

Lecture 2- In Class Problems

AFTERNOON

9/8/2020

1. Suppose that market for hamburgers was in equilibrium, with a supply curve of $Q^S = 2000P - 10000$ and a demand curve of $Q^D = 20000 - 1000P$. Responding to populist citizen pressure, the government puts a price ceiling of \$8 on hamburgers.

(a) In market equilibrium, before the ceiling, find

- (a) equilibrium price
- (b) producer surplus
- (c) consumer surplus

$$Q_D = Q_S$$

$$20,000 - 1000P = 2000P - 10,000$$

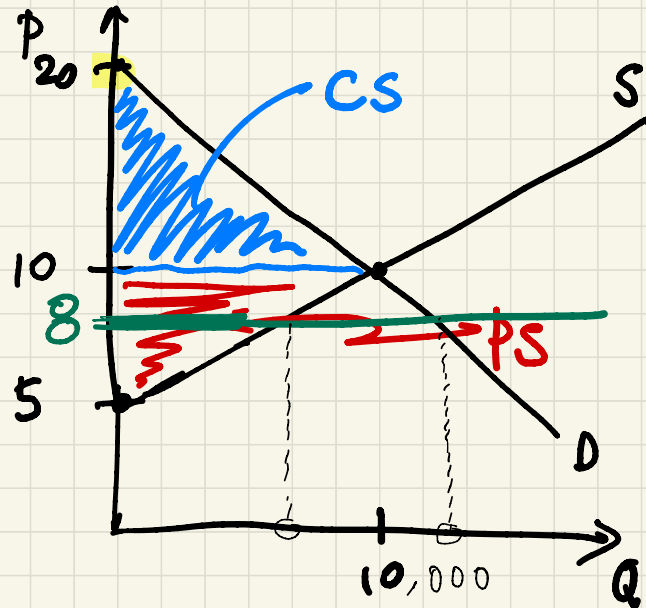
$$P = 10 \text{ in eqbm}$$

$$Q_S = 2000P - 10,000$$

$$0 = 2000P - 10,000$$

$$10,000 = 2000P$$

$$P = 5 \leftarrow \text{price at which } Q_S = 0$$



$$Q_s = 2000P - 10,000$$

$$Q_s = 2000(10) - 10,000$$

$$Q_s = 10,000 \text{ when } P = 10.$$

$$PS = \frac{1}{2} b \cdot h$$

$$= \frac{1}{2} (10,000) (10 - 5)$$

$$= \frac{1}{2} (10,000) 5$$

$$= 25,000 = PS$$

CS

-first find price where $Q_d = 0$

$$Q_d = 20,000 - 1000P$$

$$0 = 20,000 - 1000P$$

$$1000P = 20,000$$

$$P = 20 \leftarrow \text{where } Q_d = 0$$

$$CS = \frac{1}{2} (b) (h)$$

$$= \frac{1}{2} (10,000) (20 - 10)$$

$$= 5,000 \cdot 10$$

$$= 50,000 = CS$$

1. Suppose that market for hamburgers was in equilibrium, with a supply curve of $Q^S = 2000P - 10000$ and a demand curve of $Q^D = 20000 - 1000P$. Responding to populist citizen pressure, the government puts a price ceiling of \$8 on hamburgers.

(b) After the price ceiling, find

- (a) new quantity
- (b) producer surplus
- (c) consumer surplus

$$Q_S = 2000P - 10,000$$

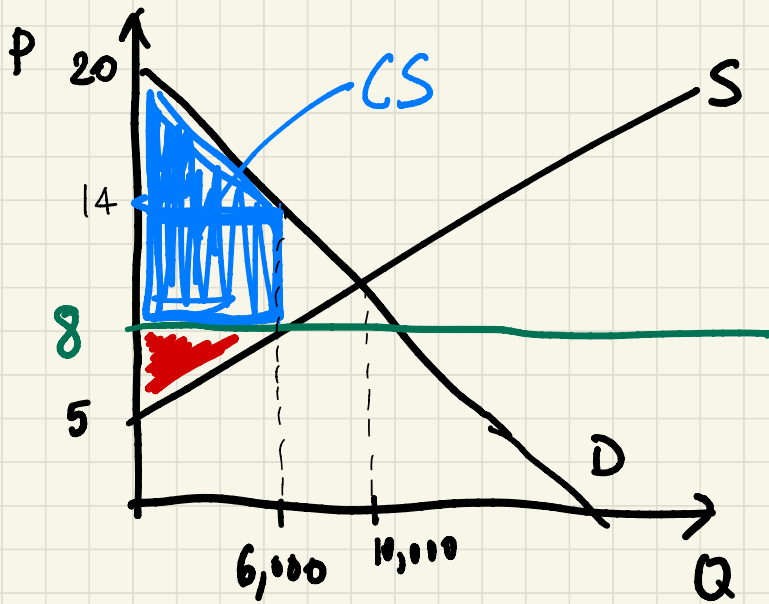
$$Q_S = 2000(8) - 10,000$$

$$Q_S = 6,000 \text{ new qty}$$

after price ceiling

Find the new eqm qty by plugging
~~the~~ the price of 8 into the supply curve.

