ECNS 204

Principles of Microeconomics

Chapter 5 (Supply and Demand) – Silberberg and Ellis

Dr. Mark Anderson

Change in demand vs. change in quantity demanded

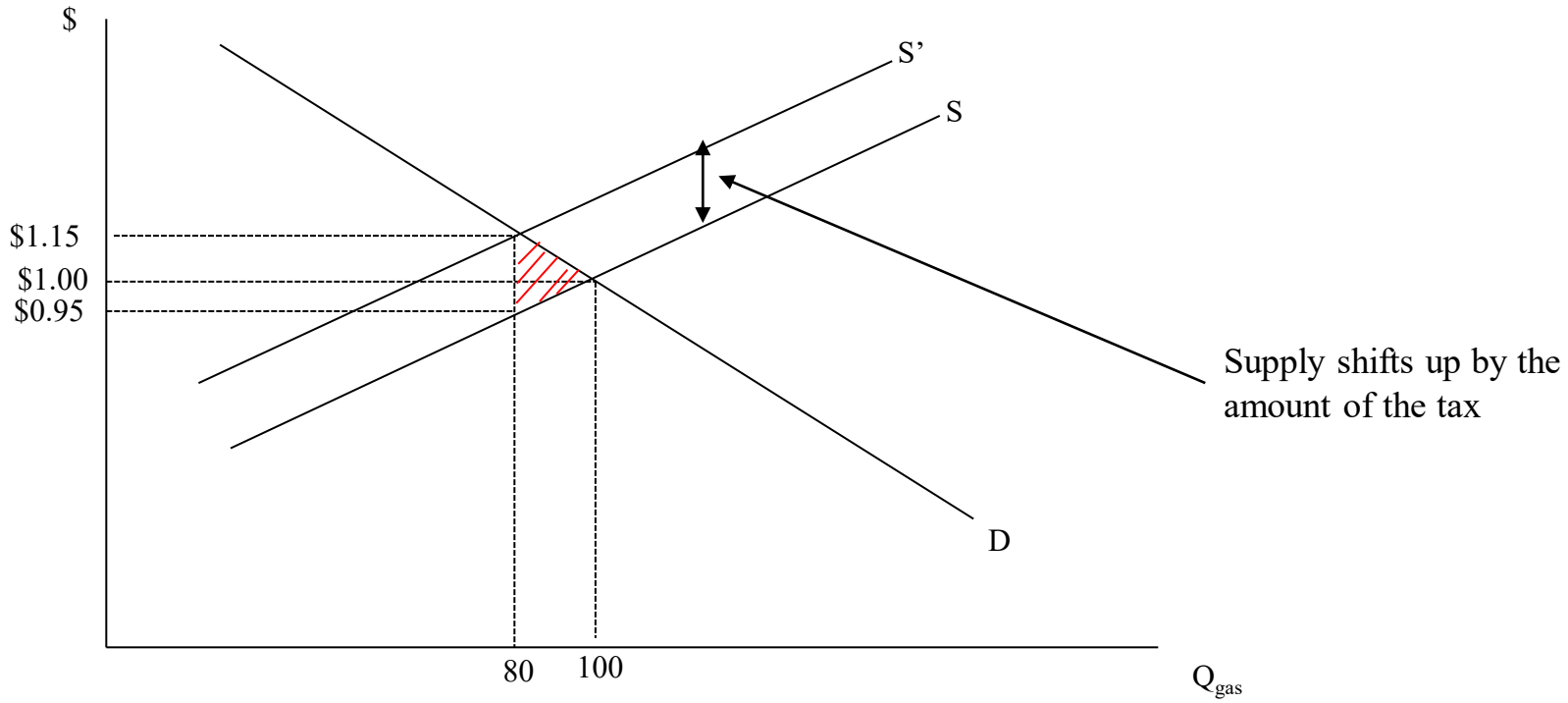
- Law of demand is a statement about the slope.
  - The economic postulates of behavior say nothing about the placement of the demand curve.
  - The location of the demand curve is a statement of how intensely consumers with to consume a good.

- Change in quantity demanded
  - For instance, consider the demand for gasoline. Q. How do we represent a change in the price of gas, holding other factors constant?
  - Ans. This is simply represented by *movement along* the demand curve.

