Reminders:

- My new office is [redacted] BVC 321.
  science center
- Review session: Tomorrow 4:30–6:00
  ↑ Wednesday
  [redacted] Room: BH 216
- Optional [redacted] repeat of midterm II:
  Thursday in class
- Score(2) = max(Score(2A), Score(2B))
- Wednesday's office hours
  9:30–10:30; 12:00–3:00

[redacted]

- Old homeworks are (piling up) in my office. Stop by if you want yours.

Today ↓

- Deadweight loss (connected to 14-2)
- Integration by parts (14-3)

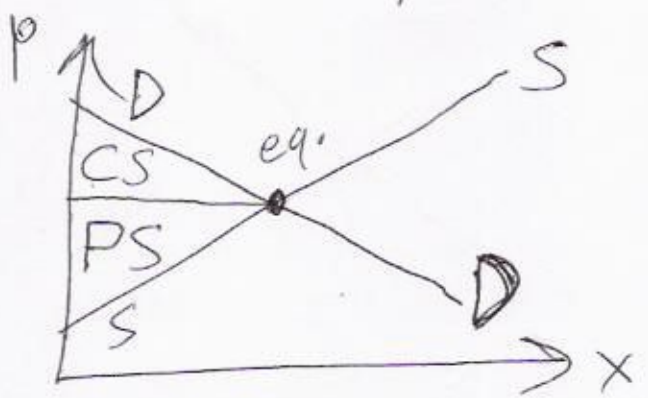
p = price x = quantity

Supply curve $p = S(x)$

Demand curve $p = D(x)$

Equilibrium: point (x, p)

where $p = S(x) = D(x)$

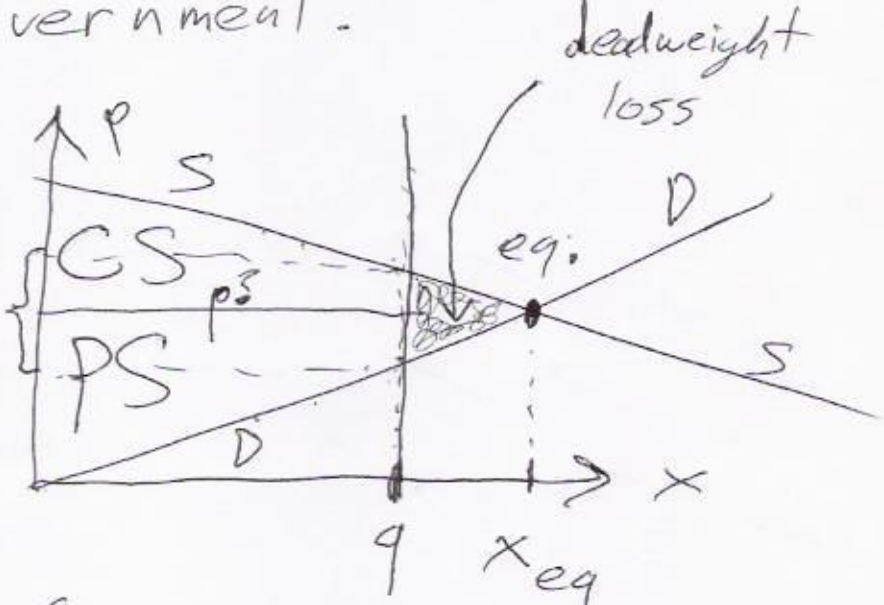


Everybody pays same price

Equilibrium can be prevented by government.

Quota:

