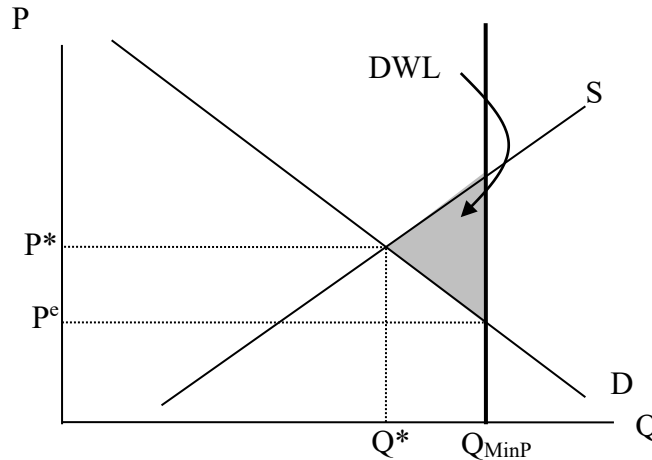


## TOPIC 17: SOLVING EXTERNALITIES

- I. Internalization
  - a. Externalities are undesirable because the acting agent isn't considering the full costs or benefits of his/her actions.
  - b. But it's hard to know what exactly to do because there are so many ways to adjust and different people/firms/groups will have different costs and benefits.
  - c. If we *internalize* the externality (somehow force the agent to consider the full costs or benefits), we can solve the market failure using the informational advantages the market mechanism allows.
- II. Pigou
  - a. One way to solve this problem is with a Pigouvian tax or subsidy:
    - i. Tax the behavior until  $MC_p$  equals  $MC_s$ .
    - ii. Subsidize the behavior until  $MB_p$  equals  $MB_s$ .
  - b. Recall from earlier how subsidies and taxes created deadweight loss. Now they *reduce* deadweight loss by correcting an externality.
  - c. Pigouvian corrections are great correcting problems since they don't require a specific action and allow people to adapt as they'd like. This is particularly important from a national policy perspective since making a rule for many millions will likely not be the best choice for a significant number of individuals.
    - i. For example by taxing gasoline instead requiring everyone to carpool, some people will carpool in a response to the change in price but for others, where carpooling's not a good option, they are free to adapt in other ways.
    - ii. Remember, prices solve problems.
  - d. The problem with Pigou is the difficulty of calculation. These curves are nearly impossible to determine so how do we know how big the tax or subsidy should be? What happens when the curves shift? What if they are shifting all the time?
    - i. One solution is to low-ball the correction to make sure you don't make a bad situation worse and since something is better than nothing, you can still reduce deadweight loss.
- III. Quotas
  - a. Quotas are just like price controls except they set quantity rather than price. They come in two stripes: production quotas and consumption

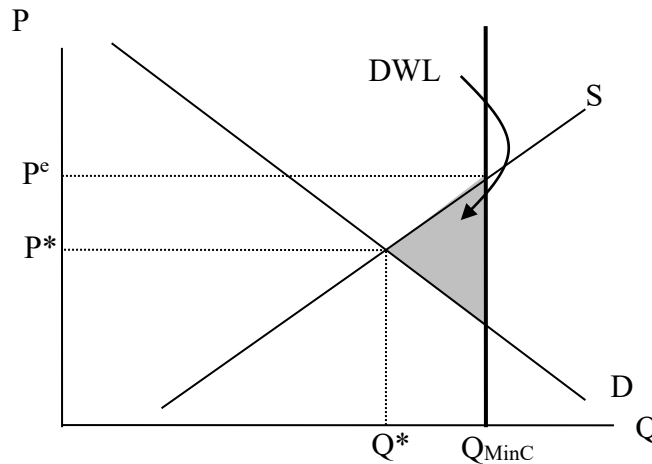
quotas, with maximum and minimum versions of each. Let's begin with no externality issues at all. The market functionally normally; there is no market failure. In these cases, quotas create deadweight loss.

- b. Consider this minimum production quota, set above equilibrium.



- i. In the above diagram, companies are required to over-produce. With so much in the market, the price, as determined by Demand, is lower than the market price.

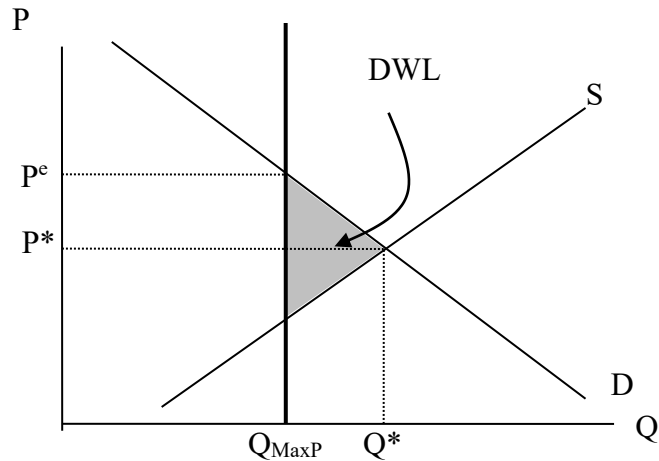
- c. Now consider this minimum consumption quota set above equilibrium.



