

CH 2- Supply and Demand

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Info — Definition

Demand: want, but you have the money & will 100% spend the money if someone offers to sell at that price you demand

- What affects demand?
 - Price of the good P
 - Price of other goods P_o
 - Information: (i.e. monetary policies) I
 - Purchasing power of consumers M
 - Government policy G

The equation of q_d , quantity demanded:

$$q_d = -P + P_o + I + M - G$$

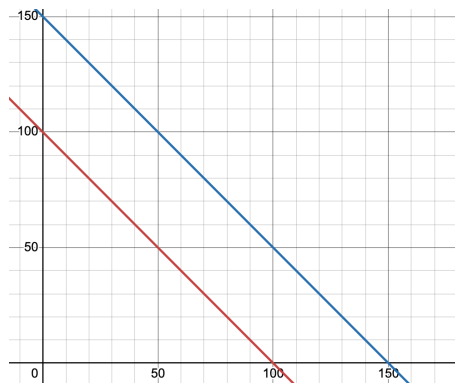
Graphical representation:

where q_d is on the x -axis and P on y -axis

If another variable changed and we can obtain the new change in q_d , results in a shift of the curve to left or right.

Changes however on P will be along the curve.

(i.e. $q_d = 100 - P$)



⚠ Warning — While solving for the slope, the traditional method of slope mathematically is reciprocal of the graphical representation of the economic model

🧠 Info – Supply

Supply is a measure of how much a market will produce with certainty at any price.

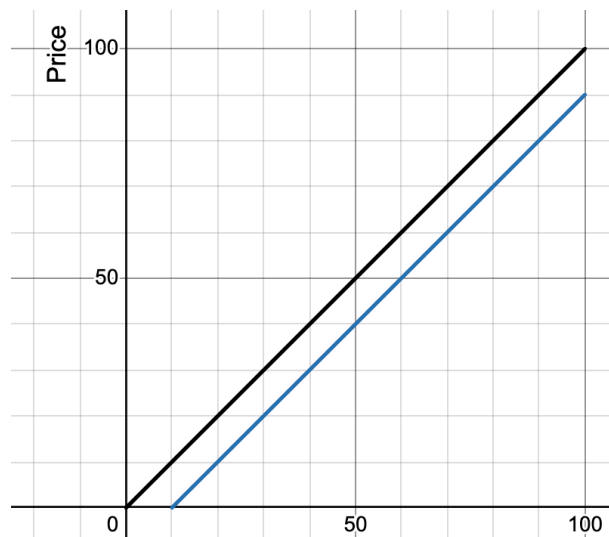
- What affects supply?
 - Price P
 - Price of other goods P_o
 - Input materials
 - Other things could have instead produced
 - Government Intervention G

Equation

$$q_s = P - P_o + G$$

where q_s is the quantity supply.

(i.e. $q_s = P$)



A positive in government intervention shifts the graph to the right whereas to the left

💡 Tip – Elasticity

The slope of each curve is given by the coefficient in front of P and it tells us the elasticity of demand → sensitivity to price.

🧠 Info – The Law of Demand

All else constant, an increase in price causes a decrease in demand

→ coefficient of price in the q_d function will always be negative

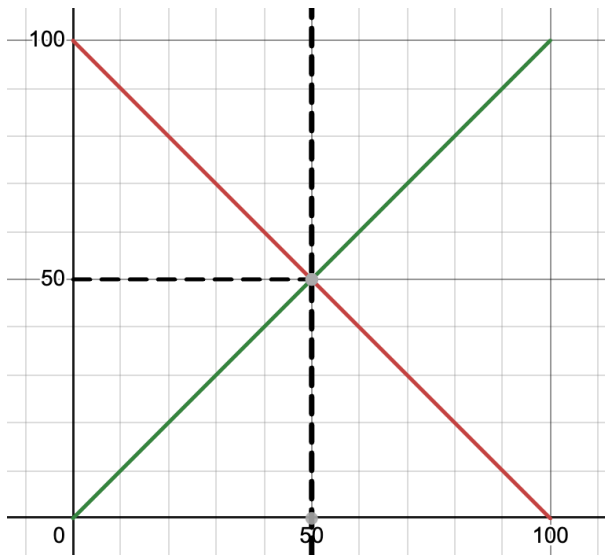
→ demand curve will always be downward sloping

Info – The Law of Supply

All else constant, an increase in price causes an increase in supply

→ coefficient of price in the q_s function will always be positive

→ supply curve will always be upward sloping



Info – Equilibrium

The intersection of the 2 curves is the Equilibrium which is a state where no agents could become better off by changing their action. (~Nash Equilibrium in Game Theory)

Info – Surplus & Efficiency

- Consumer Surplus
 - ▶ A measure of “happiness” of consumer
 - ▶ Difference between a consumer would have paid and what they end up paying.
 - ▶ Graphically, CS can be found in the Supply-Demand graph above the vertical line of the Price of Equilibrium and below the Demand curve. $\int_0^{50} x - 50 \, dx$ graphically speaking.
- Firm Surplus (Producer Surplus)
 - ▶ A measure of “happiness” of firm
 - ▶ Difference between a firm would have sold for and what they ended up selling.
 - ▶ Graphically, FS can be found in the Supply-Demand graph below the vertical line of the Price of Equilibrium and above the Supply curve. $\int_0^{50} 50 - x \, dx$ graphically speaking.

