Econ 1 Review Session 1

with Maggie apRoberts-Warren

UCSC Fall 2012

Introduction

- What will be covered in the exam?
  - Chs. 1-8
- What will the exam look like?
  - 20 multiple choice questions
  - 4 short answer/graphing questions
- What do I need to bring?
  - Full-page, pink scantron
  - Pencil
  - Student ID (or state-issued ID)
  - You may use a calculator
    - NO graphing calculators, NO phones/iPods/iPads as calculators

Chapter 2

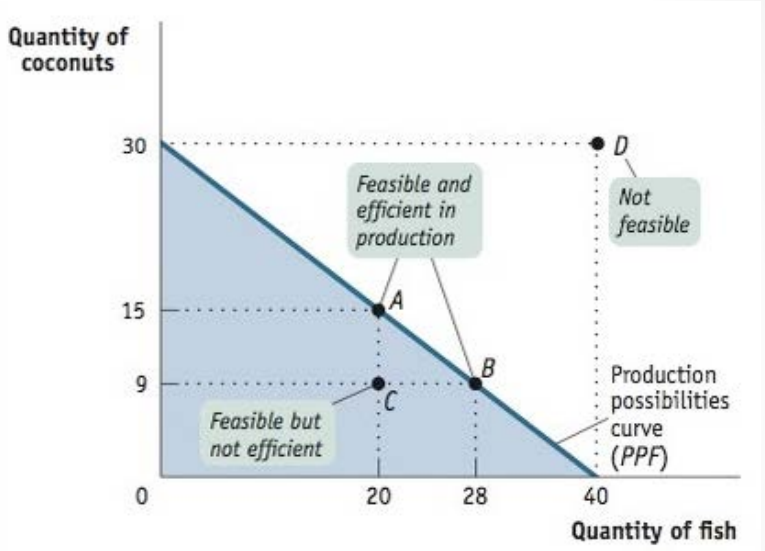
- What are the most important topics in Chapter 2?
  - The production possibilities frontier model (PPF)
    - What is the PPF?
    - How to construct a PPF
    - Regions of the PPF (feasibility and efficiency)
    - How to calculate opportunity costs (OC)
    - The difference between constant OCs and increasing OCs
      - Graphically and intuitively
    - Comparative and absolute advantage
    - Pattern of trade based on comparative advantages
    - Shifts and pivots of the PPF
  - Positive vs normative economics

Ch. 2: Production Possibilities Frontier

- What is the PPF model?
  - Model that shows us the trade-offs in production an economy faces
    - Throughout we assume there are only two goods
  - The PPF gives all the possible production combinations of the two goods such that all resources are used efficiently using the best available technology
- How to construct a **straight-line** PPF:
  - Find the intercepts for each axis
    - The x-axis intercept can be interpreted as the amount of good x an economy can produce if it produces none of the y good (and likewise for the y-axis intercept).
  - Once you find the intercepts, connect the two intercepts with a straight line
    - This is the PPF!

Ch. 2: PPF con't

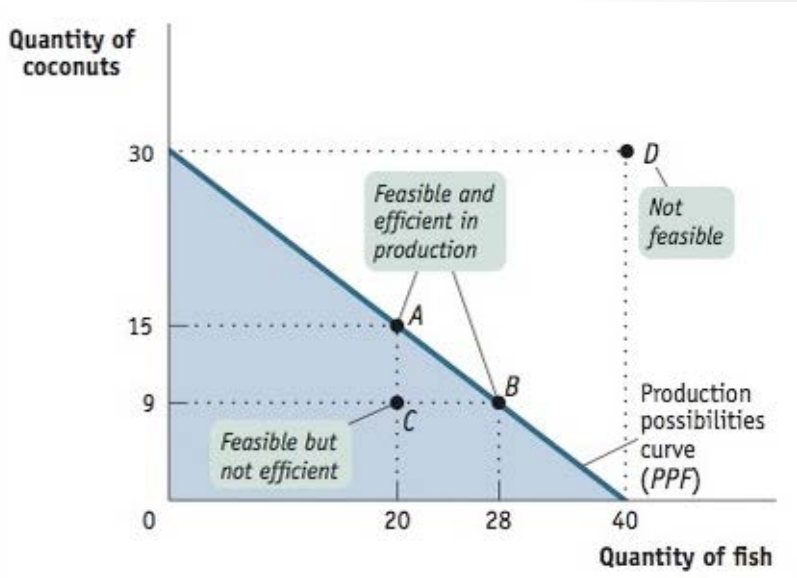
- The PPF and Feasibility
  - Any point on or inside the PPF is considered feasible: we could produce that combination given our resources and technology
    - ex: points A, B, C
  - Any point outside the PPF is infeasible: we do not have the resources or technology needed to produce a given combination of goods
    - ex: point D



- The PPF and Efficiency
  - Any point on the PPF is efficient: the only way to get more of one good is to give up some of the other good
    - ex: points A and B
  - Any point inside the PPF is inefficient: we can get more of both goods without giving anything up
    - ex: point C

Ch. 2: PPF con't

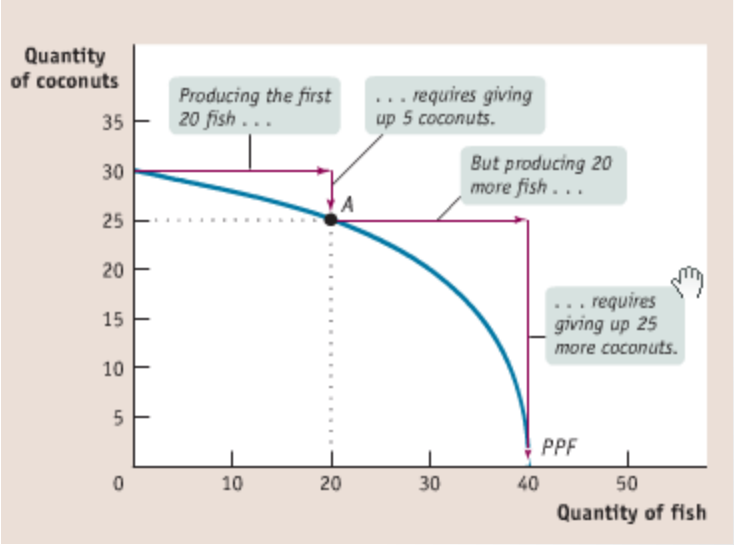
- The PPF and <u>opportunity costs</u>
  - OC of fish is how many coconuts you must give up to produce one more unit of fish
  - How do we measure this?
    ➔ slope!
    - The slope of the PPF is the OC of the good on the x-axis
    - The reciprocal of the slope (1/slope) is the OC of the good on the y-axis



- Why the slope?
  - Slope = m = rise/run = ΔC/ΔF
  - OC of fish is the amount ΔC such that ΔF =1
    - OC of fish is how many coconuts do I need to give up (ΔC) to get one more unit of fish (ΔF =1)
  - m= ΔC/1➔m= ΔC
    - Slope is the OC of fish (good on x-axis)

Ch. 2: PPF con't

- Constant versus increasing opportunity costs
  - So far, we've only looked at <u>constant opportunity cost</u> PPFs
    - These are our straight-lined (or linear) PPFs
      - Linear ➔ constant slope ➔ constant OC
    - Implicitly assumes that all inputs are equally as good at producing both goods
  - A more realistic PPF would exhibit <u>increasing opportunity costs</u>
    - These are PPFs that are **bowed out from the origin**
    - As I produce more fish I have to give up an increasing number of coconuts
      - Slope increases as Q_{fish} increases
      - Reflects the fact that not all resources are equally suited in the production of all goods

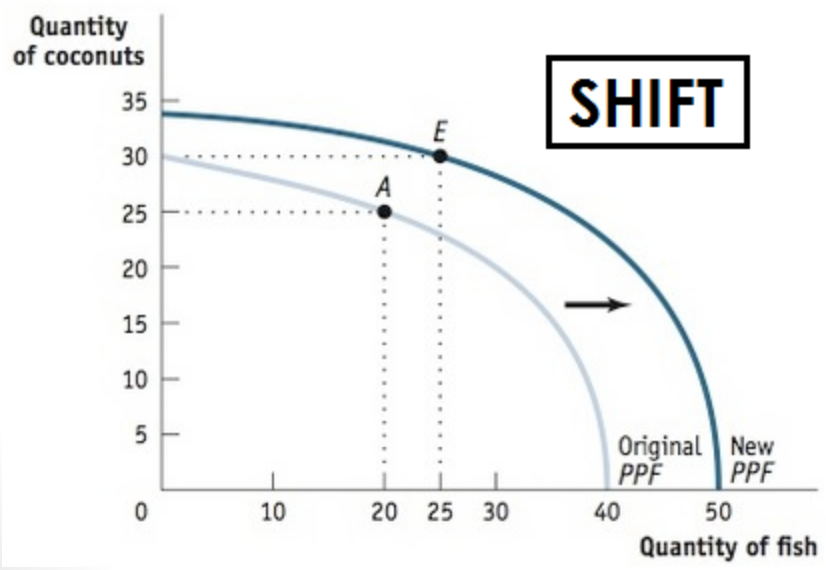


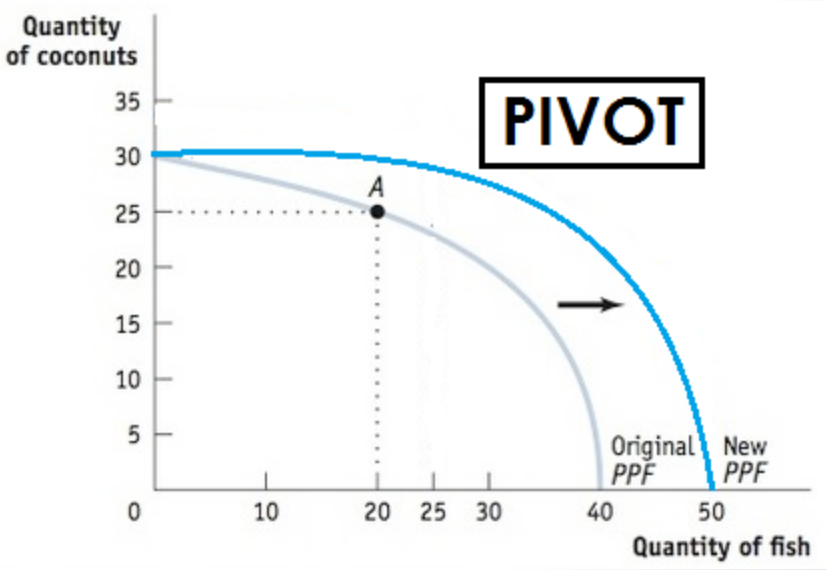
Ch. 2: PPF con't

- Absolute advantage versus comparative advantage
  - Absolute advantage: when a party/country can produce more of a good
  - Comparative advantage: when a party/country has the lowest OC of producing a good
    - Comparative advantage is the basis for gains from trade!
- Comparative advantage and the pattern of trade
  - Pattern of trade: what goods does an economy export/import and to/from where?
  - Countries should specialize in what they respectively do best and then trade for other goods
    - That is, countries should specialize in the good for which they have a comparative advantage
    - Specialization and trade can increase total worldwide production and increase consumption in both countries

