Intro to Economic Analysis: Microeconomics

EC 201 - Day 13 Slides

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Department of Economics - University of Oregon

8 November 2021

Logistics

- Homework 5 due this Saturday at 11:59pm
- Next news assignments posted, due this Wednesday, Nov 10, at 11:59pm
- Midterm grades with grade update to come

Recall – Tax Motivation

- There are many ways to talk about taxes/subsidies, we will solely focus on per-unit taxes in this class
- We may tax (subsidize, resp.) consumers to discourage (encourage) consumption, and we may tax (subsidize) producers to discourage (encourage) production
- For a demand curve $P = mQ + b$, a tax t shifts demand down by t units, to $P = mQ + b - t$
- Conversely, a subsidy s shifts demand up by s units, to $P = mQ + b + s$

Recall – Tax Effects

- For a supply curve $P = mQ + b$, a tax t shifts supply up by t units, to $P = mQ + b + t$
- Conversely, a subsidy s shifts supply down by s units, to $P = mQ + b - s$
  - This is because a tax on *consumers* induces the price paid, P, to be replaced with $P + t$
  - While a tax on *producers* induces the price received, P, to be replaced with $P - t$
- Taxes and subsidies induce *two* different notions of price in our market: prices paid by consumers, and prices received by producers
- It's still the case that taxes have a negative, regressive effect on supply/demand, while subsidies have a positive, stimulative effect on supply/demand
  - It just looks backward because of the difference in slopes for supply/demand

Example – A Tax on Producers

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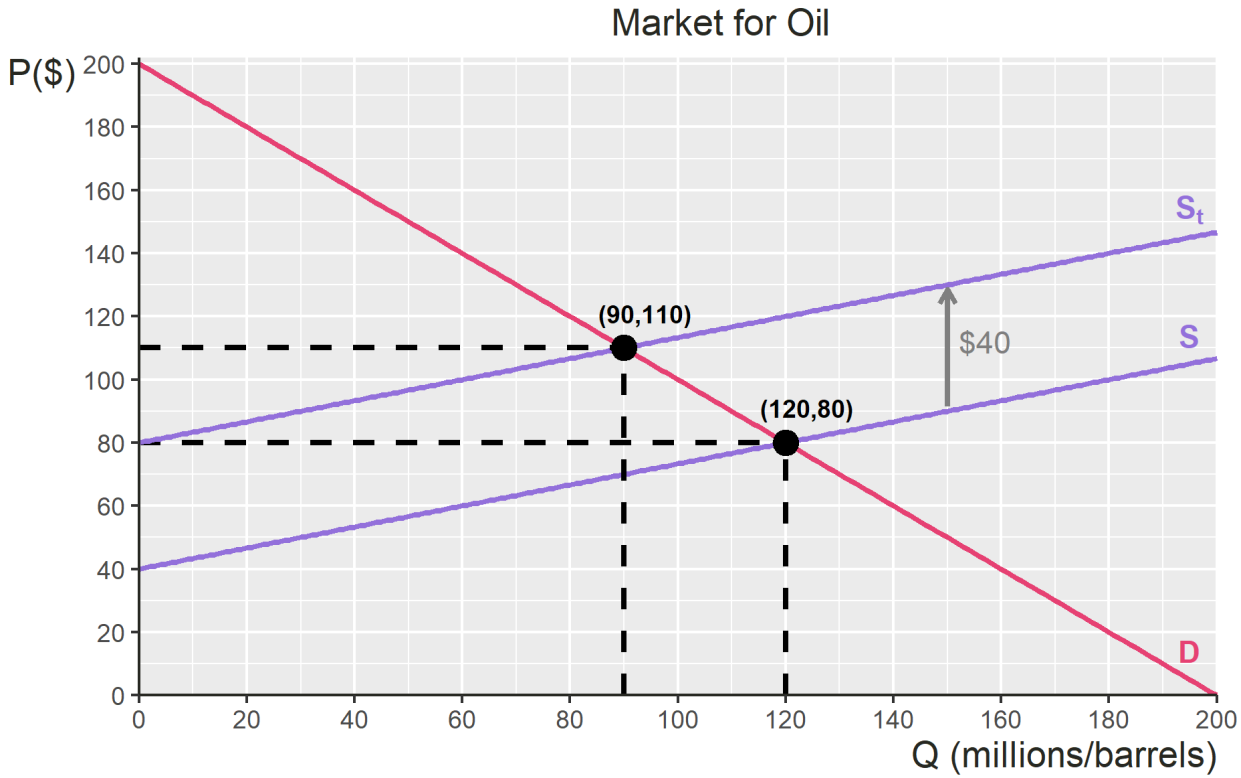

The supply line shifts from S to S_t with the tax

Difference in Prices – Tax on Producers

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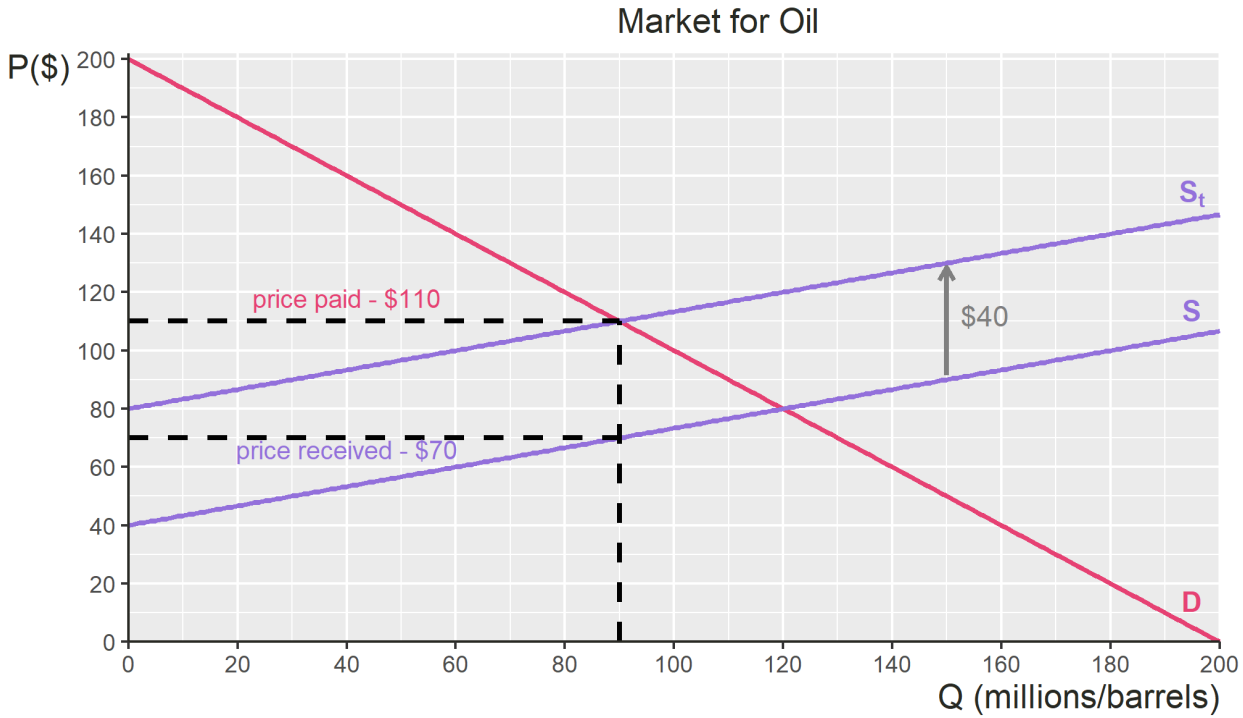

Government Revenue – Tax on Producers

- What is government revenue under this policy?

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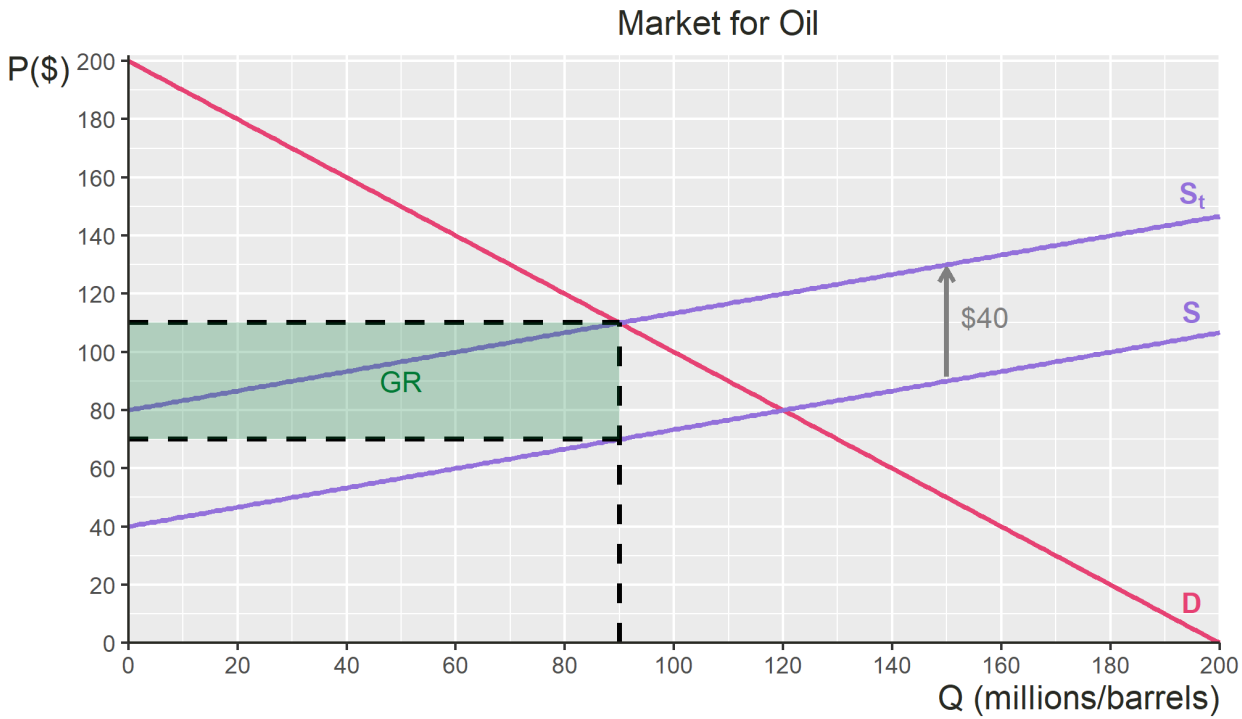
- At \$40/unit times 90 units,