- Change in demand
  - If any other variable other than the price changes, the demand curve itself shifts
  - For instance, influences other than the price of gas have affected the demand for this good
    - As income rises, many people decide to purchase their first car or an additional car. In this case, demand for gas shifts out. *At higher incomes, individuals want to consume more gas at all of the old prices.*
    - Note: Because gasoline is a normal good, an increase in income implies an outward shift in demand. Demand shifts inward when income increases and a good is inferior.

Who pays the tax?

- Let's again consider the market for gasoline. Let's also consider that the government imposes a sales tax in the market for gasoline.
- Q. Does a sales tax impact what people prefer or what constraints they face?
  - Ans. It impacts constraints. It does not affect the usefulness of gas to people.
- Let's suppose a nationwide sales tax of $.20 gallon is levied on gas.
  - For simplicity, let's assume the sellers have to mail the tax receipt to the government.
  - How do we represent this sales tax graphically? (see following slide)



- The original supply curve represents the supply of gas only when the price on the vertical axis means NET price to the sellers (i.e., the money actually received by the sellers.
- B/c sellers receive $.20 less per gallon, their decision on how much to supply will be based on the net price received after paying the tax
  - The supply curve, plotted against gross price (i.e., the price before tax is paid) is everywhere $.20 above the original supply.

Who pays the tax?

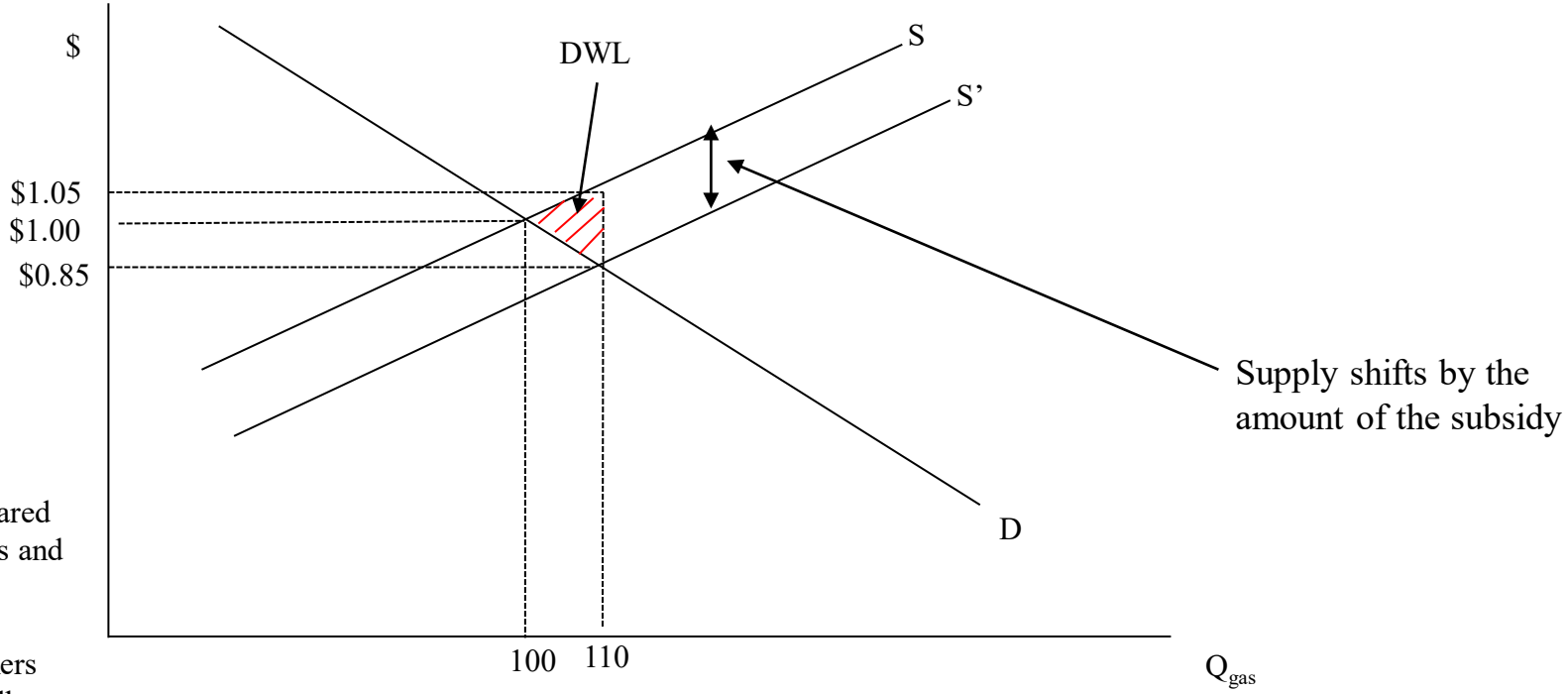
- With the tax, the new equilibrium occurs where 80 million gallons are sold
- Note the effect on price
  - Price to consumers rises to $1.15/gallon
  - Sellers receive $.95
- In general, the price to consumers does not go up by the full amount of the tax
- The price sellers will accept is lower b/c the supply curve is upward sloping and a smaller quantity is sold
- The tax is shared by both consumers and producers
  - Total tax = ($.20/gal.)(80 million gallons) = $16 million
  - Portion of tax consumers effectively pay = ($1.15/gal. - $1.00/gal.)(80 million gal.) = $12 million (note: this comes out of their consumer surplus)
  - Portion of tax producers effectively pay = ($1.00/gal. - $.95/gal.)(80 million gal.) = $4 million (note: this comes out of their producer surplus)

