Supply and Demand Worked Examples

Intial Thoughts

Supply and Demand is/are:

- A great visual model fore making forecasts about the future direction of prices and quantities.
- Often works well even when not exactly the right model to use.
- Provides a general framework for quickly and easily thinking about externalities (Later in class)

Generally

Things that increase consumers' likelihood of buying a good:

- Increase price
- Increase transactions
- Observed prices and transactions trace out a supply function

Things that increase suppliers' likelihood of selling a good:

- Decrease price
- Increase transactions
- Observed traces out a demand function

Example Tracing Demand

Some prices, e.g., electricity, are fixed by regulation and set years ahead of time.

- Show a supply function that shows a single price no matter how much electricity is purchased.
- Show what happens in this market (Not really perfect competition but still work) when you started zooming to class.
- Does this make sense given your electric bill?

Groceries

This is about eggs and meat.
https://www.businessinsider.com/grocery-prices-record-breaking-april-spike-labor-department-2020-5

- These are separated into restaurant and grocery store products early
- Restaurants closed and people ate at home more.
- Try supply and demand for grocery store meats.
- Two interpretations of what happened to demand.

How about a trade war (2019)

https://www.reuters.com/article/us-usa-trade-china-pork/china-bought-u-s-pork-last-week-as-beijing-declared-halt-in-u-s-farm-purchases-idUSKCN1V523R

- China stopped importing US pork.
- What does this mean for pork prices and the pork sales in US?

Gas

Take a look at US gas prices by month
(https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s
=EMM_EPMR_PTE_NUS_DPG&f=M)

- Notice that June prices are almost always higher than January prices.
- If oil, an input to gasoline, prices don't change from Jan to June

Show a diagram that explains this price increase.

Lets try this with math

$$P = 10 - 2q_d$$

$$P = 3q_s$$

Find the Competitive Equilibrium

- Set the two equations equal to each other, both have P.
- Solve for a common quantity, $q_s = q_d$, that is equilibrium quantity transacted, q^*.
- Plug that quantity into one of the equations and solve for equilibrium price, P^*

Solve for q^*

$$10 - 2q = 3q$$
$$10 = 5q$$
$$q^* = 2$$

Find p^*

$$P = 3q = 3(2) = 6$$

or

$$P = 10 - 2q = 10 - 2(2) = 6$$

Now lets shift something

The key here is that we need to rephrase supply and demand so they better describe quantity than price.

$$P = 10 - 2q_d$$
$$P - 10 = -2q_d$$
$$5 - \frac{P}{2} = q_d$$

Supply is easy $q_s = \frac{1}{3}p$

Now lets give a shock

Firms will now supply 2 extra units no matter what the price. This is an increase in supply, a shift to the right.

- This changes supply to $q_s = \frac{1}{3} + 2$
- Demand remains the same.
- Resolve for the new equilibrium

Solve similar to before

- Set the supply and demand equations, which now describe q, equal to each other.
- Solve for p^*
- Substitute into an equation to find q^*

$$\frac{1}{3}P + 2 = 5 - \frac{1}{2}P$$

$$\left(\frac{1}{3} + \frac{1}{2}\right)P = 3$$

$$\frac{5}{6}P = 3$$

$$p^* = 3\left(\frac{6}{5}\right) = \frac{18}{5}$$

Find new q^*

$$q = \frac{1}{3}P + 2 = \frac{1}{3}\frac{18}{5} + 2 = \frac{6}{5} + 2 = 3\frac{1}{5}$$

- Note that price went from 6 to $\frac{18}{5} = 5\frac{3}{5}$
- Transactions went from 2 to $3\frac{1}{5}$
- Direction is what you expect, $p \downarrow$ and $q \uparrow$