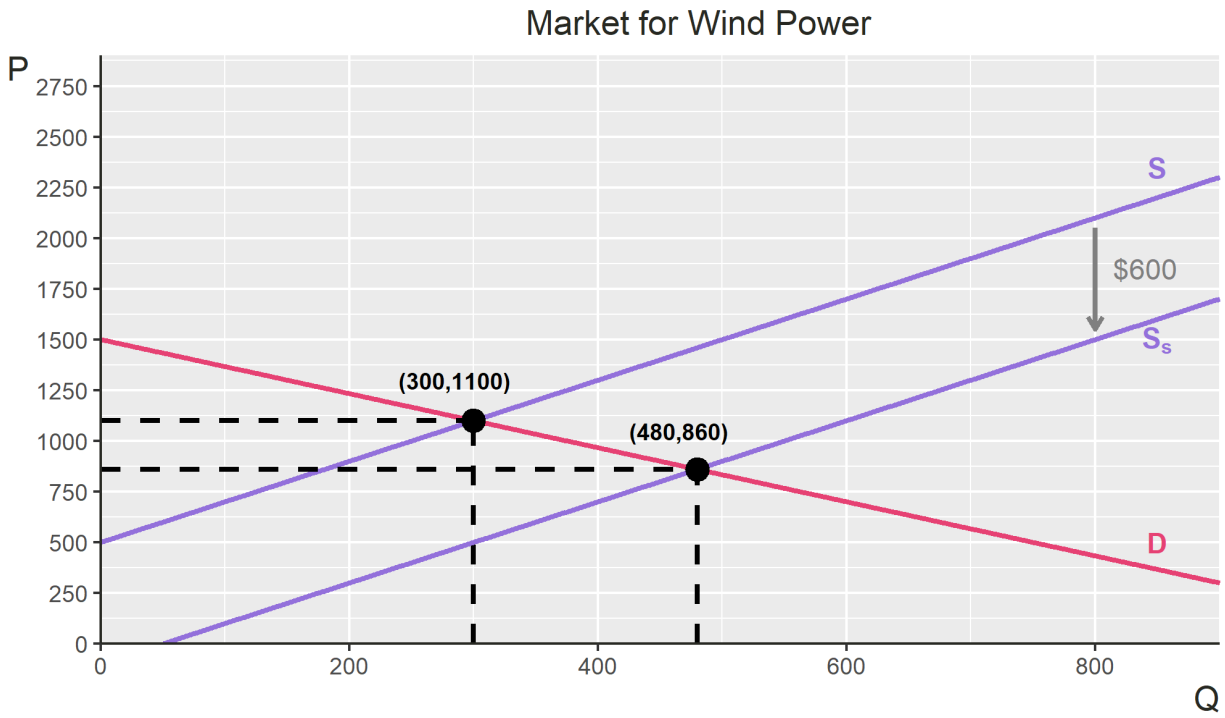
$$GR = (40)(90M) = \$3.6B$$



If we weren't working in millions, it would be \$3600

Example – A Subsidy for Producers

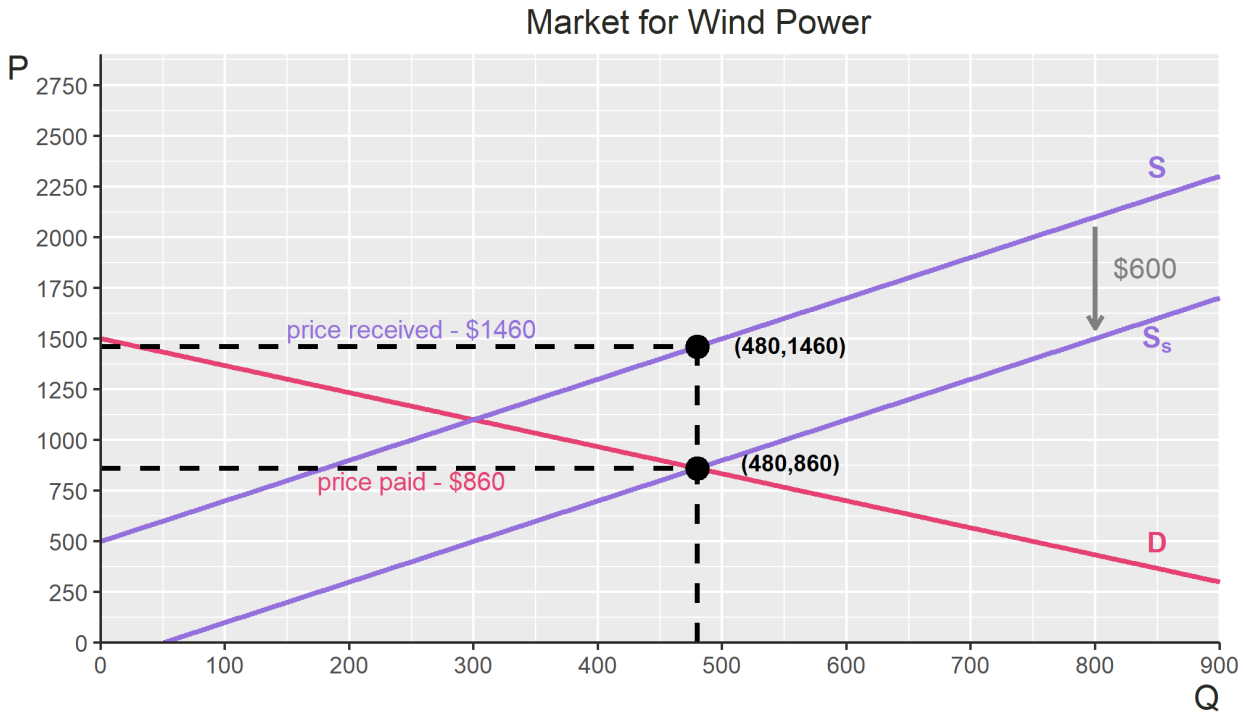
- Suppose that, in order to encourage wind power prominence, the government provides a \$600/unit subsidy to producers



The supply line shifts from S to S_s with the subsidy

Difference in Prices – Subsidy for Producers

- Now, the consumer pays \$860 for win power, and the producer gets \$600 extra for making and selling the wind power, meaning they receive \$1460



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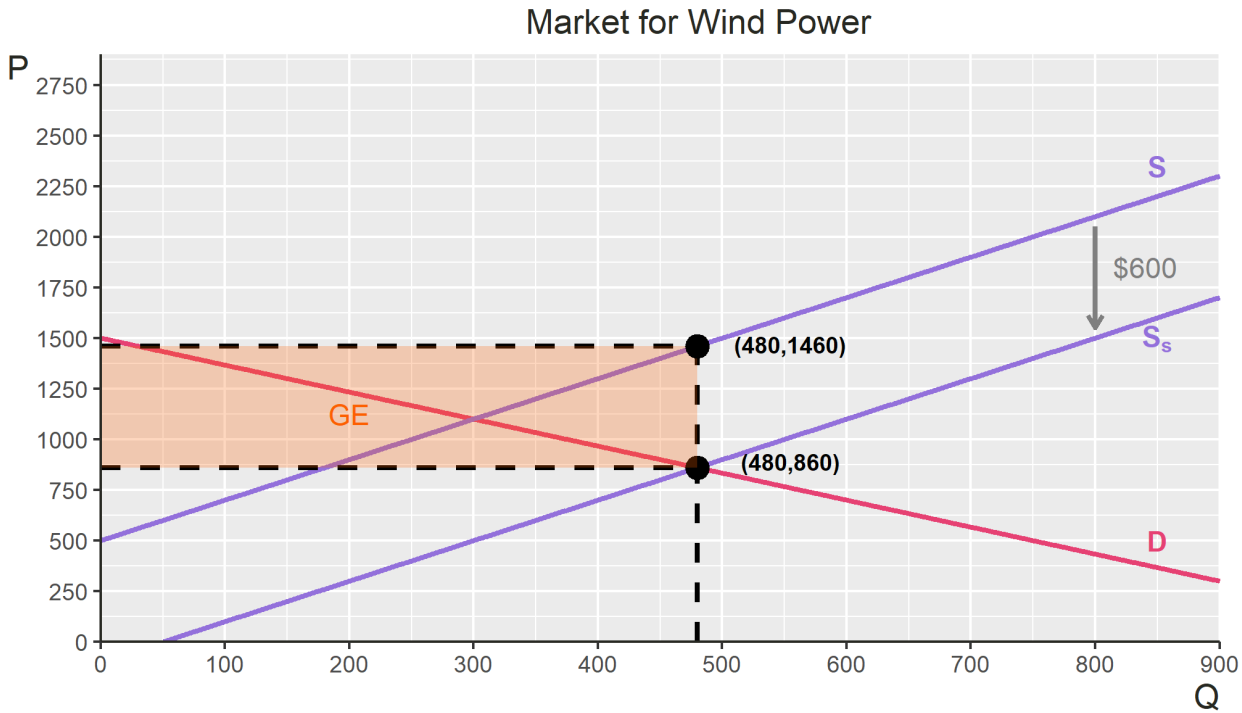

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    - This works the other way too, when the tax is on consumers: they may, effectively, "pass" it to producers

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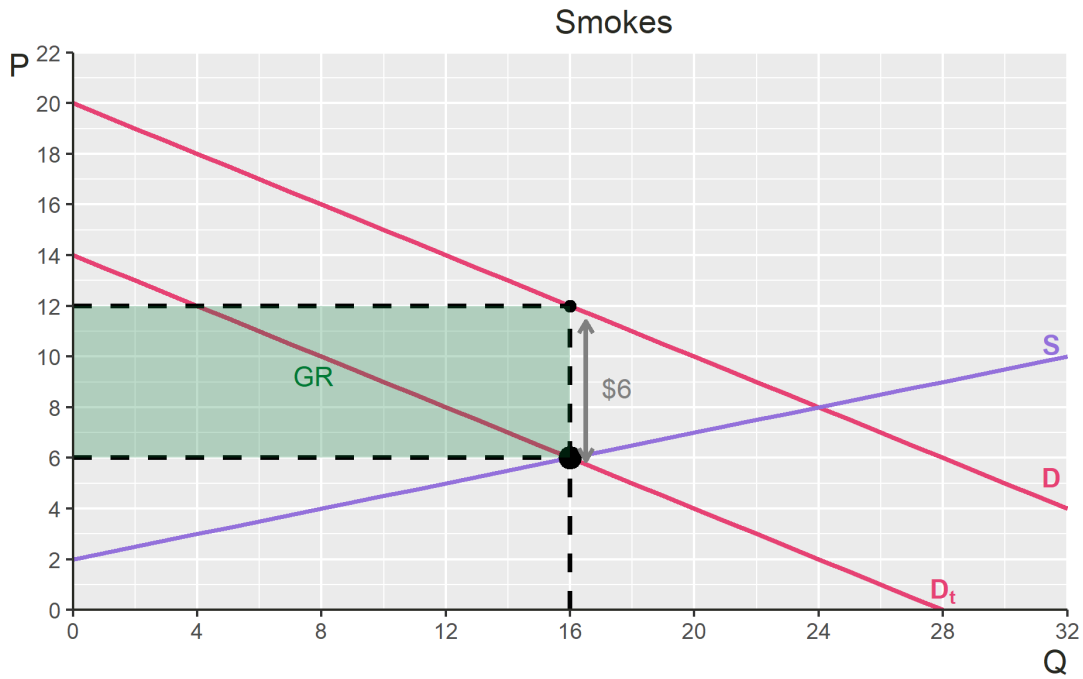
  - For consumers, the tax burden is the difference between what consumers *used to* pay, and what they *currently* pay
  - For producers, the tax burden is the difference between what producers *used to* receive, and what they *currently* receive
- This is even easier to show graphically, let's look at some of our previous examples

Tax Burden – Tax on Consumers

- Recall the \$6 tax on cigarettes, from our last class:



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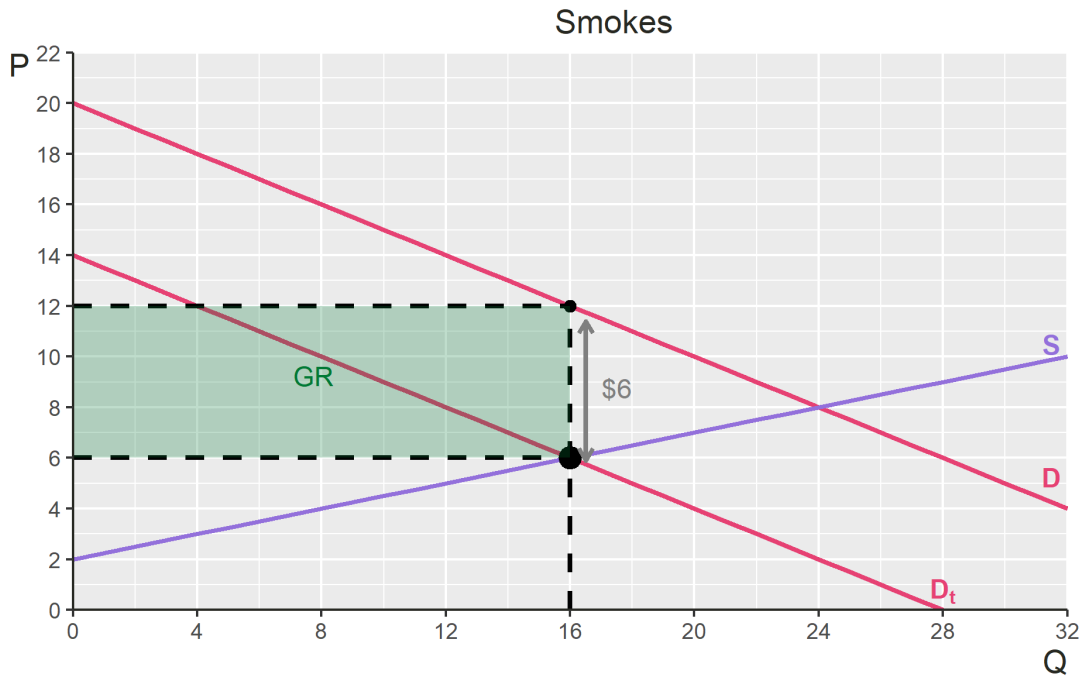

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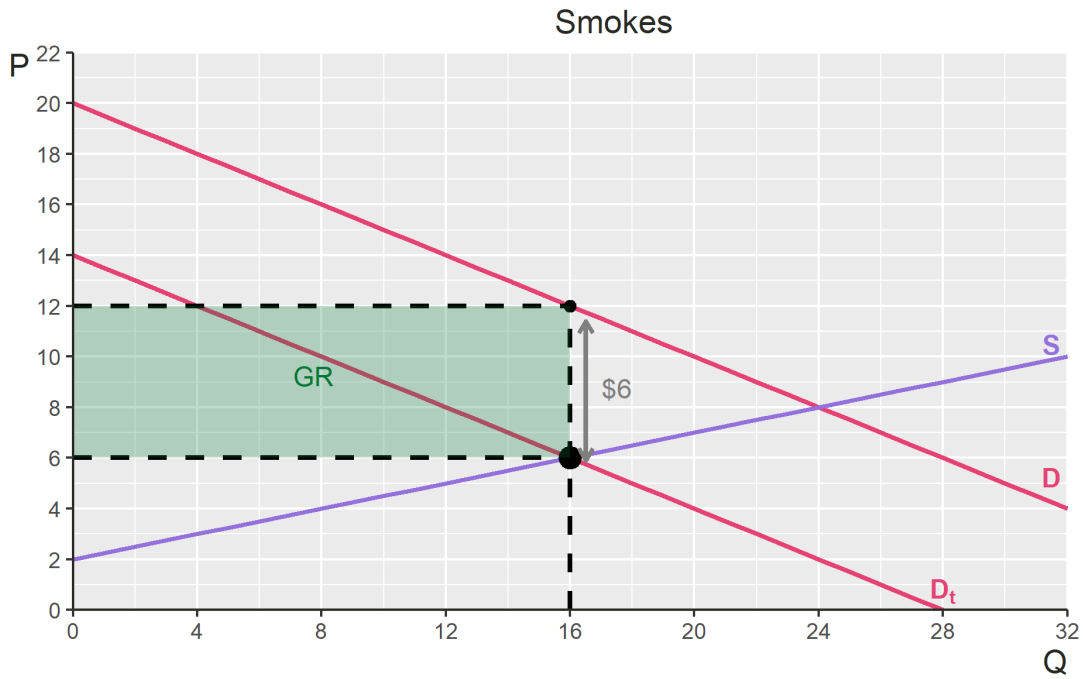

- Consumers used to pay \$8 and producers used to receive \$8
- Now, consumers pay \$12/pack, and producers receive \$6/pack. Who is bearing what?

