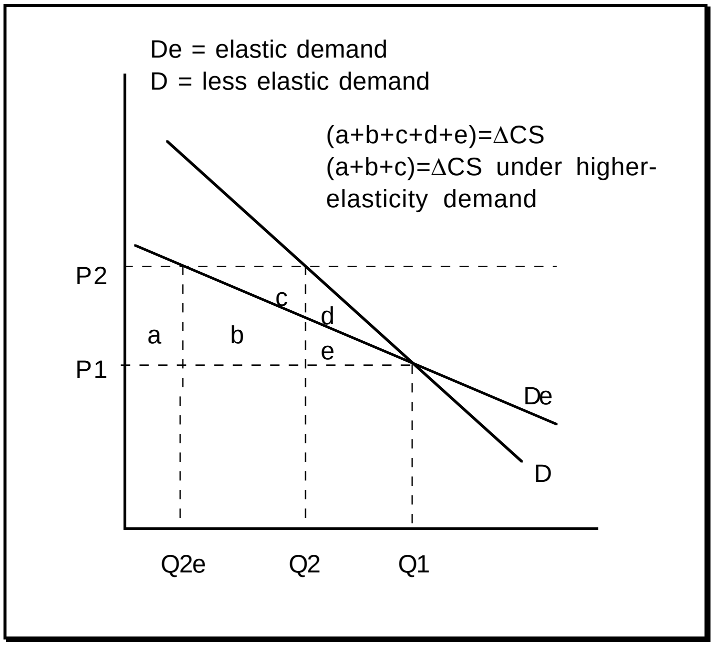
To the extent that you have to assume elasticity, you want to be aware of how sensitive your results are to that assumption.

<u>Sensitivity</u>

Higher elasticity corresponds to a flatter curve: you get a higher change in Q for an identical change in P. Note that the gross loss of ΔCS is smaller in the graph below under more elastic demand, but as a percentage of total CS the loss is greater.



Why did we just rotate the demand curve through the original point? Because that's a known point. Varying elasticity doesn't vary known points!

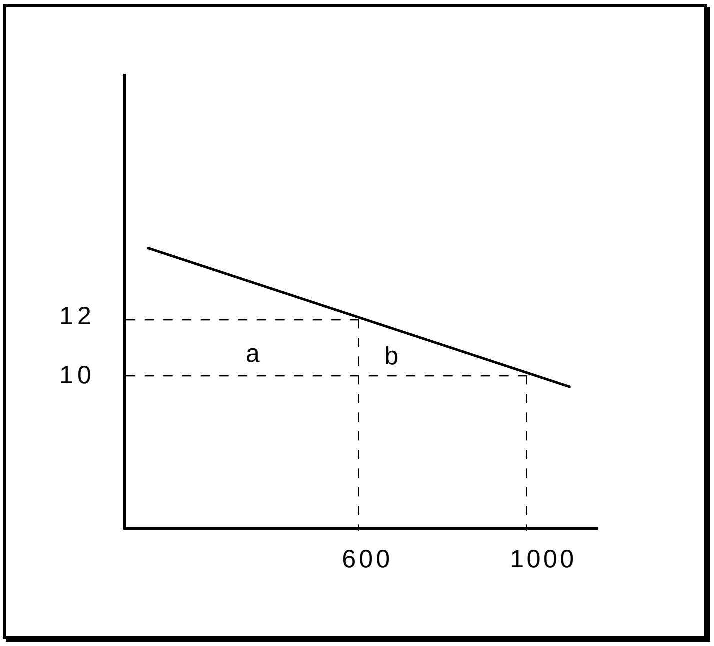
What if you observe both the initial and final Q? What role does E play here? None at all because we have enough data to calculate ΔCS directly.

Back to the pizza case

Q1=1000 pizzas

P1=$10

Tax=$2



SPP gains ($2)(600) = $1200 = a
Taxpayers loss = -$1600 = a+b
Net = -$400 = DWL = b

This tax is a loser from a social point of view.

Notice that producers aren't hurt. We've been assuming that the price just covers costs, so there was no surplus to lose in the move. What about pizza employees? We've been assuming that labor is perfectly mobile and fungible, so any pizza employees who were laid off can find jobs elsewhere. One might question the validity of both of these assumptions, and we will later.