Who pays the tax?

- Also note that the tax drives a "wedge" b/w the price paid by consumers and the price received by sellers
  - B/c the participants in this market no longer face the same price, their MVs of the good must differ
    - Consumer's MV = $1.15/gal.
    - Producer's MV = $.95/gal.
  - What does this difference imply?
    - Anytime MVs differ, lost mutual benefits from exchange must exist…NOT Pareto efficient equilibrium
  - These lost mutual benefits are represented by the red dead weight loss (DWL) triangle, which represents lost gains from trade b/c output is below the efficient level.
- Q. What determines the relative impact of such a tax on consumers vs. producers?
  - I want you guys to think about this on your own and work through it graphically…in doing so, think about the relative slopes between the demand and supply curves.
  - For instance, consider the case of elastic demand vs. inelastic demand.

Subsidies

- The opposite of a tax
- Occurs when gov't shares the cost of production
- A per-unit supply-side subsidy will shift supply curve outward, where the difference b/w the original supply curve and the new supply curve is the amount of the subsidy.
- Suppose we have a $.20/gallon subsidy



·Subsidy is shared b/w consumers and producers:

-Price consumers pay is $.85/gallon

-Price producers receive is $1.05/gallon

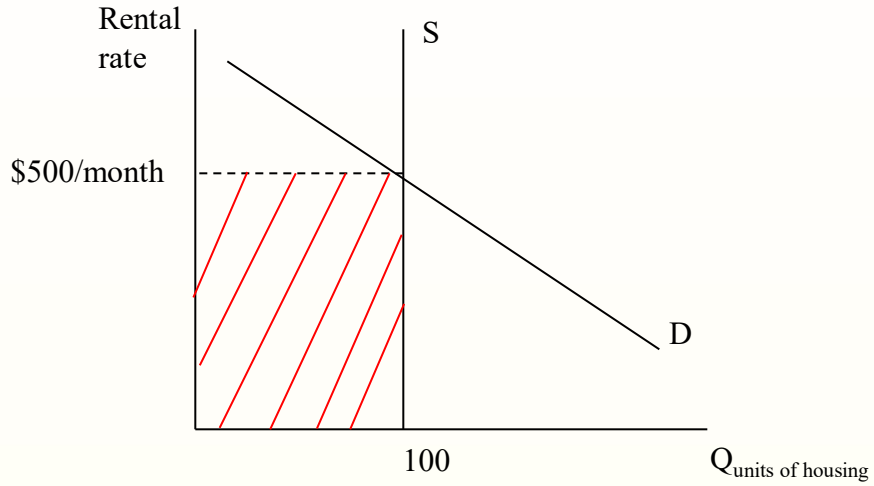
·Total subsidy paid by taxpayers = ($.20/gallon)(110 million gallons) = $22 million
·Cost to taxpayers is partially offset by lower price, which saves consumers ($.15/gallon)(110 million gallons) = $16.5 million
·Net cost to taxpayers = $22 million - $16.5 million = $5.5 million

