Econ 1101
Summer 2013
Lecture 4

Section 005
6/20/2013

Announcements

- Homework 3 is due ~~tonight at 11:45pm, CDT~~ Friday and Saturday night
- Recitation starts today at 6.40pm (same room).

- Another Aplia experiment (price ceilings):

  Today, after 6.15pm
  (following a 20min break after the lecture ends)

Agenda for today

- Taxes and subsidies
- Case study with taxes
- Introducing price ceilings
- Impacts of price ceilings in Econland
- Impacts of price ceiling in Aplialand
- Supply Management in Econland and Canada
- Handy summary of the effects of policies

Taxes

Big Picture:

- We will see how taxes distort decision making in Econland.
- With taxes we won't be getting socially efficient quantity (but remember, no externalities here).
- But the government gets revenue and it might do something useful with it….

Taxes, cont'd

Tax is a wedge between price consumer pays and price producer receives (Note: a tax is also sometimes represented as a curve shift. The wedge and the curve shift is saying the exact same thing, but I like the wedge representation better)

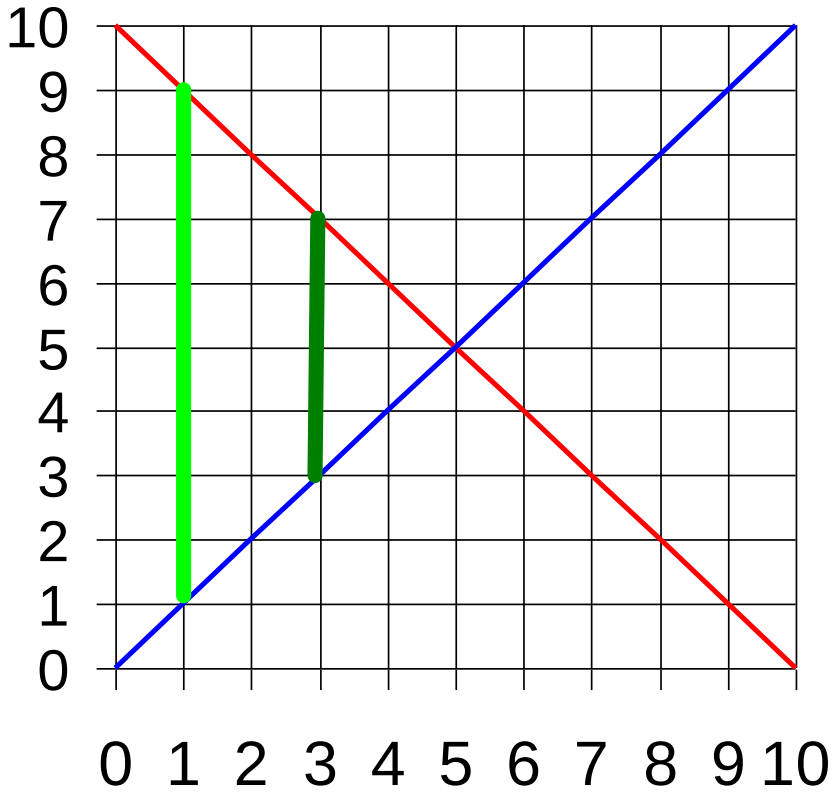
$P^d = \text{tax} + P^s$

P^d is price that the consumers pay (price for demanders)

P^s is price that the producers get (price for suppliers)

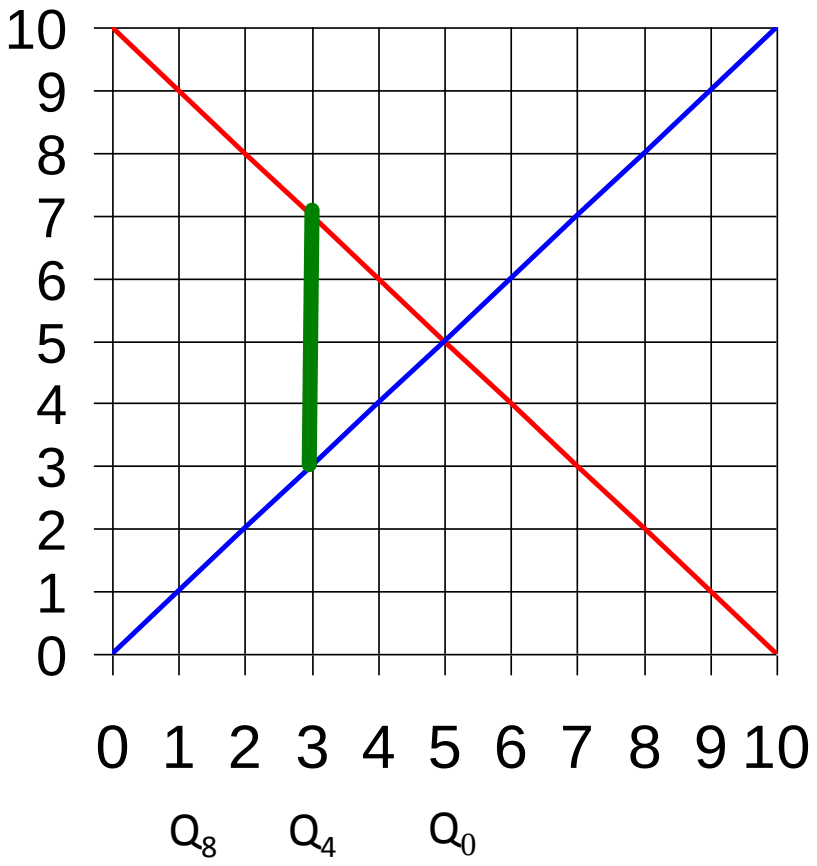
To find equilibrium under tax, find quantity where distance between demand and supply equals the tax. (the wedge)

Graphically



Equilibrium when tax = $4, $8?

Equilibrium graphically



Pd = tax + Ps

	No Tax	$4 tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	+2

Taxes, cont'd

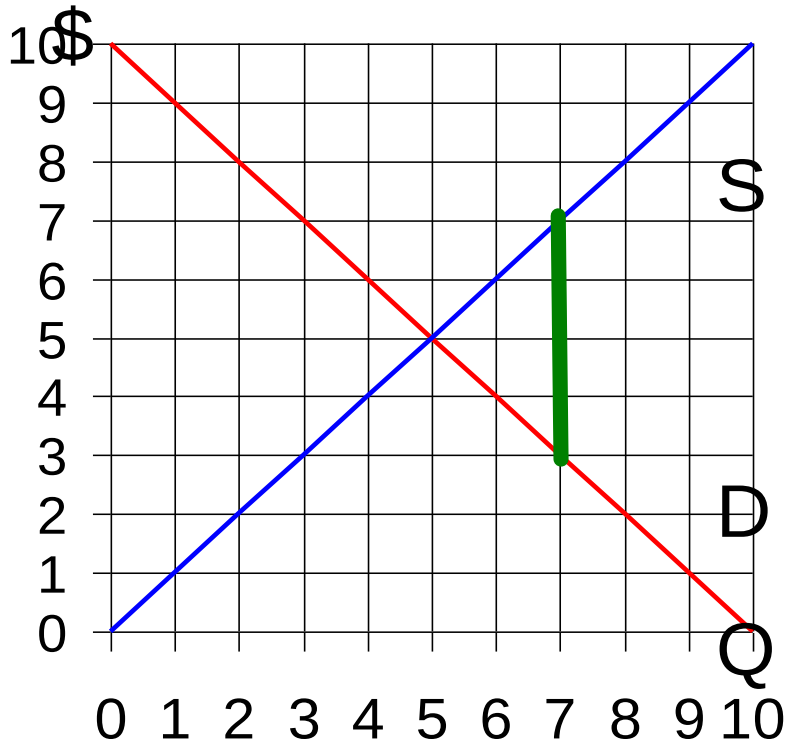
Great question: Are we always on the left side of the free market quantity with a tax?

With tax, in general yes (except for one extreme case).

What about a $4 widget subsidy

$P^S = P^D + \text{subsidy}$

Subsidies, graphically



Equilibrium when subsidy = $4

Taxes, cont'd

Great question: In Econland, after the $4 tax, $\Delta P^D = +\$2$, $\Delta P^S = -\$2$.

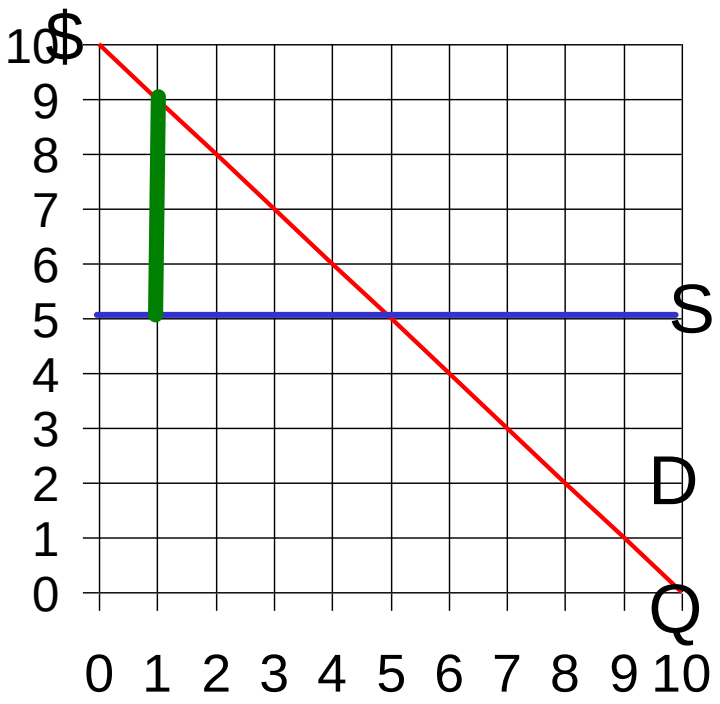
Do buyers and sellers always split the tax 50/50?

No, it depends on elasticity.

Taxes, cont'd

Suppose supply is perfectly elastic:

buyers take the entire burden of tax

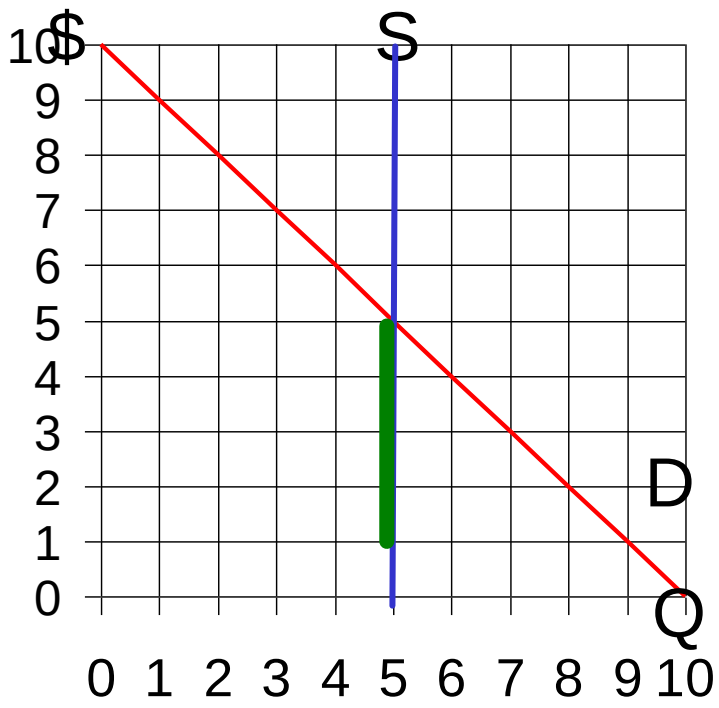


Taxes, cont'd

Pd = tax + Ps

tax = Pd - Ps

Suppose supply is perfectly inelastic



Big Idea

The more inelastic the side of the market you are on, the more you pay of the tax!

Does this make intuitive sense?