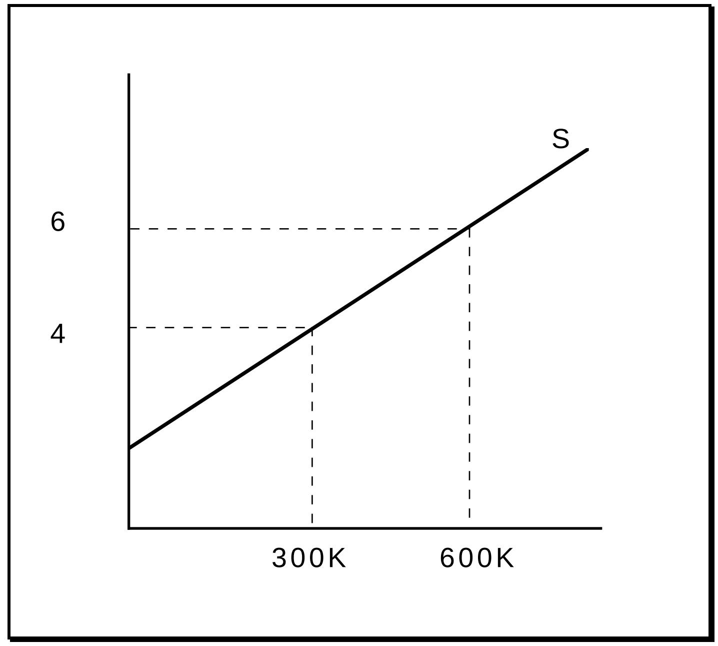
Is there a scenario under which this tax is a winner? We may think that SPP having money is more important than putting that money elsewhere, and therefore place a higher weight on the dollars that SPP receives. In this scenario, however, we place equal weight on taxpayers and SPP, and the tax is a loser. We may also think that SPP's uses for the money generates positive externalities the sum of which outweigh the loss to taxpayers. We may think that consuming 1000 pizzas/day has adverse and costly health effects.
We've assumed all these possibilities away in this scenario.

Note that as long as there is some elasticity to demand a tax will generate a net loss (keeping all the assumptions and assuming away all the things we've discussed).

<u>Producer Surplus</u>

New case: T-Shirts. Market for t-shirts is a world-wide market, where imports compete with domestically-produced goods. Thus, our Northern CA t-shirt producer is a price-taker. Suppose the price of t-shirts drops because of cheap imports: what might we do about it in this town?

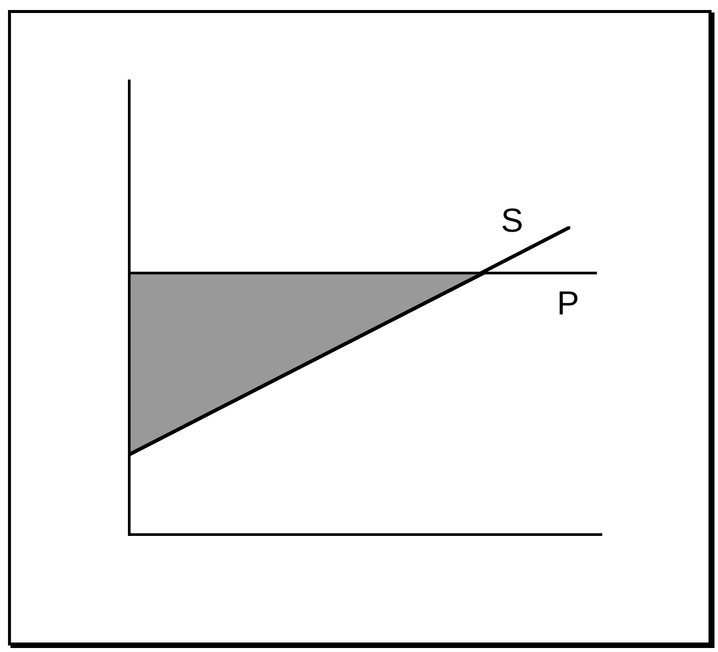
Mayor proposes a \$2 subsidy to prop up the local industry.
local price before imports: \$6.
world price: \$4. This is a given, and locals can't do much to change it. This is the initial price in our calculations. We'd like to get back to where we were.