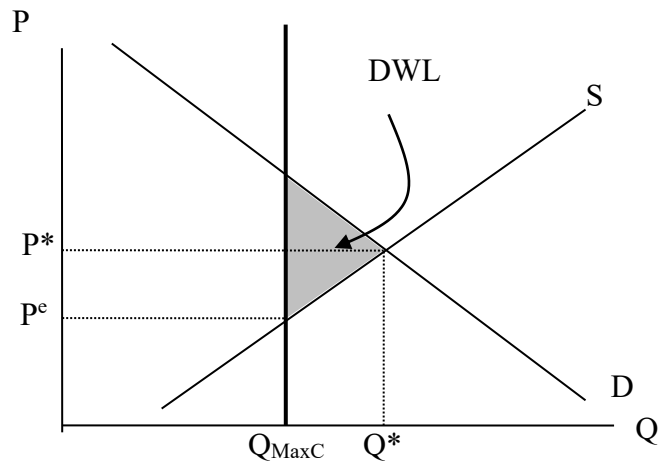
- i. Now that consumers are forced to overconsume, the price is above the optimal, rather than below it.

- d. Like price controls, production quotas can be completely ineffective. Minimum quotas set below equilibrium do nothing.

- e. Now consider this maximum production quota set below equilibrium.



- i. With companies not allowed to produce more, prices rise (note the similarity between this and our monopoly model).
- f. And here's a maximum consumption quota set below equilibrium.

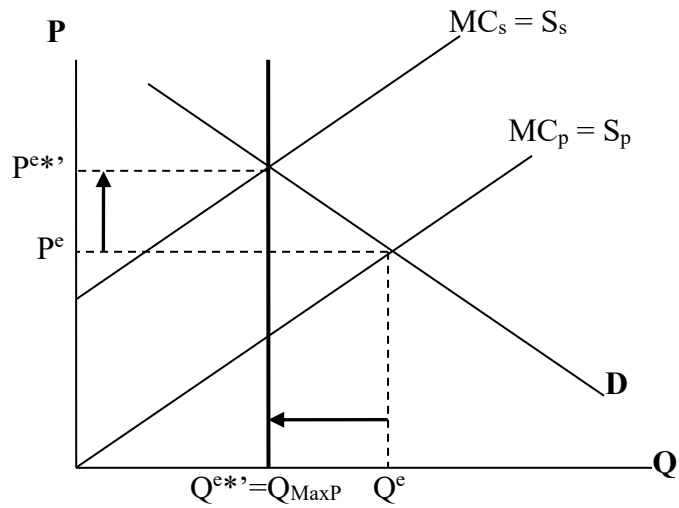


- i. With so few people allowed to buy, the price falls.
  - g. Maximum quotas set above equilibrium do nothing.
  - h. We can use quotas to solve externality issues and *eliminate* deadweight loss by forcing quantity to the where we want it to be. This is kind of a brute force method of getting us to optimal quantity (rather than taxes and subsidies which is about incentivizing people to get to optimal quantity).
- IV. The Coase Theorem.
- a. Ronald Coase offered his own theory of how to deal with externalities—specifically negative externalities—in 1960.
  - b. Suppose there are two neighbors and one (**A**) of them is externalizing a cost (say, noise) onto the other (**B**) through some activity.

- i. Also suppose **A** values the externalizing activity at \$30 and **B** would pay \$50 to avoid the externalized costs.
    - c. In Coase's world, the two could go to a judge who would assign whom has the right to what—does **A** have a right to do what he wants in his own place or does **B** have a right to not be disturbed?
    - d. The judge can conclude in two ways:
      - i. *If **A** has the right*, then **B** would be willing to pay **A** something between \$30 and \$50 to make him stop.
      - ii. *If **B** has the right*, then **A** would not be willing to pay **B** to allow the noise to continue so it remains quiet.
    - e. *The Coase Theorem* dictates that if transaction costs are low and property rights are clearly defined (in this case, by a judge), externalities don't create market failures. Even with externalities, the market result will be efficient.
    - f. The weak point with the Theorem is that it assumes low *transaction costs*, or the costs associated with participating in the market place. There are costs, such as time to negotiate and difficulty to coordinate, required for buyers and sellers to agree.
      - i. If **A** is a polluting factory and **B** is a community of people, how does one negotiate between them all? Suddenly, it really does matter who is assigned the right to what because it will determine which party bears the transaction costs, and that can change the outcome.
      - ii. In his paper, Coase realized this weakness and offered a solution. The person who changes their behavior should be the one who's the "least cost avoider." What's cheaper: for **A** to stop polluting or for **B** to deal the pollution (or just move)?
- V. Application of Coase Theorem: Tradeable Allowances
- a. Externalities exist because of a lack of private property. One way to solve them is establish private property.
  - b. Tradeable allowances are one such way. The government caps pollution (or fishing, or whatever) at a certain level and then allows private individuals to purchase the ability to pollute (or fish, or whatever).
    - i. These allowances are private property: you can buy or sell them.
    - ii. Thus you must pay to externalize a cost, which, in practice, is the same as a tax. The difference is you have direct control over how much negative externality there is, rather than having

direct control over how much more the negative externality will cost.

- c. Note that anyone can purchase these allowances, including environmental groups and ordinary citizens like you and me! We can buy the right to pollute and then not use it.
- d. Tradeable allowances are an efficient version of quotas. Rather than dragging  $Q^e$  away from  $Q^*$ , we bring  $Q^e$  to  $Q^*$  by setting the quota to the optimal quantity.



- i. Much like Pigouvian corrections, the optimal level is hard to figure out. But it may be sometimes easier to figure out optimal quantity levels than the size of the externality even if both are hard to do.