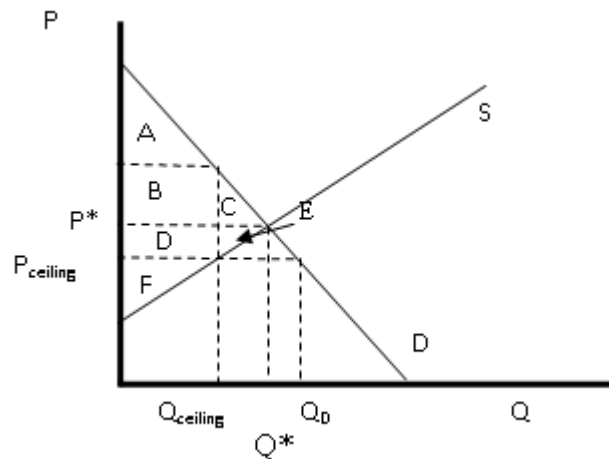# Lecture # 5 – Applications of Supply and Demand

I. Price Controls

- We began class discussing cases where the government sets a price ceiling – a maximum price for a good.
    - An example is rent control
    - The figure below shows the changes in welfare resulting from a price ceiling.


- Before the price ceiling:
    - Consumer surplus is areas A, B, & C
    - Producer surplus is areas D, E, & F
- After the price ceiling:
    - Consumer surplus is areas A, B, & D
    - Producer surplus is area F
    - Deadweight loss is areas C & E
    - Because the government sets the price below the market equilibrium, there is excess demand for the good.
        - Not everyone who would like to purchase the good is able to do so.
            - This may result in other secondary effects, such as:
                - people may have to wait in long lines to get the goods,
                - a black market may develop,
                - demand for other goods may increase (e.g. people move to suburbs if they can't get an apartment in the city).
                    - This is known as a *general equilibrium* effect.

- While total consumer surplus may go up, not everyone benefits, since some people who could purchase the good before cannot get it now.
  - Even though they can afford it, suppliers are not making the good available.
- Producer surplus will be lower.
- Some of the surplus that went to either consumers or producers before simply disappears. This is the deadweight loss.

II. Trade Policy

- Next, we considered how trade policy affects welfare.
  - Our example applies to a small country. Because it is small, the country is a *price taker*. That is, its actions do not influence the world price of the product being considered.
    - Thus, we can apply our competitive model.
    - If the country were large enough to affect prices throughout the world, the perfectly competitive model would not apply.
  - There are two supply curves to consider.
    - S_{DOM} is domestic supply. This is what can be produced within the country.
    - S_W is the world supply. Because the country is small, it can purchase as much as it wants at the price prevailing in world markets.
   - Thus, this supply curve is horizontal.
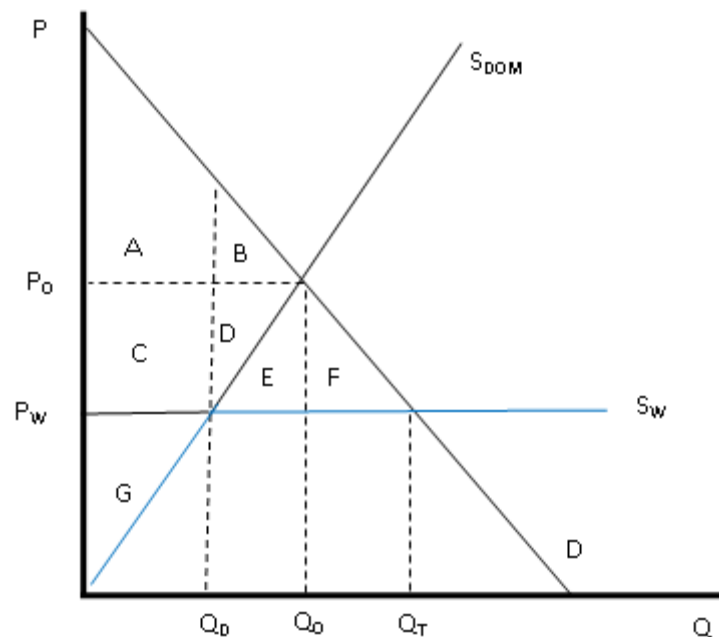
- Without trade, only the domestic supply matters. The equilibrium is at P_0 and Q_0.
- With trade, the blue lines represent supply.
  - The price that prevails in the market is the world price, P_W.
    - Total quantity demanded at this price is Q_T.
  - Domestic producers make as much as they can for that price. This is the blue portion of S_{DOM}.
    - Q_D is the quantity produced at home.
  - Foreign producers then provide the remaining goods.
    - Thus, imports = $Q_T - Q_D$.
- Finally, consider the change in welfare:
  - No trade:
    - Consumer surplus is areas A & B.
    - Producer surplus is areas C, D, & G.
  - With trade:
    - Consumer surplus is areas A, B, C, D, E, & F.
      - Consumers are better off. They buy more, and at a lower price.
    - Producer surplus is area G.
      - This is for domestic producers only.
      - They are worse off because they face more competition, and thus sell fewer goods at a lower price.
  - The gains from trade are areas E & F. These areas are only captured with free trade.
- Next, we considered the effect of a tariff.
  - A per unit tariff raises the world price in the country imposing the tariff.
    - The new supply is S_W + tariff.
    - The new price with trade is thus $P_W + t$.
  - The total quantity demanded at this higher price is Q'_T.
  - Local producers can supply more at the higher price.
    - Thus, Q'_D is now produced locally.
  - Imports fall to $Q'_T - Q'_D$.
  - Finally, consider the change in welfare.
    - With free trade:
      - Consumer surplus is areas A, B, C, D, E, & F.
      - Producer surplus is area G.
    - With the tariff:
      - Consumer surplus is areas A & B.
      - Producer surplus is areas C & G.
      - Revenue is area E.
        - For each unit imported, the government collects the tariff. The tariff times the number of imports is revenue to the government.
        - The rectangle E represents this area.

