

Week 5 Discussion Section

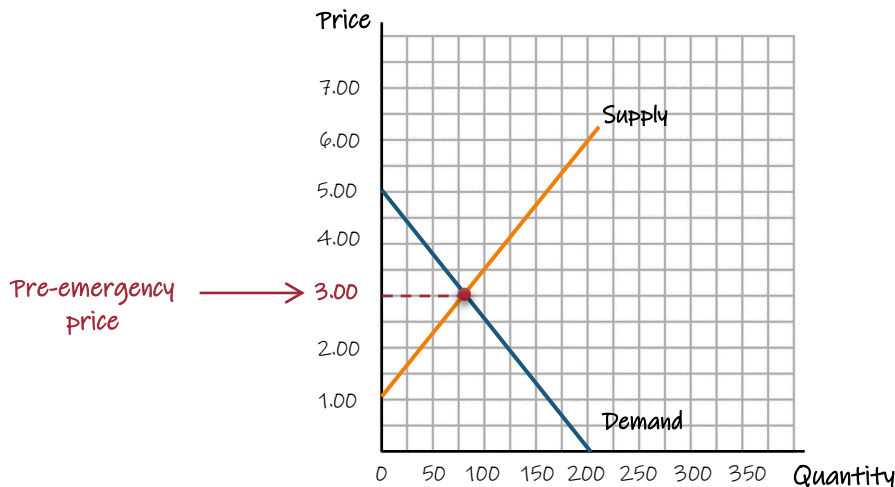
Part 1: Price Gouging

Wisconsin's Price Gouging Law

Wisconsin's statute §100.305 prohibits charging "unreasonably excessive prices," commonly referred to as price gouging, during "a period of abnormal economic disruption." The public health emergency declared by Governor Tony Evers on March 12, 2020 triggered enforcement of this law.

Once declared, wholesalers and retailers in this state are prohibited from selling consumer goods or services that are subject to the order at prices that are more than 15% higher than pre-emergency prices. Retailers are permitted to pass on their cost increases, including increases in the cost to replace the goods being sold.¹

Consider the Wisconsin retail market for hand sanitizer depicted below.



Demand in this market is described by $Q^d = 200 - 40P$ and supply is described by $Q^s = 40P - 40$.

Suppose that in response to a global health crisis, demand for hand sanitizer changes such that at each potential price, 80 additional units are demanded.

1. Update the daily demand function to reflect this change in demand.

$$Q_n^d = 200 + 80 - 40P$$

$$Q_n^d = 280 - 40P$$

¹ *Know Your Rights: AG Kaul Urges Wisconsin Consumers to Know Their Rights Regarding Price Gouging.* Wisconsin Department of Justice. (2020, March 24). <https://www.doj.state.wi.us/news-releases/know-your-rights-ag-kaul-urges-wisconsin-consumers-know-their-rights-regarding-price>.

2. Solve for the new equilibrium price and quantity in the hand sanitizer market.

$$\text{Set } Q_n^d = Q^s$$

$$280 - 40P = 40P - 40$$

$$320 = 80P$$

$$P = \$4.00$$

$$Q = 40 \times 4 - 40 \rightarrow Q = 120$$

Due to a public health emergency declaration in Wisconsin, prices are not permitted to exceed 115% of the pre-emergency price.

3. Determine the size of the resulting hand sanitizer shortage.

$$\text{The price is now limited to } 1.15 \times 3.00 = \$3.45$$

$$Q_n^d = 280 - 40 \times 3.45 = 142$$

$$Q^s = 40 \times 3.45 - 40 = 98$$

$$\text{Shortage} = Q_n^d - Q^s = 142 - 98 = 44 \text{ units}$$

4. When the public health emergency order ends what will happen to the price and quantity sold in the market for hand sanitizer? By how much will they rise or fall?

