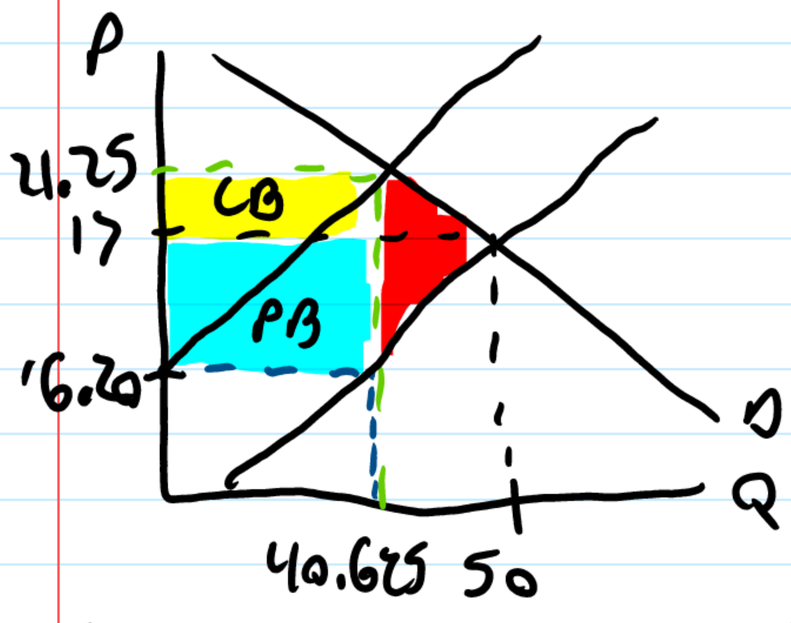
HW 5 Taxation 2

Tuesday, September 15, 2020 7:57 PM

Worked w/ Alex, Austin, + River

At the current market equilibrium, price is $17 and quantity is 50. A tax of 25% is imposed. The elasticity of demand is -0.75 and the elasticity of supply is 4. Find the new equilibrium quantity, the after tax price paid by consumers, the after tax price received by suppliers, tax revenue, the producer burden, the consumer burden, and the excess burden. Draw a figure to illustrate. Hint: It will help to sketch the figure noting what you know and what you need to figure out before starting the algebra!



$\varepsilon^D = -.75$

Passed Solution review

Big Yikes

Demanded

Supplied

DWL

Equilibrium Quantity: $\varepsilon^D = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$ ← Should've done $(Q_2 - Q_1/Q_1)/(P_2 - P_1/P_1) = \varepsilon^d$

$\Delta P = 17 \cdot .25 = 4.25$

$-.75 = \frac{\Delta Q}{4.25} \cdot \frac{17}{50} \rightarrow -\frac{3}{4} \cdot \frac{50}{17} = \frac{\Delta Q}{4.25} \rightarrow -\frac{150}{68} = \frac{\Delta Q}{4.25} \rightarrow \Delta Q = -9.375$

That mistake carries

$Q_2 = 40.625$

After tax Pod: $4 = \frac{\%\Delta Q}{\%\Delta P} \rightarrow \%\Delta P = \frac{(-9.375/50)}{4} \rightarrow \%\Delta P = -.7969$

$P_2 = 16.203$

After tax consumer: $17 \cdot 1.25 = 21.25$

CB: $(40.625)(21.25 - 17) = 40.625 \cdot 4.25 = 172.65625$

PB: $(40.625)(17 - 16.203) = 40.625 \cdot .797 = 32.378125$

Tax revenue: $172.65625 + 32.378125 = 205.03$

DWL: $\frac{1}{2}(50 - 40.625)(17 - 16.2) + \frac{1}{2}(50 - 40.625)(21.25 - 17)$

$= \frac{1}{2}(9.375)(.8) + \frac{1}{2}(9.375)(4.25) = 3.75 + 19.92 = 23.67$

Using ε^D:

$\frac{Q - 50}{50} / \frac{P_d - 17}{17} = -.75 \rightarrow Q = 87.5 - 2.21 P_d$

Using ε^S

$\frac{Q - 50}{50} / \frac{P_s - 17}{17} = 4 \rightarrow Q = -150 + 11.76 P_s$

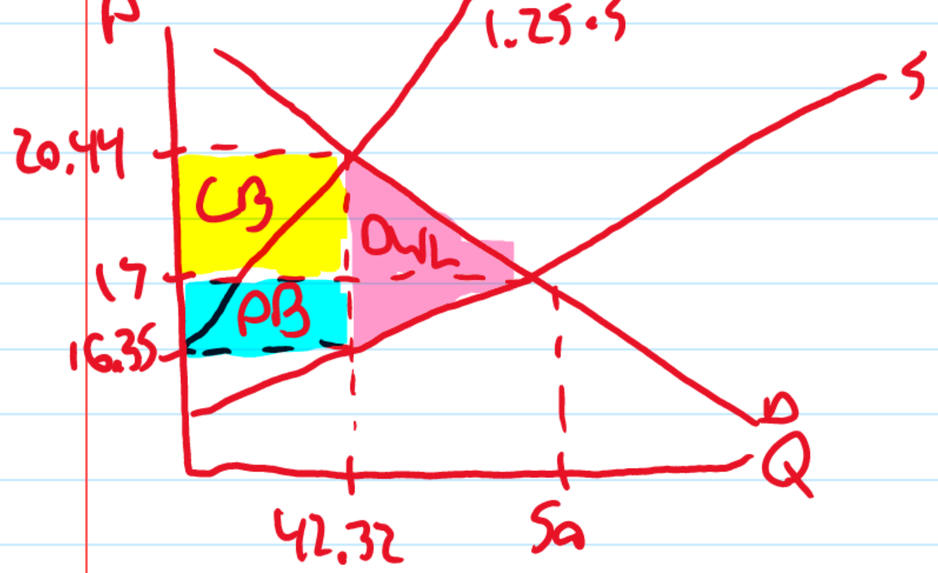
Therefore... $1.25 P_s = P_d$

Solving w/ substitution

$-150 + 11.76 P_s = 87.5 - 2.21 \cdot 1.25 P_s \rightarrow P_s = 16.35$

$P_d = 1.25 P_s \rightarrow P_d = 1.25 \cdot 16.35 \rightarrow P_d = 20.44$

$Q = -150 + 11.76 \cdot 20.44 \rightarrow Q = 42.32$



Revenue = $.25 \cdot 16.35 \cdot 42.32 = 173.03$

CB = $(20.44 - 17) \cdot 42.32 = 145.69$

PB = $(17 - 16.35) \cdot 42.32 = 27.34$

DWL = $\triangle CB = (20.44 - 16.35)(50 - 42.32)/2 = 15.69$