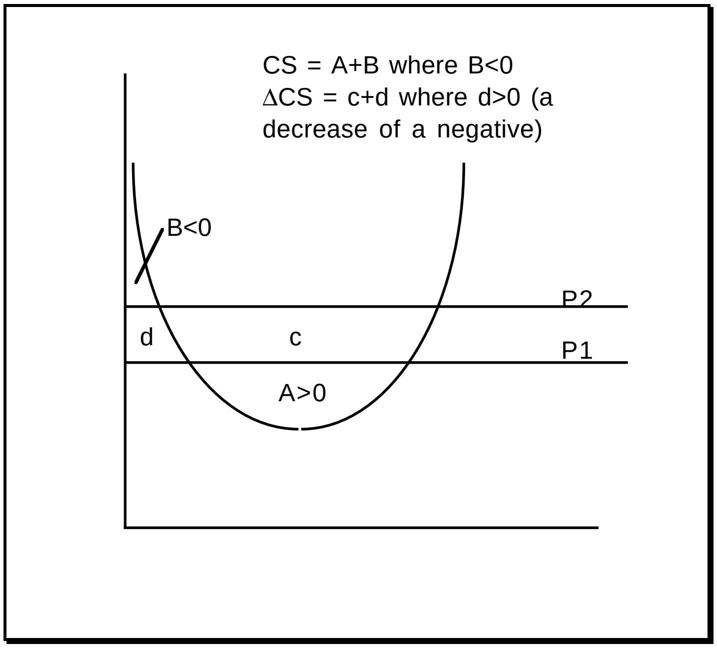


Data
Now: P1=\$4, Q1=300,000
Target: P2=\$6, Q2=600,000
Assume a linear function between the two points.

The questions we want to ask are: what is the effect of this policy on producer surplus? What is the cost to taxpayers (the opportunity cost)?

Producer Surplus
PS is to supply side as CS is to demand side and can be motivated similarly. The supply curve shows the price at which firms are willing to produce/supply the next unit. The difference between the actual selling price and the supply price is the producer surplus.





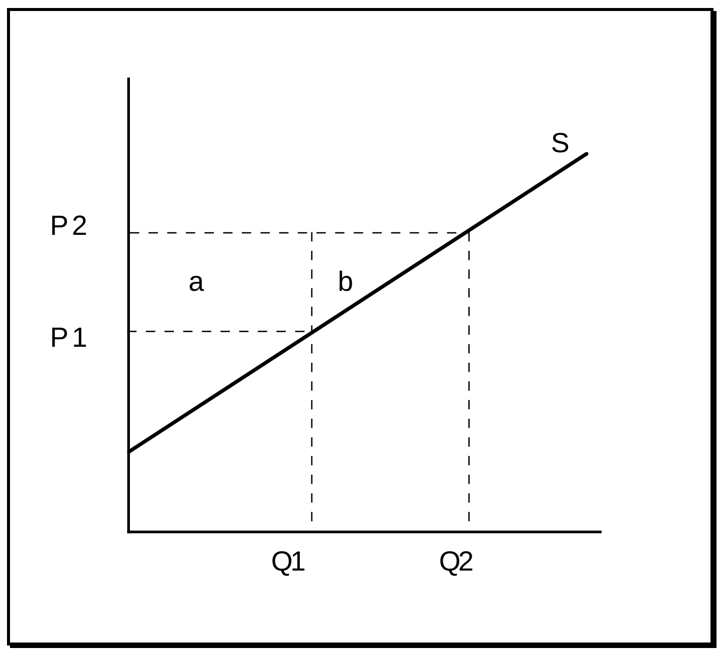
What if the marginal cost curve isn't straight? The procedure is the same; you just have to notice which sections are gains and which are losses.

Generally speaking, ΔPS is + if P increases and is - if P decreases.

<u>ΔPS for linear supply</u>
Suppose supply is straight.

$\Delta PS = \Delta PQ1 + 0.5(\Delta P \Delta Q)$
or ΔPQbar where Qbar = (Q1+Q2)/2

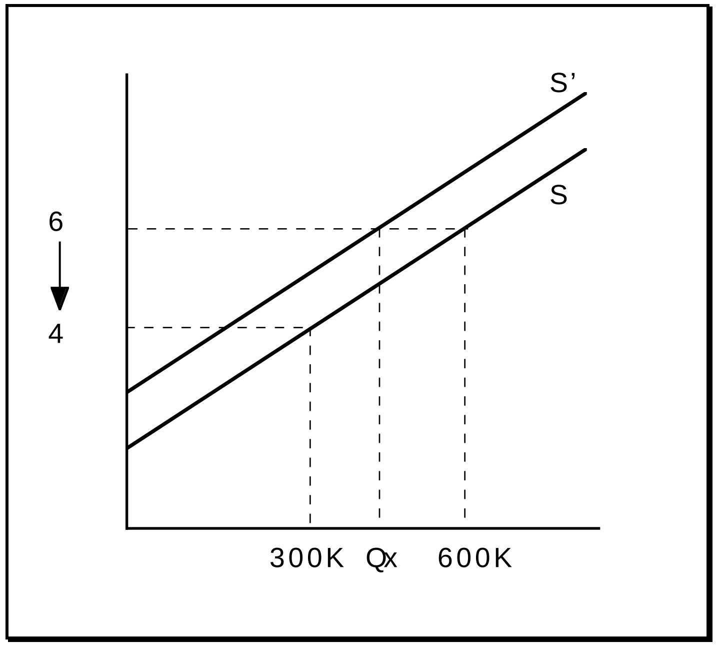
If you don't know where Q2 is, you may use an elasticity of supply to estimate how much Q responds to a change in P. Again, analogous to demand elasticity stuff. Just call it E_s.