Under the public health emergency

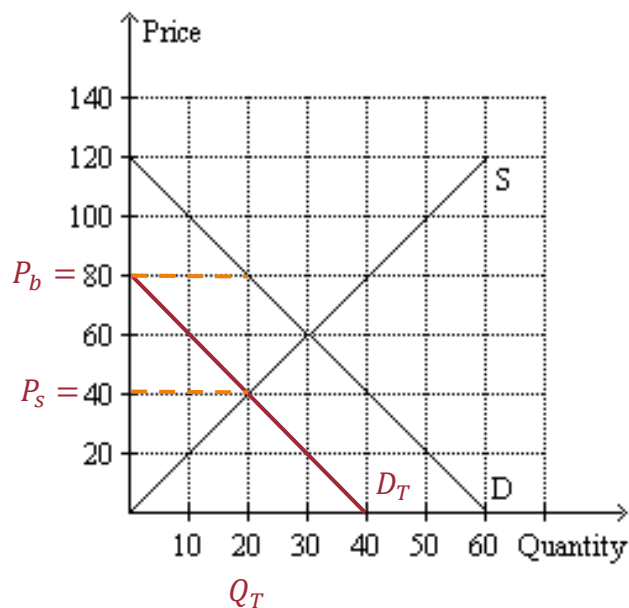
$P = \$3.45$ and quantity sold is $Q^s = 98$ (note: more is demanded at this price, but sales are limited by suppliers in this case.)

When the order is lifted

Price rises by \$0.55 to \$4.00 and quantity sold rises 22 units to 120.

Part 2: Graphical Analysis of Taxes

Consider the following market:



Suppose the government levies a tax of \$40 per unit on buyers in this market.

5. Draw in the demand curve that reflects this tax on buyers (Label it D_T).

Demand shifts down by \$40.

6. Label the price buyers pay (P_b), the price sellers receive (P_s), and the quantity sold under the tax (Q_T).

$$P_b = 80, P_s = 40, Q_T = 20$$

7. Determine how much of the burden of the tax is on buyers in this market and how much of the burden of the tax is on sellers in this market.

$$\text{Burden on buyers} = P_b - P_E = 80 - 60 = \$20$$

$$\text{Burden on sellers} = P_E - P_s = 60 - 40 = \$20$$

8. Suppose instead that the government levies a tax of \$40 per unit on sellers in this market. Would your answers to questions 6 and 7 change? Explain why or why not.

The answers will be identical. It doesn't matter which side of the market is administratively responsible for collecting the tax, the outcome is the same! This is easily demonstrated by shifting the supply curve up by \$40 instead.

Part 3: Algebraic Analysis of Taxes

Consider a market where demand is described by $Q^d = 20 - P$ and supply is described by $Q^s = 2P - 4$. Suppose the government levies a tax of \$3 per unit on sellers in this market.

9. Update the supply curve to reflect this tax on sellers.

Option 1:

Rearrange Supply: $P = \frac{Q}{2} + 2$

Add tax to reflect upward supply shift: $P = \frac{Q}{2} + 2 + 3$

Rearrange again: $Q_T^s = 2P - 10$

Option 2:

Recognize that the price sellers take home will be \$3 less than the market price

$$Q_T^s = 2(P - 3) - 4$$

$$Q_T^s = 2P - 10$$

10. Solve for the equilibrium under this tax, that is, determine the price that buyers pay (P_b), the price sellers receive (P_s), and the quantity sold under the tax (Q_T).

Step 1: Set $Q_T^s = Q^d$ to find the market price.

$$2P - 10 = 20 - P \rightarrow 3P = 30 \rightarrow P = \$10$$

Step 2: Plug $P = 10$ into Q_T^s or Q^d to find Q_T

$$Q_T = 20 - 10 = 10 \text{ units}$$

Step 3: Recognize that buyers pay \$10, but sellers only receive $P_s = 10 - 3 = \$7$

Equilibrium: $P_b = \$10, P_s = 7, Q_T = 10$

11. Determine how much of the burden of the tax is on buyers in this market and how much of the burden of the tax is on sellers in this market.

We first must determine the equilibrium price when there is no tax.

$$2P - 4 = 20 - P \rightarrow 3P = 24 \rightarrow P_E = \$8$$

$$\text{Burden on buyers} = P_b - P_E = 10 - 8 = \$2$$

$$\text{Burden on sellers} = P_E - P_s = 8 - 7 = \$1$$

12. Given your answer to 11, which side of the market (buyers or sellers) is more price elastic?

Sellers are paying less of the tax, so supply must be more price elastic than demand.