Find producer surplus



$$\begin{aligned}
 PS &= \frac{1}{2}bh \\
 &= \frac{1}{2}(6,000)(8-5) \\
 &= 3,000 \times 3 \\
 &= 7,000 = PS
 \end{aligned}$$

new surplus
 = old surplus - dealer loss

CS = triangle
 + rectangle

to find relevant price, plug

$Q = 6,000$ into demand

curve $\Rightarrow P = 14$

$$\begin{aligned}
 CS &= (6,000)(14-8) \\
 &\quad + \frac{1}{2}(20-14)(6,000) \\
 &= 54,000
 \end{aligned}$$

1. Suppose that market for hamburgers was in equilibrium, with a supply curve of $Q^S = 2000P - 10000$ and a demand curve of $Q^D = 20000 - 1000P$. Responding to populist citizen pressure, the government puts a price ceiling of \$8 on hamburgers.

(b) After the price ceiling, find

(d) transfer

(e) deadweight loss

(f) deadweight loss as a share of the transfer (from either producers to consumers or vice-versa)

$$\begin{aligned}\text{size of transfer} &= (10 - 8) \times 6,000 \\ &= 12,000\end{aligned}$$

$$\begin{aligned}\text{DWL} &= \frac{1}{2} b h \\ &= \frac{1}{2} (14 - 8) (10,000 - 6,000) \\ &= \frac{1}{2} (6) (4,000) = 12,000 = \text{DWL}\end{aligned}$$

(c) Up until now, we assumed that all hamburgers were created equal, and it is self-evident that they are not. If there is a variety of hamburger quality, which hamburger sellers will be the most harmed by this policy?

hamburger sellers with higher costs will be
most hurt

2. GLS Chapter 3, Question 3

The annual demand for full-spectrum LED light bulbs in Fairbanks, Alaska, is estimated to be $Q^D = 20,000 - 1000P$. The supply is estimated to be $Q^S = -12,000 + 3,000P$.

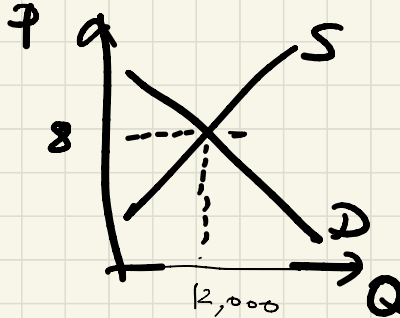
(a) Find the equilibrium price and quantity of LED light bulbs in Fairbanks, Alaska.

$$Q_D = Q_S$$

$$20,000 - 1000P = -12,000 + 3000P$$

$$32,000 = 4000P$$

$$P = 8$$



eqbm qty

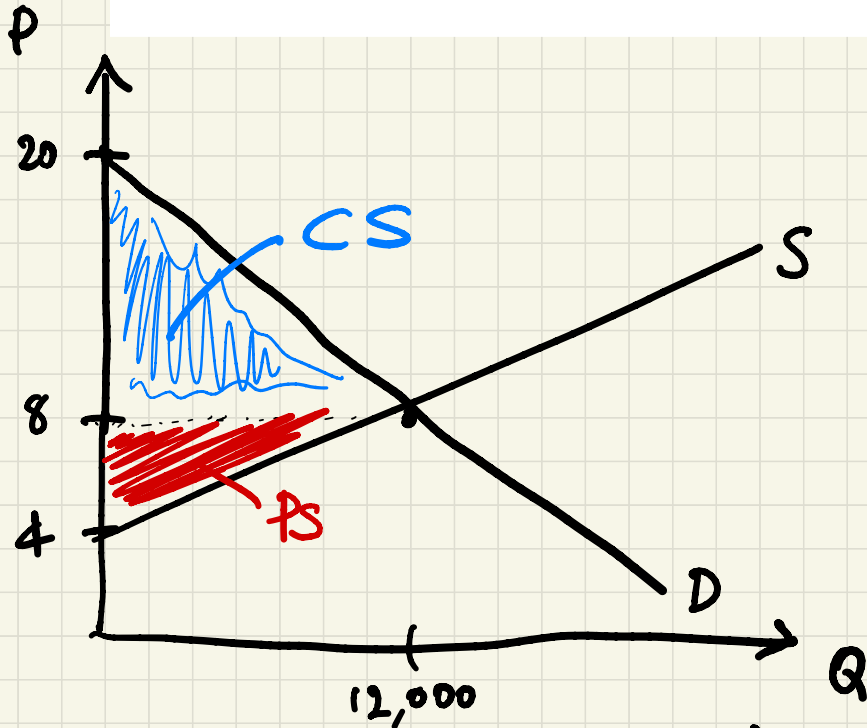
$$Q^S = -12000 + 3000P$$

$$= -(12,000 + 3000(8))$$

$$= -12,000 + 24,000$$

$$Q_S = 12,000$$

(b) Calculate consumer and producer surplus at the equilibrium price.



To draw the demand curve

$$Q_D = 20,000 - 1,000P$$

$$0 = 20,000 - 1,000P$$

$$1,000P = 20,000$$

$$P = 20 \text{ when } Q_D = 0$$

Find supply choke

$$Q_S = -12,000 + 3,000P$$

$$0 = -12,000 + 3,000P$$

$$\left. \begin{aligned} &=) 3,000P \\ &= 12,000 \end{aligned} \right\}$$

$$P = 4$$

$$CS = \frac{1}{2}bh$$

$$= \frac{1}{2}(12,000)(20-8)$$

$$= 6,000 \times 12$$

$$CS = 72,000$$

$$PS = \frac{1}{2} b \cdot h$$

$$= \frac{1}{2} (12,000) (8-4)$$

$$= 6,000 \times 4$$

$$PS = 24,000$$

(c) What is the total surplus created in the market for LED light bulbs?

$$\text{total surplus} = CS + PS$$

(d) (my addition) Would consumers get more surplus if the price were \$6 and the quantity were unchanged?