Maximum quantity q permitted

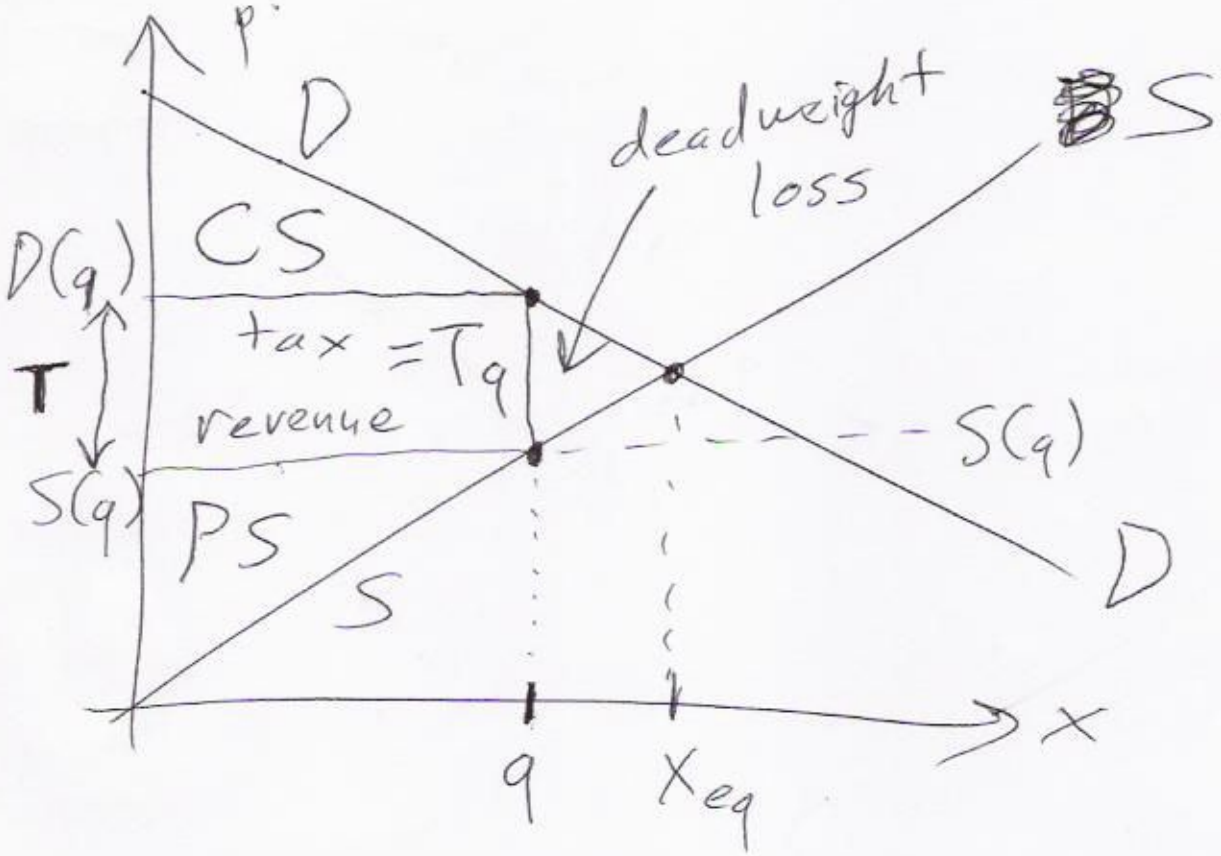


$$CS + PS = \int_0^q (S - D)\, dx$$

deadweight loss = DWL $= \int_{q}^{x_{eq}} (D-S)\,dx$

Another example: a flat sales tax:

flat tax = T = constant tax per unit



Solve $D(q) = S(q) + T$

for q.

Another example: flat rate tax:

rate is r (e.g. r=0.05=5%)