Ch. 2: PPF con't

- Shifts and pivots of the PPF
  - Increase in quantity or quality of resources
    - Outward parallel shift of the PPF
  - General increase in technology used for producing all goods
    - Outward parallel shift of the PPF
      - Ex: internet, computers
  - Increase in technology used for production of one good
    - PPF pivots out





Ch 2: Positive vs Normative Economics

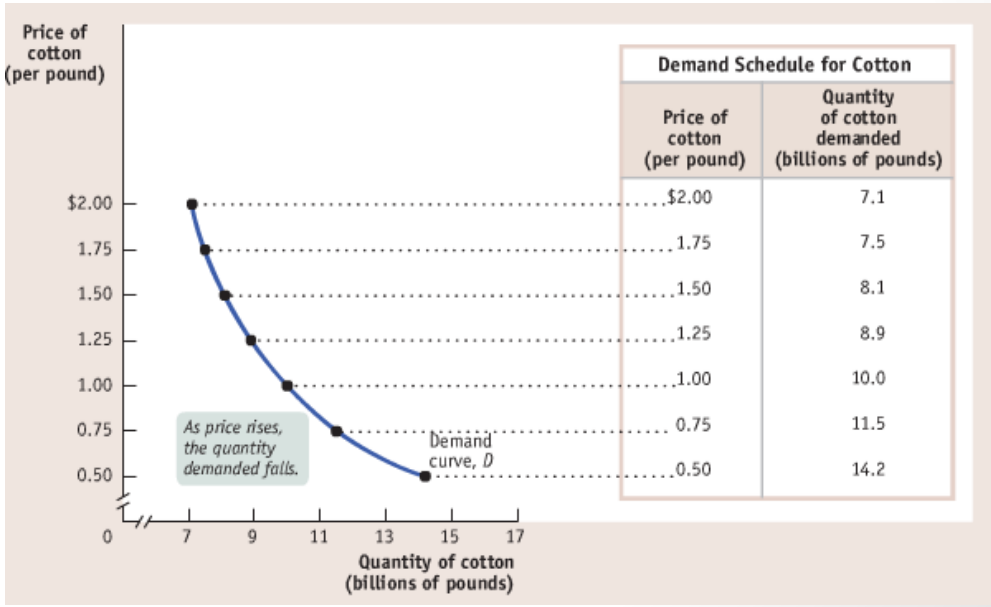
- Positive economics: describes how the economy actually works
  - Ex: “If the government reduces spending by $X, GDP will fall by $Y.”
  - Often involves forecasts or predictions.
- Normative economics: prescriptions for how the economy should work, or what policy makers should do
  - Ex: “The government should lower taxes on high income earners to stimulate job creation.”
  - Often involves some sort of value judgment.

Chapter 3

- What are the most important concepts from chapter 3?
  - Demand
    - The demand curve and law of demand
    - Shifts of the demand curve versus movements along a demand curve
      - What factors shift the demand curve?
  - Supply
    - The supply curve and law of supply
    - Shifts of the supply curve versus movements along a supply curve
      - What factors shift the supply curve?
  - Equilibrium ➔ putting supply and demand together
    - Determining equilibrium price (P) and quantity (Q)
    - Disequilibrium
      - Shortages and surpluses
    - Effect of a shift in demand
    - Effect of a shift in supply
    - Effect of a simultaneous shift (a shift in both supply and demand)

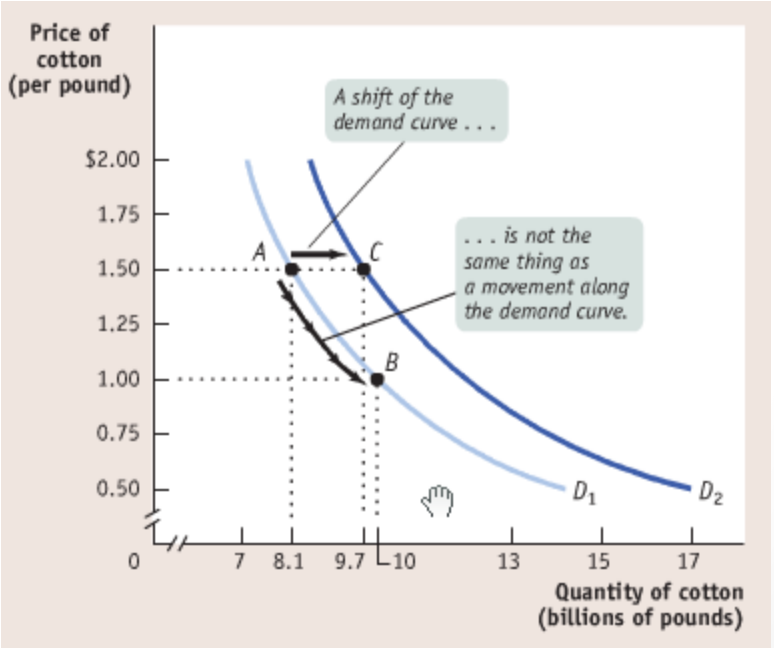
Ch. 3: Demand

- Demand schedule: a table showing how much of a good consumers will want to buy at various prices
  - The amount demanded at a specific price is the quantity demanded
- Demand curve: graphical representation of the demand schedule
  - Shows the relationship between price and quantity demanded
- Law of demand: all else equal, as the price of a good falls (rises), the quantity demand rises (falls)
  - ↑P ➔ ↓Q_D; ↓ P ➔ ↑Q_D
  - This is why the demand curve is downward sloping



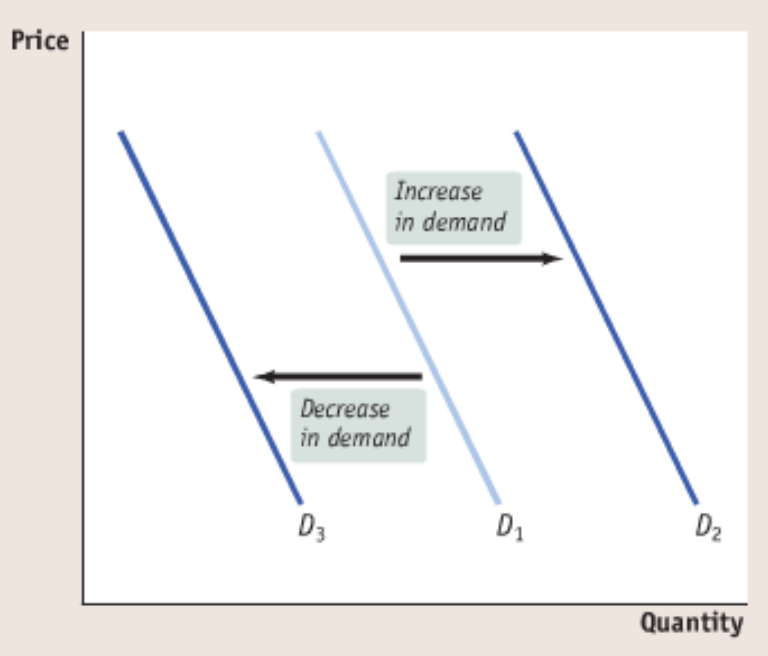
Ch. 3: Demand con't

- Shifts of the demand curve versus movements along a demand curve
  - Movements: the ONLY thing that will cause you to move along a demand curve is a change in the price of the good in question
    - Holding all else equal, as the price goes down, quantity demanded goes up and we move down the same, initial demand curve
  - Shifts: the entire demand curve shifts when on of the "all else equal" factors changes
    - When demand shifts, we have to draw an entirely new curve



Ch. 3: Demand con't

- What does a shift in demand look like?
  - Decrease ➔ shifts to left
    - At any given price, quantity demand is less
  - Increase ➔ shifts to right
    - At any given price, quantity demanded is greater



Ch. 3: Demand con't

- What shifts the demand curve?
  - Change in the price of related goods/services
    - Compliments (in consumption): goods that are often consumed together; ex: hot dogs and hot dog buns, PS3 gaming system and Call of Duty game
      - If goods A and B and compliments, then

$$P_A\uparrow \rightarrow D_B\downarrow;\ P_A\downarrow \rightarrow D_B\uparrow$$

    - Substitutes (in consumption): goods that often serve a similar purpose; ex: Pepsi and Coke, blue jeans and khakis
      - If goods A and B are substitutes, then

$$P_A\uparrow \rightarrow D_B\uparrow;\ P_A\downarrow \rightarrow D_B\downarrow$$