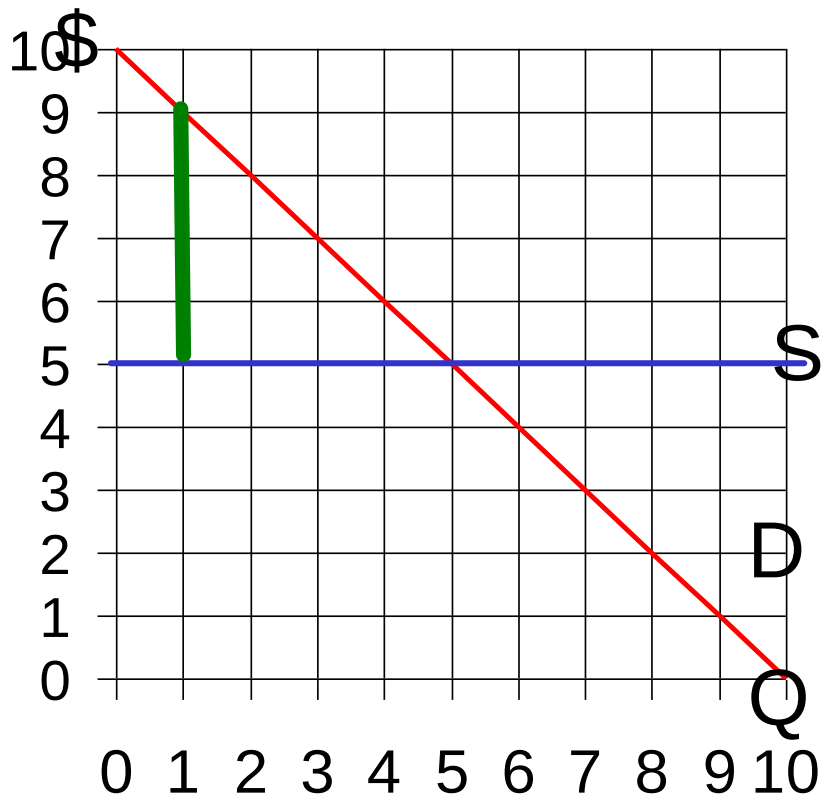
I hope it does - think about our previous example: insulin buyers. Since their demand is perfectly inelastic, they will pay the entire tax amount, so that the producers' price can stay unchanged.

Example

Let's look at retail gas prices and gas taxes across countries from Homework 3.

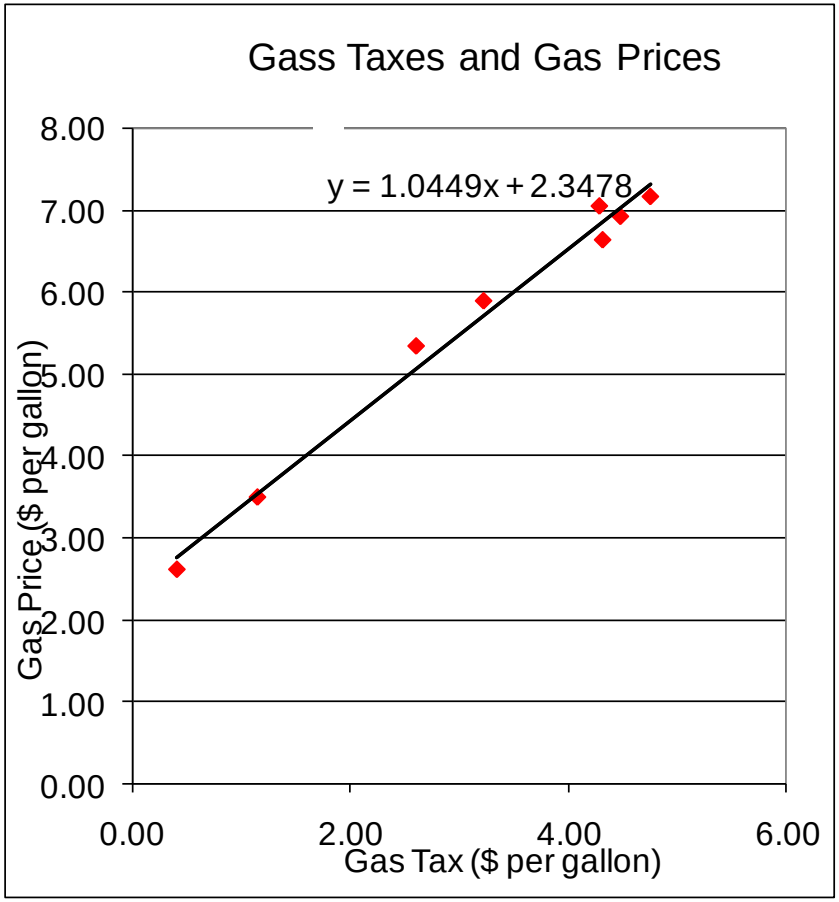
Key point: the world oil market is global. Since any one country tends to be small, its own demand has a small impact on world market. If Spain doubles its demand, it won't impact the global market (i.e. it won't drive the price of oil up on a global level)

Example, cont'd



Theory implies a gas tax in Spain gets passed on to consumers, Euro for Euro. How does the theory do?

Example, cont'd



Example, cont'd

The result is consistent with the theory. Note the slope of the regression line is approximately one. The figure shows that taxes are approximately passed along dollar for dollar to consumers.

Comparing the U.S., with a tax of .40 and a price of 2.61 with Germany, with a tax of 4.76 and a price of 7.17 (all in $ per gallon), the difference in gas price of 4.56 is approximately equal to the difference in tax of 4.36. Of course, other things can contribute to differences in gas prices across countries.

Taxes, cont'd

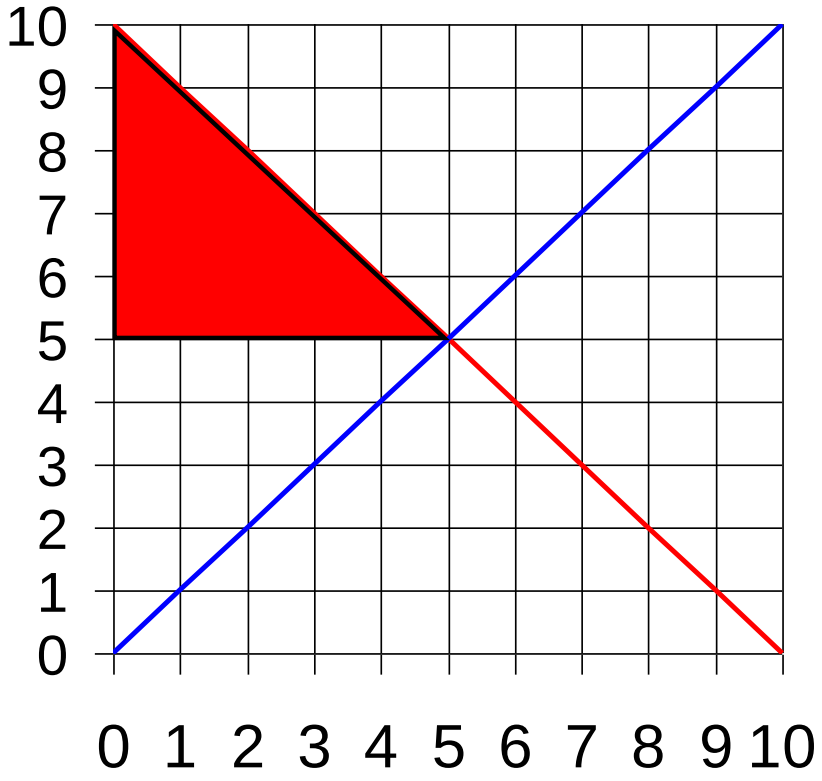
Let's get back to Econland and the $4 tax.

Let's do a welfare analysis of the effects of the tax!

Econland Surplus Calculation

	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	-8
PS	12.5	4.5	-8
Gov't Surplus	0	+12	+12
TS	25	21	-4

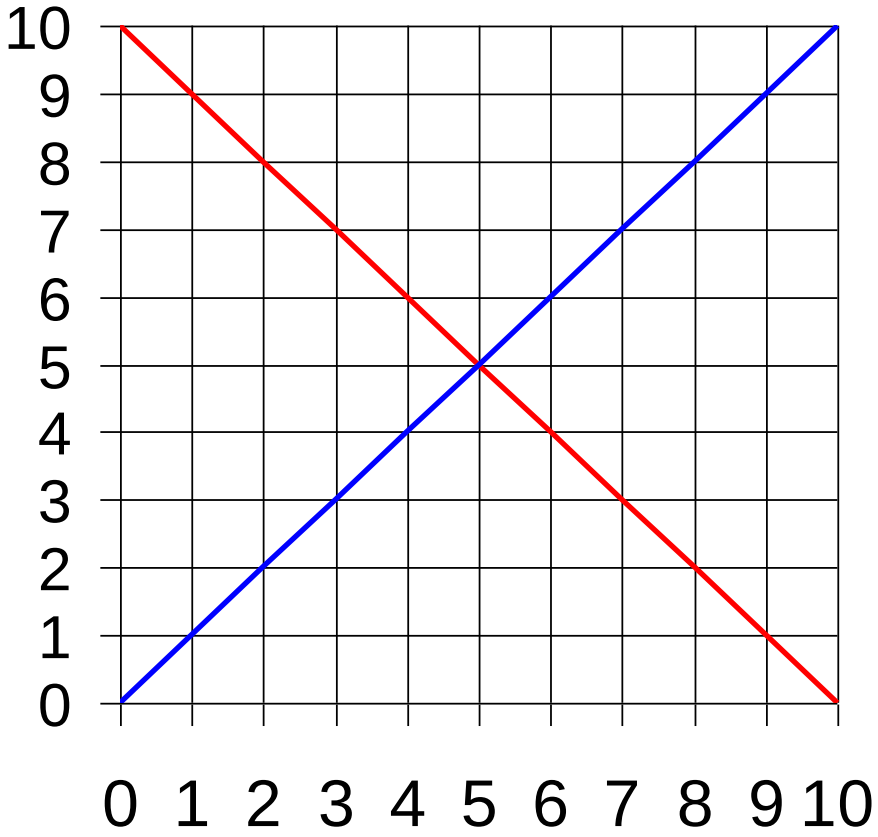
Econland Surplus Calculation



	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS			
PS			
Gov't Surplus			
TS			

Consumer Surplus at $P^D = 5$

Econland Surplus Calculation

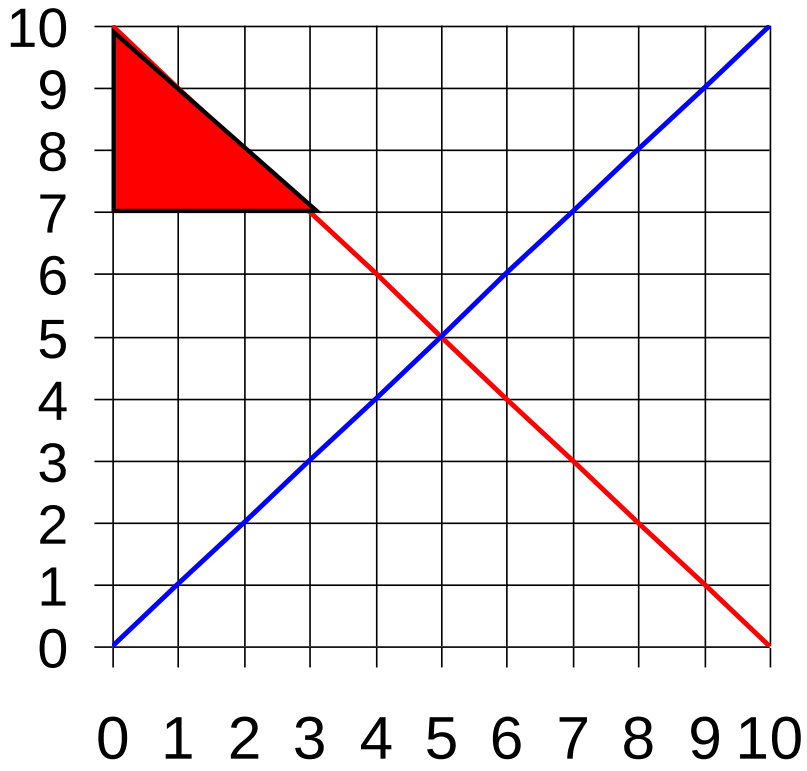


	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5		
PS			
Gov't Surplus			
TS			

$4 tax in Econland.