- Areas D and F disappear. These are the deadweight loss.
  - F represents lost opportunities because fewer units are purchased.
  - D is lost because some goods are produced at a higher cost by local producers, rather than by foreign producers.
    - Consider, for example, the part time farmers in the *Economist* article on rice tariffs in Japan who would be forced out of the market if Japan removed tariffs on rice.
 - Consumers must now pay the higher cost of local production.
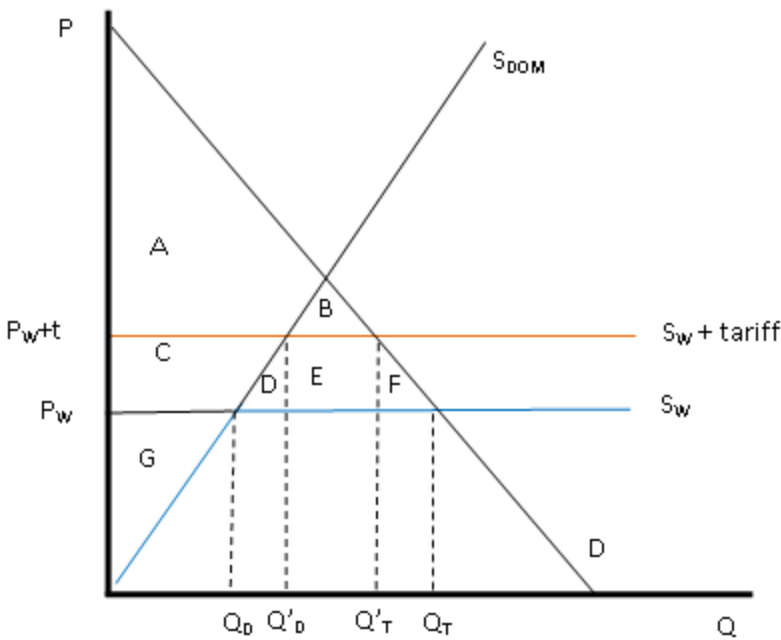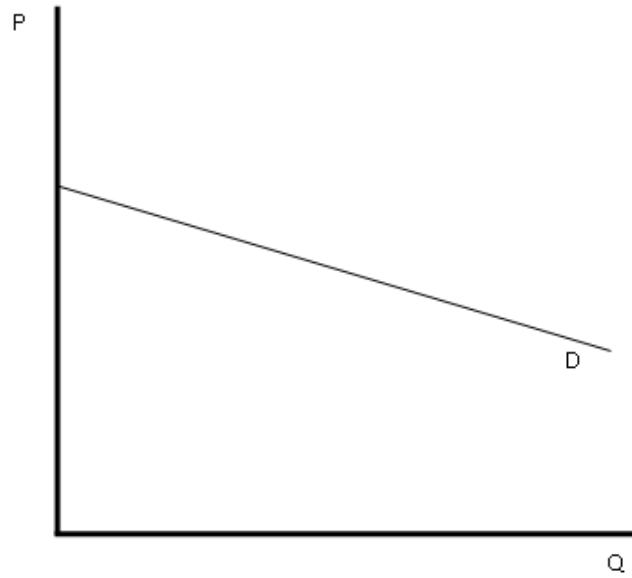
III. Elasticity