  - Change in income
    - Normal good: goods for which an increase in income causes an increase in demand

$$Y\uparrow \rightarrow \uparrow D_{NG}$$

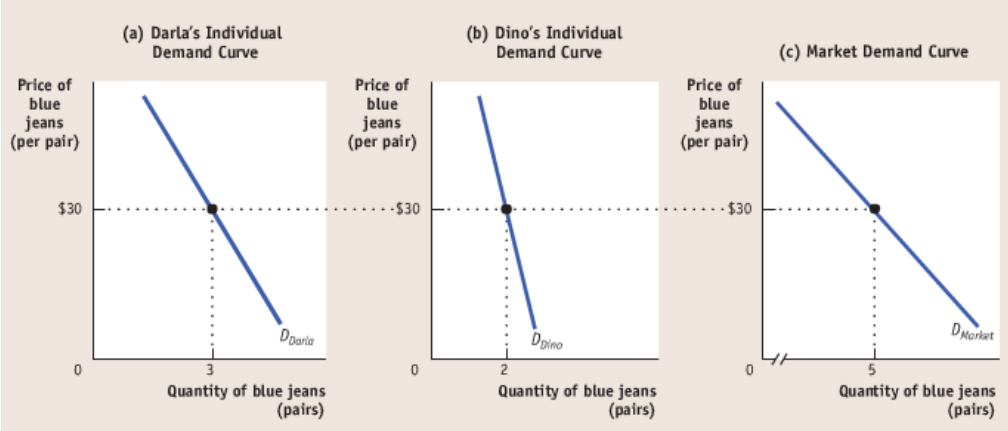
    - Inferior good: goods for which an increase in income causes a decrease in demand

$$Y\uparrow \rightarrow \downarrow D_{IG}$$

      - Tend to be low quality goods
  - Change in tastes: change in demand induced by fads, beliefs, cultural shifts, etc.
    - Ex: Fish oil supplements, shoulder pads, etc.

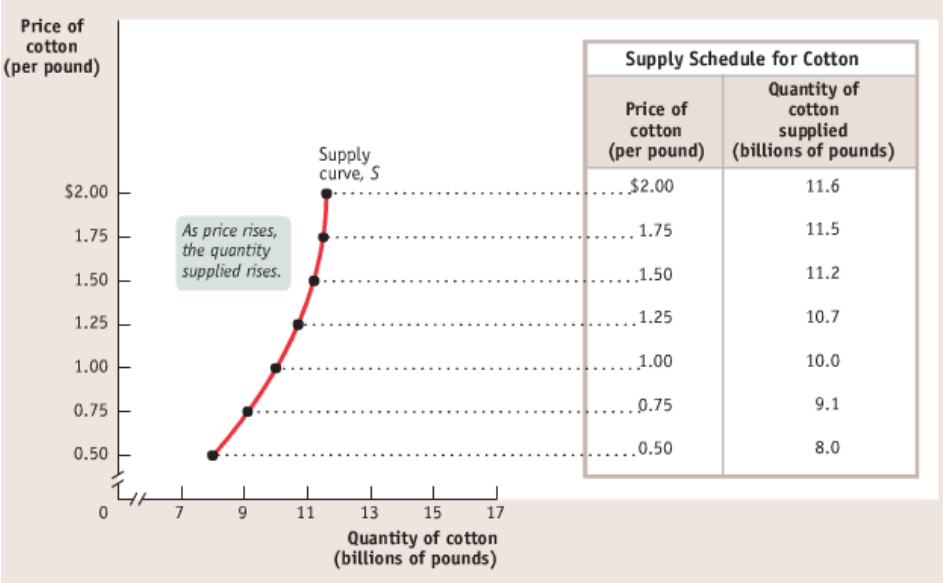
Ch. 3: Demand con't

- What shifts demand? con't
  - Change in expectations: expectations of many things shape demand, but two of the most important are
    - Expected future price: ↑ expected price in future➔↑demand today
    - Expected future income: same effect on demand as a change in current income
  - Change in the number of consumers
    - Market demand is the horizontal summation of all individual consumers' demand curves
      - Horizontal summation: find each individual consumer's quantity demand at each price, sum over all consumers ➔ market quantity demanded at each price
      - All else equal, if we increase the number of consumers, the Q_D increases at all prices (i.e., market demand increases)



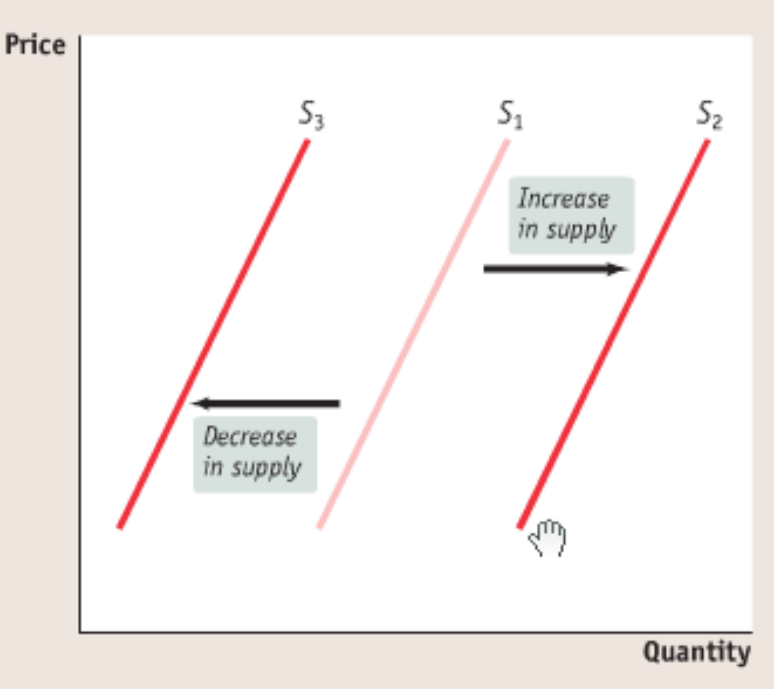
Ch. 3: Supply

- Supply schedule: a table showing how much of a good or service producers are willing to supply at different prices
  - The amount supplied at a specific price is called the quantity supplied
- Supply curve: graphical representation of the supply schedule
  - Shows the relationship between price and quantity supplied
- Law of supply: all else equal, as the price of a good rises (falls) quantity supplied also rises (falls)
  - ↑P ➔↑Q_S; ↓ P ➔↓ Q_S
  - This is why the supply curve is upward sloping



Ch. 3: Supply con't

- Shifts of supply versus movements along a supply curve
  - ONLY a change in price will cause a movement along a supply curve
  - Changes in other factors cause the entire curve to shift
- What does a shift in supply look like?
  - Decrease ➔ shifts to left
    - At any given price, quantity supplied is less
  - Increase ➔ shifts to right
    - At any given price, quantity supplied is greater



Ch. 3: Supply con't

- What shifts the supply curve?
  - Changes in the price of inputs
    - Producers use inputs (ex: labor, raw materials, other finished goods, etc.) to make their output
      - If inputs get more expensive and production becomes more costly, producers are less willing to supply goods

$$\uparrow \text{P of inputs} \rightarrow \downarrow Q_S; \downarrow \text{P of inputs} \rightarrow \uparrow Q_S$$

  - Changes in the price of related goods/services
    - Compliments (in production): goods that can be produced simultaneously from the same resource ("by-products"); ex: lumber and sawdust (both can made at the same time from a single tree)
      - If goods A and B are compliments in production , then

$$\uparrow P_A \rightarrow \uparrow S_B; \downarrow P_A \rightarrow \downarrow S_B$$

    - Substitutes (in production): goods that are produced using the same resource but cannot both be simultaneously produced from a single unit of said resource; ex: lumber and paper products (both are made from a tree, but a producer cannot make both lumber and paper from a single tree)
      - If goods A and B are substitutes in production, then

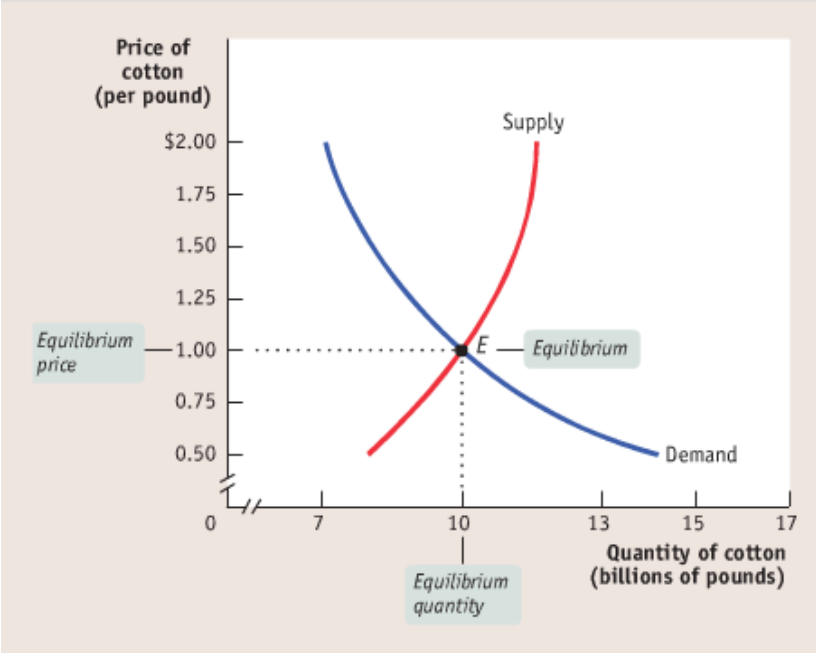
$$\uparrow P_A \rightarrow \downarrow S_B; \downarrow P_A \rightarrow \uparrow S_B$$

Ch. 3: Supply con't

- What shifts the supply curve? con't
  - Changes in technology
    - Technology is the means by which producers turn inputs into output
    - Better tech ➔ produce a given amount of output using fewer inputs/at a lower cost
      - Better tech ➔ ↓ production costs ➔ ↑ supply
  - Changes in expectations: many expectations affect supply, but the most important one is
    - Change in expected future price: if producers expect a ↑ price for their goods in the future ➔ ↓ supply today
  - Changes in the number of producers
    - Like demand, market supply is a horizontal summation of all individual producers' supply curves
    - ↑ # of producers ➔ ↑ market supply; ↓ # of producers ➔ ↓ market supply

