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H.W. 2 consumers 1 seller

A : $Q_A = 10 - P \Rightarrow P = 10 - Q$

B : $Q_B = 10 - \frac{1}{2}P \Rightarrow P = 20 - 2Q$

$Q = P$

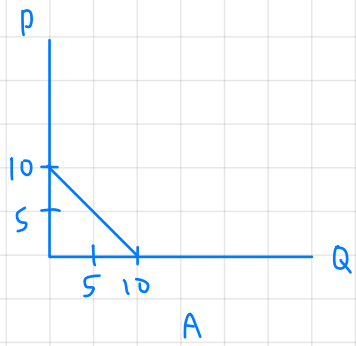
1) draw diagrams
2) tend eq^m

$P < 10$; $Q^m = Q^A + Q^B$

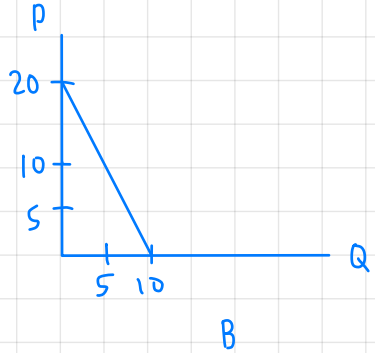
$Q^m = 20 - 1.5P$

$P > 10$; $Q^m = 10 - \frac{1}{2}P$

1) Market Equilibrium



A



B

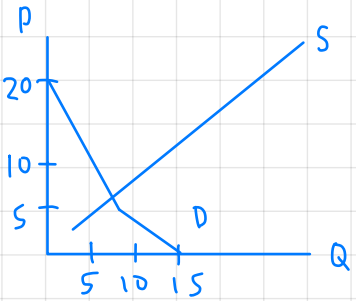
$P < 10$

$Q^D = Q^S$

$20 - 1.5P = P$

$P = 8$

2)



∴ There is 1 buyer.

$Q^D_{mkt} \begin{cases} 10 - \frac{1}{2}P ; P > 10 \\ 20 - \frac{3}{2}P ; P \leq 10 \end{cases}$

H.W.

Example 3.J: Excess burden *formula under linear model & Tax-Revenue-maxizing tax rate*

Due monday

Demand: $p^d = a - bQ^d$; $a \geq 0, \quad b \leq 0.$

Supply: $p^s = c + dQ^s$; $d \geq 0.$

P supply supply

- Solve for quantity and prices equilibrium when the unit tax is imposed. Analyze the result

Before tax: Solve for P^*, Q^*

$P^* = f(a, b, c, d)$

$Q^* = f(a, b, c, d)$

After tax: Assume tax per unit $= t$

new S: $P = c + dQ + t$

$P^*_{tax} = f(a, b, c, d, t)$

$Q^*_{tax} = f(a, b, c, d, t)$

Before tax

$$a - bQ = c + dQ$$

$$Q = \frac{a-c}{b+d}$$

$$P = c + d\left(\frac{a-c}{b+a}\right)$$

$$P = \frac{cb + cd - ad - cd}{b+a}$$

$$P = \frac{cb - ad}{b+a}$$

After tax

$$a - bQ = c + dQ + t$$

$$Q = \frac{a-c+t}{b+d}$$

$$P = c + d\left(\frac{a-c+t}{b+d}\right)$$

$$P = \frac{ab - ad + dt}{b+d}$$

H.W.

- Derive the excess burden formula for buyers and sellers

consumers' burden

$= (P_B - P^*) \times Q_{tax}$

producers' burden

$= (P^* - P_S) \times Q_{tax}$

Tax burden on consumer per unit

$= \left[\left(\frac{cb-ad+dt}{b+d}\right) - \left(\frac{cb-ad}{b+d}\right)\right]$

$= \frac{dt}{b+d}$

Tax burden on producer per unit

$= t - \frac{dt}{b+d}$

$= \frac{bt}{b+d}$

H.W.

- Calculate the tax rate that maximizes the tax revenue of government.

$$\text{tax revenue} = t \times Q_{tax}^{(\ldots t)}$$

$$\frac{\partial \text{tax revenue}}{\partial t} = 0$$

$$\Rightarrow t^*$$

$$\text{Total Tax} = t\left(\frac{a-c+t}{b+d}\right)$$

$$= \frac{at - ct + t^2}{b+d}$$

$$\frac{d\text{total}}{dt} = 0 = \frac{a-c+2t}{b+d}$$

$$t = \frac{c-a}{2}$$

Example 3.K ***Price control and Welfare***

Consider the market for apartment rentals in Chicago. The price of rent is determined by the following system of equations.

Demand: $p = -2q_d + 160$

Supply: $p = q_s + 10$

- What is the equilibrium price and quantity in the market for apartment rentals?

H.W.

$-2q + 160 = q + 10$

$150 = 3Q$

$Q = 50$

$P = 60$

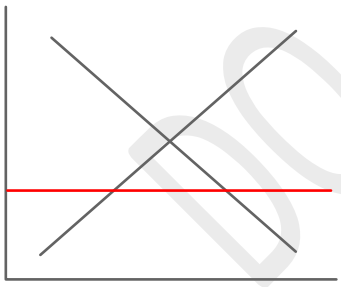
- Suppose the government tries to control the rent prices through a price ceiling of $40. Discuss the implication of this policy. Is there any deadweight loss?

H.W.

$P = 40$

Q^d ; $40 = -2Q + 160$

$Q = 80$



Q^s ; $40 = Q + 10$

$Q = 20$

so, excess demand = 50

∴ There is DWL b/c it is not in eq^m