P^D increases from $5 to $7

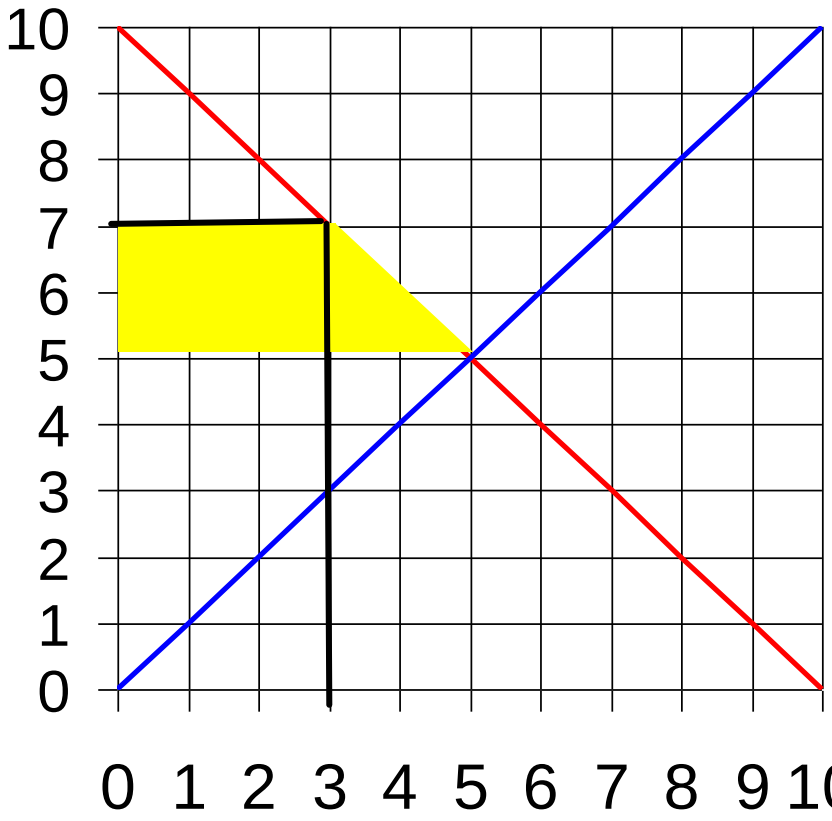
Econland Surplus Calculation



	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	
PS			
Gov't Surplus			
TS			

Consumer Surplus at $P^D = 7$

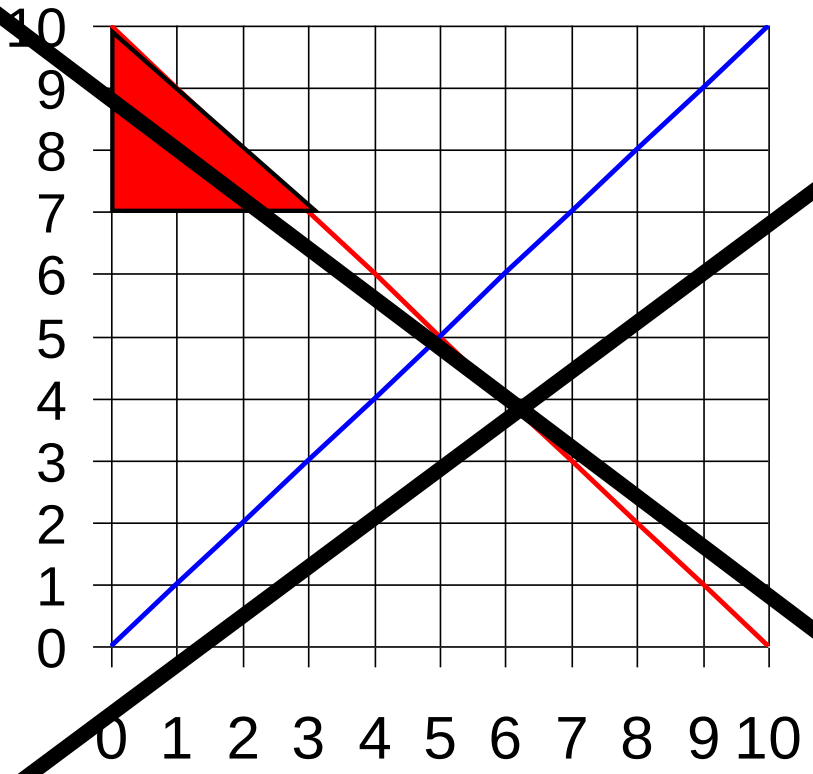
Econland Surplus Calculation



	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	-8
PS			
Gov't Surplus			
TS			

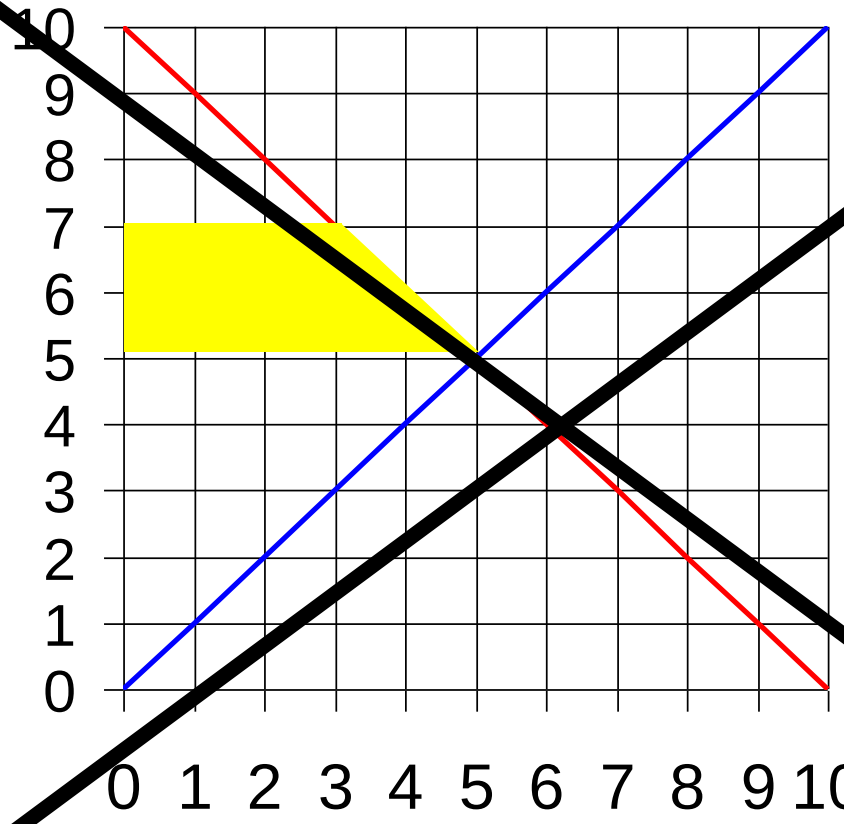
Change in Consumer Surplus (ΔCS)
(P^D from 5 to 7)

Econland Surplus Calculation



Consumer Surplus at $P^D = 7$

Econland Surplus Calculation



Change in Consumer Surplus (ΔCS)
(P^D from 5 to 7)

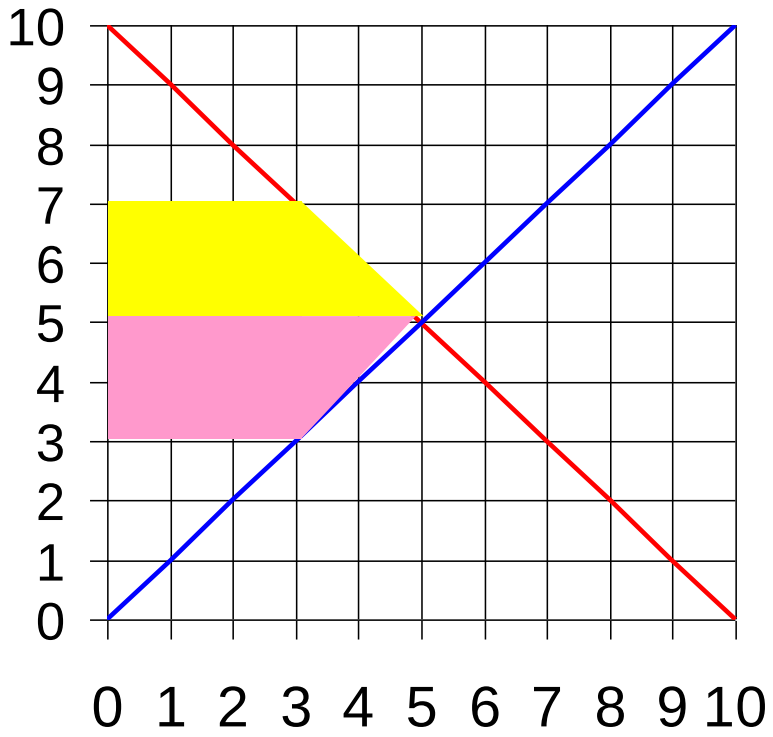
Econland Surplus Calculation

This trapezoid can be broken into two parts

Rectangle: The first three units are bought whether there is a tax or not, (maybe it will help to think that D1, D2, and D3 have a high reservation price, so even after the tax they are willing to buy) and the rectangle is just their loss in consumer surplus because of a higher price for consumers.

Triangle: This represents the loss in surplus resulting from the tax lowering consumption from 5 units to 3 units. As a result of the tax, two people won't consume anymore.

Econland Surplus Calculation



ΔCS and ΔPS

(P^D from 5 to 7)
(P^S from 5 to 3)

	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	-8
PS	12.5	4.5	-8
Gov't Surplus			
TS			

Econland Surplus Calculation

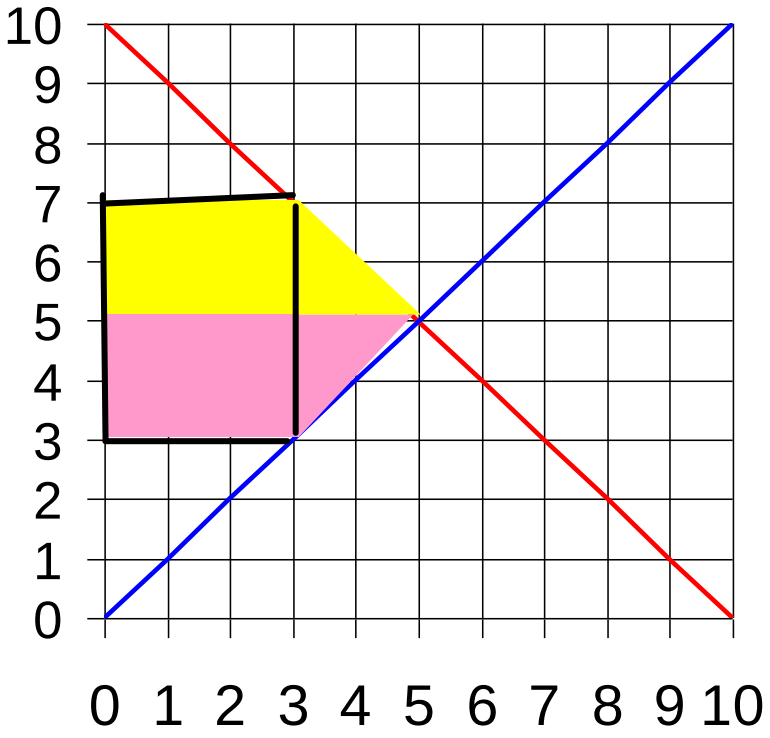
	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	-8
PS	12.5	4.5	-8
Gov't Surplus	0		
TS	25		

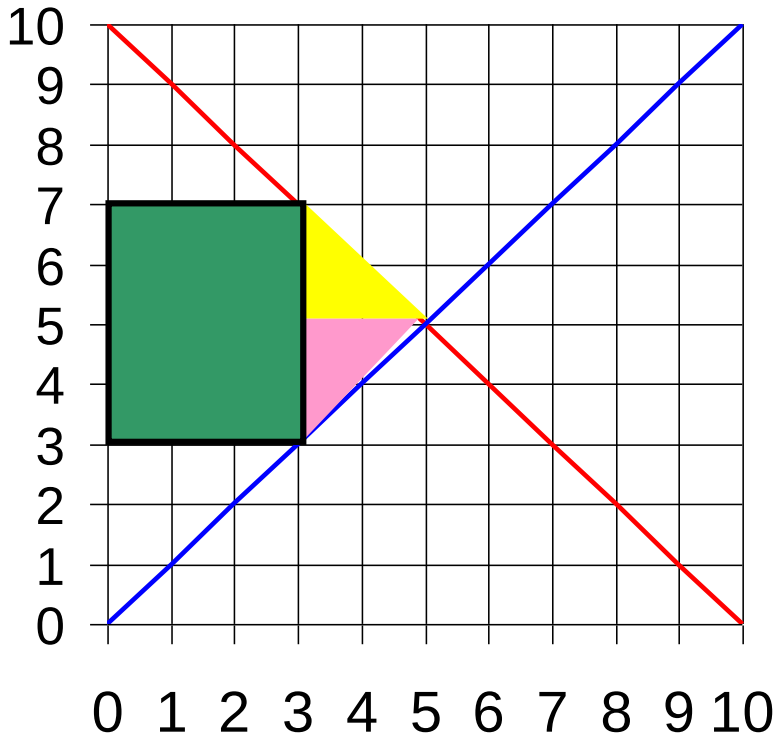
Econland Surplus Calculation

	No Tax	$4 Tax	Change
Q	5	3	-2
P^S	5	3	-2
P^D	5	7	2
CS	12.5	4.5	-8
PS	12.5	4.5	-8
Gov't Surplus	0	12	12
TS	25	21	-4

Econland Surplus Calculation

Change in Government Surplus
$\Delta GS = Q \times tax$
$= 3 \times 4 = 12$





Taxes, cont'd

Allocation with tax not Pareto Efficient.