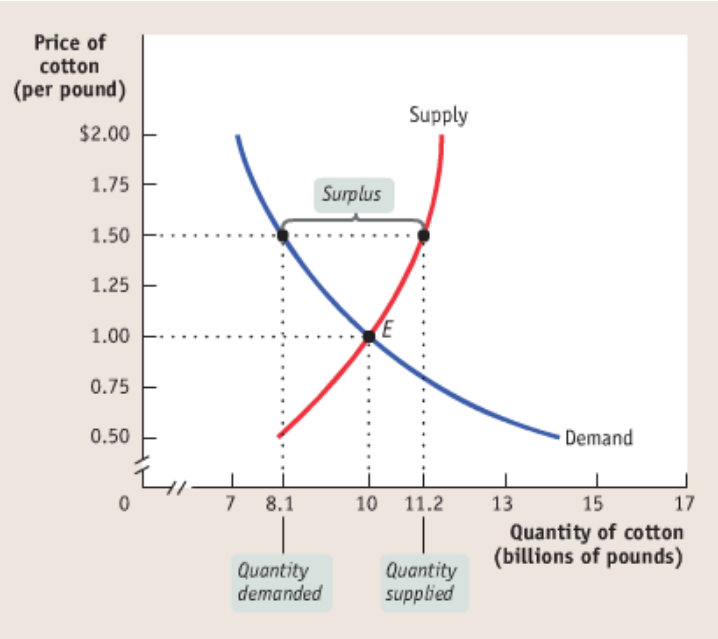
Ch. 3: Equilibrium

- What is equilibrium?
  - Equilibrium occurs when $Q_D = Q_S$
  - Graphically, this occurs were the demand curve intersects the supply curve
    - At this price, all consumer who want to buy the good are able to do so and all the producers who wish to sell can find a buyer



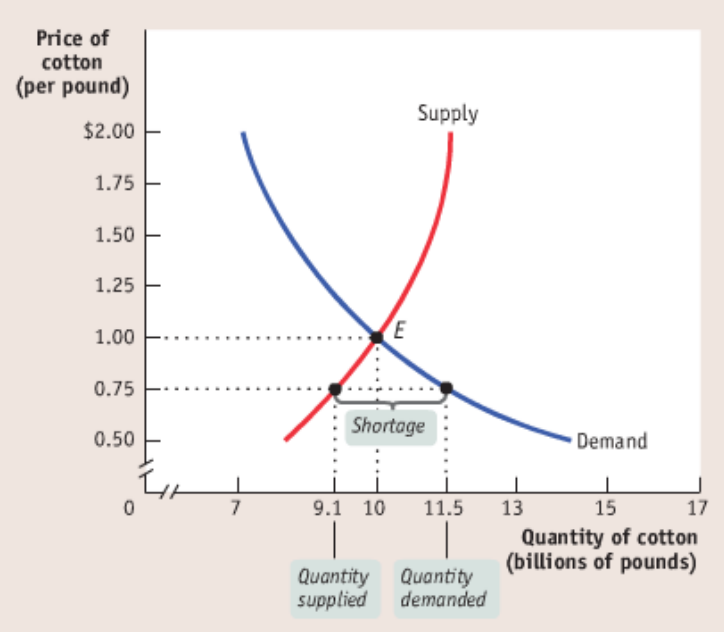
Ch. 3: Equilibrium con't

- Disequilibrium: surpluses
  - What happens if we aren't at the equilibrium P and Q?
  - Specifically, what happens if $P > P^e$?
    - This will result in a surplus of goods; that is, $Q_S > Q_D$
      - Sellers produced more of the good than consumers want to buy
      - Eventually, the price of the good must fall to sell these excess (surplus) units of output
        - ➔ move to equilibrium



Ch. 3: Equilibrium con't

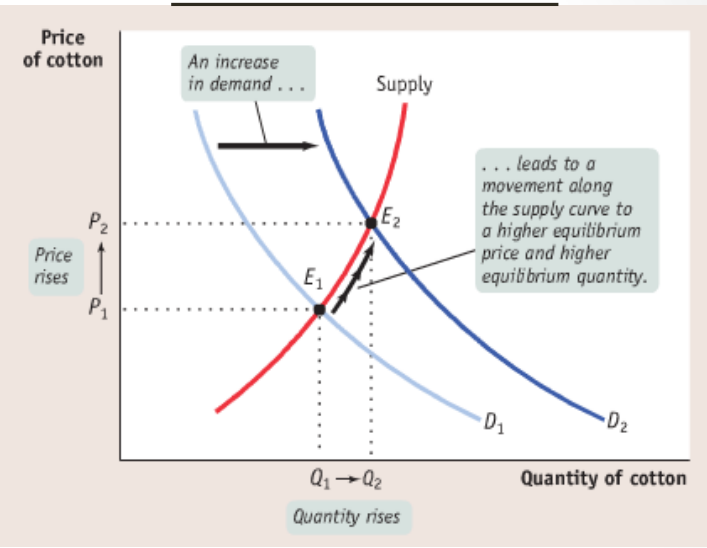
- Disequilibrium: shortages
  - What happens in $P < P^e$?
    - This will result in a shortage of goods; that is, $Q_S < Q_D$
      - Consumers want to buy more of the good than sellers produced
      - Eventually, the price must rise to eliminate the excess demand (and eliminate the shortage)
        - ➔ move back to equilibrium



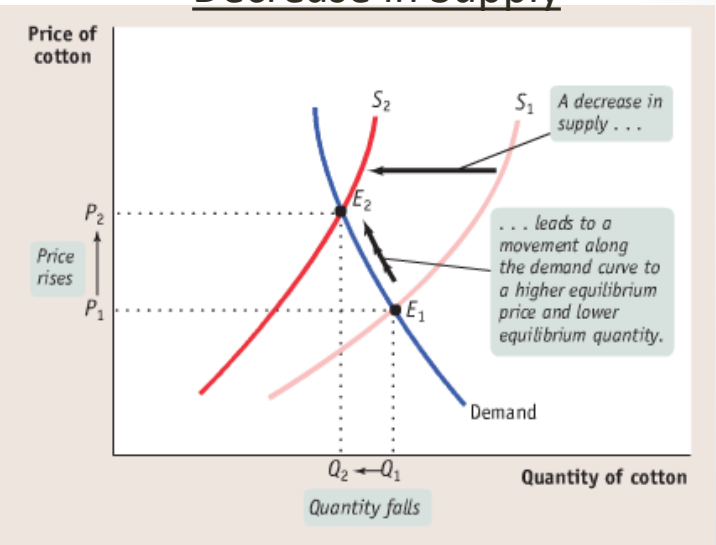
Ch. 3: Equilibrium con't

- The effect of a demand shift
  - Increase in demand
    - ↑D ➔ ↑P ↑Q
  - Decrease in demand
    - ↓D ➔ ↓P ↓Q
      - Price and quantity move in the same direction in response to a change in demand
- The effect of a supply shift
  - Increase in supply
    - ↑S ➔ ↓P ↑Q
  - Decrease in demand
    - ↓S ➔ ↑P ↓Q
      - Price and quantity move in the opposite direction in response to a change in supply

Increase in Demand



Decrease in Supply



Ch. 3: Equilibrium con't

- Simultaneous shifts
  - What happens to the equilibrium P and Q when both supply and demand shift at the same time?
    - Change in one of the variables (P or Q) will be ambiguous…
      - …but which one?
  - Ex: suppose supply decreases and demand increases at the same time
    - First, look at the effects of each change in isolation
      - Effect of ↑D: ↑P and ↑Q
      - Effect of ↓S: ↑P and ↓Q
    - Compare the effect of the demand shift and supply shift for price and quantity (i.e., compare the arrows!)
      - If the arrows point in opposite directions, then the change is ambiguous
        - Here, ↑D ➔↑Q, but ↓S➔↓Q
          - The two shifts have opposite effects on equilibrium quantity
          - End result on Q ➔ ? (need to know magnitudes of shifts to determine this)
      - If the arrows point in the same direction, then the change is certain
        - Here, ↑D ➔↑P and ↓S➔↑P
          - Both shifts act to increase equilibrium price
          - End result on P ➔ price increases

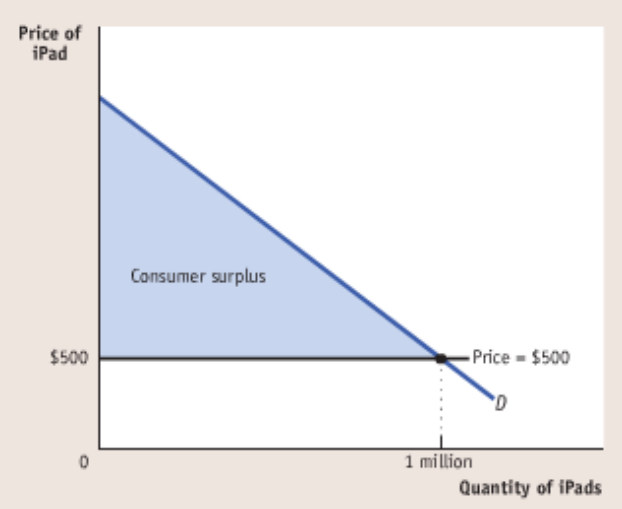
Chapter 4

- What are the most important concepts from chapter 4?
  - Consumer surplus
    - Individual consumer surplus
    - Total consumer surplus
    - Relation to price
  - Producer surplus
    - Individual producer surplus
    - Total producer surplus
    - Relation to price
  - Total surplus

Ch. 4: Consumer Surplus

- Individual consumer surplus
  - Net gain to an individual buyer from the purchase of a good
  - How to calculate