Subsidies

- Again, we have a DWL…but now it exists b/c of too much production
  - Production is carried beyond the point where the marginal value of the good to consumers equals its marginal value to producers.
  - Beyond the point where S and D intersect (i.e., the intersection point corresponding to Q = 100), consumers value resources more highly in some other use…indicated by the height of the original supply curve.
  - DWL ≈ (1/2)(10 million gallons)($.20/gallon) = $1 million
  - Economic intuition behind the DWL
    - DWL = cost to taxpayers – gain to producers = $6.5 million – ($.05/gallon)(110 million gallons) = $1 million

Taxes on Immobile Resources

- Consider a resource whose supply is relatively fixed (e.g., housing in the short run)

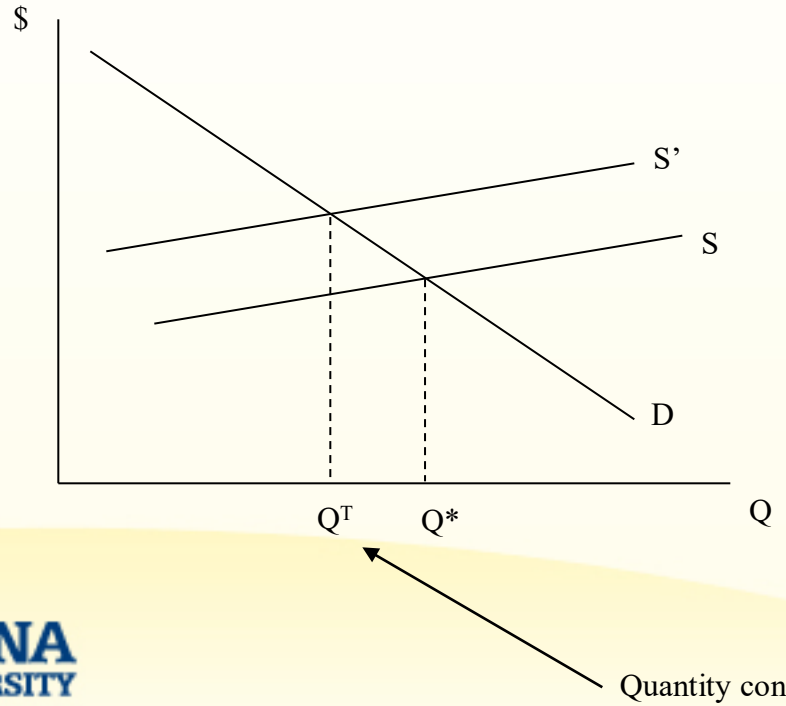


- Red shared area = all payments to landlords = $50,000
- Suppose gov't keeps some part of the rent in form of taxes (would be represented by some chunk taken out of the red shaded area)
- Suppose property tax is reduced
  - Demand for housing does not change (i.e., nothing about people's desire to have a roof over their heads is changed by this legislation)
  - Also, since supply (in the short run) is essentially fixed (i.e., vertical supply curve), nothing changes with regard to the number of housing units offered for rent.

- Since neither the supply nor demand changes, the market price cannot change.
  - Any lowering of rents by property owners would be pure altruism, a trait not often associated with landlords!
- Decrease in taxes in the short run simply increases share of total expenditures on housing that landlords receive
- In the long run, lower property taxes raise profitability of owning rental properties and new units will be built over time and supply curve will shift to the right.

Who pays a new sales tax on food?