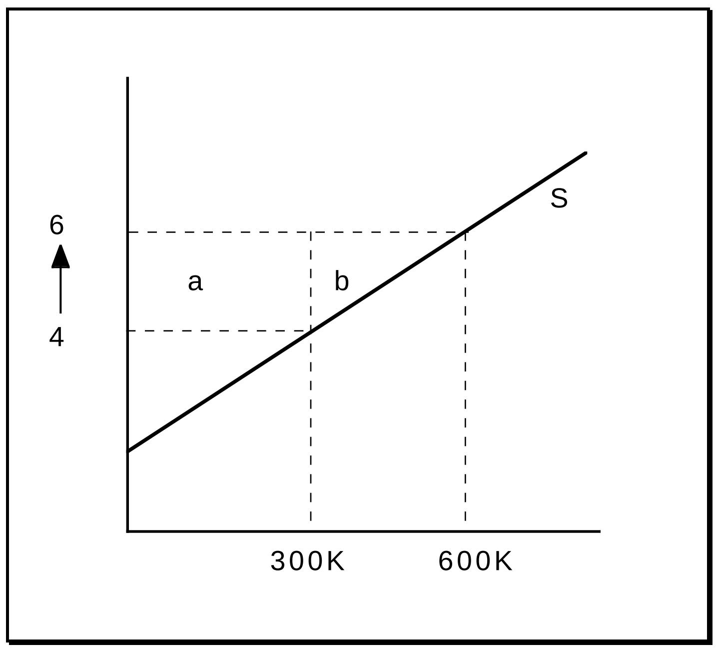
Back to t-shirts.
Q: Is it desirable to subsidize the t-shirt industry in this case; that is, do the gains to producers outweigh the losses to taxpayers?

Costs: (\$2 subsidy)(600,000)=\$1,200,000. This is true only if there is no shift in the supply curve.

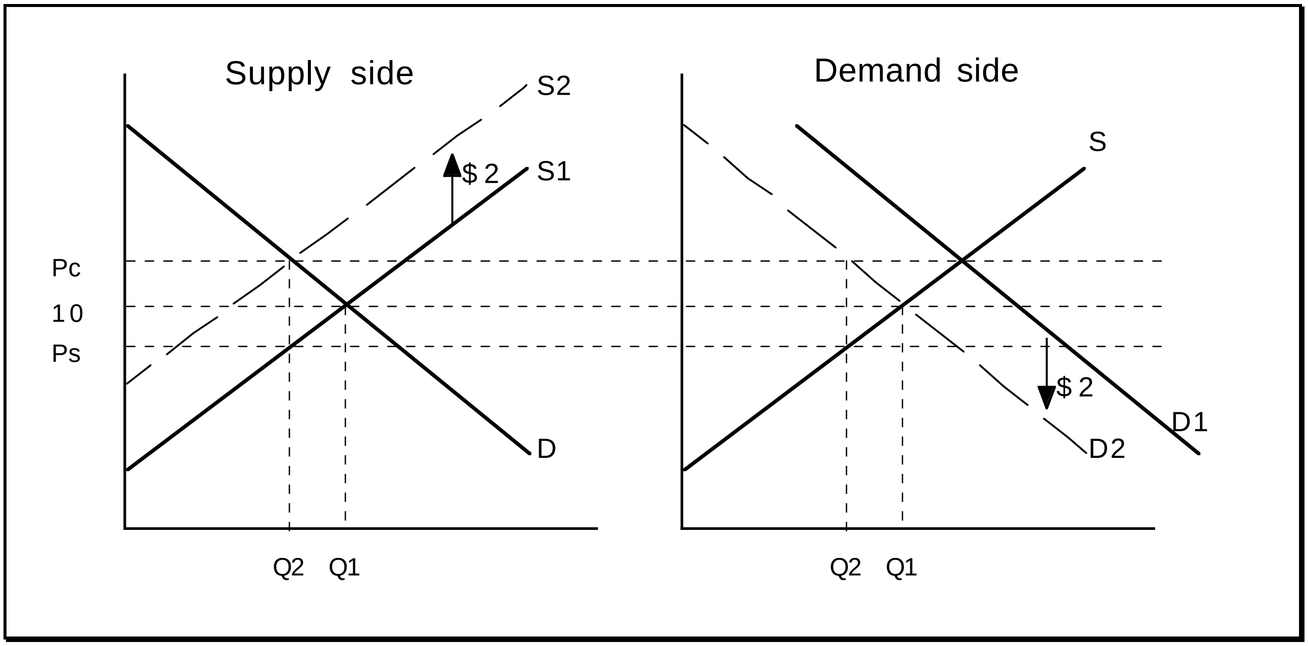
If we'd observed a shift in the supply curve when the price dropped, our 1.2 million observation would have been an overstatement because (assuming the curve didn't shift back after subsidy) the new Qx is less than the original level.