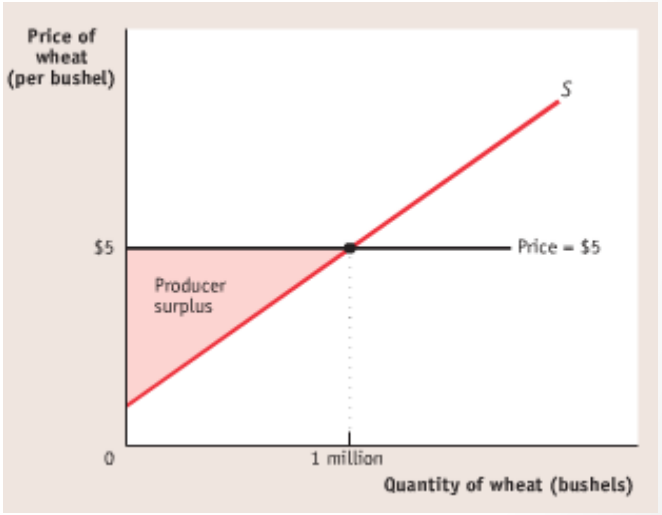
    Individual CS = willingness to pay – price paid
    - What is willingness to pay (WTP)? ➔ demand curve
- Total consumer surplus
  - Sum of all individual consumer surpluses
  - Graphically, it is the area below the demand curve and above the price line
- CS and price
  - All else equal, if the price of a good increases ➔ CS falls
  - If the price of a good decreases ➔ CS increases



Ch. 4: Producer Surplus

- Individual producer surplus
  - Net gain to an individual seller from selling a good
  - How to calculate

    Individual PS = price – cost
    - What is cost? ➔ supply curve
- Total producer surplus
  - The sum of all individual producer surpluses
  - Graphically, it is the area above the supply curve and below the price line
- PS and price
  - If the price of a good increases ➔ PS ↑
  - If the price of a good decreases ➔ PS ↓

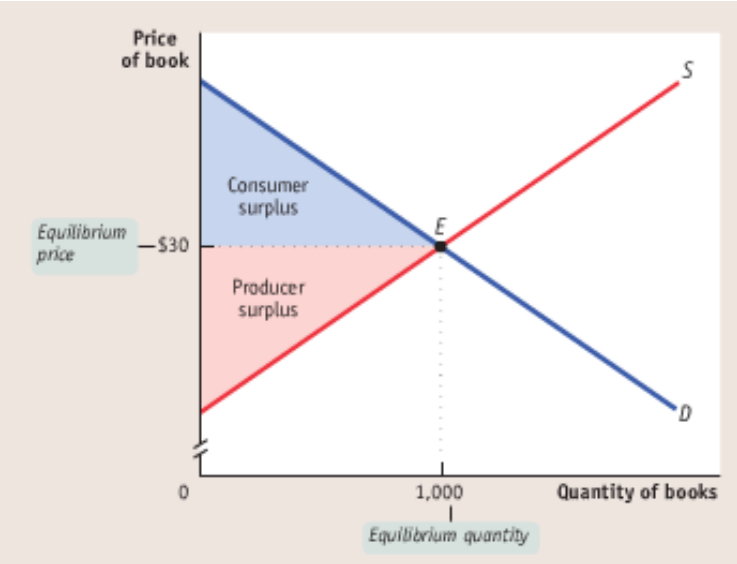


Ch. 4: Total Surplus

- Total surplus
  - Net gain to both consumers and producers from trading in a market
  - How to calculate

Total surplus = total CS + total PS

  - Total surplus is maximized at the market equilibrium
    - There is no way to reallocate consumption, sales or change the quantity transacted to increase surplus



Chapter 5

- What are the most important concepts from chapter 5?
  - Price ceiling
    - What is it?
    - When is it binding?
    - Effects of a binding price ceiling
    - Graphing a price ceiling
  - Price floor
    - What is it?
    - When is it binding?
    - Effects of a binding price floor
    - Graphing a price floor
  - Quotas
    - What is it?
    - Effects of a quota/graphing a quota
    - Quota rents
  - Concept of deadweight loss

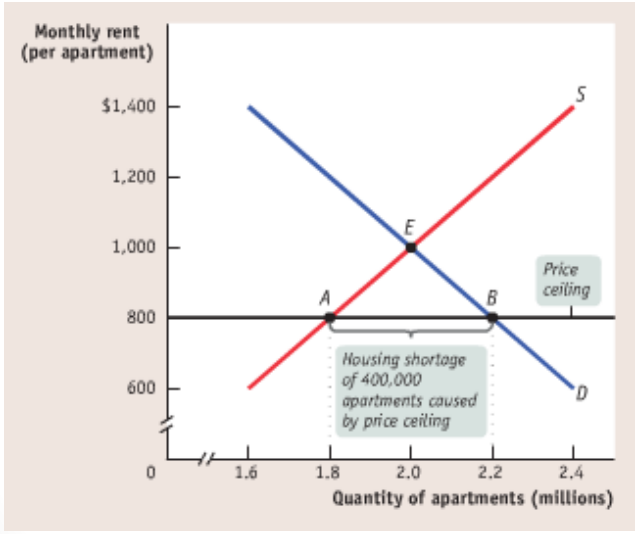
Ch. 5: Price Ceiling

- What is a price ceiling?
  - Maximum price that can be charged for a good or service
    - Ex: rent control apartments, gasoline in 1970's
- When is a price ceiling binding?
  - A price control is binding when it has an effect on the price of a good and the quantity transacted
  - Put another way, a price control is binding when it prevents the market equilibrium from occurring
    - Since a price ceiling is a maximum price, it will be binding when set below the market equilibrium price
  - If a price ceiling (max price) is set above the equilibrium price, the ceiling is said to be non-binding
    - Market equilibrium will occur

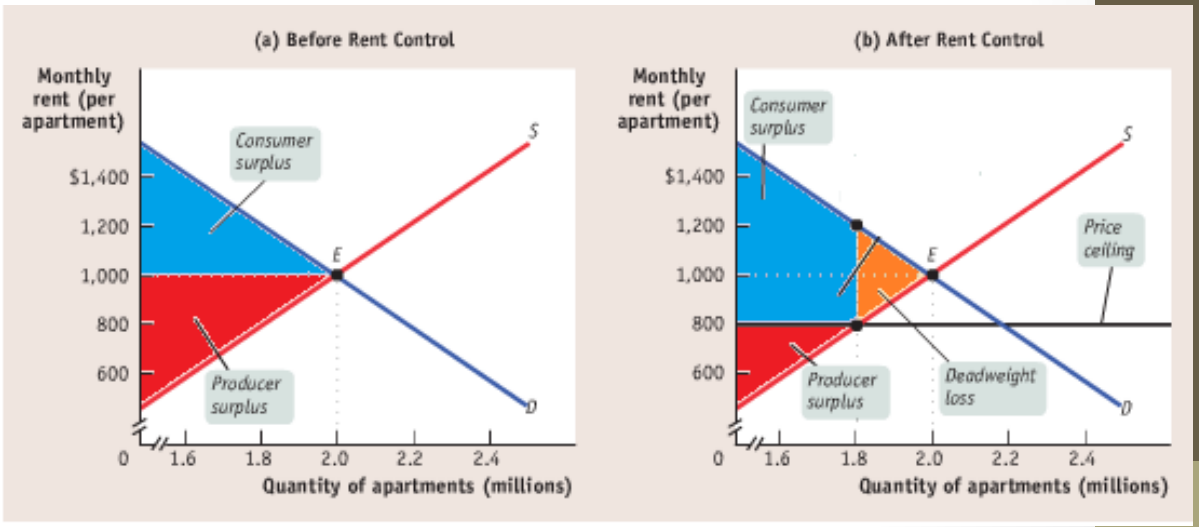
Ch. 5: Price Ceiling, con't

- Modeling a price ceiling
  - Binding price ceilings result in persistent shortages…
  - …and reduces total surplus

Shortages



Lower Surplus



Ch. 5: Price Ceiling, con't

- Inefficiencies caused by a binding price ceiling
  - Inefficiently low quantity ➔ deadweight loss (DWL)
    - DWL: loss in total surplus that occurs whenever a policy or action reduces the quantity transacted below the efficient market equilibrium
      - A binding price ceiling prevents mutually beneficial transactions from occurring ➔ DWL
    - Who wins? Who loses?
      - Consumers who can get the good win (consumer surplus increases)
      - Producers lose (producer surplus decreases)
  - Inefficient allocation to consumers
    - The consumers who value the good the most are not necessarily the ones who end up getting the good
      - Some may be willing to pay a higher price because they really need/want the good, but cannot legally offer a higher price because of the price ceiling

Ch. 5: Price Ceiling, con't

- Inefficiencies caused by a binding price ceiling
  - Wasted resources
    - People must spend time, money, and effort to deal with the shortages caused by price ceilings
      - Ex: waiting in line, time it takes to search for a good
  - Inefficiently low quality
    - Some consumers may be willing to pay more for a higher quality good…
    - …but since a higher price cannot be charged, producers will not have the incentive (higher revenues) to make a higher quality product
  - Black markets
    - Illegal markets may emerge where consumers pay an (illegal) price that is above the price ceiling

