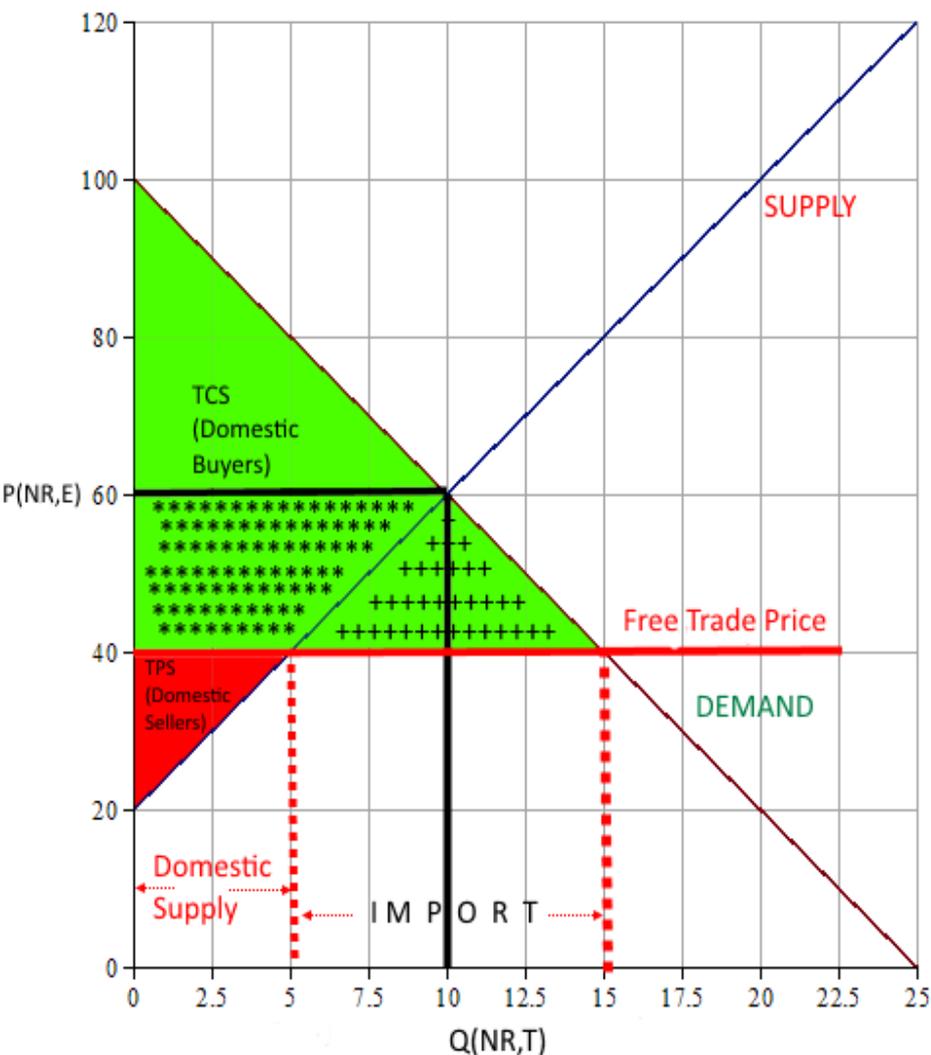
- A point of debate over the years has been the following: Should countries open up trade? After all trade generates gains from trade.
- This seemingly simple question has quite a complicated response. If I stop buying domestic goods and substitute them with cheaper foreign goods, what happens to the domestic sellers and those employed by them?
- Without going into anything complicated, we can study the merits of the following very popular argument in International Economics : *“Free trade is better than no trade.”*
- Naturally, an extension to this analysis would be to look at how international trade is controlled/regulated or restricted.
- That is to say, what happens when you restrict a market which already has free trade?
- Looking at simple welfare results, you should be able to understand why there are always people who speak for and those who speak against open trade, and why there are different groups advocating for and against restricting an existing free trade.
- The following examples use the Demand and Supply curves used in the previous part of this lecture note.

Free Trade



- Consider the domestic country consuming a good. The domestic suppliers, under closed economy would charge a price of \$60 and sell quantity 10 units.
- Now open this country up to trade. A foreign country sells the same good cheaper. In fact, if the domestic country imports the good, they would have to pay \$40/unit, instead of \$60/unit.
- So what happens? The terms of trade is \$40/unit under free trade. At \$40 Domestic producers supply 5 units. At \$40 the domestic consumers have an excess demand of $15 - 5 = 10$ units.
- This 10 units is imported by the domestic consumers at \$40/unit.
- Trade has caused consumers to buy more (15 units) than no trade case (10 units).