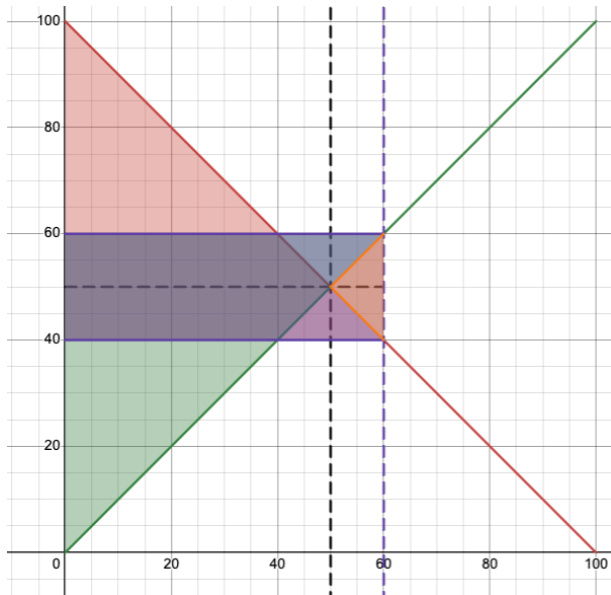
To the right of the Equilibrium are people that are not participating in the market.

Examples:

Assume that we have a quota on goods for $q_{\text{quota}} = 60$

Is this quota efficient?: Inefficient

- Maximizing total Surplus
- Total Surplus = Consumer Surplus + Producer Surplus + Government



Red + Purple Trapezoid: Consumer Surplus

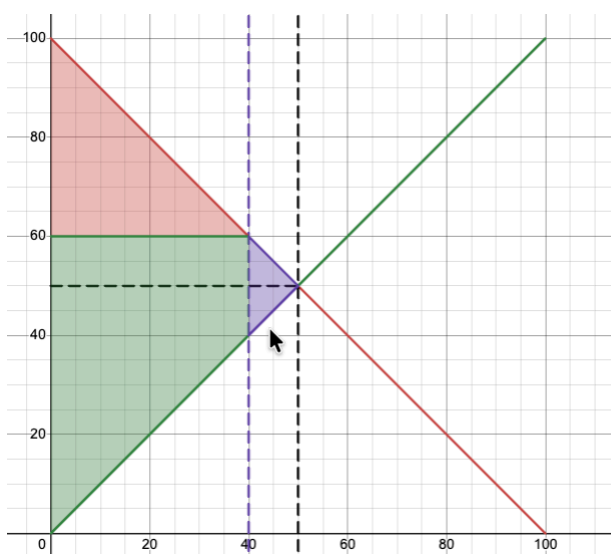
Green: Producer Surplus

Orange Triangle: Deadweight loss

Lower Purple Triangle: Compensated loss

Assume that we have a quota on goods for $q_{\text{quota}} = 40$ What about a negative quota?: Inefficient

Loss on efficiency \Rightarrow Deadweight loss which comes from both consumer surplus and producer surplus



Red: Consumer Surplus
Green: Producer Surplus
Purple: Deadweight loss

Limitation to when we can use the Supply & Demand Model

1. Identical goods
2. Full Information
3. Ease of entry/exit
4. Low/No friction
 - Cost of trading are Low

BIG Assumption: Everyone is a price taker

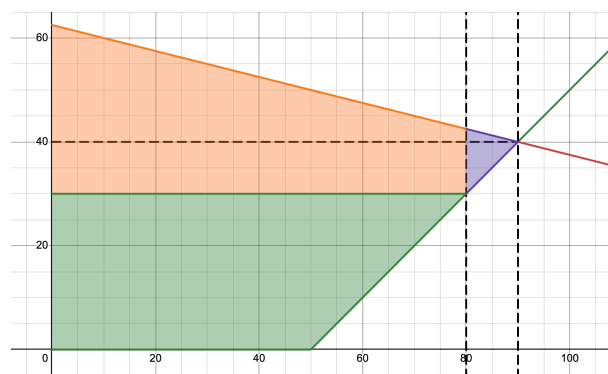
Example analysis (take note that the graph is hard to draw):

$$q_d = 250 - 4p$$

$$q_s = 50 + p$$

1. Find Equilibrium
 - $E(40, 90)$
 - Given Quota: 120
2. Find surpluses
 - $P_{\text{Producer}} = 32.5$
 - $P_{\text{Consumer}} = 62.5$
 - CS Triangle: 1800
 - PS Triangle : $1625 + 528.125 = 2153.125 - 703.125 = 1450$
 - Firm losses: 703.125
 - Total Surplus = 3250
 - Deadweight loss: 562.5
 - Pre-Quota Surplus = $3250 + 562.5 = 3812.5$

Post-Policy: We restrict the prices for \$30



Orange: Consumer Surplus = 1800

Green: Producer Surplus = 1950

Total Surplus = 3750

Better than the production quota, more efficient

Better policy is the production quota in context wise as the market is for food.