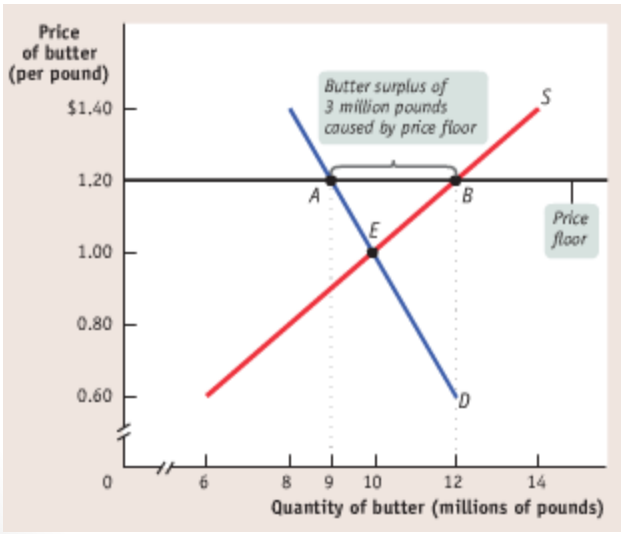
Ch. 5: Price Floor

- What is a price floor?
  - Minimum price that a good or service can be sold for
    - Ex: minimum wage, agricultural goods
- When is a price floor binding?
  - A price floor is binding when it has an effect on the price of a good and the quantity transacted
    - Prevents the market equilibrium from occurring
  - Since a price floor is a minimum price, it will be binding when set above the market equilibrium price
  - If the price floor (min price) is set below the market equilibrium price, the floor is said to be non-binding
    - Market equilibrium will occur

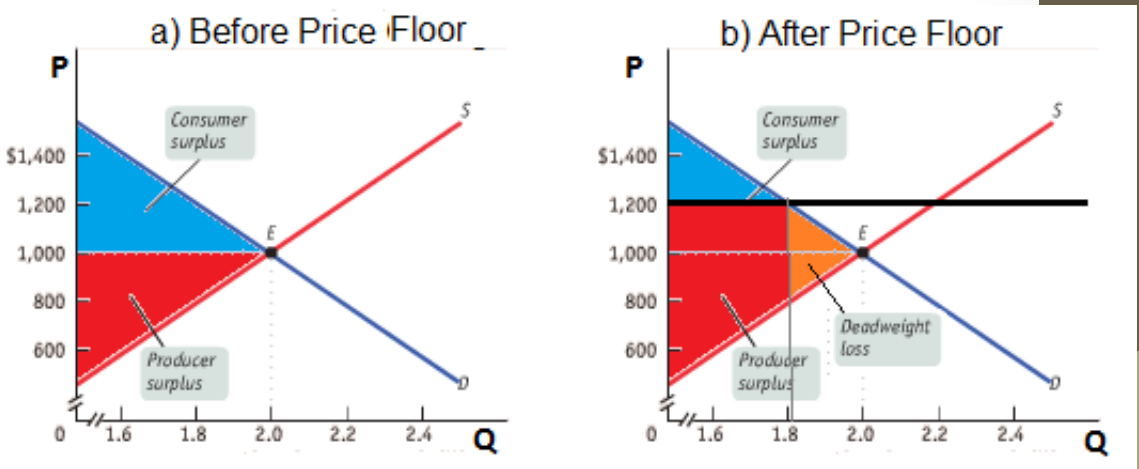
Ch. 5: Price Floor, con't

- Modeling a price floor
  - Binding price floors result in persistent surpluses…
  - …and reduces total surplus

Surpluses



Lower Surplus



Ch. 5: Price Floor, con't

- Inefficiencies caused by a binding price floor
  - Inefficiently low quantity ➔ deadweight loss
    - Mutually beneficial transactions are prevented from taking place
    - Total surplus is reduced, but there are winners and losers
      - In terms of surplus, producers who still sell the good are winners…
      - …but consumers lose out
  - Inefficient allocation of sales among producers
    - Lowest cost producers may not be the ones who end up selling the good
  - Wasted resources
    - Producers spend time, effort trying to sell their goods in the face of surpluses
    - In some cases, the government must buy up surplus goods to keep the price floor in place
      - Ex: butter mountain

Ch. 5: Price Floors, con't

- Inefficiencies caused by a binding price floor
  - Inefficiently high quality
    - Consumers may want to pay less for a lower quality good, but the price ceiling prevents them from being able to do so
    - Producers make very high quality goods to entice consumers to pay the high price imposed by the price floor
      - Ex: airlines prior to deregulation
  - Illegal activities/black markets
    - Illegal markets may emerge where an (illegal) price that is below the price floor

THE·PUB

The Pub flies again!

Of all North America's great watering holes, one is 35,000 feet above the rest. The Pub. After a long dry spell, we're putting it back in every Continental widebody flight in the continental United States.

The Pub. Where you can dive into something wet. Or extra-dry. And enjoy complimentary appetizers and good company.

The Pub. It isn't English. Just very Continental.

TECHNICAL SPECIFICATIONS OF THE PUB:

AREA: 308 sq. ft.
SEATING CAPACITY: Bar stools–2; Lounge Chairs–8.
SEATS: Genuine leather.
STANDING CAPACITY: The more, the merrier.
ELBOW ROOM: Ample.
BAR: 16.6 running ft.
BAR RAIL: Brass, 56 in. long, capacity 3 feet.

Continental Airlines

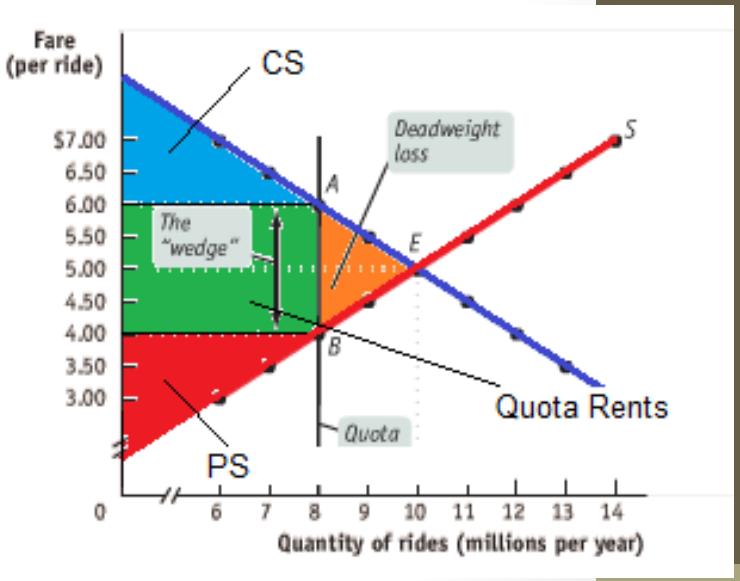
The Pub flies again!

Ch. 5: Quotas

- What is a quota?
  - A quota is a form of quantity control that sets an upper limit on the amount of a good that can be bought and sold
    - Ex: taxi cabs in NYC
  - Government limits quantity via licenses
    - Only producers with a license may serve the market
- A quota only has an effect when the quantity limit is below the market equilibrium
  - Quota limits the quantity of a good transacted ➔ deadweight loss

Ch. 5: Quotas, con't

- Quota Rent
  - Quotas create a "wedge" between the supply price and demand price
    - Demand price: price at which consumers will demand a given quantity
    - Supply price: price at which producers will supply a given quantity
  - The wedge is referred to as the "quota rent"
    - Benefit that accrues to a license-holder from ownership of the right to sell a good or service
      - Quota rent is how much a license-holder could rent their license for if they decided they didn't want to directly supply a good
    - How much will people pay to rent a license?
      - Receive the demand price as revenue…
      - …but cost of producing is equal to supply price
      - Net benefit (how much rent they are willing to pay) = demand price – supply price = "wedge"/quota rent



Ch. 6: Elasticity

- What are the most important concepts from chapter 6?
  - Price elasticity of demand
    - Definition and formulas
    - Interpretation (elastic, unit-elastic, inelastic)
      - The “extremes”: perfectly elastic, perfectly inelastic
    - Determinants
    - Total revenue and the price elasticity of demand
    - Elasticity along a linear demand curve
  - Income elasticity of demand
    - Definition and formulas
    - Interpretation (inferior and normal goods)
  - Cross-price elasticity of demand
    - Definition and formulas
    - Interpretation (substitutes and complements)
  - Price elasticity of supply
    - Definition and formulas
    - Interpretation
      - The “extremes”
    - Determinants

Ch. 6: Price Elasticity of Demand

- Definition
  - Price elasticity of demand (e_D) = %change in Q_D/% change in P
    - Intuitively, tells us how sensitive the quantity demanded of a good is to changes in the price of the good
- Formulas
  - Single-point method

$$e_D = \frac{\frac{\Delta Q_D}{initial\ Q_D}}{\frac{\Delta P}{initial\ P}} = \frac{\Delta Q_D}{\Delta P} \times \frac{initial\ P}{initial\ Q_D}$$

    - Where ΔX = new X – initial X, for some variable X
  - Midpoint method

$$e_D = \frac{\frac{\Delta Q_D}{average\ Q_D}}{\frac{\Delta P}{average\ P}} = \frac{\Delta Q_D}{\Delta P} \times \frac{average\ P}{average\ Q_D}$$

    - Where average X = (new X + initial X)/2, for some variable X

Ch. 6: Price Elasticity of Demand, con't

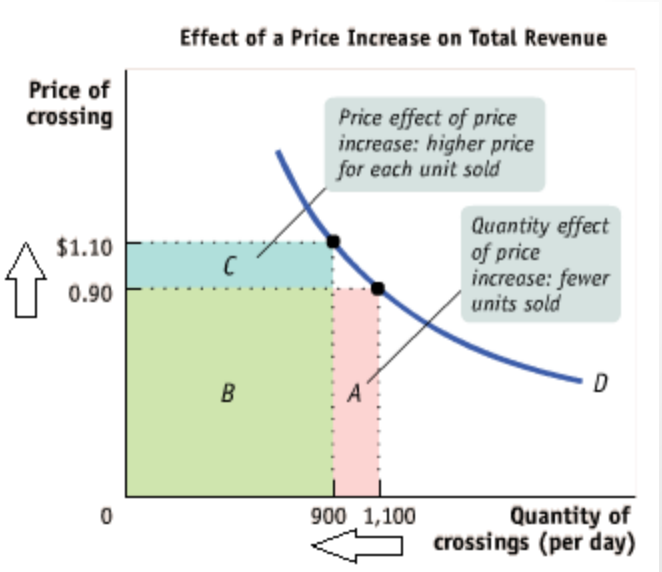
- Interpretation
  - If $e_D < 1$, then demand is inelastic
    - $\%\Delta Q_D < \%\Delta P$ ➔ qty. demanded is unresponsive relative to price changes
  - If $e_D = 1$, then demand is unit-elastic
    - $\%\Delta Q_D = \%\Delta P$ ➔ demand responds 1-for-1 with price changes
  - If $e_D > 1$, then demand is elastic
    - $\%\Delta Q_D > \%\Delta P$ ➔ qty. demanded is responsive relative to price changes
  - NOTE: the elasticity of demand is ALWAYS negative (because of the law of demand), but it is conventional to drop to negative sign
- The "extremes"
  - Perfectly elastic demand: $e_D = \infty$
    - Horizontal demand curve
      - Change price at all and quantity demanded goes to zero
  - Perfectly inelastic demand curve: $e_D = 0$
    - Vertical demand curve
      - Can pick any price and quantity demanded is unchanged