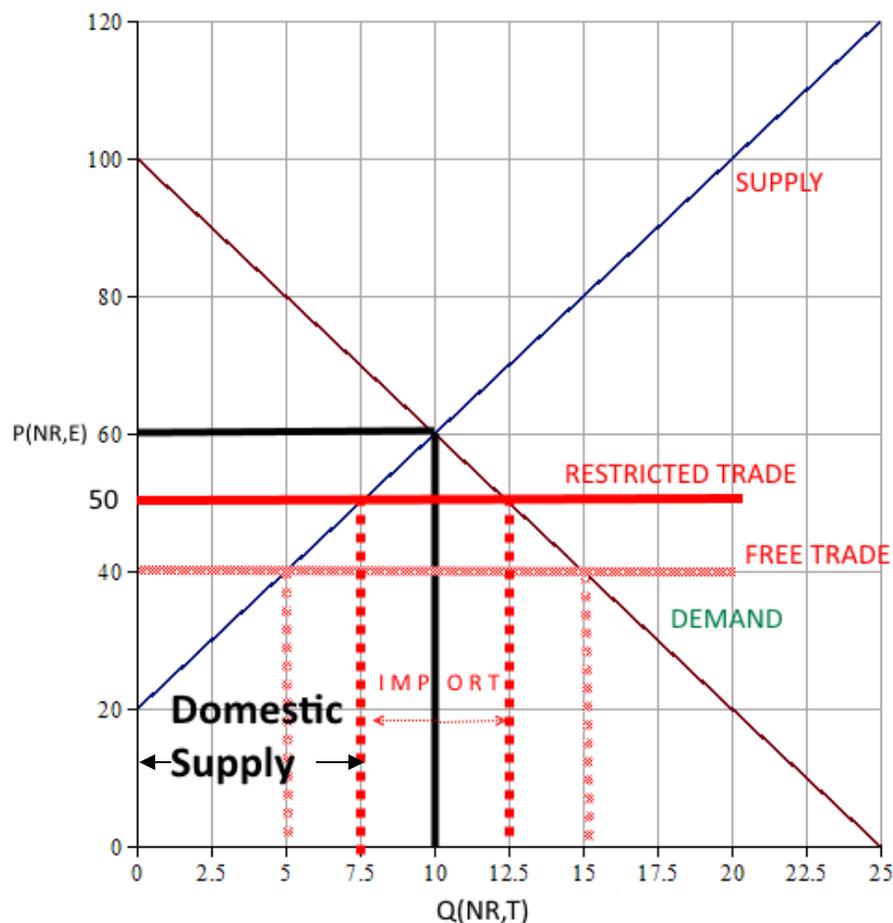
Winners and Losers



- Look what happens to the Welfare! The Total Surplus under no trade has now expanded.
- This is because, consumers have been able to expand their choices under trade. Consumers win!
- They pay \$40 for 15 units. For the 10 units they import, they snap up an extra Consumer Surplus.
- The domestic producers lose! Their PS goes down.
- A part of their old PS is captured by the consumers.
- The part marked “++” which is the addition to CS and Welfare, is the gain from international trade. Winners gain more than losers lose.
- The Welfare of the entire economy rises by the triangle marked by “+++”.