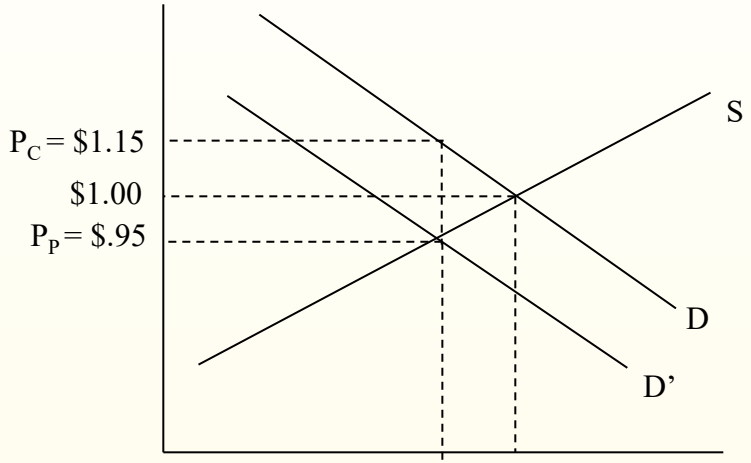
- First, let's speculate about supply curve slope…
- Suppose one state in the U.S. imposed a food tax and no other states have such a tax
- Because food production and distribution is worldwide, what does this imply about elasticity of local supply of food?
  - Q. Do the changes in buying habits of consumers in one state affect the national/world price of food?
  - Ans. No! So, we would say that supply is highly elastic. Which we can draw as follows…



- *Here's a question I want you guys to think about and try to solve on your own…Who bears the larger tax burden in this scenario? We have a very elastic supply curve and a per-unit supply-side tax. Who bears the greater tax burden, consumers or producers??? The answer is in your text…if you are struggling, just work through it via the textbook.*

Effects of a Tax when Buyers (not Sellers) Collect the Tax

- Recall the original gas tax example where sellers mailed tax receipts to the government
- What happens if buyers were responsible for collecting the tax?
  - An example would be the market for human labor
    - Government levies a tax on market to pay for social security
    - Employer must pay part of this tax (i.e., the ***buyer*** of labor)
  - Now, the demand curve shifts by the amount of the tax.
- Let's go back to our gas tax example and see what this looks like…



Much of our answer looks the same when compared to the tax imposed on sellers!
-Consumers still effectively pay $1.15/gallon
-Producers still effectively receive $.95/gallon

Shortages

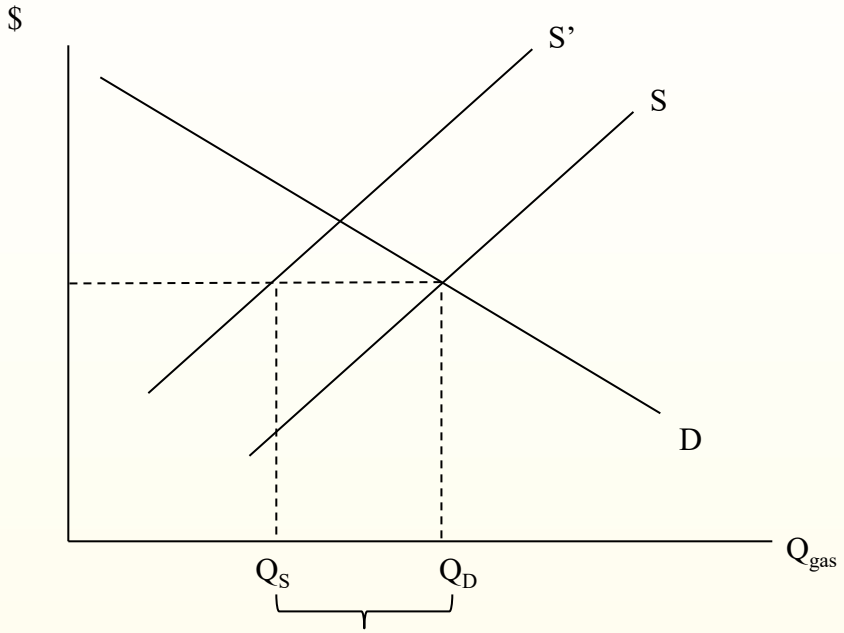
- Q. How does the market respond to supply shocks?
- Ans. Competition by price for scarce resources.

- For instance, suppose a freeze destroys a citrus crop.
  - Q. What happens? How does the market respond?
  - Ans. The price goes up!

- Q. However, what happens when competition by price is restricted or forbidden?
- Ans. In this situation, we have nonprice competition.
  - An example would be if the gov't issued a ruling that sellers were forbidden to raise prices. This is called a "price control."