Ch. 6: Price Elasticity of Demand, con't

- Determinants
  - Availability of close substitutes
    - More substitutes ➔ more elastic demand (less inelastic demand)
      - Intuition: if a good has more close substitutes, a consumer can easily switch goods in response to a price change ➔ more responsive demand
  - Whether the good is a necessity or luxury
    - Necessity ➔ more inelastic demand (less elastic)
    - Luxury ➔ more elastic demand (less inelastic)
      - Intuition: if a good is a necessity (ex: gas, food, etc.), demand will not respond much to a change in price
  - Share of income spent on the good
    - Large share ➔ more elastic demand (less inelastic)
    - Small share ➔ more inelastic demand (less elastic)
      - Intuition: much more aware of price changes for goods that take up a large share of income
  - Time elapsed since price change
    - More time ➔ more elastic demand (less inelastic)
      - Intuition: the more time that passes, the more time consumers have to find good substitutes for the good, change consumption habits, etc.

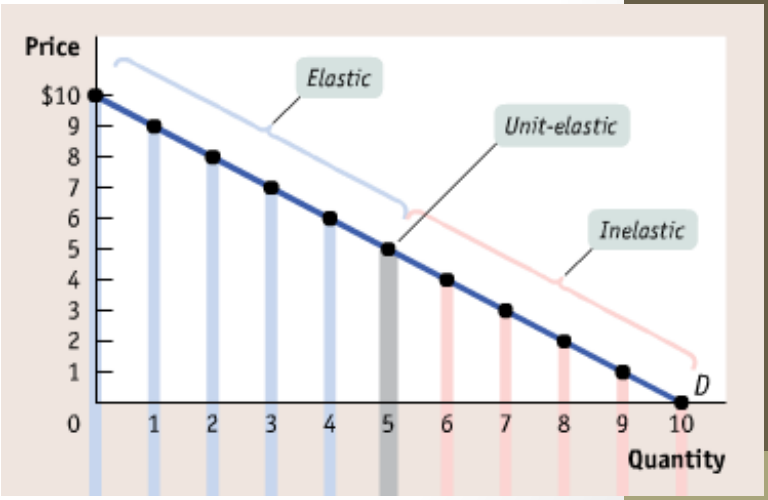
Ch. 6: Price Elasticity of Demand, con't

- Total revenue
  - What is revenue?
    - How much money a producer brings in from selling a good (not accounting for costs)
    - Total revenue (TR) = P x Q
  - An increase in price, has two effects on total revenue
    - Price effect: at a higher price, each unit sells for more ➔ increases TR
    - Quantity effect: per the law of demand, a higher price means fewer units are sold ➔ decreases TR
  - What happens to TR after a price increase? Which effect is stronger?
    - Depends on the price elasticity of demand
    - If demand is inelastic:
      - ↑P ➔ ↑TR; ↓P ➔ ↓TR
        - Price effect is stronger than the quantity effect
    - If demand is elastic:
      - ↑P ➔ ↓TR; ↓P ➔ ↑TR
        - Price effect is weaker than the quantity effect
    - If demand is unit-elastic:
      - ↑P has no effect on TR
        - Price effect cancels out quantity effect



Ch. 6: Price Elasticity of Demand, con't

- The price elasticity of demand along a linear demand curve
  - Along a linear (straight-line) demand curve, e_D changes depending on what portion of the line we are on
    - At the midpoint of the demand curve, demand is unit-elastic
    - On the portion above the midpoint, demand is elastic
    - On the portion below the midpoint, demand is inelastic
      - Proof
- In general: elasticities and slope
  - The steeper a curve, the more inelastic demand is
    - As curve gets steeper and steeper, it moves towards the perfectly inelastic demand case (vertical demand curve)
  - Flatter curve ➔ more elastic
    - As a curve gets flatter and flatter, it moves towards the perfect elastic demand case (horizontal demand curve)



Ch. 6: Other Elasticities

- Income elasticity of demand (e_I)
  - Definition: $\%\Delta Q_D / \%\Delta$income
    - Measures how responsive demand is to changes in income
    - Know how to calculate with both the single point and midpoint methods
  - Interpretation
    - $e_I > 0$ ➔ normal good
      - Income goes up (positive $\%\Delta I$) ➔ increase in demand (positive $\%\Delta Q_D$)
    - $e_I < 0$ ➔ inferior good
      - Income goes up (positive $\%\Delta I$) ➔ decrease in demand (negative $\%\Delta Q_D$)
- Cross-price elasticity of demand (e_X)
  - Definition: $\%\Delta P_A / \%\Delta Q_B$, where A and B are two goods
    - Measures how responsive demand for good B is to a change in the price of good A
    - Know how to calculate with both the single point and midpoint methods
  - Interpretation
    - $e_X > 0$ ➔ substitute goods
      - P_A goes up (positive $\%\Delta P_A$) ➔ increase in demand for good B(positive $\%\Delta Q_B$)
    - $e_X < 0$ ➔ complementary goods
      - P_A goes up (positive $\%\Delta P_A$) ➔ decrease in demand for good B(negative $\%\Delta Q_B$)

Ch. 6: Elasticity of Supply

- Definition
  - Price elasticity of supply (e_S) = $\%\Delta Q_S / \%\Delta P$
    - Intuitively, e_S tells us how sensitive the quantity supplied of a good is to changes in the price of the good
- Formulas
  - As with the other elasticities, you can calculate e_S using
    - The single point method
    - Or the midpoint method
- Interpretation
  - If $e_S > 1$, then supply is elastic
    - $\%\Delta Q_S > \%\Delta P$ ➔ qty. supplied is responsive relative to price changes
  - If $e_S = 1$, then supply is unit-elastic
    - $\%\Delta Q_S = \%\Delta P$ ➔ qty. supplied changes 1-for-1 with price
  - If $e_S < 1$, then supply is inelastic
    - $\%\Delta Q_S < \%\Delta P$ ➔ qty. supplied is unresponsive relative to price changes

Ch. 6: Elasticity of Supply, con't

- The "extremes"
  - Perfectly inelastic supply ➔ $e_S = 0$
    - Vertical supply curve
    - Can pick any price and quantity supplied does not change
  - Perfectly elastic supply ➔ $e_S = \infty$
    - Horizontal supply curve
    - Change price at all and quantity supplied goes to zero
- Determinants
  - Availability of inputs
    - Readily available inputs ➔ more elastic supply (less inelastic)
      - Intuition: can easily ramp up (or reduce) production in response to a price change
  - Time
    - More time ➔ more elastic supply (less inelastic)
      - Intuition: more time to respond to price changes and change production

Ch. 7: Taxes

- What are the most important concepts from this chapter?
  - Modeling an excise tax
  - Tax incidences
    - Definition
    - Relation to elasticities of demand and supply
  - Tax revenue
    - Relation to elasticities of demand and supply
  - Deadweight loss
    - Relation to elasticities of demand and supply

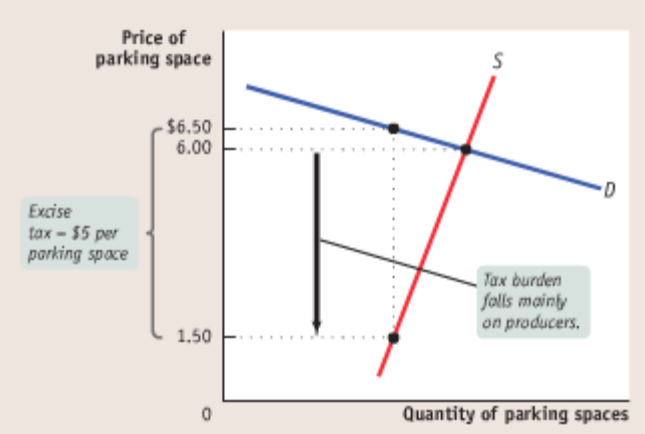
Ch. 7: Modeling an Excise Tax

- What is an excise tax?
  - A flat tax that is charged on each unit of a good or service sold
- How to model an excise tax
  - When the tax is levied on the supplier…
    - Supply curve shifts back (to the left) by the amount of the tax
  - When the tax is levied on the consumer…
    - Demand curve shifts back (to the left) by the amount of the tax
  - Regardless of whom the tax is levied on, the tax will drive a wedge between the demand price and supply price
    - The vertical distance of the wedge is equal to the amount of the excise tax