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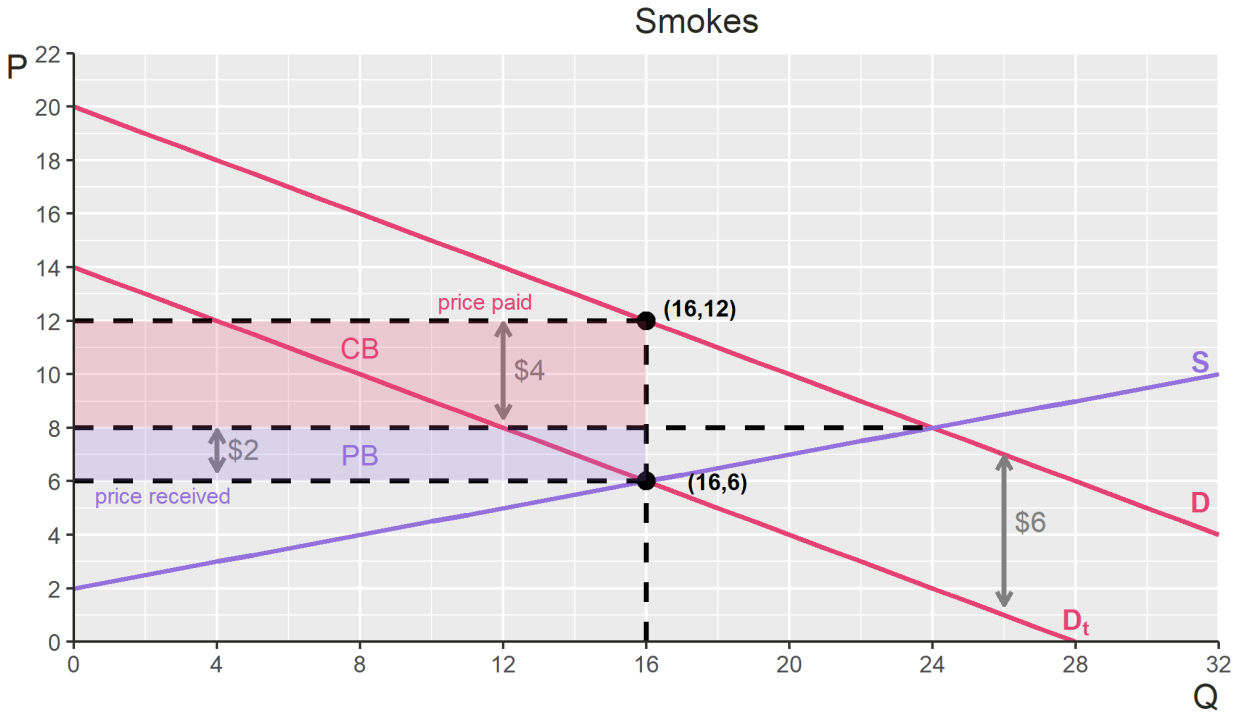

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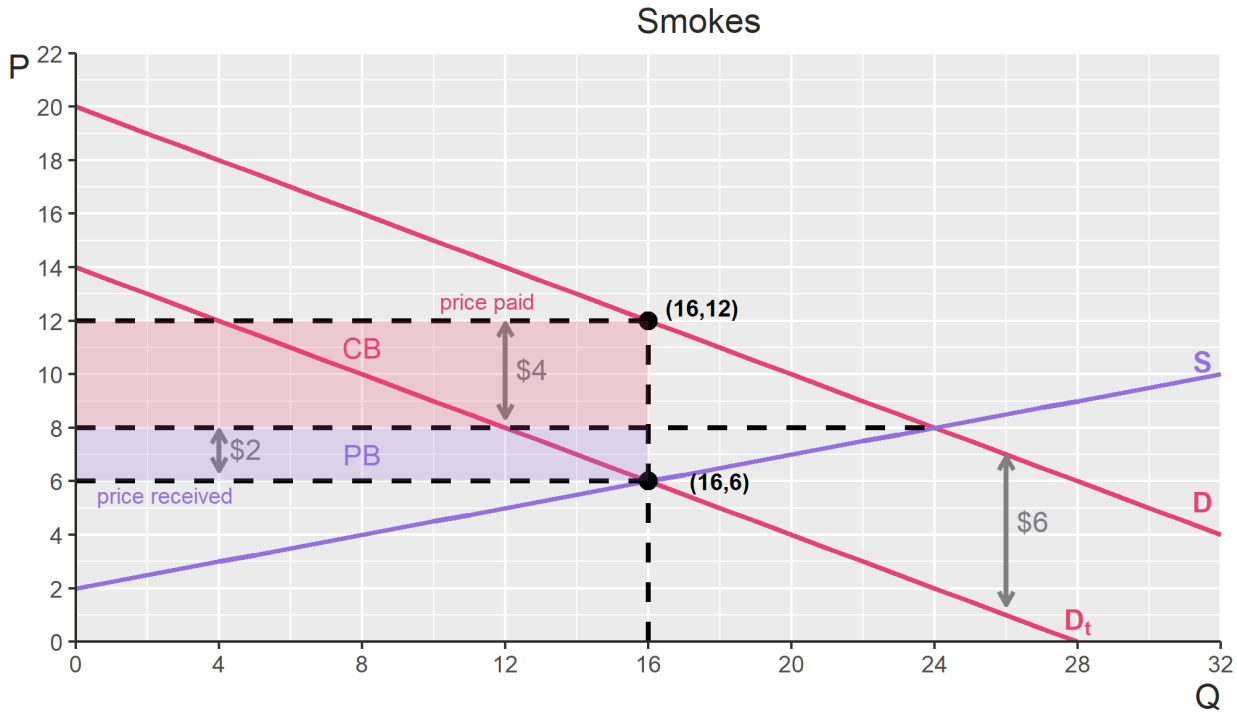

- Consumers used to pay \$8, now they pay \$12: they pay $12 - 8 = \$4$ of the burden, out of \$6
- Producers used to get \$8, now they get \$6: they pay $8 - 6 = \$2$ of the burden, out of \$6

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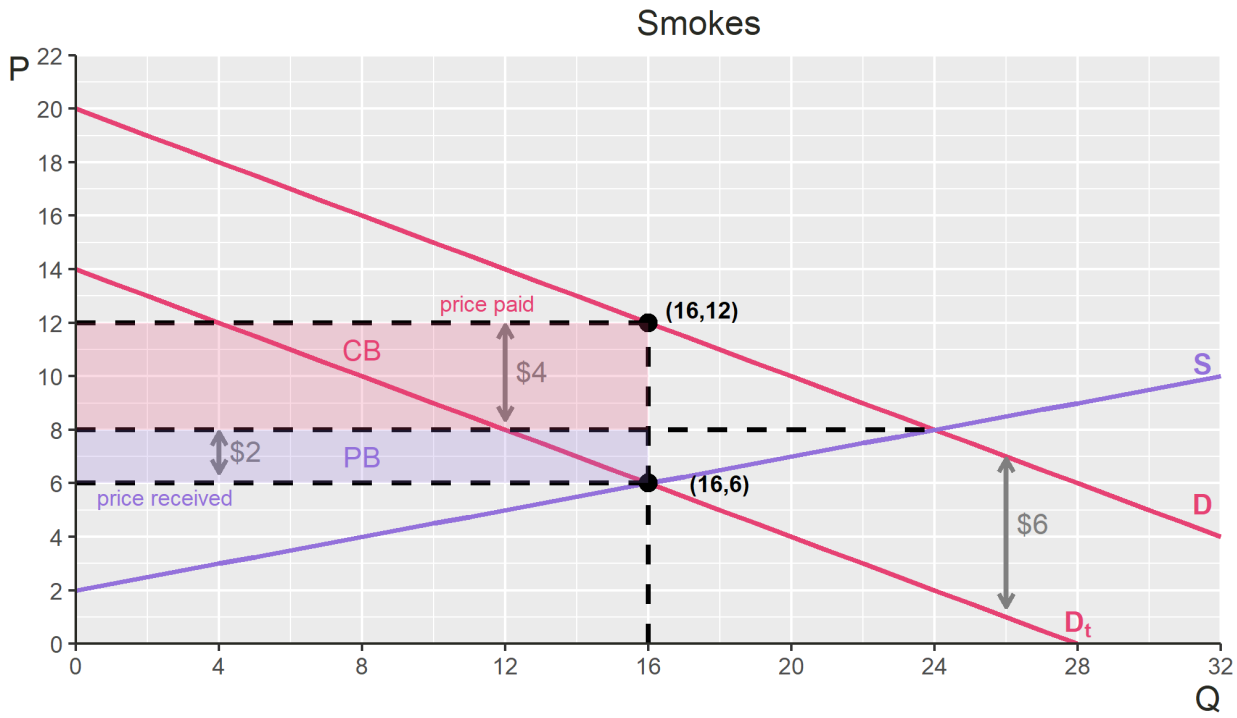

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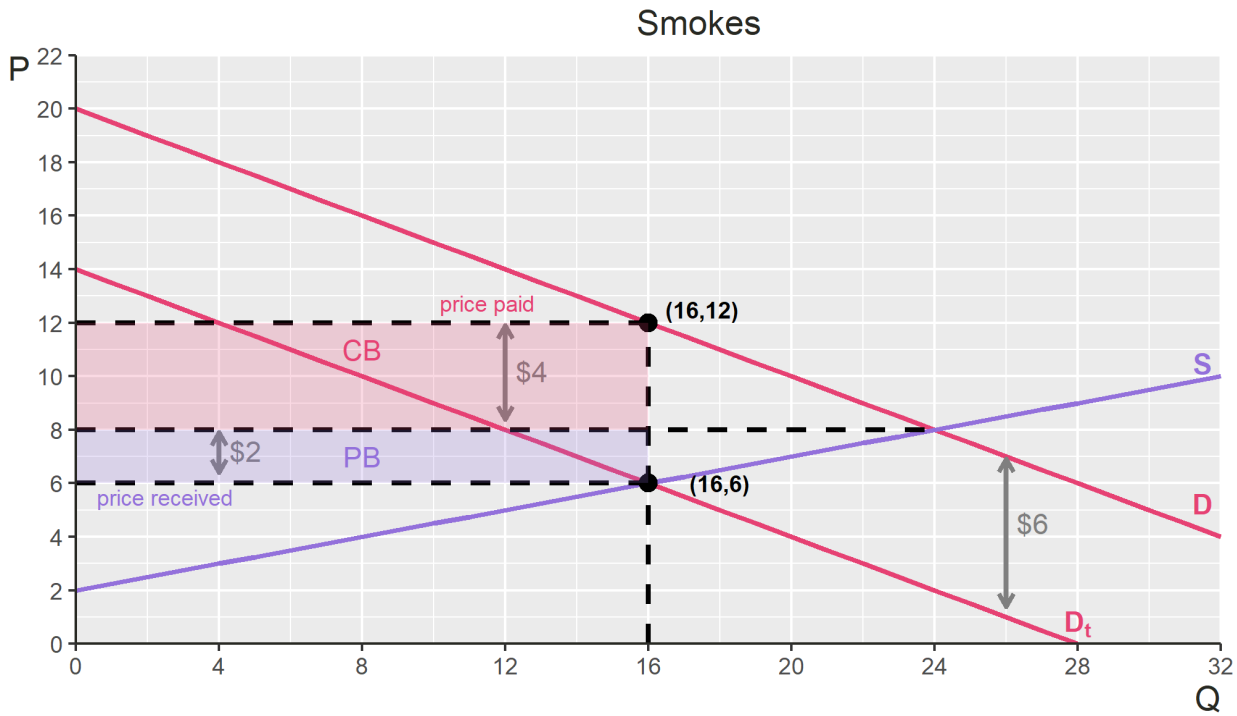

- Consumers bear \$4/unit, producers bear \$2/unit
- Note that these are only in terms of per-unit burdens, the full burden on consumers and producers can be found by calculating the area of the rectangles above