Pareto efficient allocations maximize the size of the pie. We can see from the loss of the triangle (the deadweight loss) that the pie is not as big as it can be.

Going back to the cheesecake example – some cheesecake pieces are being thrown into the trash, so consumers, producers, and government are not getting that cheesecake. Since in the free market, the total surplus is maximized (Pareto efficient), the allocation with tax is not Pareto efficient (because it does not maximize the size of the total surplus, as we have a dead weight loss).

Call in the Economics Doctor

Diagnosis the source of inefficiency.

Problem: Breakdown of General Principle 3, Efficient Quantity where

- Marginal Reservation Price (MRP) equal to Marginal Cost (MC).

- Q = 3 is too small (Tax puts wedge between MRP and MC)

(But note General Principle 1 and 2 continue to hold. Get efficient allocation of consumption and production.)

What about government spending?

Suppose the government needs money.

- D10 did something special, Government revenue is needed to give him a prize of $12.

Alternative 1

- Head Tax $0.60 a person. Lump sum tax
- Tax 20 people raises $12.
- No deadweight loss from widget tax.

Tax widgets, quantity changes compared to free market

Tax heads, quantity is the same as free market

- **No distortions of behavior**

What about government spending?

- Example: In 1377 in England, everyone over the age of 14 had to pay a goat to the Crown (to fight war with France)

- Head tax is a regressive tax (low income taxes that are a higher proportion of their income than high income people)

What about government spending?

Alternative 2:

- Tax of $2 for people with last names <=3. (So S1,S2,S3, D1,D2,D3 all pay $2)

Pareto improvement compared to $4 widget tax. Why?

Principle:

- Taxes that distort decision making reduce the size of the social pie compared to taxes that don't distort decisions.

Subsidies

Back to Econland

- Campaign promise: Get to 90% widget coverage (Q=9)

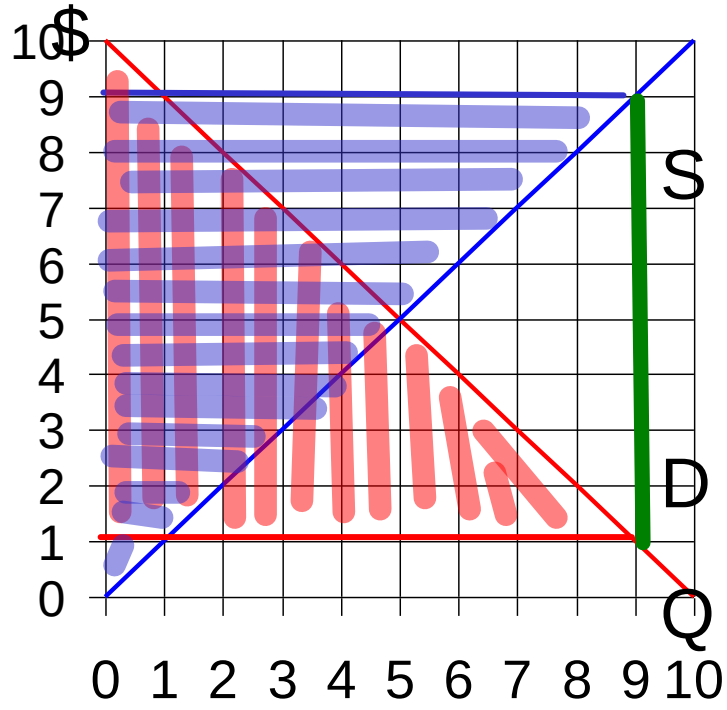
Got to pick a subsidy so that:

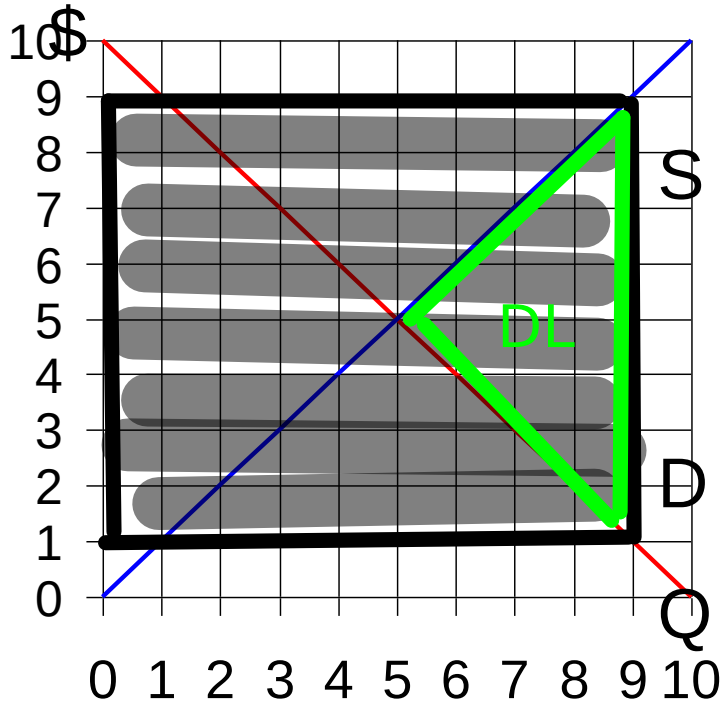
P^D =1 (a price that D1-D9 would be willing to pay)

What should the subsidy be?

Name	Res. Price	Cost	Name
D1	9	1	S1
D2	8	2	S2
D3	7	3	S3
D4	6	4	S4
D5	5	5	S5
D6	4	6	S6
D7	3	7	S7
D8	2	8	S8
D9	1	9	S9
D10	0	10	S10

Subsidies, cont'd





Equilibrium when subsidy = 8

Medicare and Social Security

New information about the demographics of Econland:

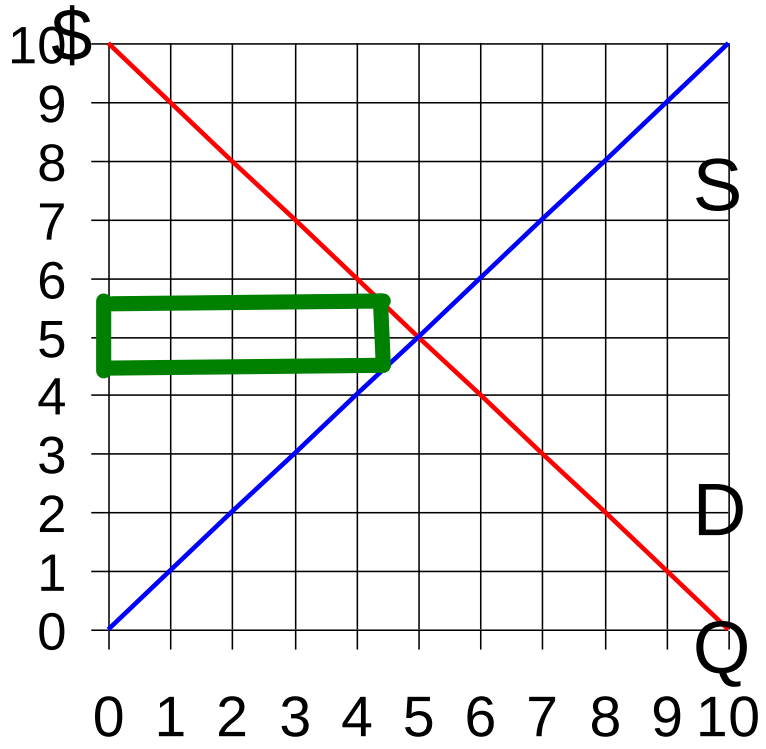
- D1 and S1 are the youngest people in the economy. Age 1 in Econland years.
- D2 and S2 are age 2, and so on.
- Today's D1 and S1 will become next year's D2 and S2. Today's D2 and S2 will become D3 and S3, and so on.

Medicare and Social Security

Econlandcare

- Once people hit age 10, they get $2.25 to cover illness and expenses.
- D10 and S10 are the only ones who qualify. So program costs government $4.50.

How can we finance this with a widget tax?



Medicare and Social Security

A widget tax of $1 results in: $Q^e = 4.5$ widgets, $P^D = 5.5$, $P^S = 4.5$

Compared to free market:

$\Delta CS = 10.125 - 12.5 = -2.375$

$\Delta PS = 10.125 - 12.5 = -2.375$

ΔGov't = +4.5

$\Delta TS = -.25$

Deadweight loss per dollar collected is .25/4.5 = .056

All this is for year 1.

Medicare and Social Security

New Development! (Year 2)

- New medical treatments prolong life to 11 Econland years!

Treatment is more costly then before. Will cost $3.00 per person per year

- Program cost this year = $6 (cost for D10 and S10)

Suppose policy this year:

- “Kick the can down the road” (in other words, procrastinate and pay later)
- Tax rates left the same, Econland borrows $1.50 from China to finance budget deficit of $6 – $4.50 = $1.50

Medicare and Social Security

Year 3

- Start with national debt = $1.50
- Meet D11 and S11!
- They still qualify for program, and now also D10 and S10.

If we keep the program as is, cost of Econlandcare = $12 = 4*$3.

Suppose fighting in Congress leads to another year of kicking can down the road.

- Current deficit = $12 – $4.5 = $7.50
- Add to debt of 1.50 at start of year (and leaving out interest payments for simplicity) yields a new debt of $9=$1.50+$7.50

Medicare and Social Security

Year 4

- Runaway debt unsustainable in the long run and this is the year that the poop hits the fan.

- Suppose hypothetically Econland tries to pay off the entire debt in one year with no change in the program.