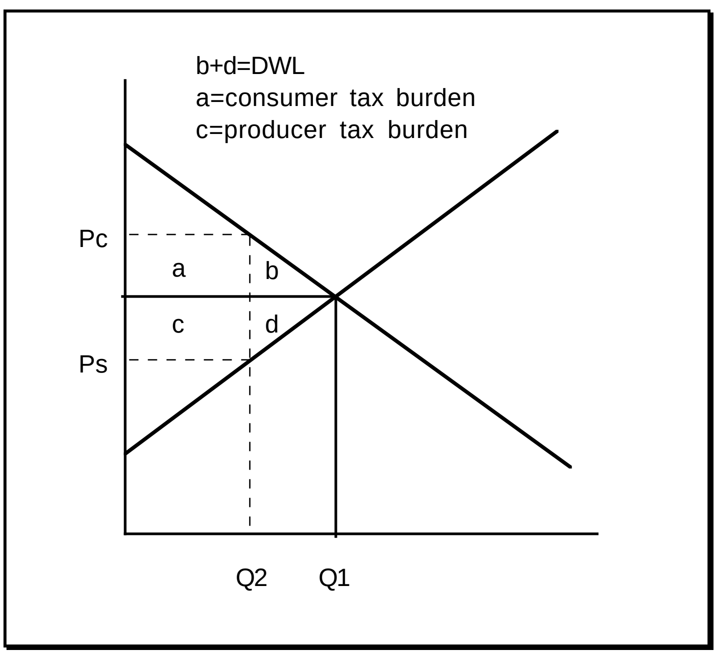
Assuming no shift in supply, the cost to the government of the subsidy is $1.2 million.
The benefit is the area of the trapezoid (a+b): ($2)(averageQ) = 2*450K = $900,000. ∴ the net result is a loss of $300K (b).



<u>Combining ΔCS and ΔPS</u>
Back to pizzas
$2 tax,
2 ways of thinking of this tax: incorporated into supply curve (which shifts it up), or incorporated into demand curve (which shifts it down).



He prefers to do neither and to find two prices: one for consumers and one for producers, with the distance between them being the value of the tax and the Q's being the same.



How much does SPP gain? ($2)(Q) = A+C.
How much do consumers lose? A+B = ΔCS
How much do producers lose? C+D = ΔPS

What is the net result for society? -(A+B+C+D)+(A+C) = -(B+D) = loss.
A is transfer from consumers to SPP: nets to zero (cancels out)
C is transfer from producers to SPP: nets to zero (cancels out)
B and C are all that's left, and that's the deadweight loss of this proposal: the net change in societal welfare.

Calculating this numerically: need some formulas. All of the following must be true:
Demand = $P_d=15-0.005Q_d$
Supply = $P_s=7+0.0003Q_s$
$Q_d=Q_s$
$P_d=P_s+2$

Solving this: Substitute demand and supply equations into $P_d=P_s+2$ and solve for Q.

$$(15-0.005Q)=(7+0.0003Q)+2$$
$$Q = 750$$

Now plug Q back into the supply and demand curves to find Ps and Pd.

$$P_d = 15-0.005Q = 15-0.005(750) = 11.25$$
$$P_s = 7-0.0003Q = 7-0.0003(750) = 9.25$$

Notice that the difference in prices is exactly $2, as it should be.

Is SPP better or worse off with rising-cost pizza or constant-cost pizza?