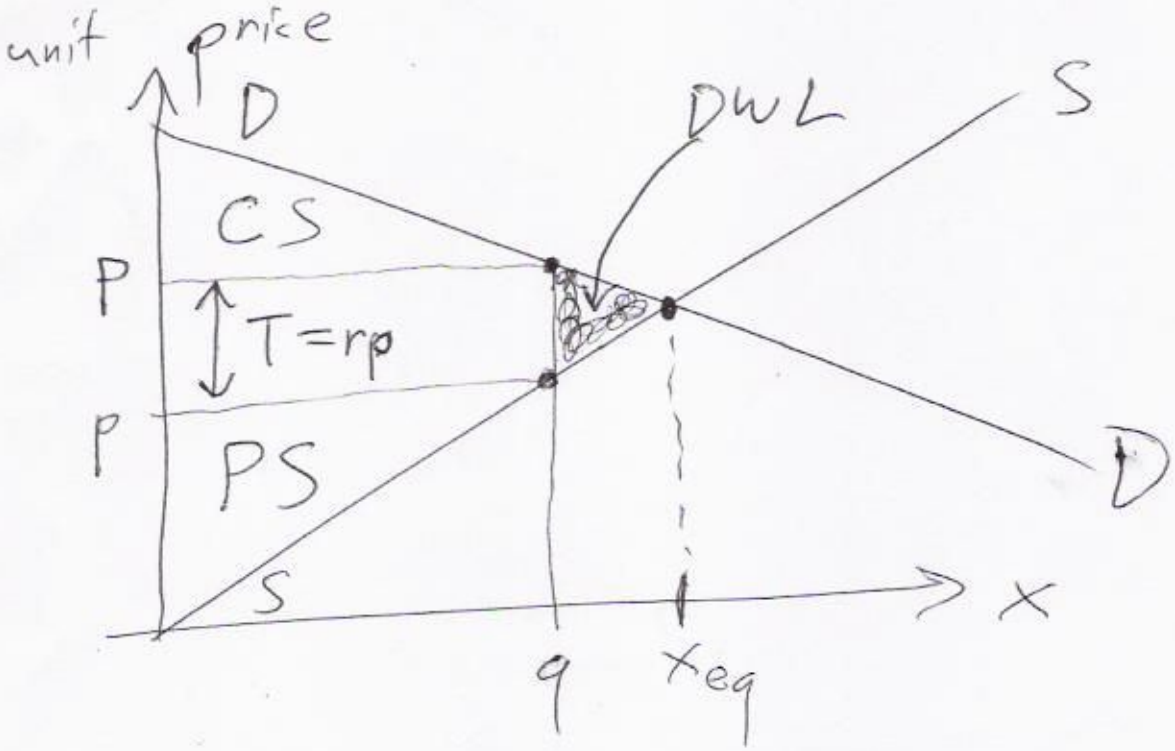
price including tax = P

price excluding tax = p

$$P = p + rp = (1+r)p$$

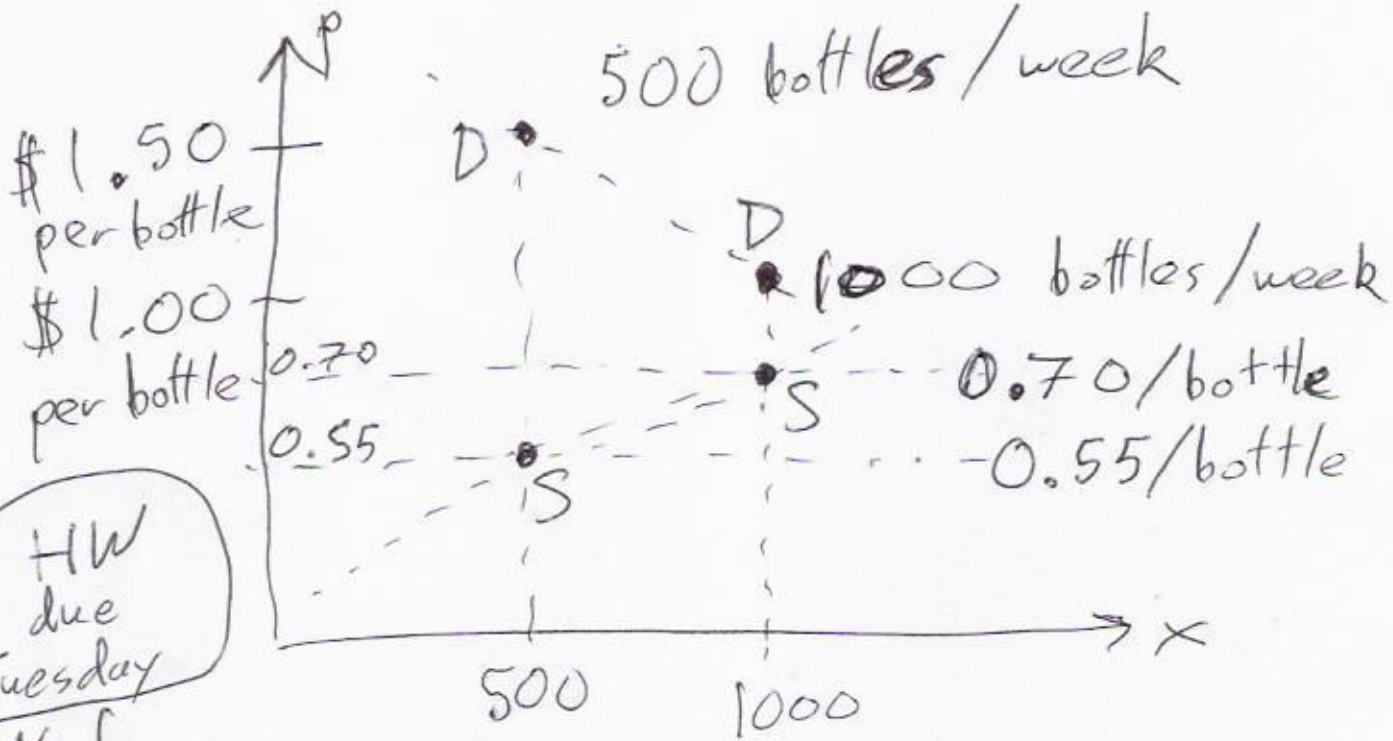
To find tax-equilibrium quantity q: solve