Needed: $12 to fund program

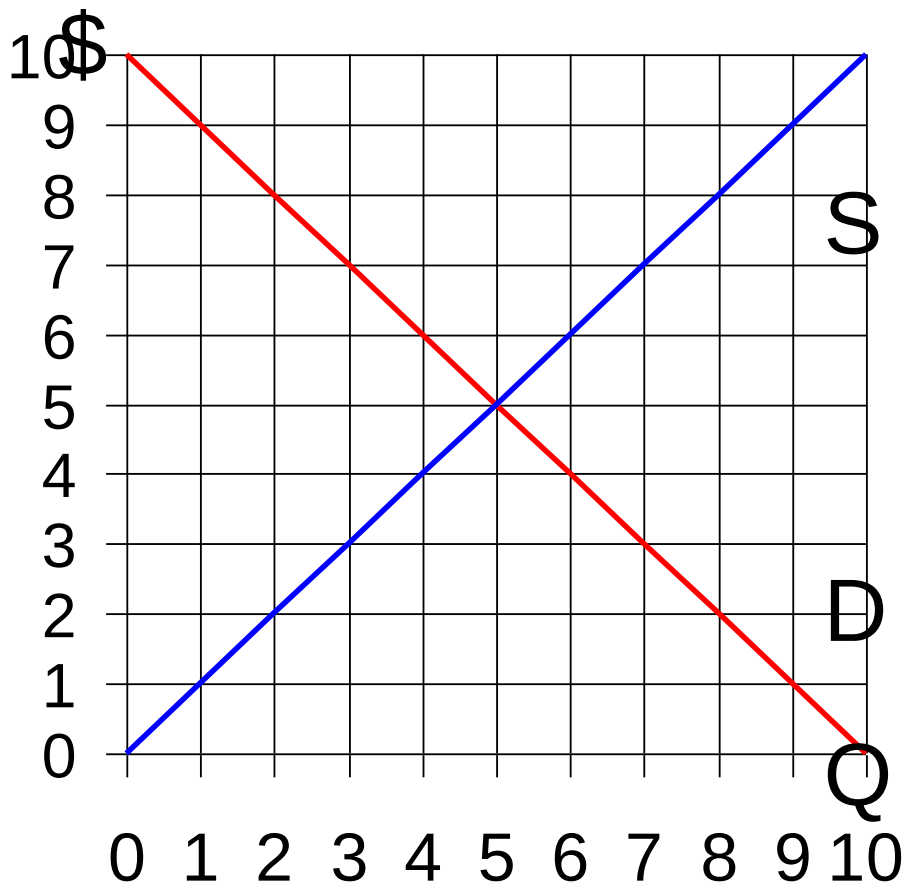
$9 to pay debt

= total of $21 in revenues.

- How are we going to get that?

Medicare and Social Security

How much should we tax to get $21 in revenue?*



*this may be a trick question

Medicare and Social Security

Tax	Q	Revenue	Dead-wgt Loss	Dead-wgt loss per $ rev
1	4.5	4.5	.25	.056
2	4	8	1	.125
4	3	12	4	.333
5	2.5	12.50	6.25	.50
6	2	12	9	.75

Impossible to raise $21!

$12.5 is maximum!
Attainted at tax of $5 which does a tremendous amount of damage (For every dollar taken in, 50 cents of dead weight loss.)

Medicare and Social Security

What will happen?

- Not going to raise $21
- Even if we set the tax high, still going to have to cut back on the program somehow.

Example (Plan A)

- In year 4, set tax = $4, raise $12.
- Cut program so seniors get $2 instead of $3

- Program costs $8 (4 people, $2 each). From tax, the government is bringing in $12, so have $4 this year to start paying down debt….

Medicare and Social Security

Discussion of this outcome

1. High taxes in year 4 are very damaging to the widget economy. (33 cents lost per dollar in government revenue)

Equality

2. ~~Equity~~ issue – intergenerational transfer

Go back to year 3 when D10 and D11 were getting $3. They paid into a system earlier in their lives where the widget tax was only $1

Current young people are paying $4 in tax. But they will only get $2 in benefits.

Medicare and Social Security

3. Costs of kicking can down the road.

- Putting off the problem made the problem worse. The greater the tax, the greater the distortion. Keeping taxes low in year 2 and year 3 led to a big debt that forced up tax rates to damaging levels later.

Debt finance for a “one-shot” expenditure makes economic sense:

- For example, U.S.’ involvement in World War II lasted four years and then was over (though debt finance spread payments over time)
- Or for an individual in buying a house to borrow to spread the payments over time

Medicare and Social Security

Paying for senior citizens' healthcare is different. It isn't "one shot." It will always be there. If you get behind on your payments, tomorrow you have to pay not only for today's cost, but tomorrow's as well.

Medicare and Social Security

Policy Alternatives Plan B.

Year 2: freeze benefits at $2.25

- Raise retirement age to 11 starting year 3 (so only “11 year olds” get to get Econlandcare).

Effects (compared to Plan A)

1) Taxes stay low so not much damage to the economy.

2) Effects on beneficiaries:

  - D10 and S10 in year 2 get $2.25 instead of $3.00, so need to come up with $.75 on their own. (And in year 3)
  - For year 3, the current D10 and S10 get nothing. So need to come up with $3 on own. D11 and S11 need to come up with $.75 on their own also.

Medicare and Social Security

What do we think of this?

- On one hand: these people should be happy compared to the old days (year 1) when people died at age 10.

- On the other hand, there may be a concern that old people would suffer too much financial hardship.

- Or maybe Plan B is irrelevant because old people have enough political clout to keep Plan B off the table.

Medicare and Social Security

Plan C?

- Perhaps some coverage starting age 10. (Maybe targeted based on need? But be wary that targeting to poor creates own-incentive problems as the old may spend down assets to qualify for benefits.)

- But unlike plan A, start cutting the benefits sooner, and start raising taxes earlier, so as to not kick the can down the road.

Before the break

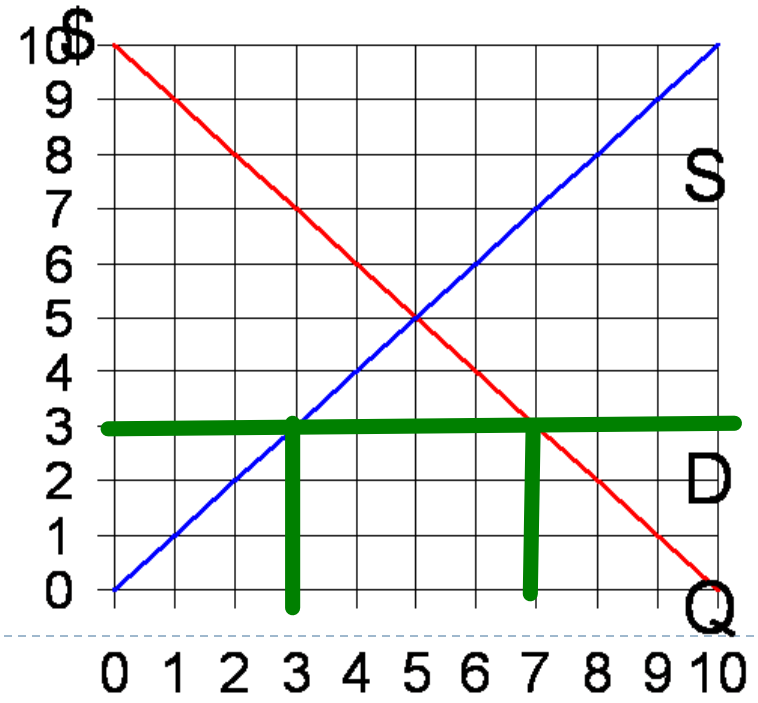
- We looked at taxes and their impact on consumer/producer surplus and government revenue.
- We found that with a tax on the good itself, there is a deadweight loss – meaning that the allocation of resources in the economy is NOT Pareto efficient.
- We also looked at subsidies, and saw that we also get a deadweight loss – the government pays for MORE than what the consumer and producers get in what they gain in subsidies.

- Now we want to look at other possible policies that the government can do. We will look at **price ceilings, price floors, and quotas.**

Price ceiling

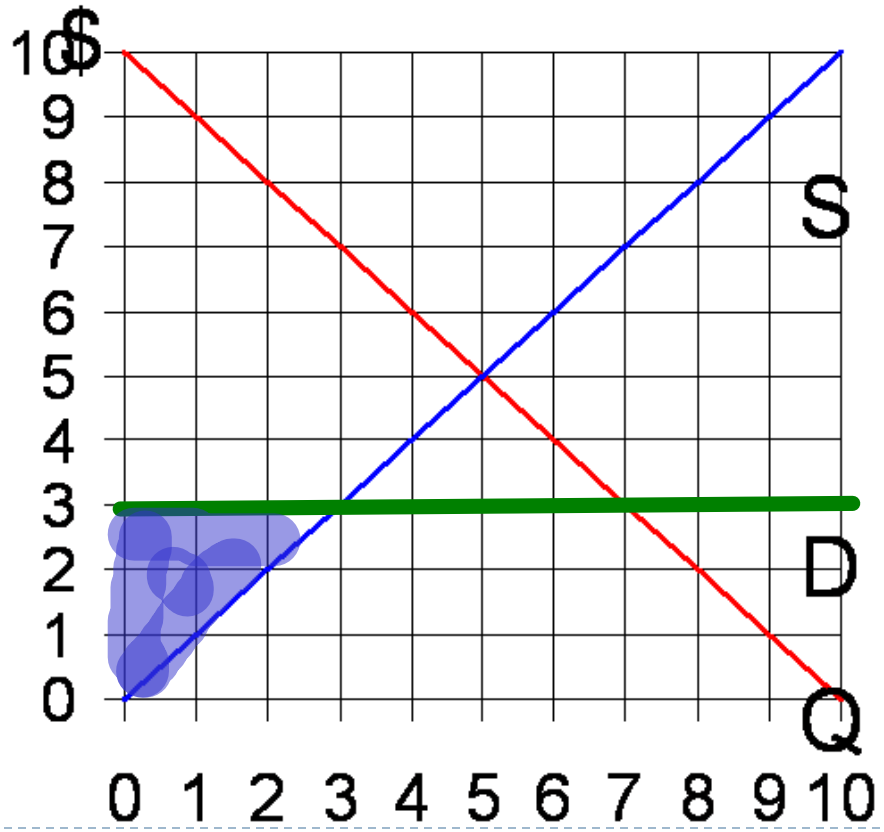
Think about a balloon hitting a ceiling. The ceiling stops the balloon from keep on going up, in the same way, a price ceiling keeps the price from going up to the equilibrium. DO NOT be confused: A price ceiling DOES NOT mean you draw a line above the equilibrium! A price ceiling is represented by a line below the equilibrium price.

With a price ceiling, there is a shortage



Price ceiling in Econland

Law in Econland: Illegal for anyone to sell widget for more than $3.



Producer surplus

What is Q^D?

7

What is Q^S?

3

What is $Q^{ceiling}$?

= min(Qd,Qs)
= 3

Price ceiling in Econland

At ceiling price of $3:

- $Q^D = 7$
- $Q^S = 3$

$Q^{Ceiling}$ = minimum of Q^D and Q^S

= 3

Producer Surplus easy to calculate

- (All sellers who want to sell are able to sell). So we use normal rule of calculating area under the P^S line (the price producers get) and above the supply curve.

Price ceiling in Econland

What is CS?

- It depends

Why?

We don't know, which 3 consumers get to buy the product.

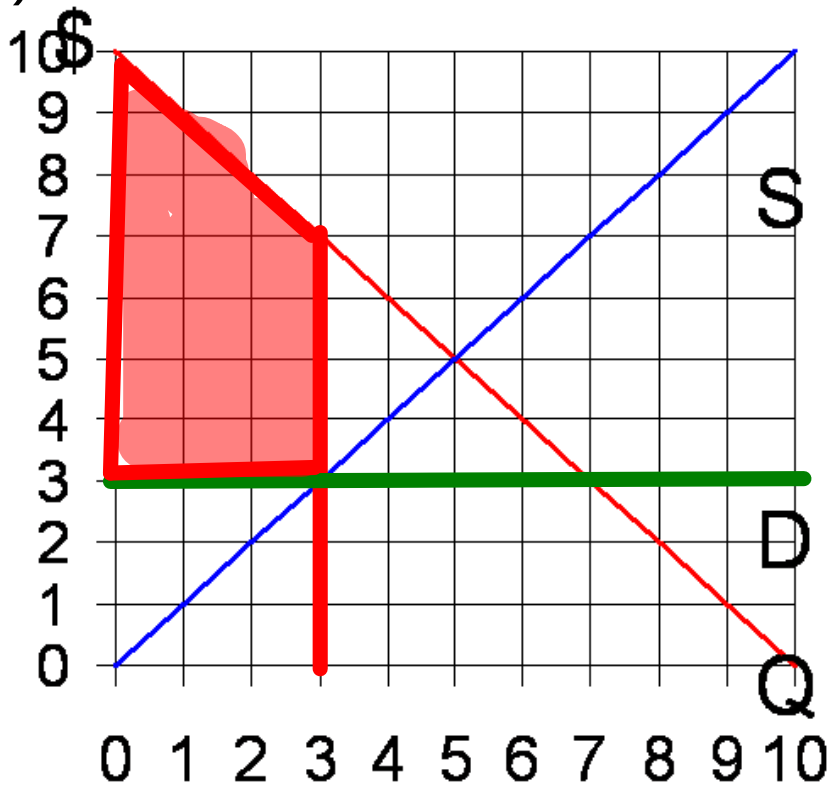
Price ceiling in Econland

There are 7 people who want a widget (D1, D2, D3, D4, D5, D6, D7), but only 3 are for sale.