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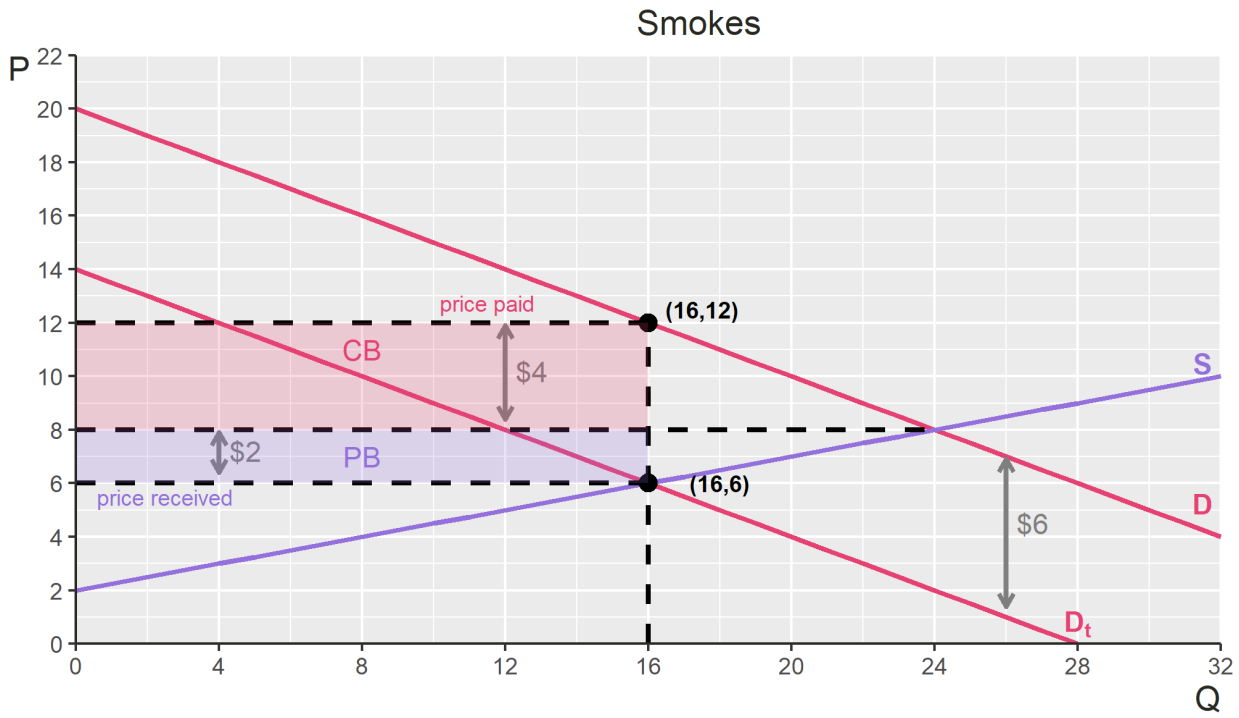

- Namely, the full consumer burden is $(4)(16) = 64$, while the full producer burden is $(2)(16) = 32$

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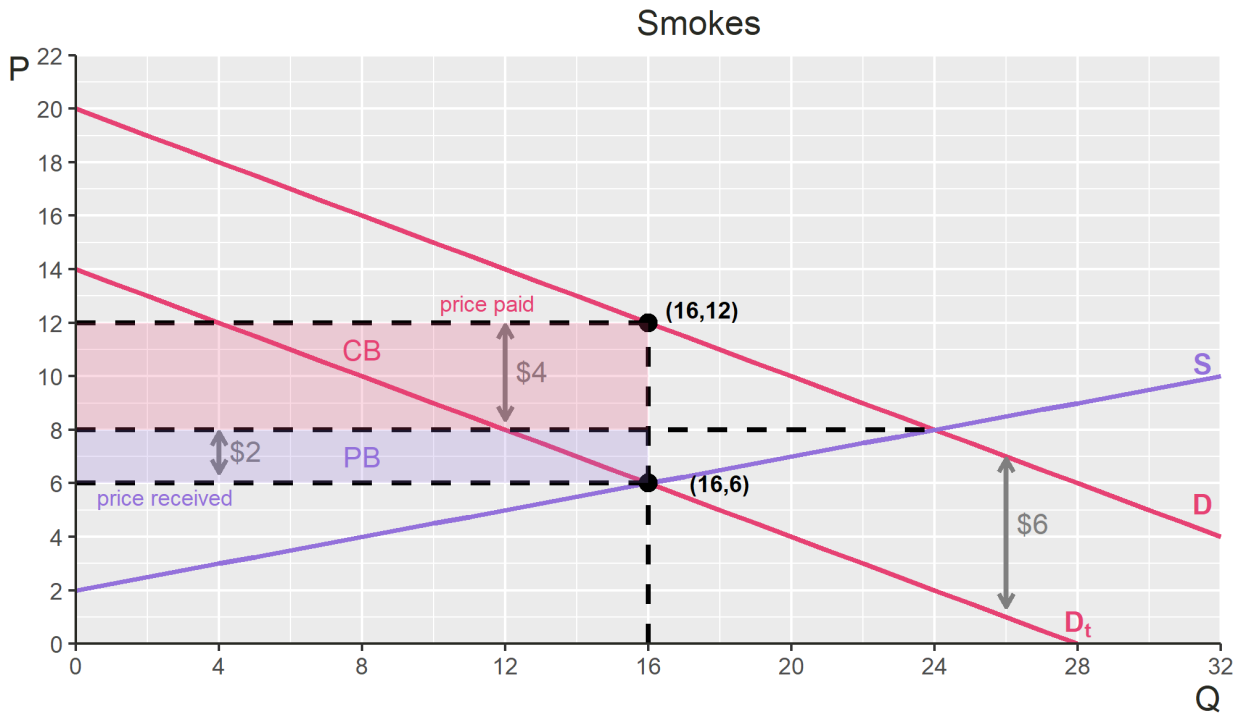
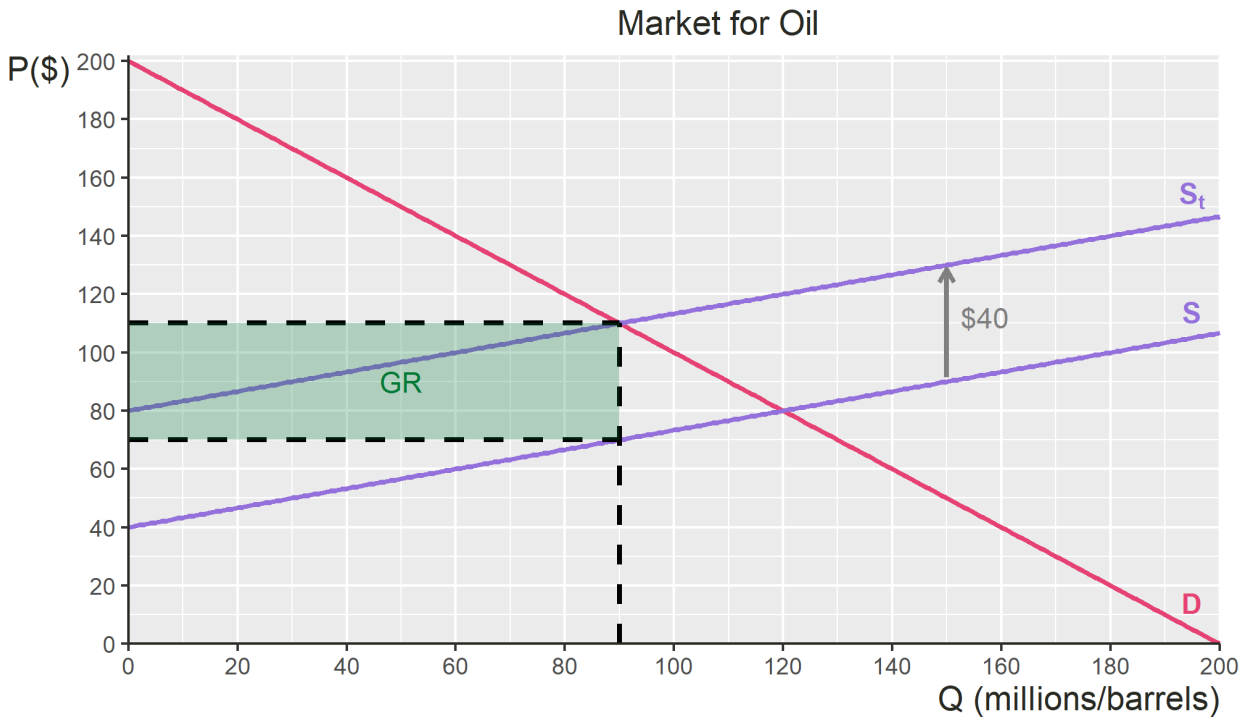


- Namely, the full consumer burden is $(4)(16) = 64$, while the full producer burden is $(2)(16) = 32$
- Also note: The total tax burden is exactly the area of government revenue, which should make sense

Tax Burden – Tax on Producers

- Recall our oil example:



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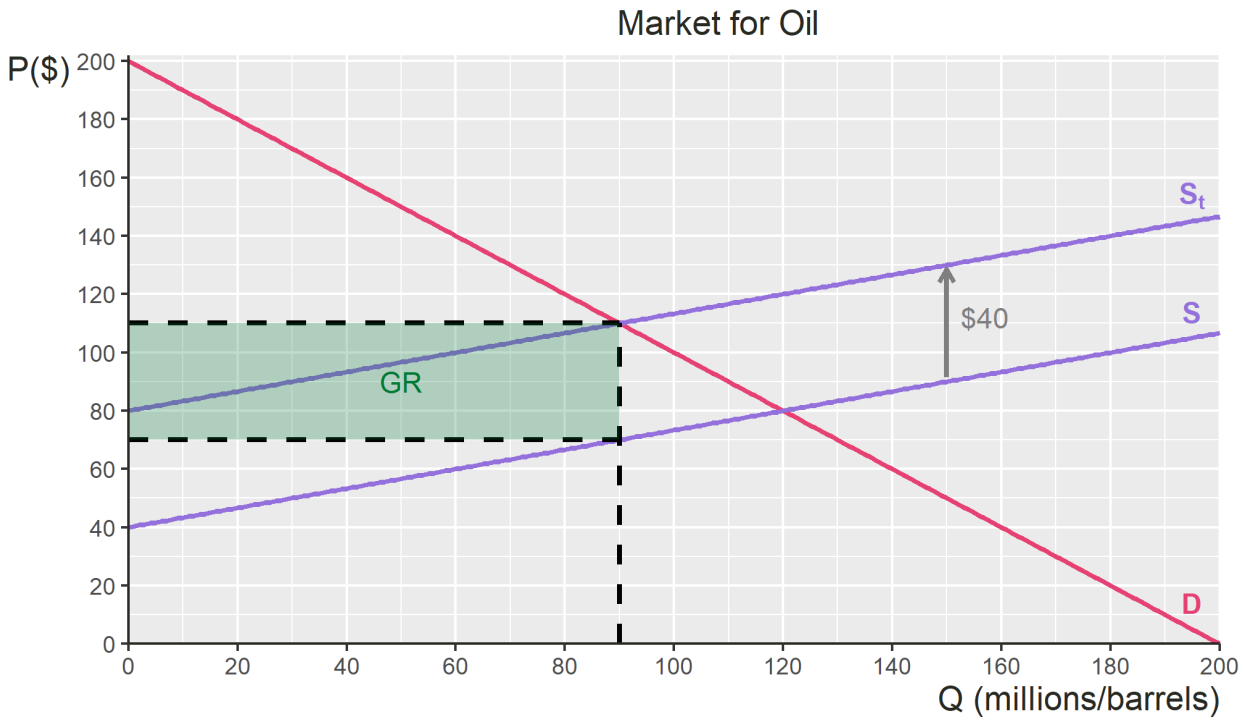

- What are the CB and PB in this diagram?

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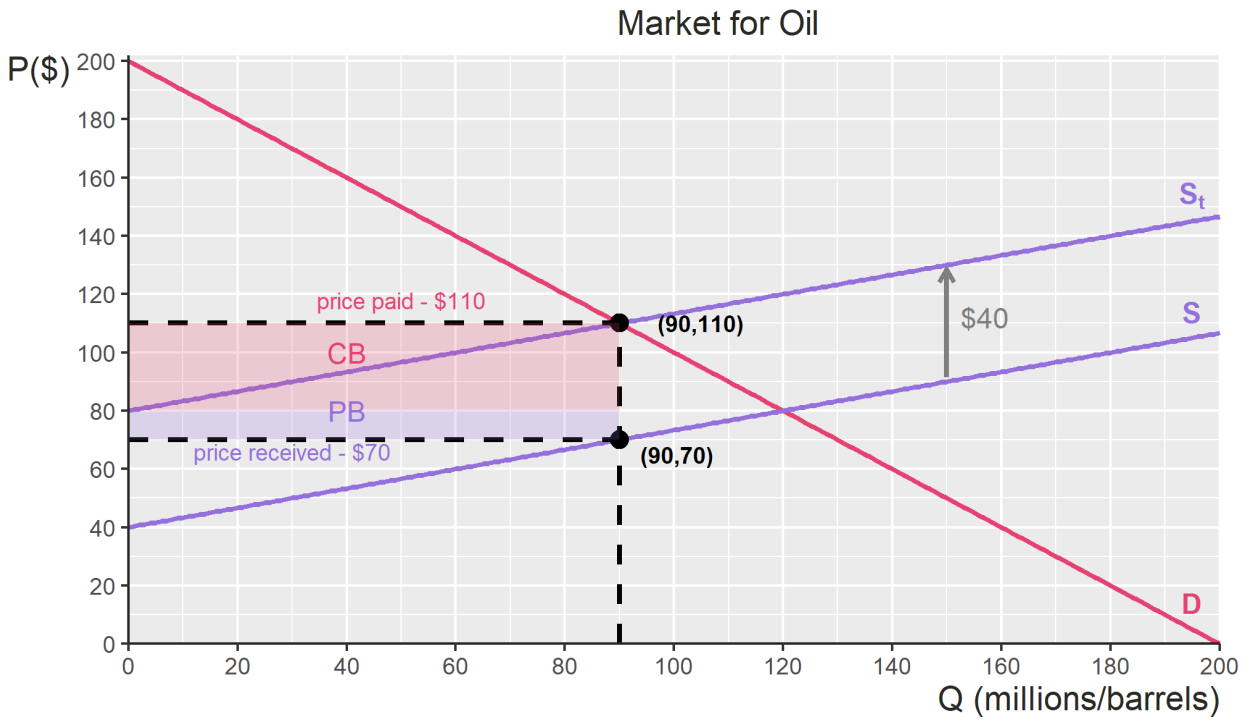
- Consumers/producers used to pay/receive \$80, now the consumers pay \$110 and the producers receive \$70