$$D(q) = (1+r)S(q)$$



tax revenue = $Tq = rpq$

Consider a market for 2L bottles of Dr. Pepper at a grocery store.



HW due Tuesday

#1

Assume S & D curves are linear. Find the natural equilibrium quantity & price. Compute CS & PS.

#2 Compute new equilibrium quantity in the presence of 5% sales tax.

Compute the new CS, PS;
compute tax revenue & DWL.

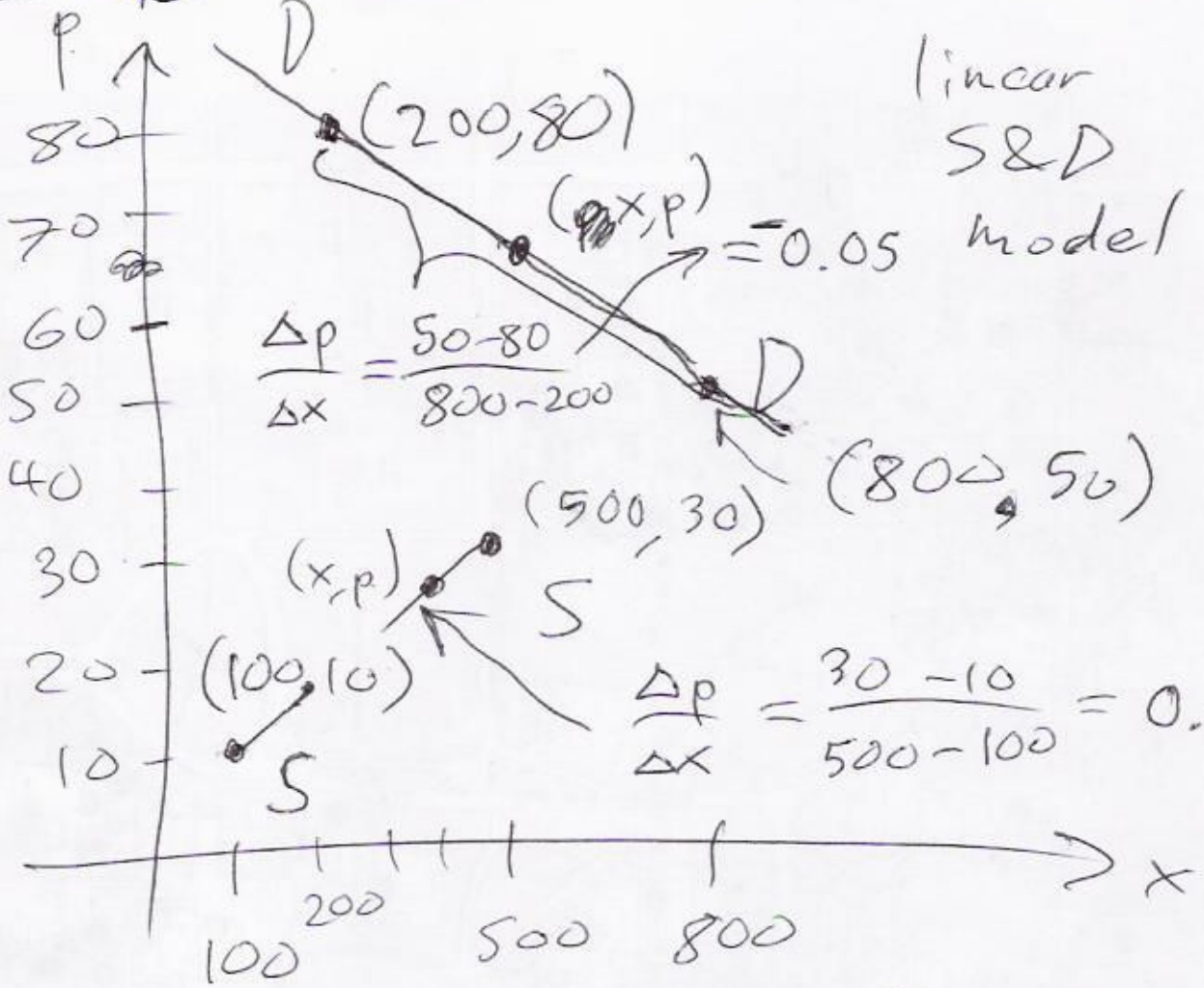
#3 Now consider a flat tax of $0.10/bottle (but no sales tax).
Compute the new equilibrium quantity, CS, & PS;
compute tax revenue & DWL.