CS depends on who gets the widgets because they differ in their willingness to pay.

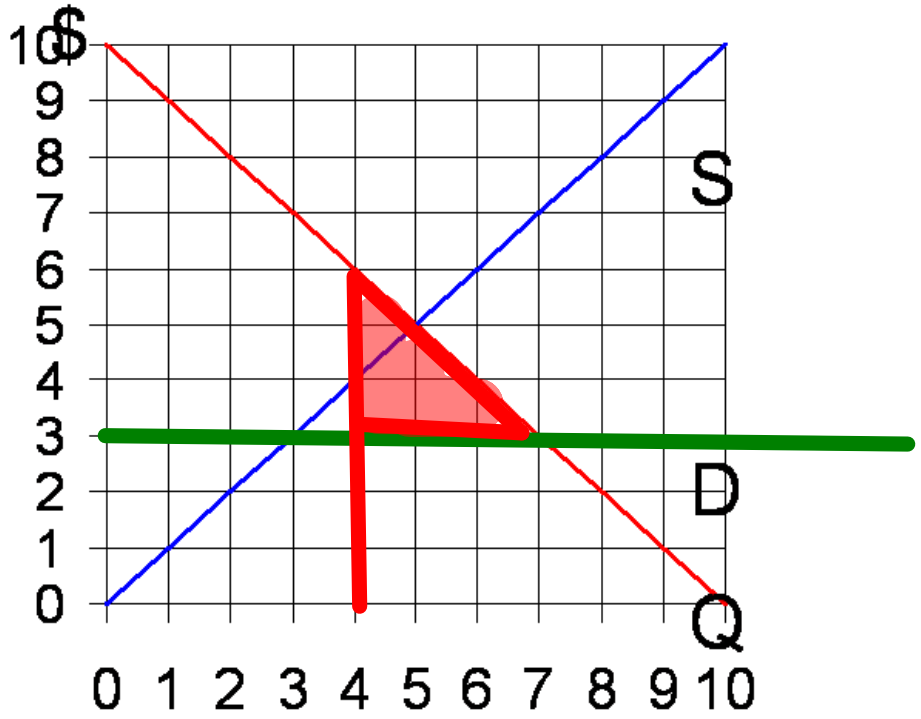
Price ceiling in Econland

One extreme case: perfectly efficient rationing: Highest value consumers get the widgets (rationing goes their way)



Price ceiling in Econland

Opposite extreme case: Perfectly inefficient rationing - Lowest Value Consumers that want widget get it. **CS is much lower!**



Of course, there are many different cases in between the two extreme cases.

Quick question

- What happens if a price ceiling is set ABOVE the equilibrium price?

  Nothing, because it's non-binding, so Q stays at 5 and P stays at 5

- What happens if a price floor is set BELOW the equilibrium price?

  Non-binding price floor, so nothing happens.

Price ceiling in Aplialand

Price Ceiling of $30 in Aplialand:

"Immoral to charge more than $30 for a textbook. Anyone selling a text for more than this in Aplialand will be shot".

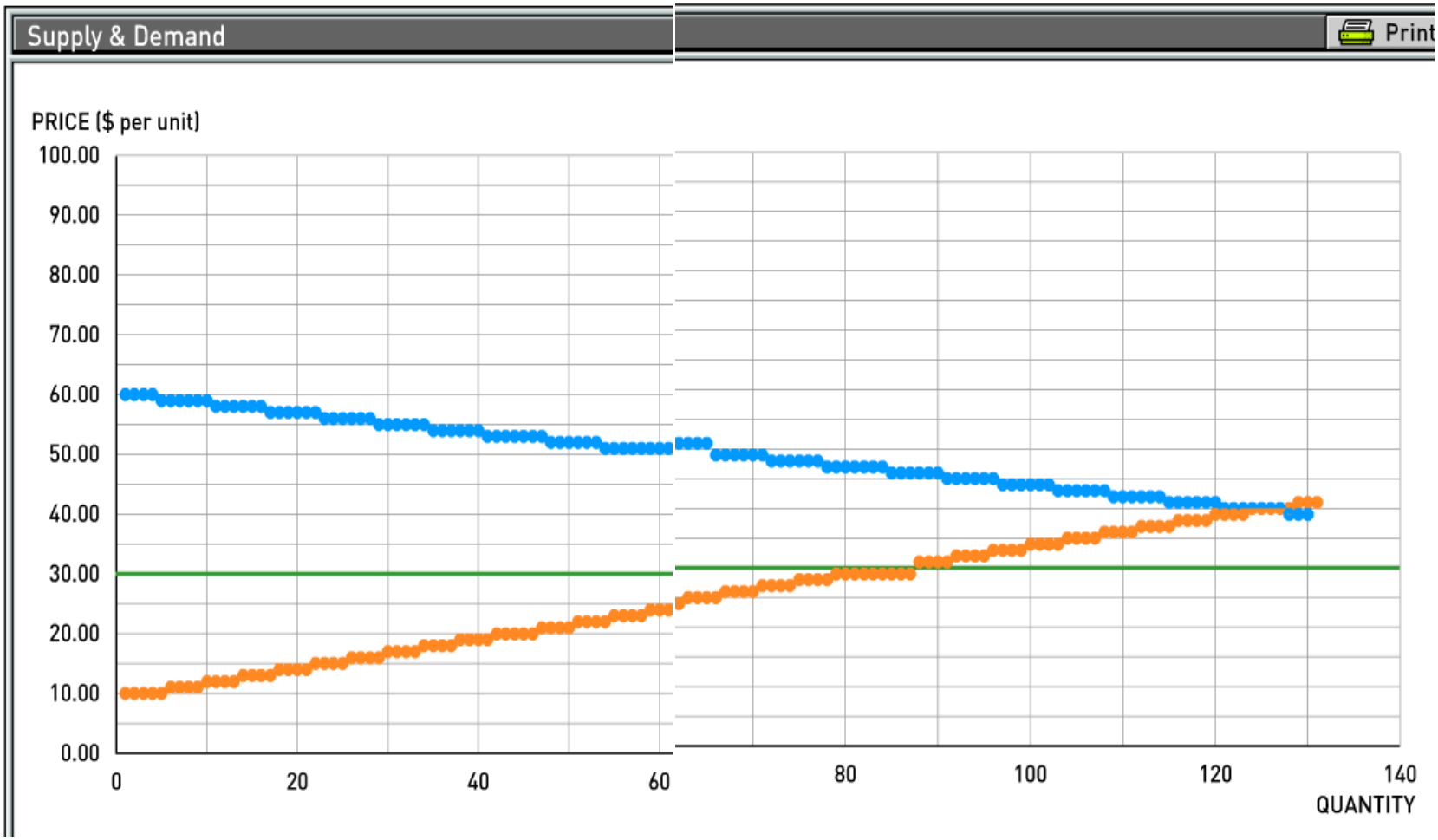
If you were a buyer in the experiment, would you figure out the optimal strategy?

Bid $30 as soon as possible.

What is optimal strategy of a seller?

$30.

$Q^*=125$, $Q^c=87$


Supply & Demand
Print
PRICE ($ per unit)
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0
20
40
60
80
100
120
140
QUANTITY

Price ceiling in Aplialand

At ceiling price:

Q^D =130 (everyone wants to buy!)

Q^S = 87

$Q^{Ceiling}$ = minimum of Q^D and Q^S

= 87

Price ceiling in Aplialand

PS easy to calculate

(All sellers who want to sell are able to sell)

PS = Q*(30-10)*.5 = 870

What is CS?

It depends.

There are 130 people who want at book, but only 87 are for sale. CS depends on who gets the books because different people place different values on the goods.

Price ceiling in Aplialand

Earlier in class we discussed how to graph:

- Perfectly Efficient Rationing
- Perfectly Inefficient Rationing

- But in the Aplia auction, we will get something in between these extreme cases. We get uniform rationing where the 130 people trying to buy the book at $30 are equally likely to be one of the 87 people who will get a book. By chance, there will be cases where a buyer willing to pay $40, gets a book, while one willing to pay $60 does not. That is, we get inefficient allocation of consumption.

Price ceiling in Aplialand

Uniform Rationing:

- Low and high value consumers who want books are equally likely to get them.
- So there is 87/130th chance you will get to buy the textbook.
- What principles are violated?

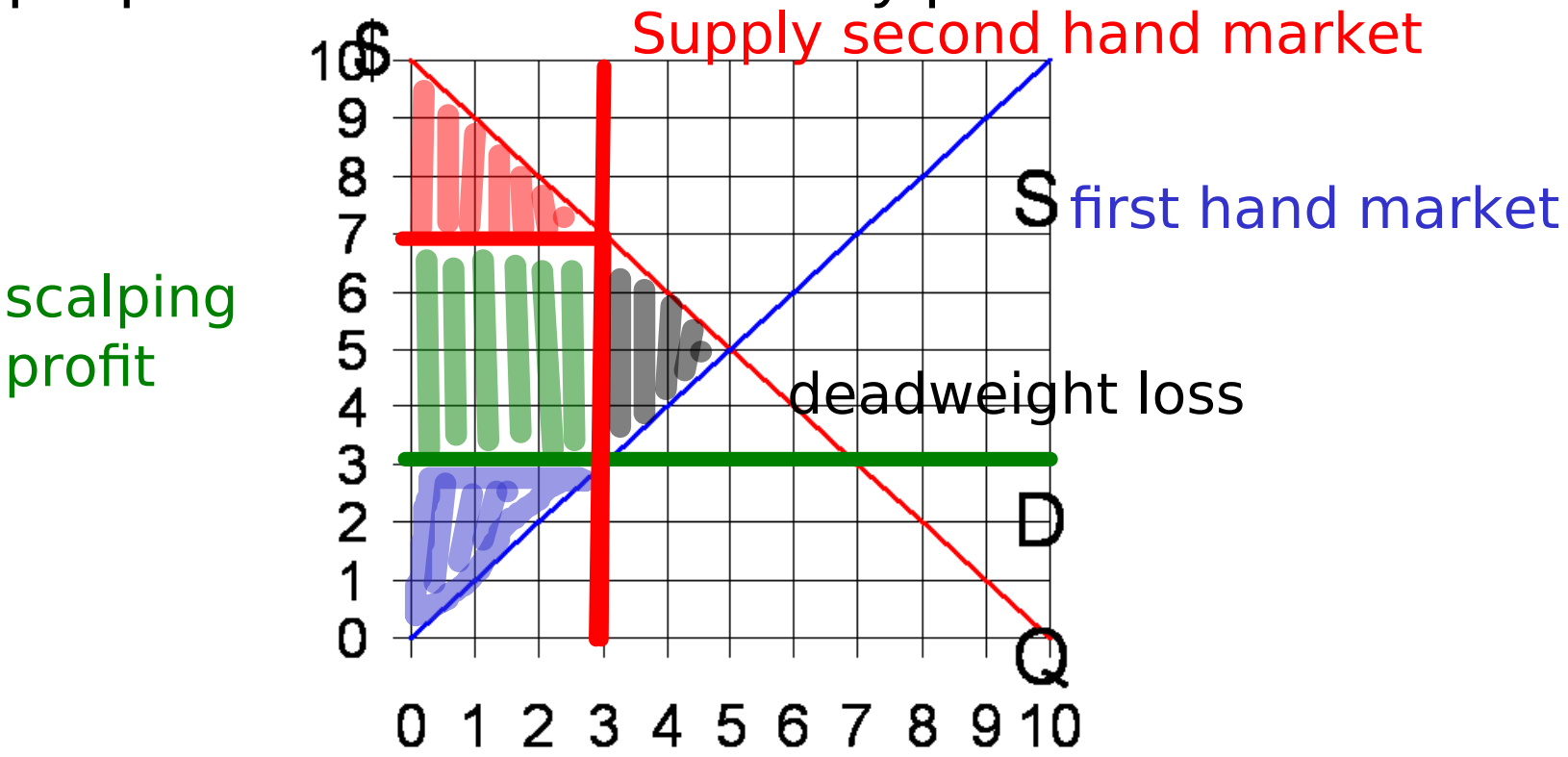
  3rd Principle violated - quantity is too low.
  1st Principle violated - some consumers with low value are going to consume instead of the high value ones.
- How is what happened in Aplialand different from what happens in many cases with rationing in the real world?