- <u>Elasticity</u> tells us the percentage change that will occur in one variable due to a one percent change in another variable.
  - It is a unit-free measure of comparison.
- <u>Price elasticity of demand</u> measures the sensitivity of quantity demanded to price changes. It tells us the percentage change in quantity demanded for a 1% change in price.
  - ε_p = % change quantity demanded/% change price
  - Elastic vs. inelastic
    - absolute value > 1 = *elastic*
    - absolute value < 1 = *inelastic*
  - Demand curves are steeper when demand is inelastic
    - Inelastic demand is a steep demand curve
   - Quantity demanded does not change much, even for large changes in price.
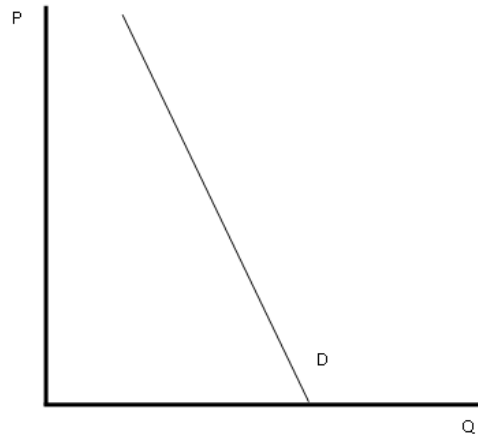
    - An extreme case is perfectly inelastic demand: quantity demanded is the same at any price:
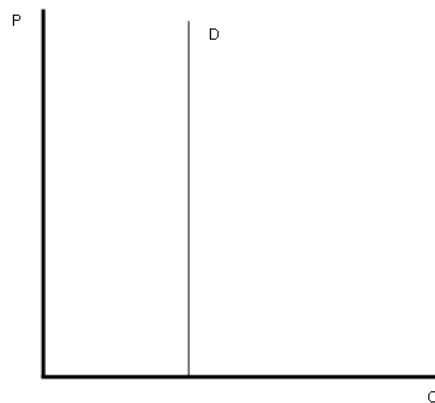
- Elastic demand is a flat demand curve.
    - Even small changes in price result in large changes in quantity demanded.

P

D

Q

- An extreme case is perfectly elastic demand: the price is the same for any quantity demanded.

P

D

Q
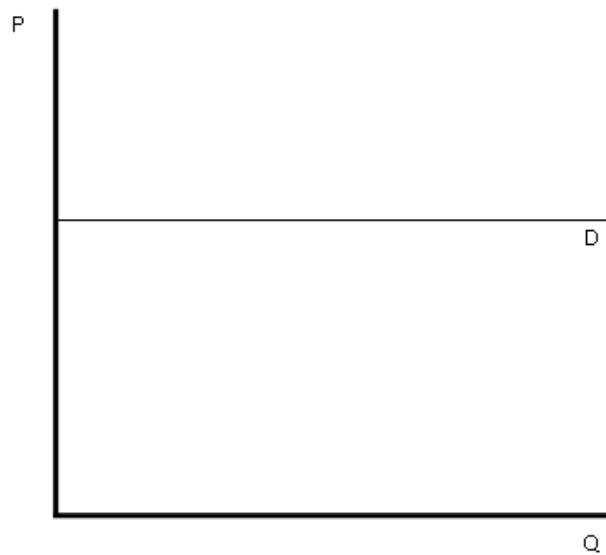
- Elastic vs. inelastic
  - absolute value > 1 = *elastic*
  - absolute value < 1 = *inelastic*
  - Elasticity and revenue:
    - When demand is inelastic, price and revenue move together. An increase in price raises revenue.
      - *Intuition*: if demand is inelastic, consumers will not respond much to a change in price. Most people still purchase the good, and they pay more to do so.
    - When demand is elastic, price and revenue move in the opposite direction. Revenues fall when the price is raised.
      - *Intuition*: if demand is elastic, consumers respond strongly to a change in price. The drop in quantity dominates the increased price.