#4 Repeat #3 but with ~~5% sales tax and~~ $0.10 per bottle flat tax charged and then a 5% tax charged. [$P = p + 0.05(p+0.10)$]

#5 If there was a quota of 900 bottles/week, then what would be the DWL?

Due next Tuesday 11/8

Example



linear S&D model

$p = D(x)$: $\frac{p-80}{x-200} = \frac{\Delta p}{\Delta x} = -0.05$

$p - 80 = -\frac{1}{20}(x-200)$

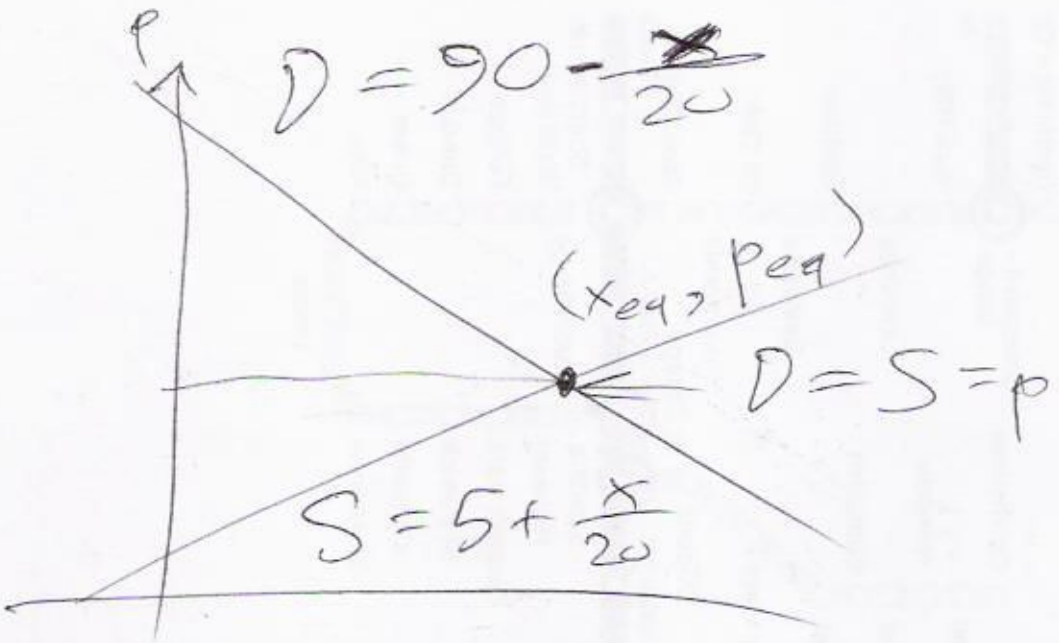
$D(x) = p = 80 - \frac{x}{20} + 10$

$D = 90 - x/20$

$p = S(x)$: $\frac{p-10}{x-100} = \frac{\Delta p}{\Delta x} = 0.05$

$p - 10 = \frac{1}{20}(x-100)$

$p = S = 10 + \frac{x}{20} - 5 = \frac{x}{20} + 5$