  More desperate people are going to stand in lines.

Price ceiling with resales

Law in Econland: S people cannot sell widget for more than $3.

- D people allowed to resell at any price.



Price ceiling with resales

What happens?

Step 1: Take ceiling of $3 and figure out how much the S people are willing to sell. This is Q = 3.

Step 2. Draw a vertical line at Q=3 above the price P=3. This is the supply of goods in the resale market

Step 3. Demand in the resale market is the original demand curve. Even if a particular D person is able to initially buy a widget from an S person for $3, the D person needs to consider whether it is worth holding onto it or reselling. The opportunity cost of consuming a widget is the price the widget could sell for in the resale market.

Step 4: Demand and Supply in the resale market yields an equilibrium resale price P = $7.

Price ceiling with resales

At an opportunity cost of $7, 3 units are demanded in the resale market and this equals supply.

Consumer surplus in the resale market is consumer surplus at P^D=$7.

Producer surplus obtained by the S people in the original market is producer surplus at
P^S = $3.

The green box is “scalping profit,” the money made when someone buys a widget for $3 and resells it for $7.

Price ceiling with resales

Note that when resale is possible, market forces will ensure that the widgets end up going to those with the highest willingness to pay. (That is, D1, D2, and D3 well end up outbidding the others and each will consume a widget).

It may be the D10 gets lucky and buys all 3 widgets at the initial price of $3 and sells them to D1, D2, and D3 at $7. In this case, D10 gets the green box of scalping profit.

Price ceiling with resales

What would happen if D1, D2, and D3 each were lucky enough to buy widgets at the initial price of $3? We can think of them as first selling their widgets in the resale market at $7 and then buying them back at $7. In this case, the green box goes to D1,D2, and D3.

Note that the surplus they get, red triangle plus green box, is exactly the same as the surplus with efficient rationing (where D1, D2, and D3 get widgets) that we calculated earlier in the class.

Bottom Line

If a price ceiling of $3 is set and resale is illegal, then in general we expect two sources of inefficiency:

- Output is too low (violates condition 3).
- Highest valuation consumers don't always get the good first (violates condition 1).

Even if resale is legal, it won't do anything about quantity being too low. (The S people will still sell only 3 units at the price of $3). However, allowing the resale market means the free-market is put to work determining how the 3 available units are allocated. The workings of the market will ensure they end up going to the people with the highest willingness to pay.

Price floors

- You should try to think about price floors on your own. Basically, it's the opposite case that the price is set too high, so now consumer surplus is easy to find but producer surplus depends on who gets to sell.

Price Controls: Big picture

- Start with the first welfare theorem. With no externalities and no monopoly, the free-market allocation is Pareto efficient.
- Price system acts as an invisible hand in such a way that:
  - Consumers willing to pay market price all buy (efficient allocation of consumption).
  - Producers with cost less than the market price produce (efficient allocation of production)
  - Value of last unit in equals its cost (efficient quantity)

Price Controls: Big picture

When we add taxes and subsidies:

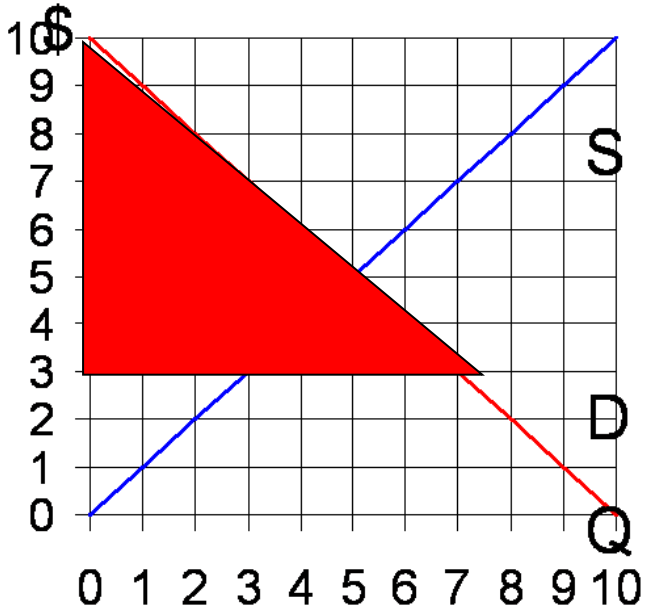
- distort quantity.
- but price system is still put to work in allocating consumption and production.

Price controls (a ceiling that price can't go above, a floor that price can't go below)

- distort quantity AND
- distort allocation on the side of the market facing rationing
  - buyer side with price ceiling
  - seller side with price floor.

Be careful…

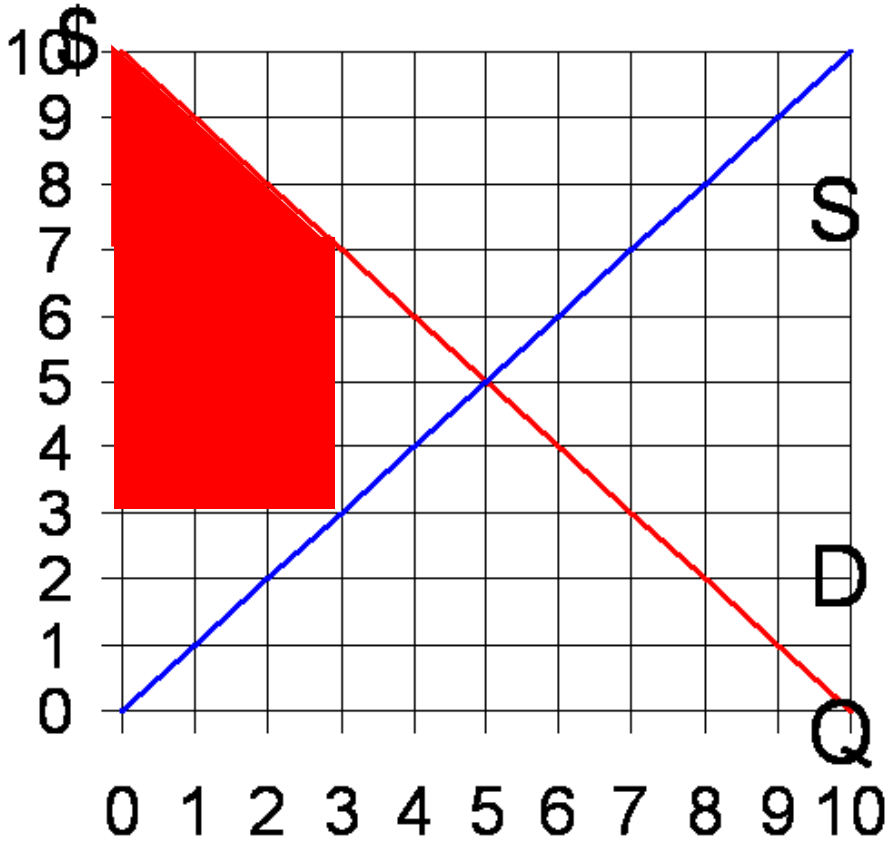
In terms of our Econland example, if there is a price ceiling of $3 the following WILL **NOT** BE CONSUMER SURPLUS



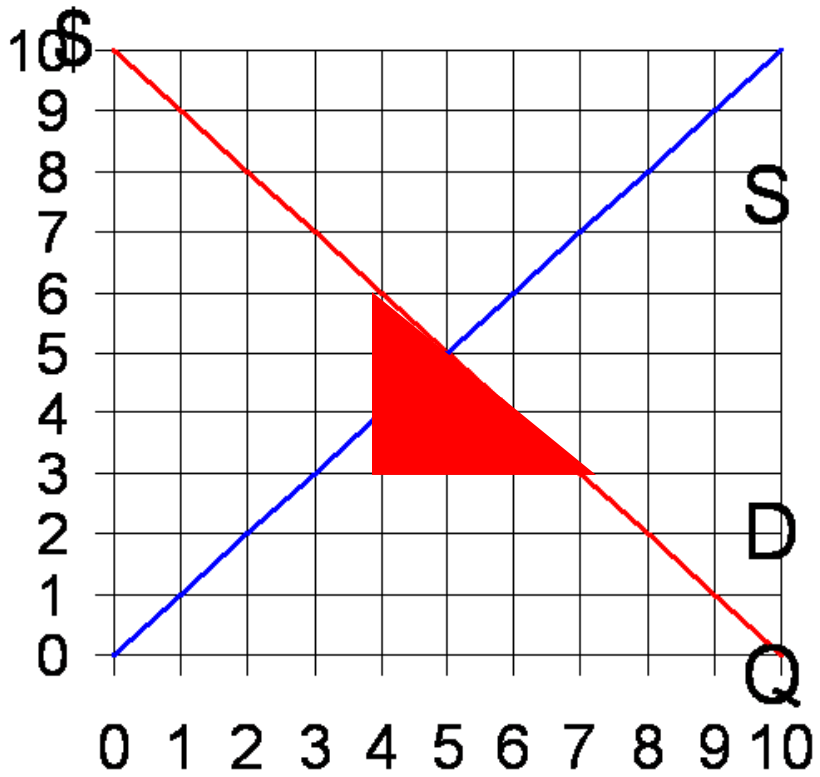
Because only 3 people get widgets, not 7

- Cut 4 widgets out, loss of consumer surplus depends upon where you do the cutting.

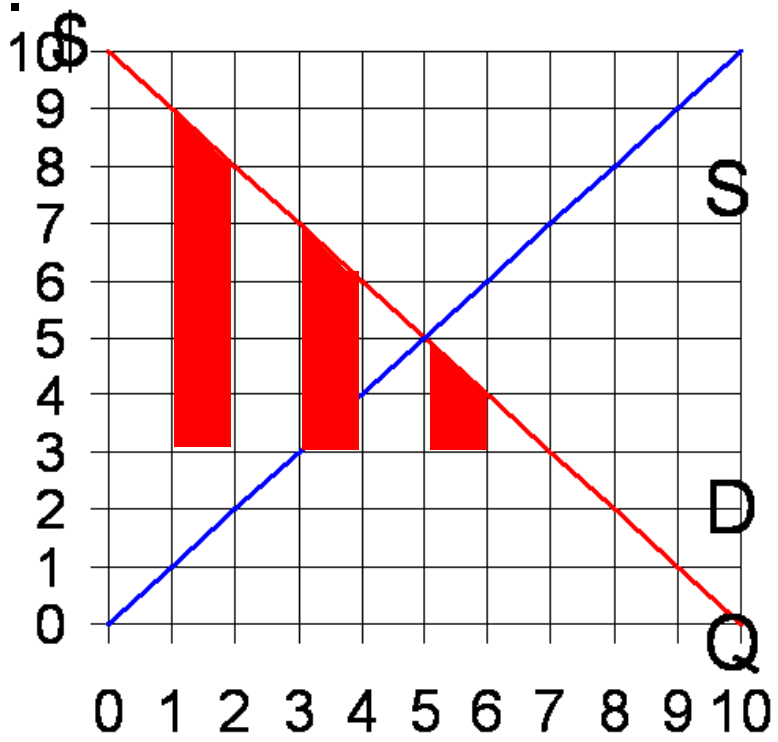
Cut 4 from right (efficient rationing)



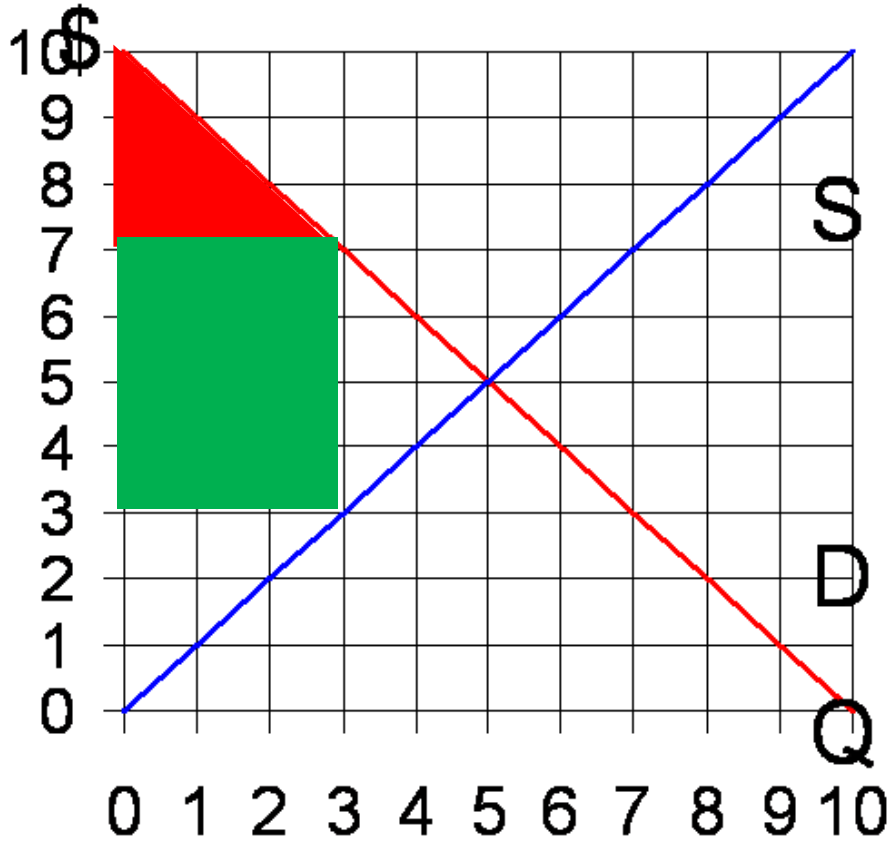
Cut 4 from left (perfectly inefficient rationing)



Or cut 4 this way, (something close to uniform rationing, like what happened in Aplia auction).