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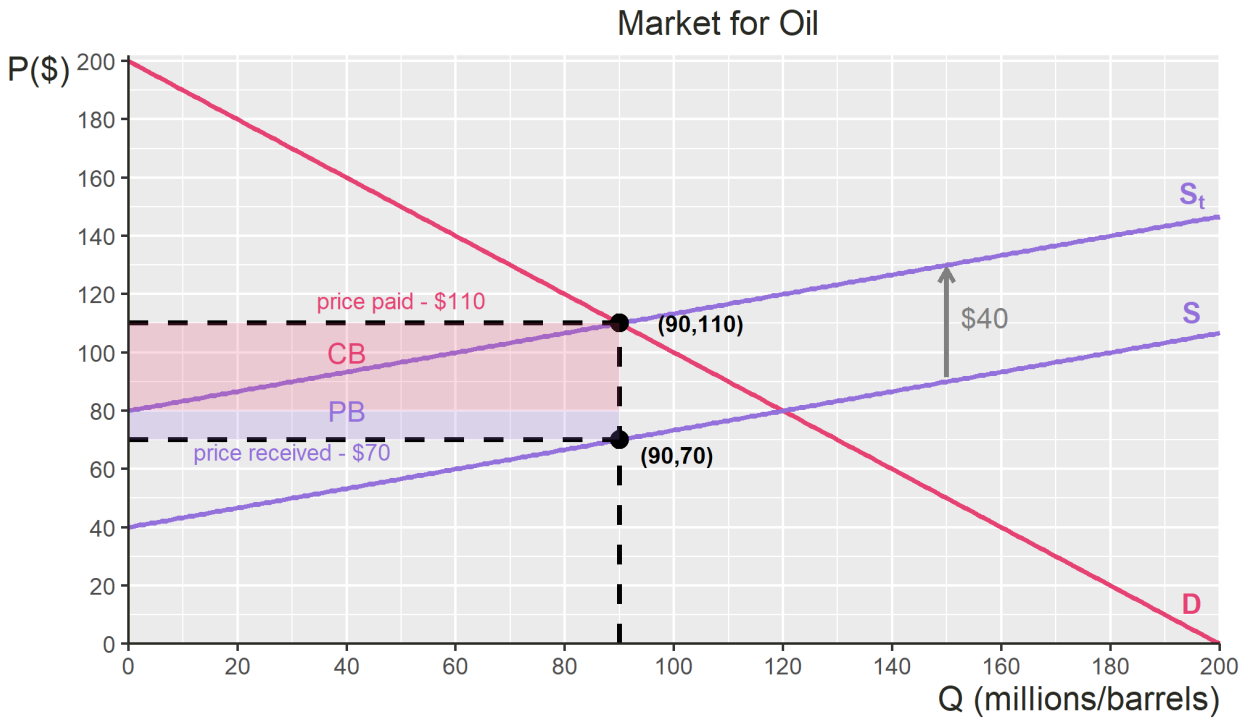

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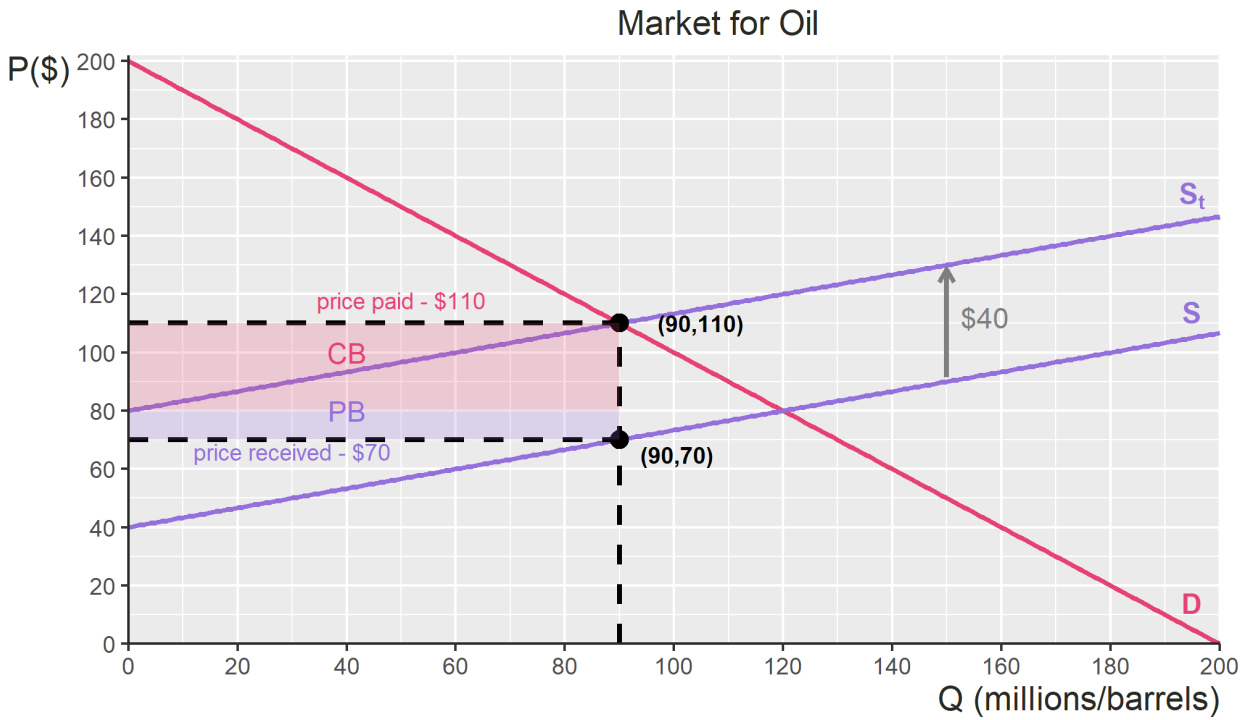

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- What are the full burdens?

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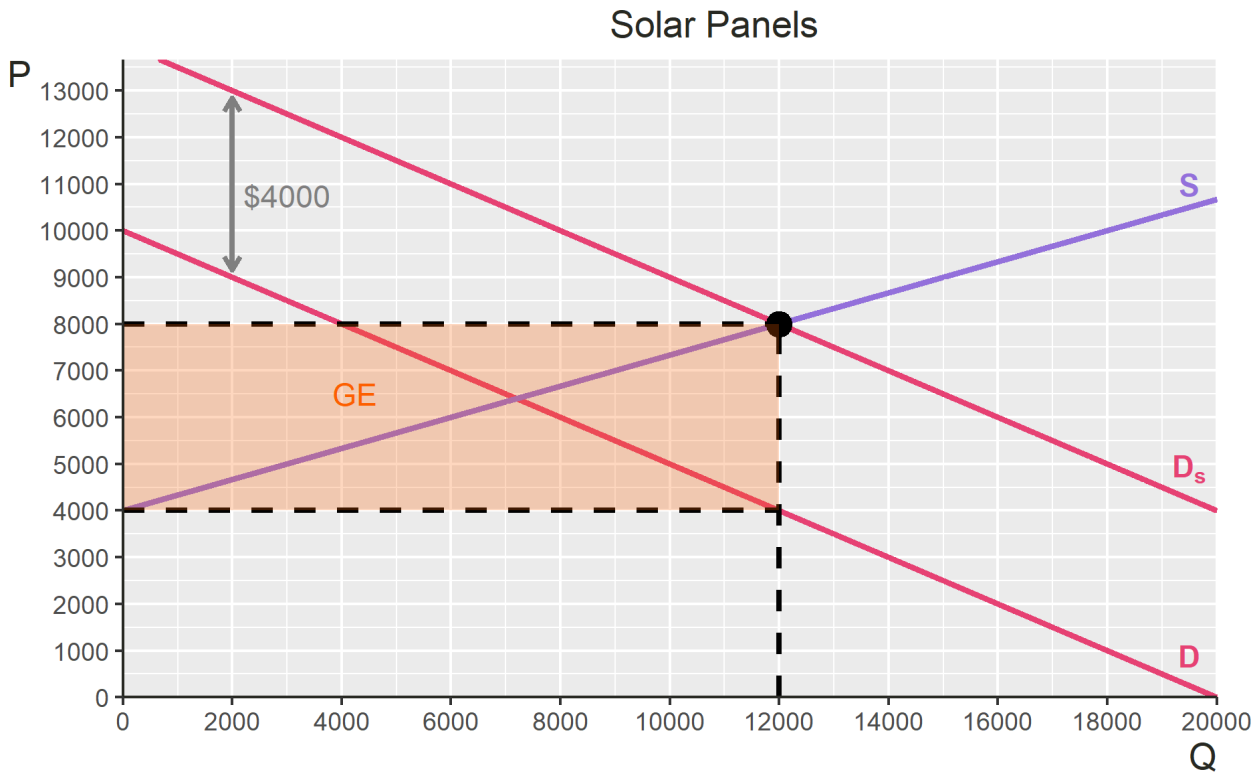
  - Again, it just uses the original equilibrium to divide the government expenditure to consumers/producers
  - However, now it is reversed: Consumer incidence is on the bottom, producers incidence is on the top

Subsidy Incidence – Subsidy on Consumers

- Recall our solar panel subsidy from last class:



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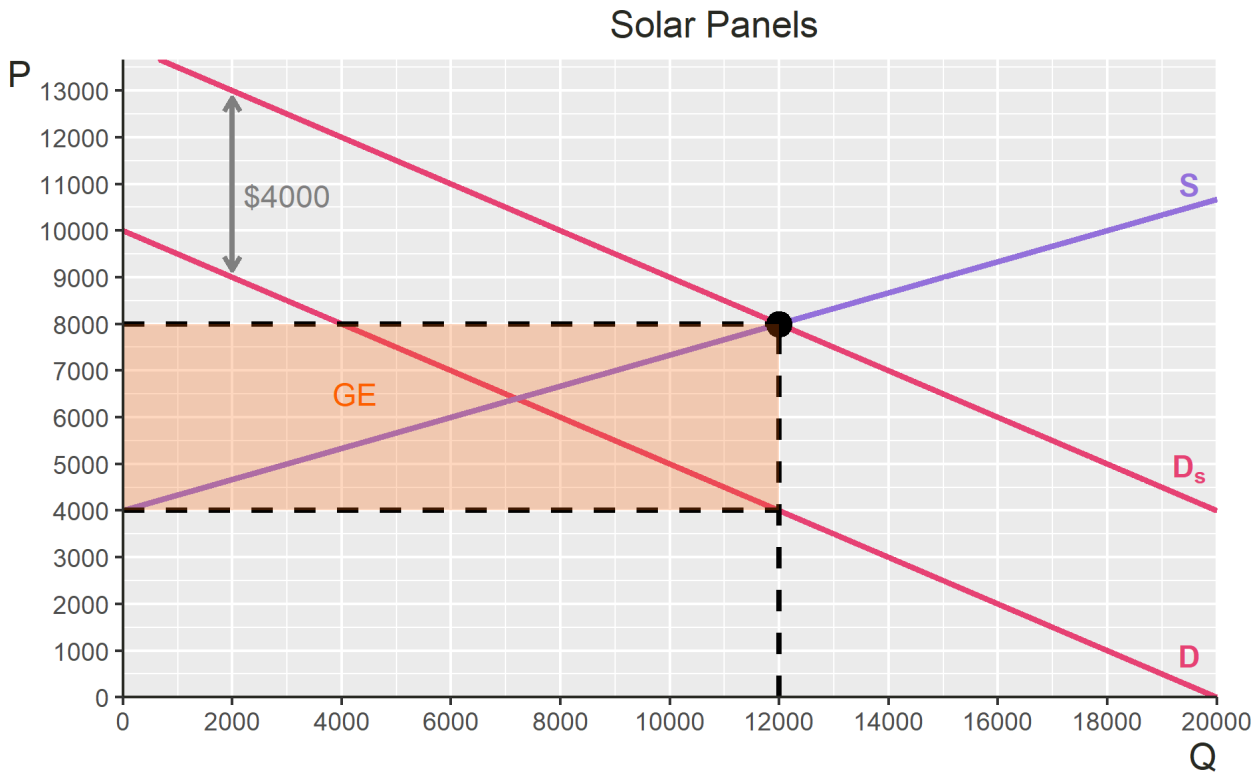