$$p_{eq} = 90 - \frac{x_{eq}}{20} = 5 + \frac{x_{eq}}{20}$$

$$85 = \frac{x_{eq}}{10}$$

$$850 = x_{eq}$$

$$47.5 = p_{eq}$$

$$T = 3 \text{ (per unit)}$$

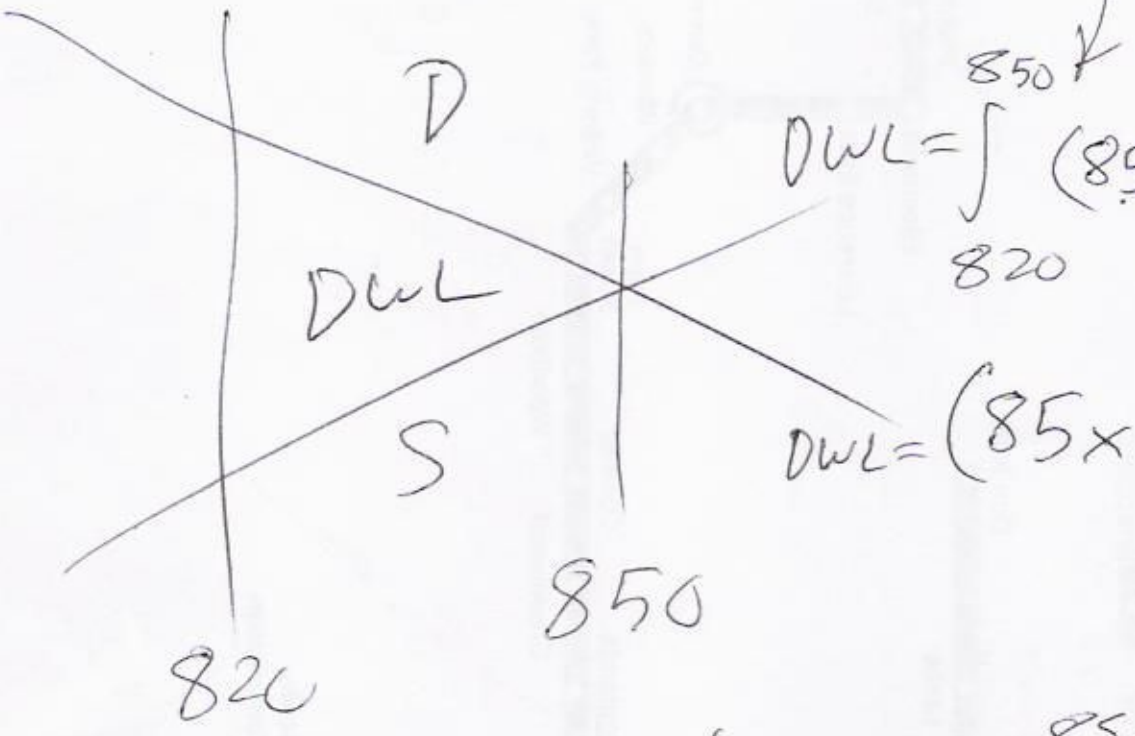
Solve $D(q) = S(q) + T$

$$90 - \frac{q}{20} = 5 + \frac{q}{20} + 3$$

$$82 = 9/10$$

$$820 = q$$

$$DWL = \int_{820}^{850} (D - S)\,dx =$$



$$DWL = \int_{820}^{850} \left(85 - \frac{x}{10}\right) dx$$

$$DWL = \left(85x - \frac{x^2}{20}\right)\Bigg|_{820}^{850}$$

$$DWL = \left(85 \cdot 850 - \frac{850^2}{20}\right) - \left(85 \cdot 820 - \frac{820^2}{20}\right)$$

$$\text{Tax rev.} = T_q = 3 \cdot 820$$