Shortages

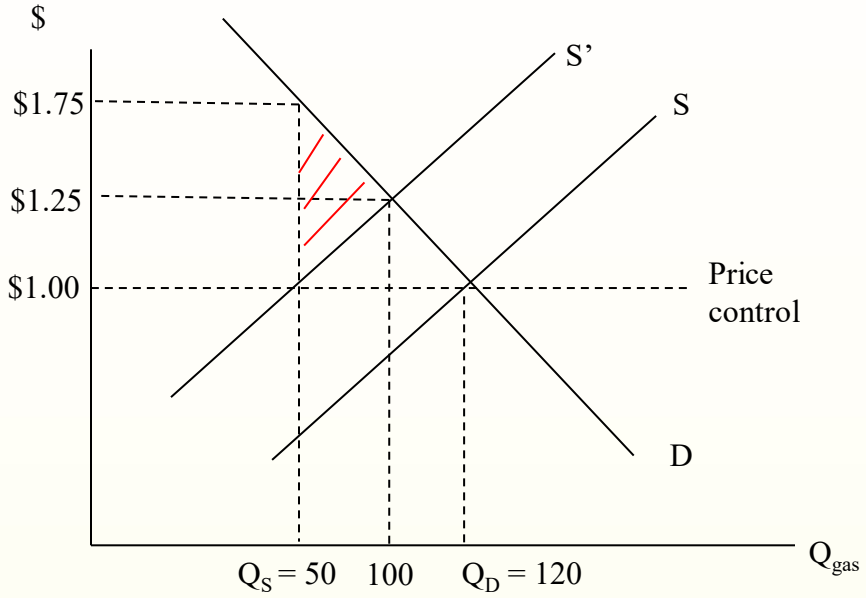
- Let's consider the following example
  - Suppose there is a negative shock in the supply of petroleum (S → S')
  - Further, suppose the gov't enacts a price control that forbids suppliers from raising the price correspondingly.



Quantity demand is greater than quantity supplied.
Thus, we have a shortage.

Shortages

- Let's add some numbers to the previous diagram…suppose price control is maintained such that sellers cannot charge more than $1.00/gallon. Suppose the market clearing price would be $1.25/gallon.



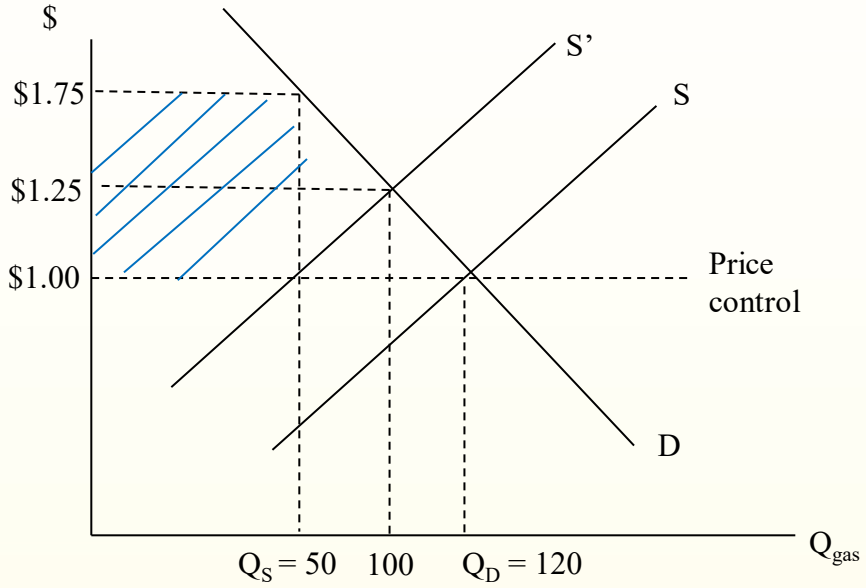
- Here, the shortage is equal to 120 units – 50 units = 70 units.
  - Shortage persists b/c excess in quantity demanded remains when price is not allowed to adjust
  - Inefficient outcome b/c at 50 units the consumer's MV is greater than the seller's MV (i.e., point on demand curve exceeds the point on the supply curve at Q = 50)
  - DWL = red-shaded area