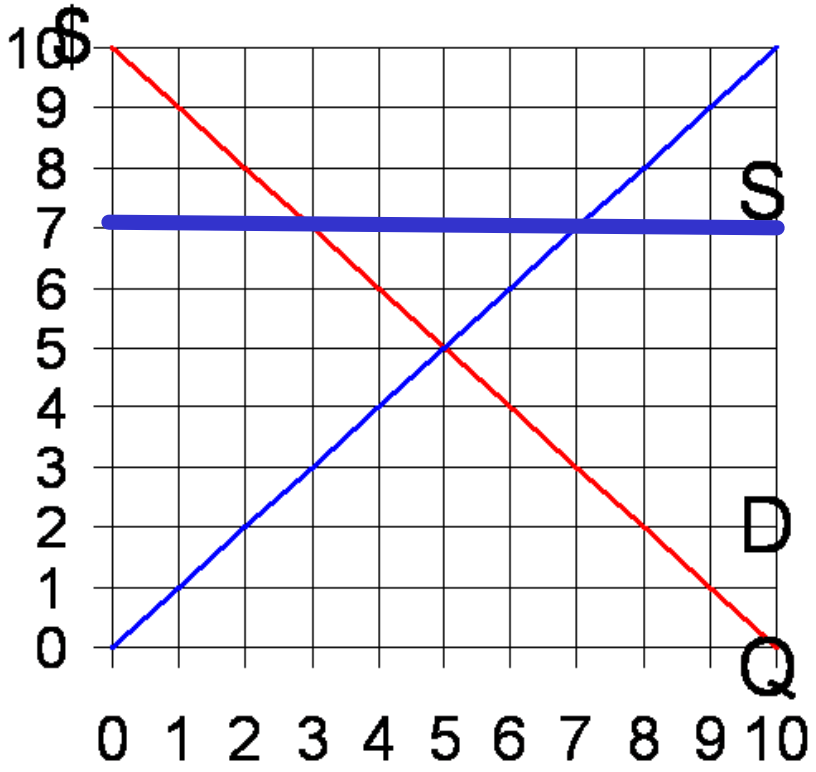


If resale is legal however, we still get consumer surplus like that of efficient rationing. The only difference is that somebody else takes over the "scalping profit".



Supply Management

So you want farmers to get $7 for their widgets....



Supply Management

There is excess supply when the price is 7 so something will have to be done about it.

In the US, maybe direct management. Perhaps subsidies for people to buy up the good, or the government directly purchases the good.

In Canada, mainly by supply management. Government organized cartel to hold back output (like the OPEC).

Supply Management in Canada

In order to sell milk in Canada, a farmer needs to own quota. Quota is a legal right created by the government and limited in supply.

Farmers are free to buy and sell quota in the quota exchange

How it currently works in Canada:

One quota unit is approximately what you need to sell the milk of one cow per day

Supply Management in Canada

Currently trading for $25,000 for one quota unit.

This is a lot more than what the cow costs!

In fact, this is the biggest cost of being in the dairy business. In the reading there is a link to a real estate listing where:

$5.8 million for the whole farm

Of that, $2.8 million is for the quota!

Supply Management in Canada

Let's go back to Econland numbers and figure out what happens with **quota=3**.

Step 1: Compare total quota to free market quantity. If quota is more than free market, irrelevant and price of quota = 0. If quota quantity less, then market quantity is quota.

Here Quota=3 < 5 (unregulated Q)

Step 2: Get widget price from demand curve at quota.

Here P = $7.

Supply Management in Canada

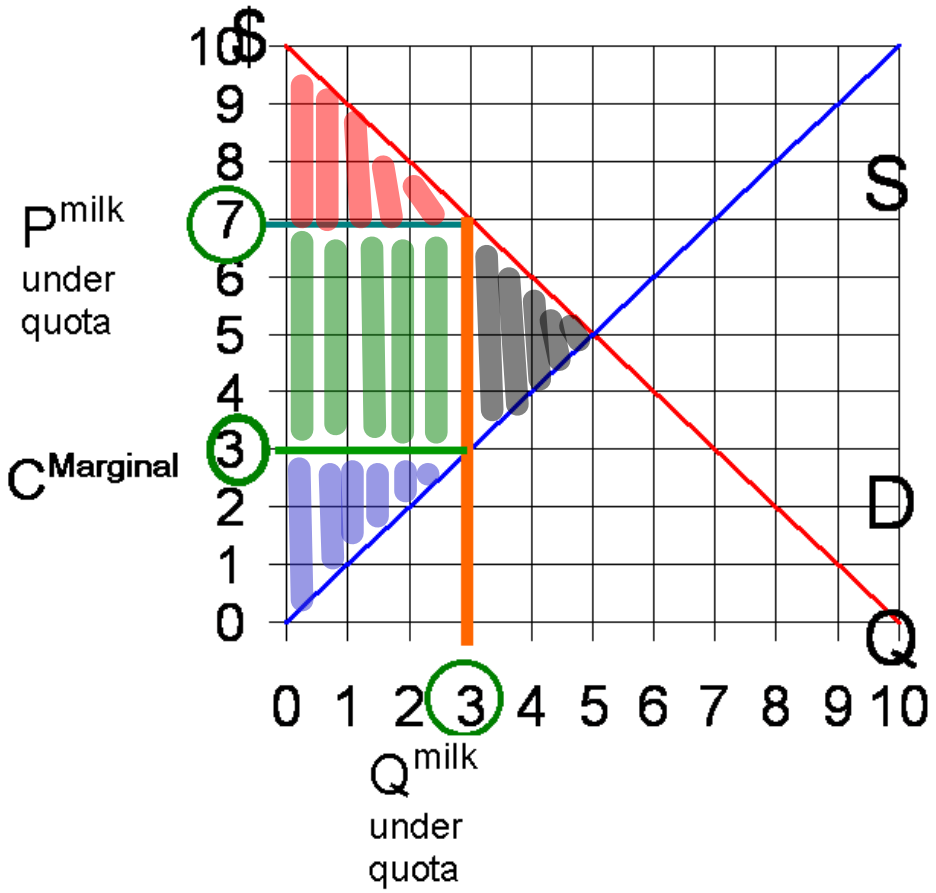
Step 3: Set price of quota so marginal producer breaks even taking into account the opportunity cost of quota.

Total cost = $production cost
+ $cost of quota

Marginal production cost at Q = 3 is $3. (see this on S curve)

If total cost equals $7, marginal producer just breaks even.
Thus:

Price of quota = $7 - $3 = $4.


$
10
9
8
7
6
5
4
3
2
1
0
S
D
Q
P milk under quota
C Marginal
0 1 2 3 4 5 6 7 8 9 10
Q milk under quota

Why does this rule work?

Think of opportunity cost!

Let farmers maintain two books:

One for their milk business (where they deduct opportunity cost of using quota).

One for their quota business (where they make money of quota if they are lucky enough to have inherited some).

When price of quota equals $4, the marginal producer just breaks even on milk business.

Variable	Free Market	Quota of 3	Change
P^{Milk}	5	$7	**+2**
Q	5	3	**-2**
P^{Quota}	0	$4	**+$4**
CS	12.5	4.5	**-8**
PS^{Milk}	12.5	4.5	**-8**
PS^{Quota}	0	12	**+12**
$PS^{Combined}$	12.5	16.5	**+4**
TS	**25**	**21**	**-4**

Call up the Economics Doctor:

What is the source of the inefficiency?

Violation of Principle 3, that the quantity be at the point where the value of the last unit consumed equals the cost of the last unit produced.

What if quota were not tradable?

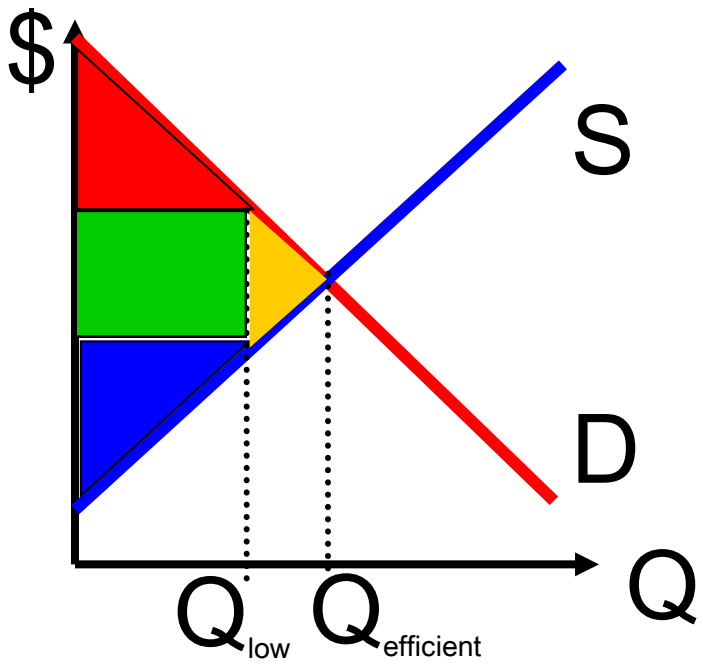
We expect there to be an additional inefficiency. A violation of rule #2 that the lowest cost producers produce. If S6 inherits a quota unit and can't sell it, she will produce instead of a lower cost producer.

- The $4 we calculated in class is what they use of the quota for one day. In Canada, quota is good for today, tomorrow, the next day, etc.

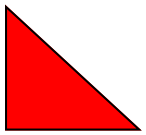
- The asset value is calculated by adding up the values of these various payments. We need to do present value calculations that involve interest rates that we will skip here.

- But just to make the point, if we give the people in Econland a year to live, (and we don't worry about interest rates) then the asset value of a unit of quota at the beginning of the year equals $4×365 = $1,460

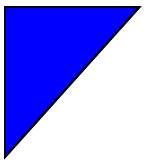
Summary



For all the policies on the next page:

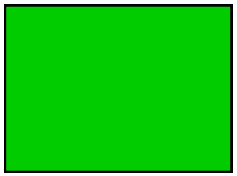


Goes to consumers



Goes to producers

Is loss in total surplus from output being too low (Q_{low} instead of $Q_{efficient}$)

Where  goes depends upon policy

Policy	**Where green box goes**
Tax	Government
Quota	Quota Owners
Price Ceiling efficient rationing (unlikely)	Consumers
Price Ceiling (more likely)	Partly destroyed by inefficient allocation
Price Floor efficient rationing (unlikely)	Producers
Price Floor (more likely)	Partly destroyed by inefficient allocation

Where does subsidy fit the table?

It doesn’t fit in.

Subsidies make quantity higher than the equilibrium quantity.