- Note: the original equilibrium price is \$6400

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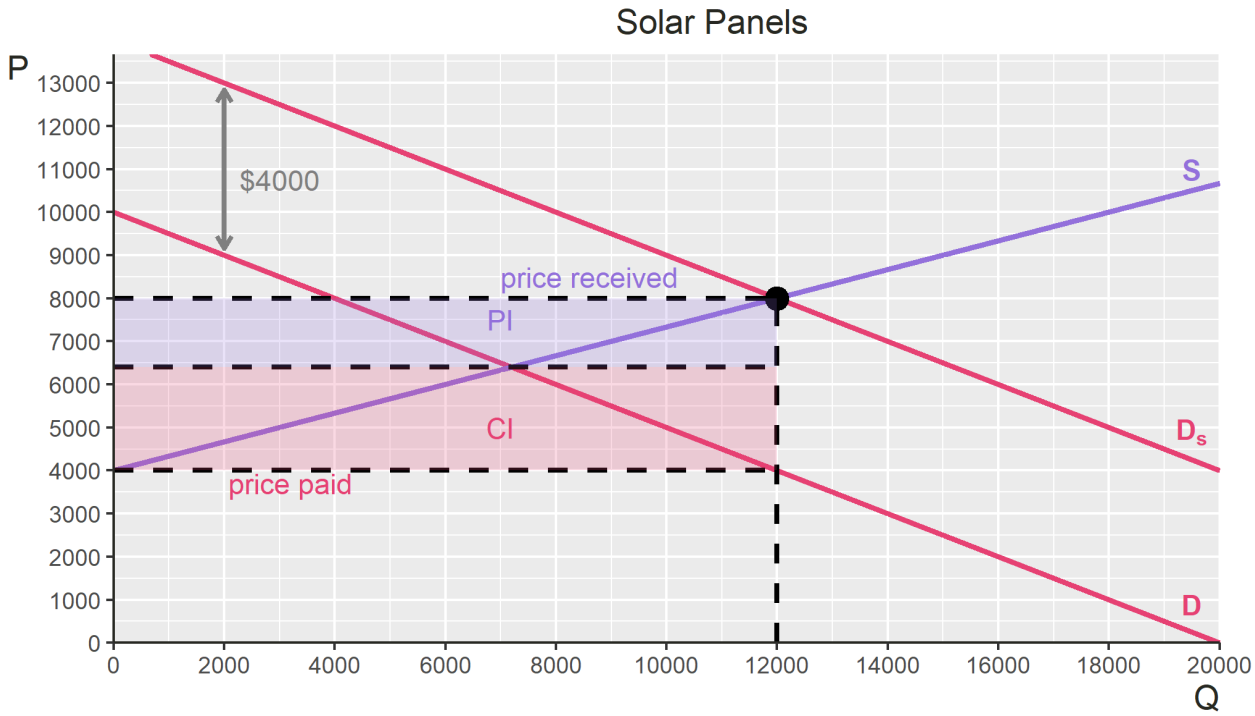
- The per-unit producer incidence is $8000 - 6400 = \$1600$, while the per-unit consumer incidence is $6400 - 4000 = \$2400$



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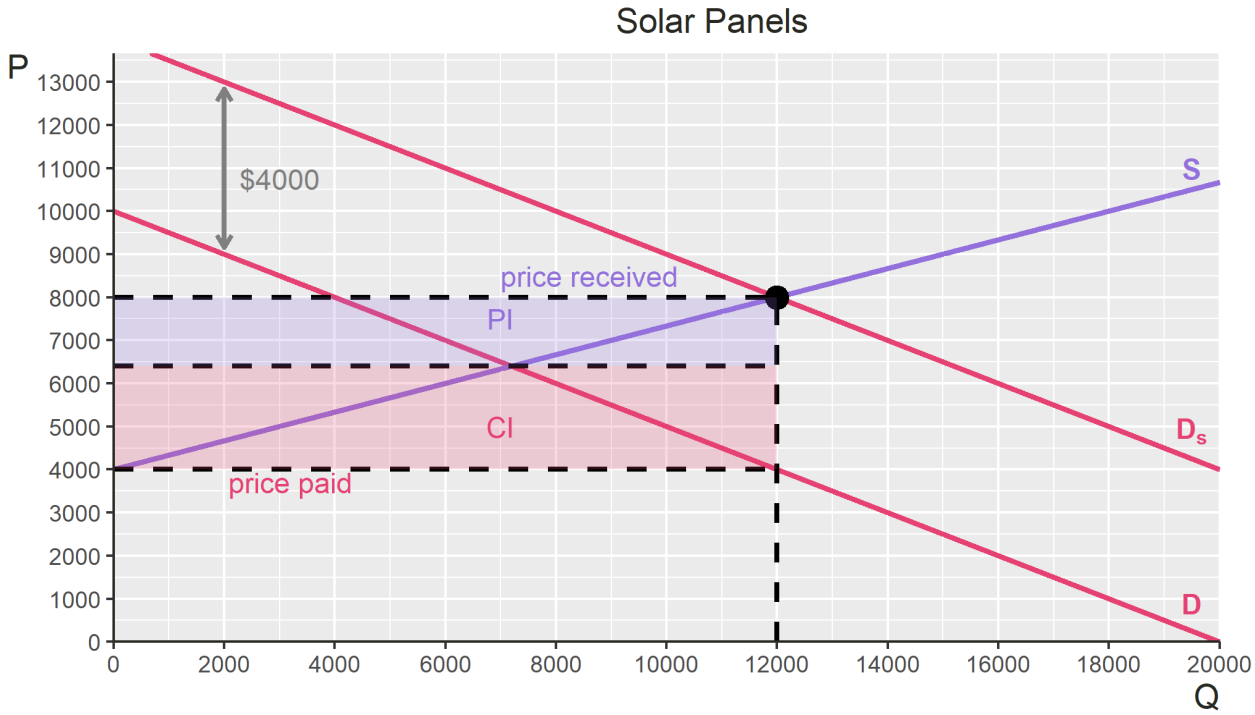

- What are full CI and PI?

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- Finally, go back and note that the burden/incidence for each party flips depending on whether we are in a tax or a subsidy, just like prices paid/received do
- It is for this reason that studying/understanding these graphs is very important – it's too much to memorize

Redefining Total Surplus

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- While we may never include a tax and a subsidy on the same diagram, the formula becomes

$$TS = CS + PS + GR - GE$$

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- Recall that consumer surplus is...

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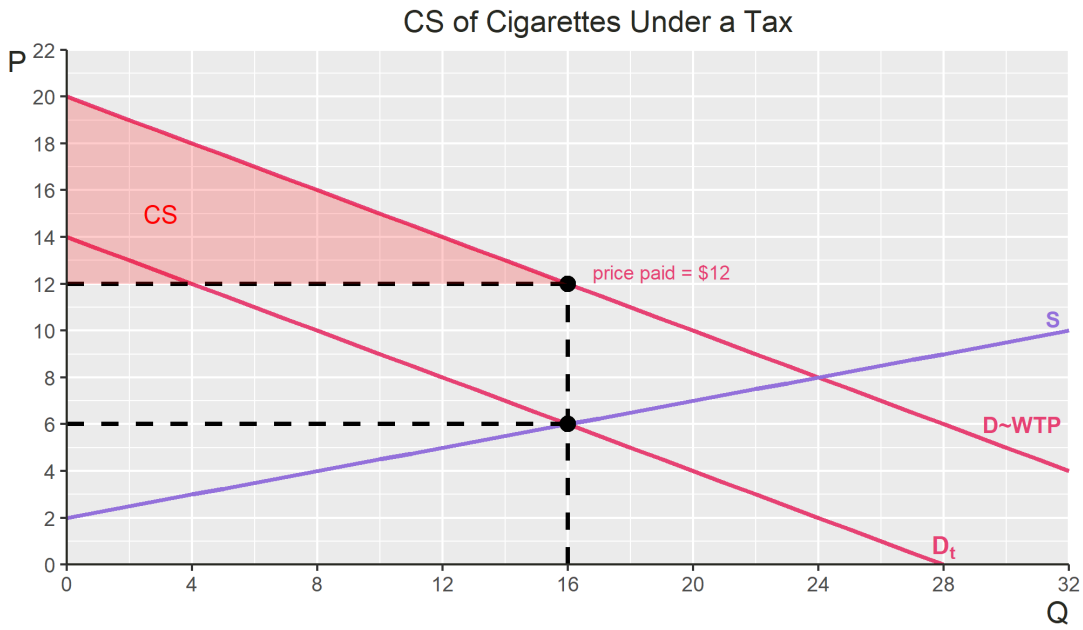
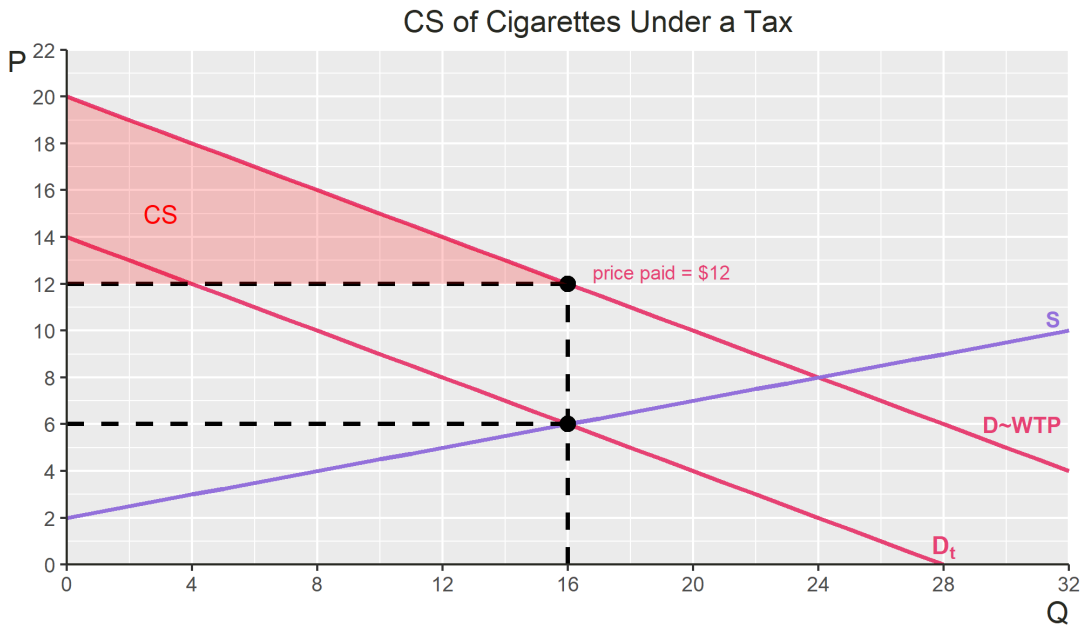
- In some sense, the taxed demand line D_t is more about determining equilibrium quantity and the price that the producer receives – the consumer is still willing to pay according to the demand D

How to Think about CS Under a Tax



- In the figure above, CS is area from the price that consumers pay, to the WTP (original demand) curve

How to Think about CS Under a Tax



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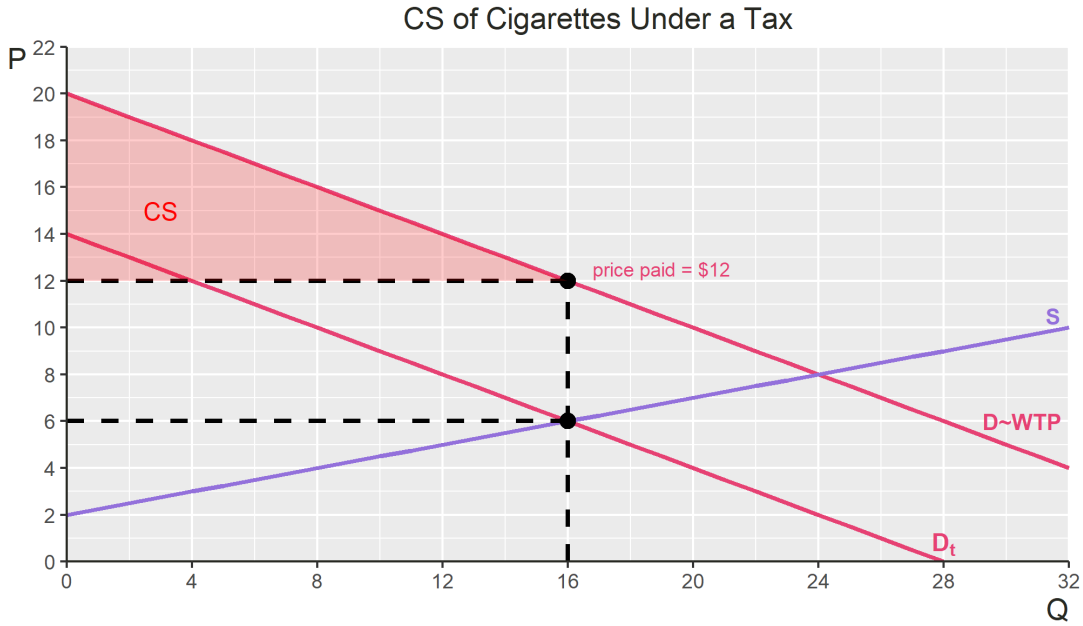