Shortages

- At Q= 50, the consumer's MV = $1.75…an amount that exceeds the current price control of $1.00 by $.75
  - Consumers lucky enough to purchase gas at this price essentially receive a gift of $.75/gallon
    - If they fill up with 10 gallons, for example, they receive "gift" of $7.50.
- Price competition is eliminated by the price control…but nonprice competition exists.
- Q. what type of behavior might we see?
- Ex. In the case of the 1973-1974 price controls (when OPEC countries reduced petroleum shipments), we saw consumers…
  - Waiting in long lines to fill up
  - Gas stations would announce the hours at which they would sell gas and consumers would start queuing up hours ahead of time
  - Other potential consequences….black market for gasoline, under-the-table deals, even violence
  - When price controls were eliminated, the lines disappeared

Shortages

- Things like waiting in line represent wasteful expenditures of resources…waste of mutual benefits from exchange.
- We say that this nonprice rationing causes a ***dissipation of rents***
- The total rents dissipated equal the area shaded in blue below…this is the difference b/w consumer's MV of gas and the price sellers are allowed to receive multiplied by the quantity supplied.



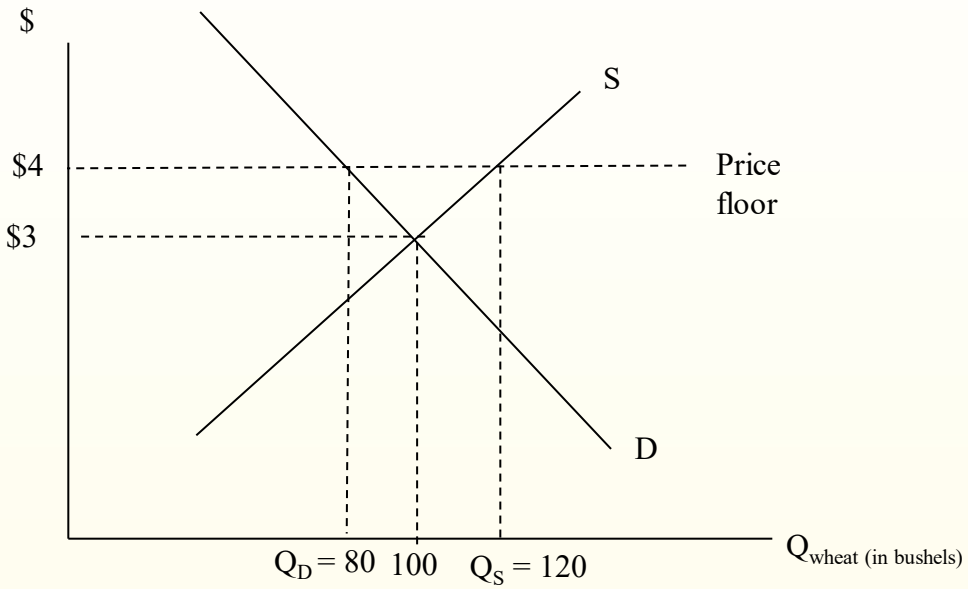
- If we know the opportunity cost of the consumer's time, we can figure out how long she/he would be willing to wait in line for gas. Let's consider this using a numerical example…

Shortages

- Q. If the consumer of gas valued time at $15.00/hr, how long would he/she wait in line to fill up?
- Recall, they receive a $7.50 “gift” when they fill up. Therefore, they would be willing to wait up to 0.5 hours!

Surpluses

- Result when government sets a price ***above*** what the market would set
- Historically, surpluses have occurred in agricultural markets when the government sets ***price floors*** above the market clearing amount.
- Example. Consider the market for wheat
  - In a free market, assume that P = $3/bushel and Q* = 100 bushels
  - Suppose a price floor is set at $4/bushel



Here, quantity supplied = 120 and quantity demanded = 80. Thus, the surplus is 40 bushels of wheat.

Surpluses

- Based on the diagram on the previous slide, I want you all to try and figure out the answers to the following questions…
  - Q. Is this market efficient?
  - Q. If it is not efficient, where is the DWL?
  - To maintain the price floor, the government must promise to buy up the surplus from producers at the price of $4/bushel. When the government buys up the surplus it represents a cost to taxpayers. How much, in total, is the cost to taxpayers of the price floor policy?