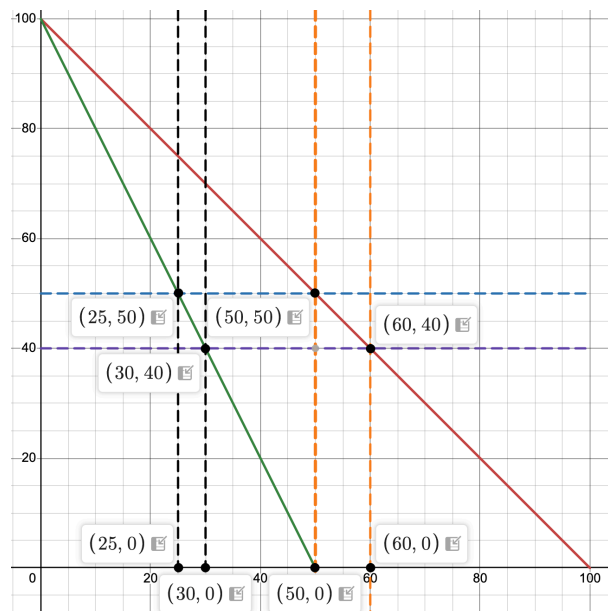
This model has a higher elasticity on the consumer side

The model that has a smaller elasticity on the producer side

Review

Think of the model as a tool we use to run experiments

Which is more elastic:



The red one. There is a bigger shift in quantity with lowering in price for the red one than the green one.

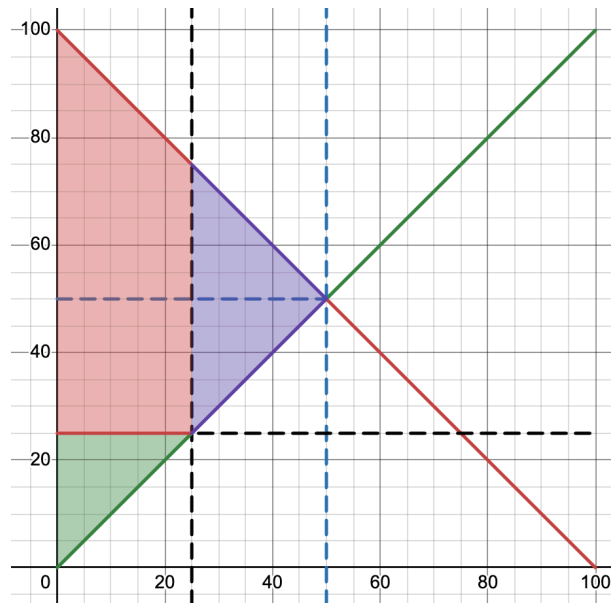
Point elasticity: $\frac{\Delta q}{\Delta p}$

Arc elasticity: $\frac{\Delta \% p}{\Delta \% q}$

Question:

Assume a move in equilibrium

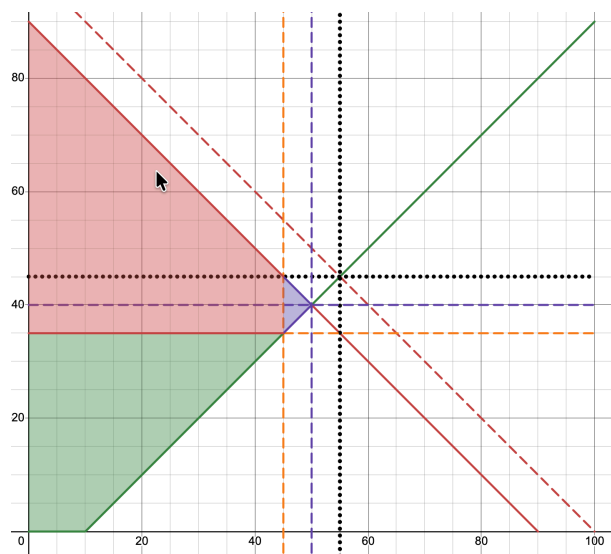
Give it a quota decrease and a price decrease



Green: Producer Surplus
 Red: Consumer Surplus
 Purple: Deadweight loss

Question:

1. We have a price control downward
2. Reduction in Demand



Green: Producer Surplus
 Red: Consumer Surplus
 Purple: Deadweight loss