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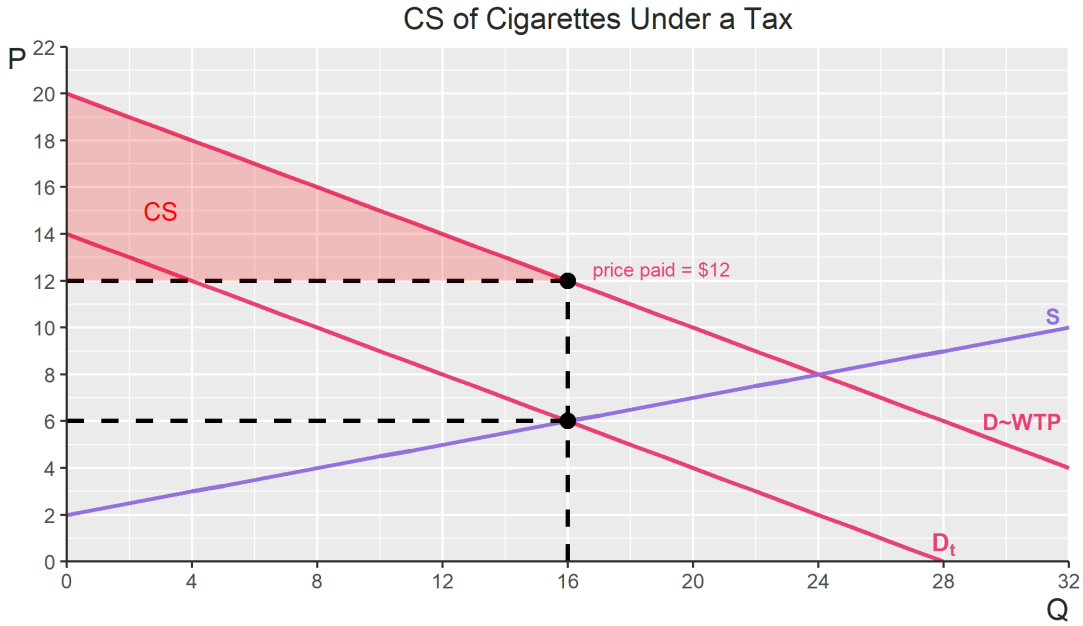

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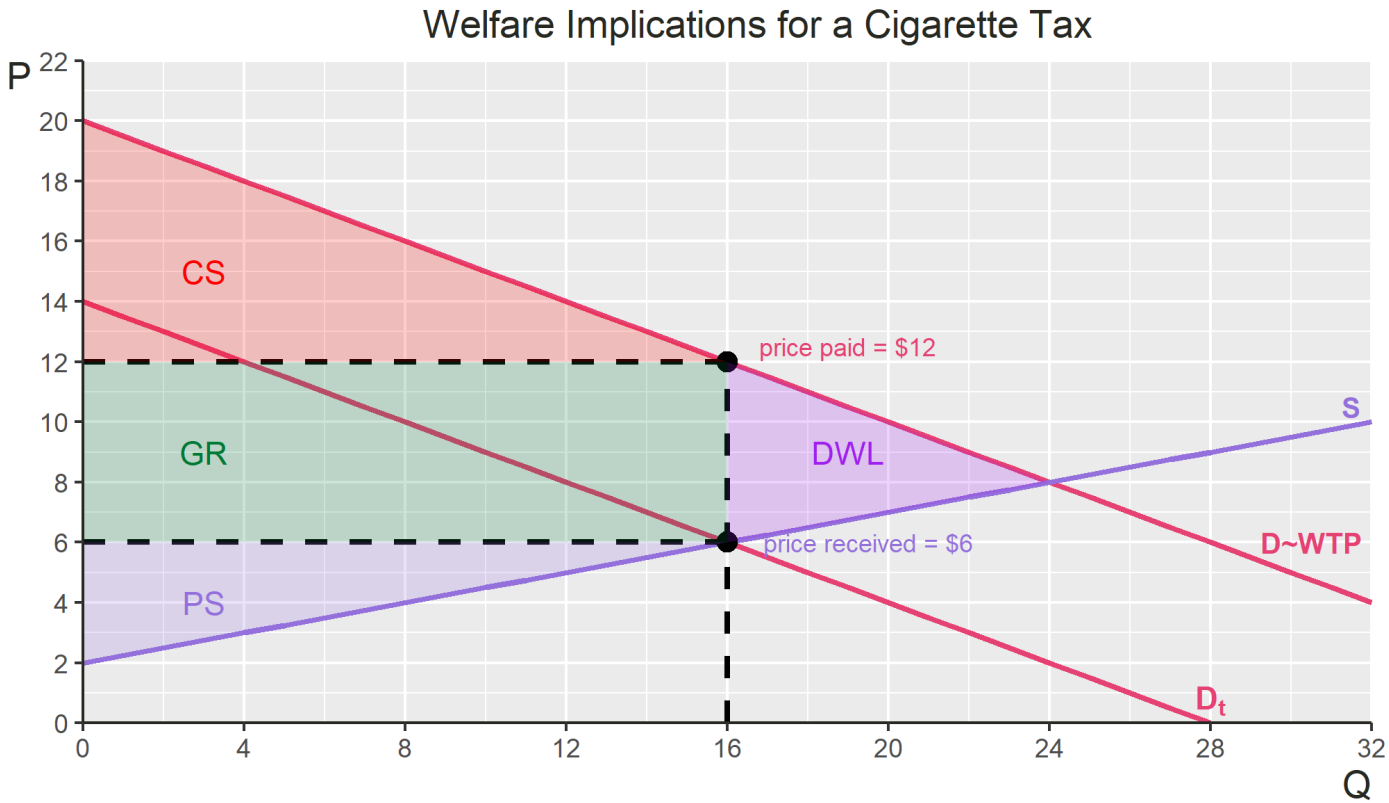
  - Not only does your figure get uglier, as you will see in a minute, but this muddles the interpretation of consumer surplus

Total Surplus – A Tax on Consumers

- The other areas carry the same definition as before, creating this nice diagram:



Total Surplus – A Tax for Producer

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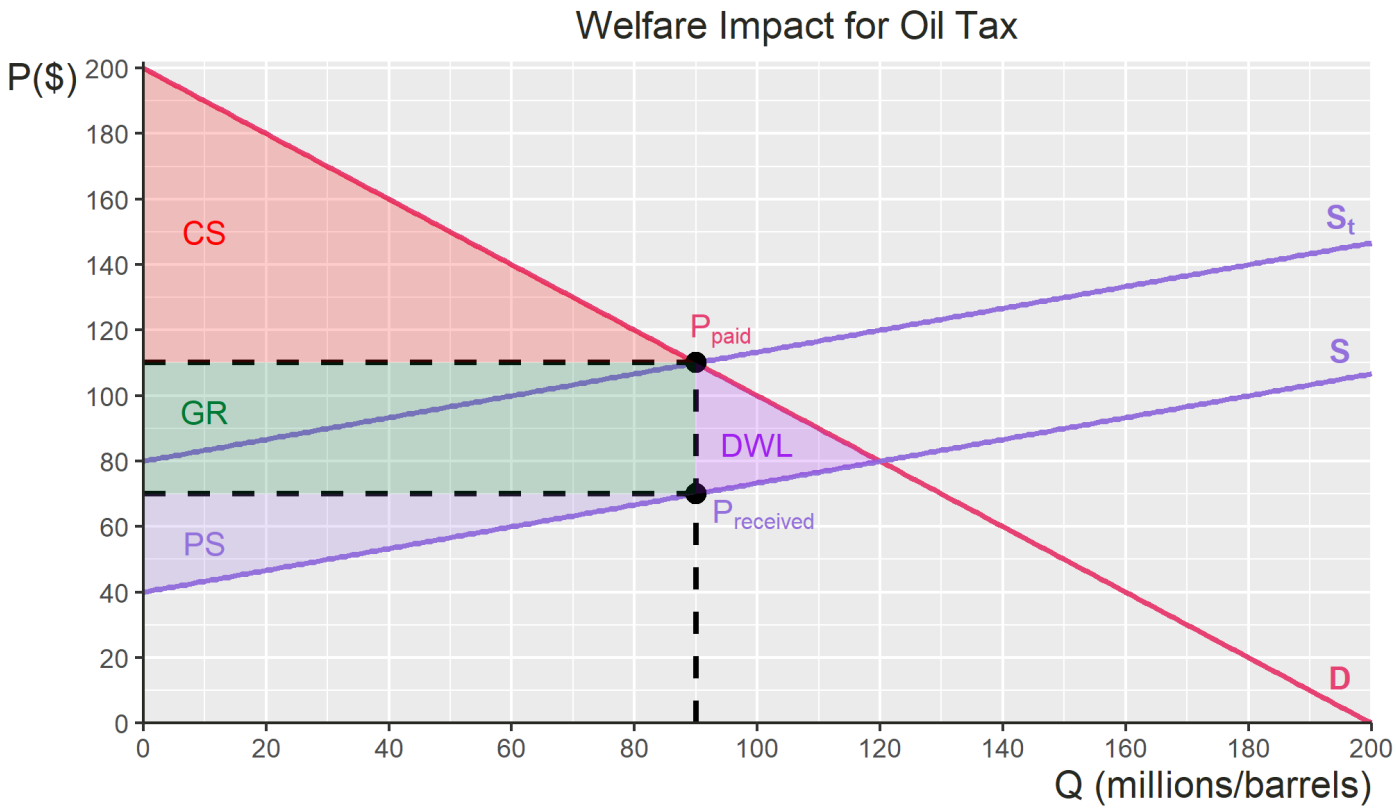
- Thus, the TS diagram looks like:



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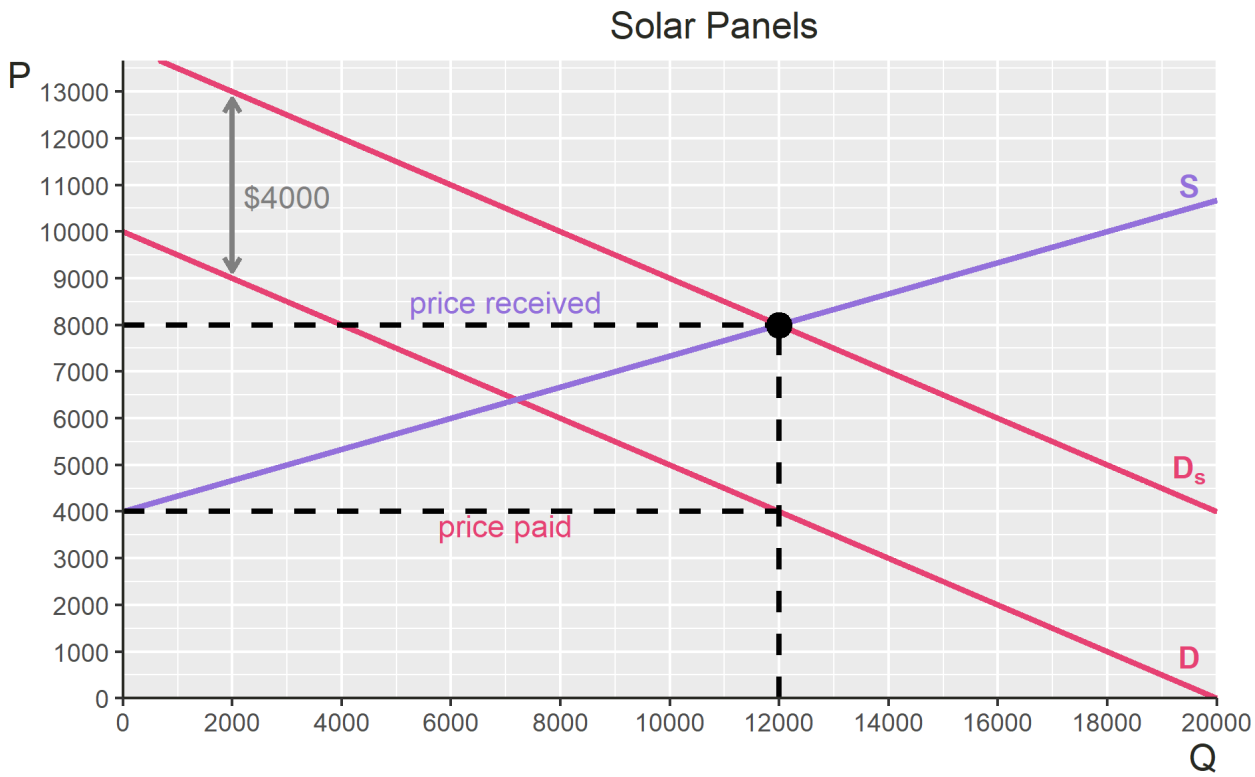
  - CS is the difference between WTP and price paid, PS is the difference between price received and WTA
  - Original demand represents WTP, original supply represents WTA
  - Always remember that DWL is the difference between optimal TS and new TS