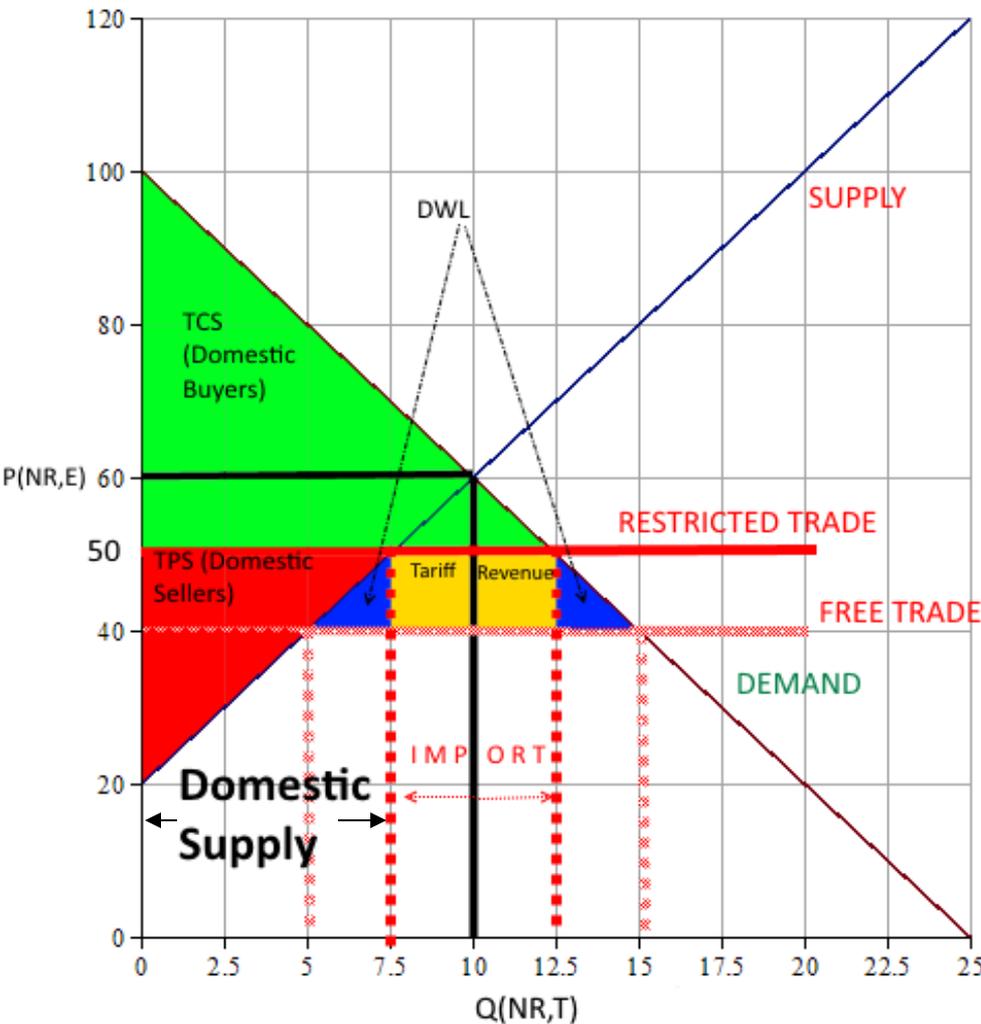
- A tariff is a tax you pay to import something from another country. The tariff is levied on the seller, but from our analysis of the excise tax, we know that the burden is shared by both buyers and sellers in the market.
- Why does a country levy a tariff? One reason is to protect a domestic industry. For most of the later half of last century, India's trade policy was restrictive. This was done to ensure that the domestic producers could be protected from the cheaper priced goods produced and sold in the rest of the world. The idea was that the domestic producers will be selling more in the domestic market and improve their production and quality and eventually lower prices, becoming more efficient. It didn't work out as planned.
- Tariffs can be used as threats. Yes. You threaten another country with a tariff to make them concede on some other treaty or to make them do something.
- Sounds far fetched? I assure you this very much happens.
- Sometimes countries reciprocate to a tariff by imposing a tariff themselves; now two countries keep increasing tariffs on each other, leading to a tariff war.
- A high enough tariff can stop trade completely.
- Revenue generated by a tariff is collected by the government of the country imposing the tariff.

Tariff - Outcome



- A Tariff of \$10/unit is levied. Consequently the foreign good is imported at \$50/unit.
- Domestic producers won't charge higher than the foreign good price ever (can you say why?)
- At \$50 price, the domestic supply is 7.5 units. The demand is 12.5 units.
- The excess demand of 5 units is imported under restricted trade.
- Due to tariff, quantity imported falls, trading price or terms of trade or equilibrium price goes up (in here from \$40 to \$50).
- Yes, producers gain. The TPS for the domestic producers rise.
- The domestic government gains. It receives a revenue from the imported units called *Tariff Revenue*.

Tariff - Welfare



- Domestic producers have increased their TPS by reclaiming the **trapezium** between \$40 and \$50 from the consumers. Restricting trade has redistributed surplus from buyers to sellers.
- The government has gained the **yellow** rectangle as tariff revenue = $\$(5 \times 10) = 50$.
- But what has happened to the economy?
- Even if the government redistributes the tariff revenue back to the economy, there are two blue triangles of DWL.
- Restricting a free trade outcome doesn't just redistribute some surplus to some people...it generates a DWL for the economy as well.
- Restricted trade is inefficient.
- Now, no trade vs free trade vs restricted trade ... which one is better?
- Depends - who are you...consumer, producer, or are you calculating the welfare of the entire economy ?