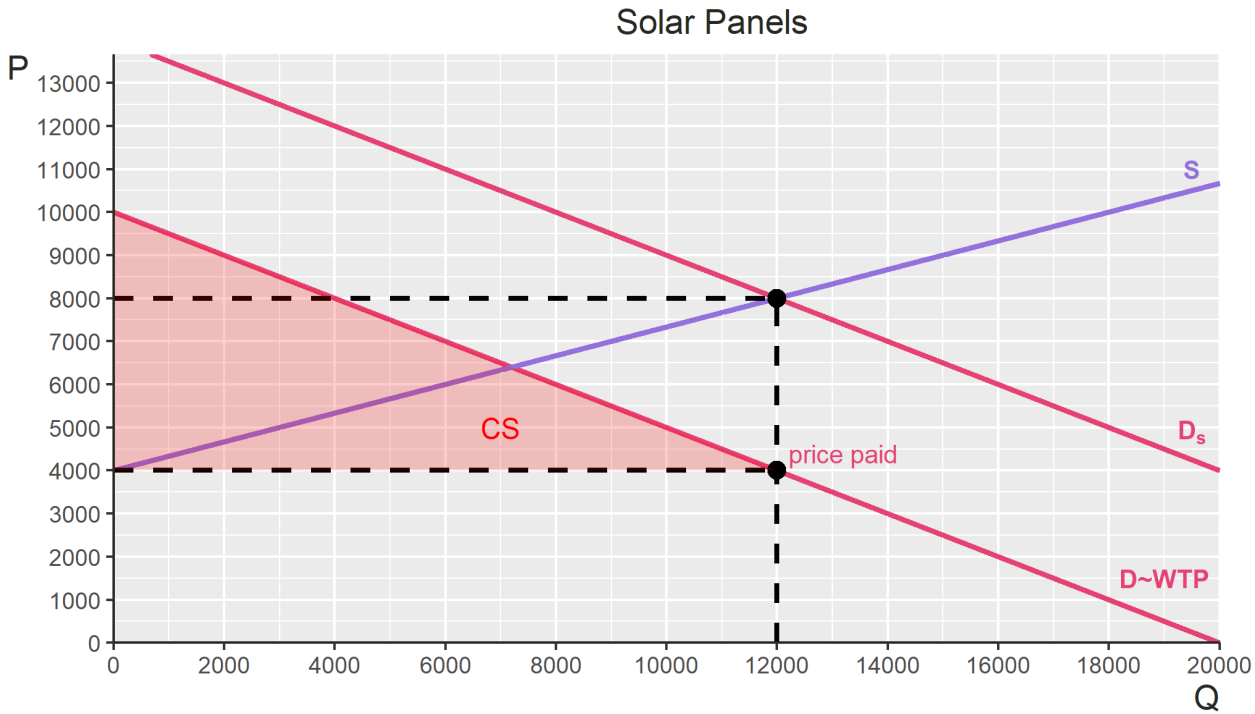
Total Surplus – A Subsidy for Consumers

- Recall this example:



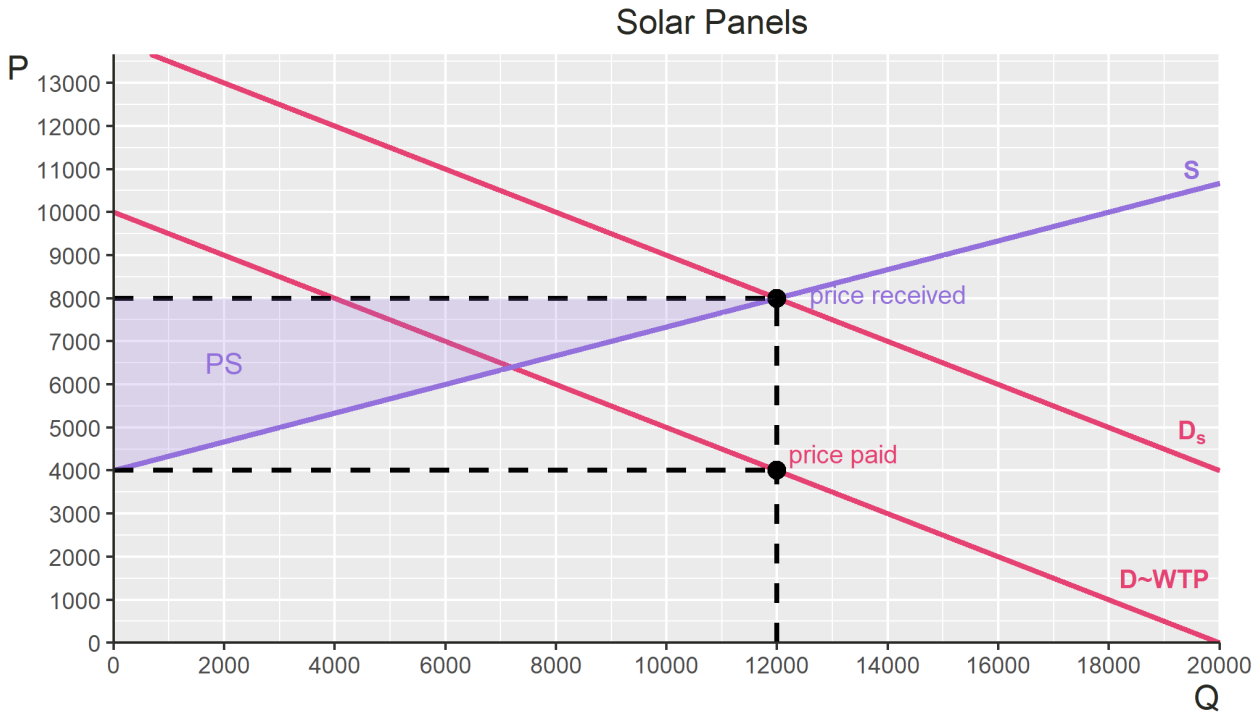
CS – A Subsidy for Consumers

- CS is shown below



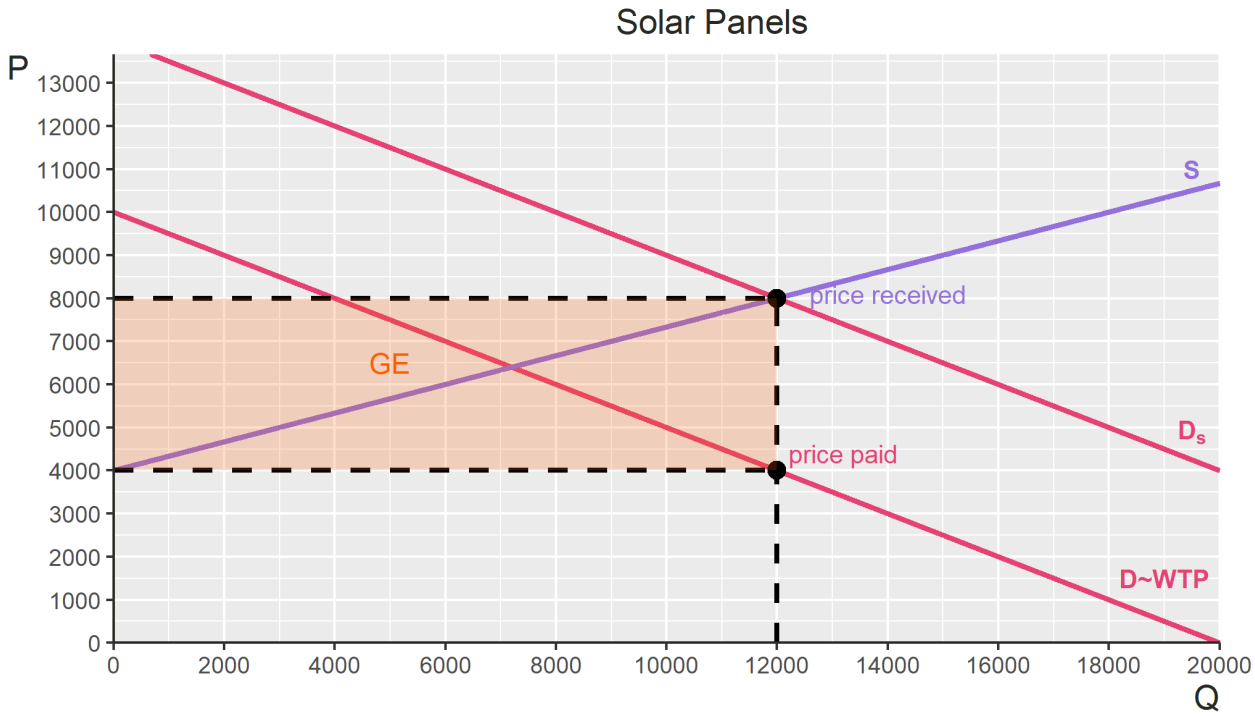
PS – A Subsidy for Consumers

- PS is shown below



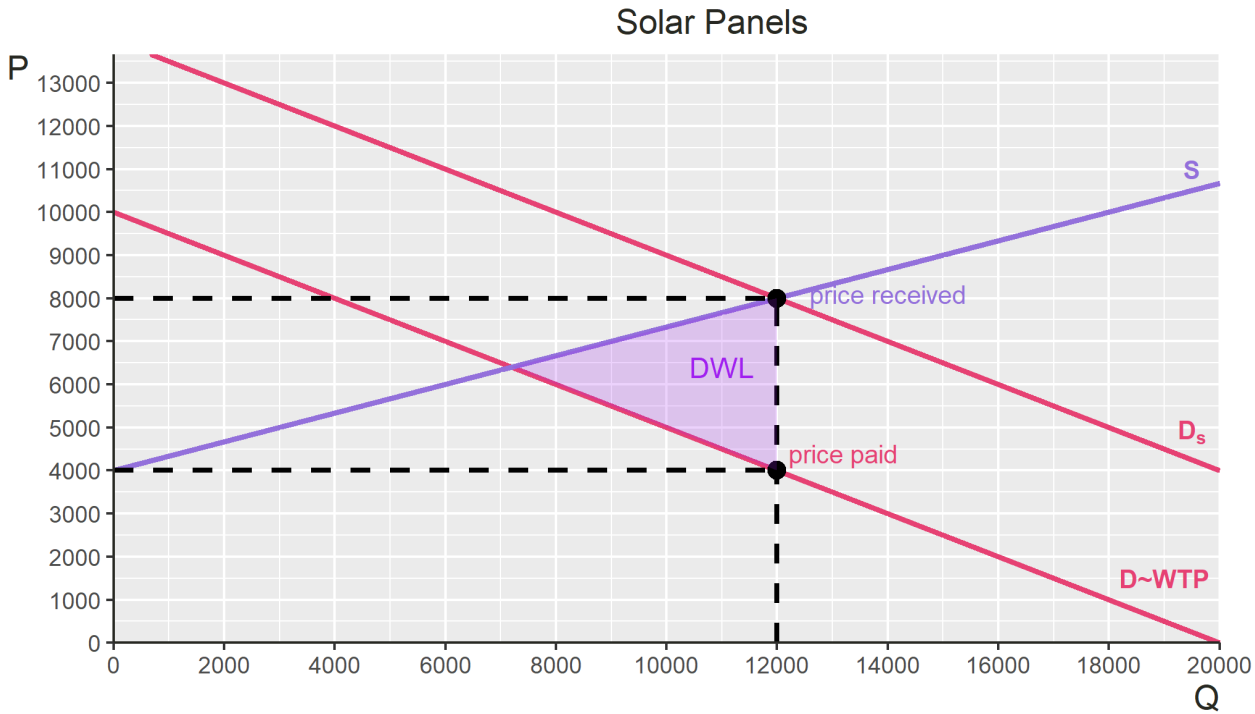
GE – A Subsidy for Consumers

- GE, which you have already seen, is shown below



GE – A Subsidy for Consumers

- DWL is shown below



TS – A Subsidy for Consumers

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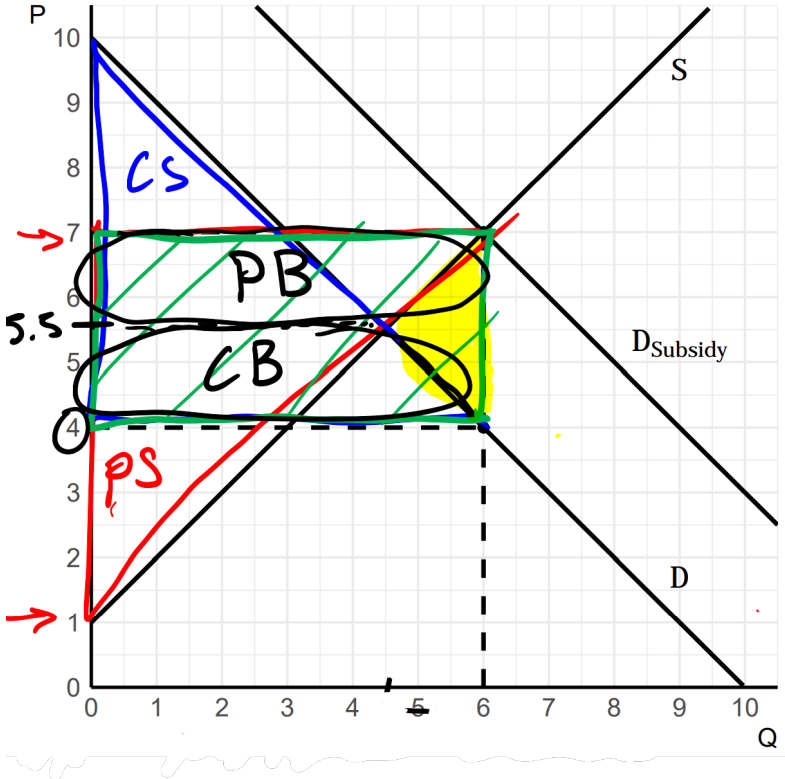
- Here is a pretty okay diagram, with consumer/producer burdens, that I drew one time:



Next Time

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