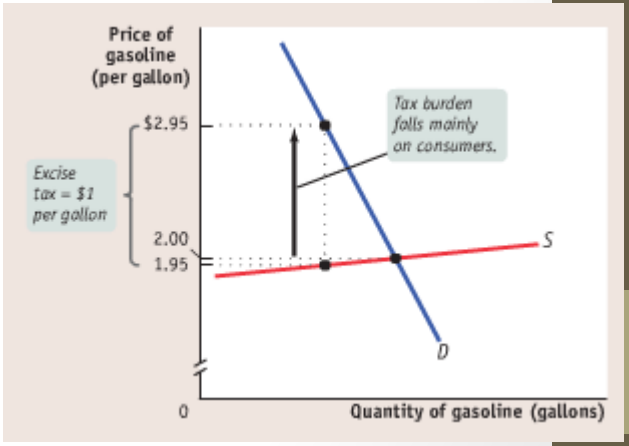
Ch. 7: Tax Incidence

- What is tax incidence?
  - The amount of an excise tax that certain groups (in our case, suppliers versus consumers) pay
    - Tells us about who bears the burden of a tax
  - Incidence on
    - Consumers = demand price – market eq. price
    - Producers = market eq. price – supply price
- The group that the tax is levied on is NOT necessarily the one that bears the burden of a tax
  - The group with the relatively more inelastic (less elastic) curve will bear the burden of a tax
    - Graphically, group with the relatively steeper curve will have a higher tax incidence

Producers Bear The Burden

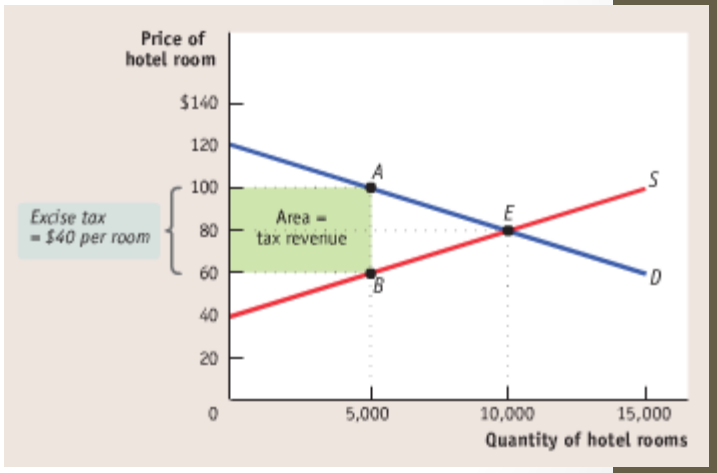


Consumers Bear The Burden



Ch. 7: Tax Revenue

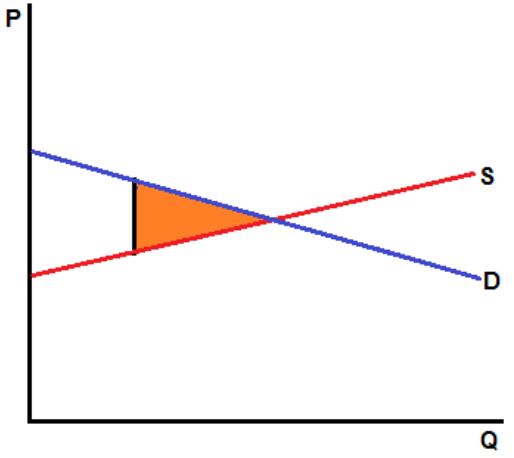
- What is tax revenue?
  - How much money the government collects from an excise tax
  - Tax revenue = tax rate * quantity transacted under the tax
    - Graphically, tax revenue is the area of the rectangle whose height is the tax wedge between the supply and demand curves and whose width is the quantity transacted under the tax
- Tax revenue and the elasticity of demand
  - The effect on tax revenue from a change on the tax rate has two opposing effects (much like the price and quantity effects from ch. 6)
    - Increase in tax rate ➔ increases tax revenue
    - Increase in tax rate ➔ lowers quantity transacted ➔ lowers tax rev.
  - An increase in the tax rate will
    - Increase tax revenue when demand is inelastic
    - Decrease tax revenue when demand is elastic



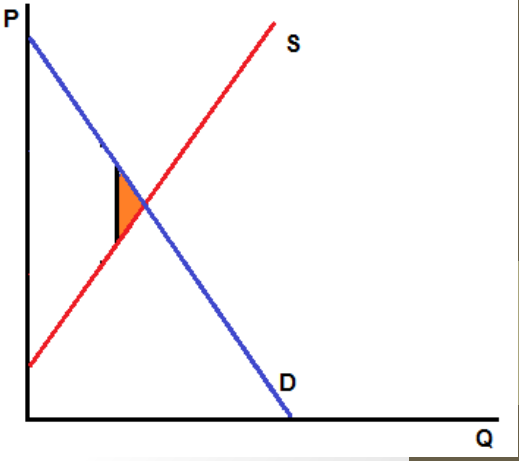
Ch. 7: Taxes and Deadweight Loss

- Excise taxes cause deadweight loss
  - Taxes cause the quantity transacted to go below the market equilibrium
    - Mutually beneficial transactions are not taking place (tax makes them cease to be mutually beneficial)
  - Size of the deadweight loss depends on elasticities of supply and demand: for a <u>given tax rate</u>
    - Relatively more elastic supply and demand ➔ larger deadweight loss
    - Relatively more inelastic supply and demand ➔ smaller deadweight loss
  - Intuition?
    - DWL arises because a tax reduces the quantity transacted
      - Increases price consumers pay (demand price) and decrease price producers receive (supply price)
      - How much the quantity transacted is reduced by depends on how sensitive consumers and producers are to price changes
        - Elastic ➔ relatively responsive ➔ larger change in Q ➔ larger DWL
        - Inelastic ➔ relative unresponsive ➔ smaller change in Q ➔ smaller DWL

<u>Elastic Curves</u>



<u>Inelastic Curves</u>



Ch. 8: International Trade

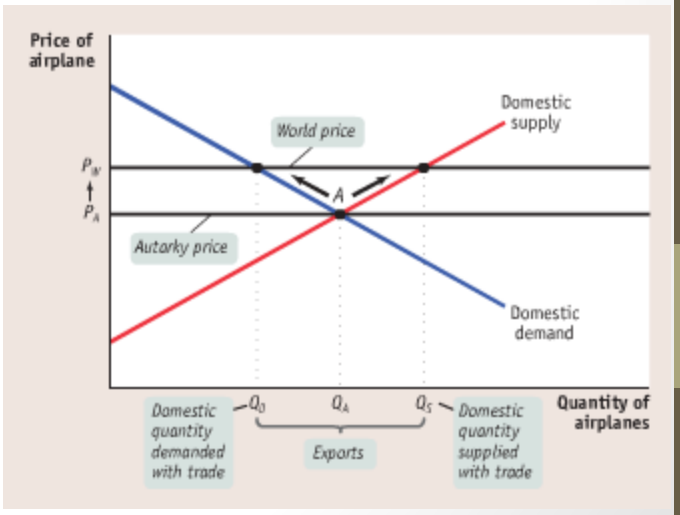
- What are the most important concepts from this chapter?
  - Comparative advantage
    - Definition
    - Basis of gains from trade
    - Sources
  - Modeling trade with supply and demand/surplus analysis
    - The case of importing a good
    - The case of exporting a good
    - The effect of a tariff or quota

Ch. 8: Comparative Advantage

- Some terminology
  - Export: domestically made goods and services that are sold to other countries
  - Import: foreign-made goods and services purchased from other countries
  - Autarky: a state of no trade
- Comparative advantage ➔ the basis of gains from trade
  - Definition: to have the lowest opportunity cost of producing a good/service
  - If two countries specialize in the good for which they have a comparative advantage and trade with each other, they will be better off
    - Will be able to consume more with specialization and trade than with autarky
- Sources of comparative advantage
  - Differences in climate
  - Differences in factor endowments
  - Differences in technology

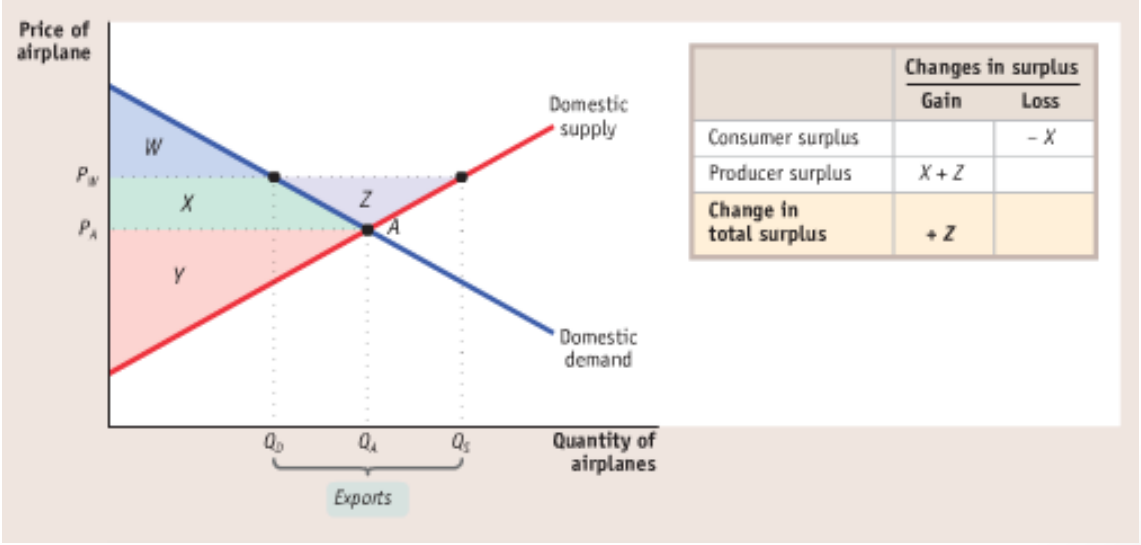
Ch. 8: Modeling Exports

- When will a country export a good?
  - When the world price, P^W, is <u>greater</u> than the autarky price, P^A (price without trade)
    - Exporting is only desirable for producers if they can get a higher price on the world market compared to the domestic market
  - We assume that domestic producers can sell as much of the good at the world price
    - Country's export decisions do not affect P^W
- Going from autarky to exporting
  - <u>Price rises</u> from autarky price (given intersection of domestic supply and domestic demand) to the world price
  - Increase in price to P^W ➔
    - ↓ the domestic Q_D;↑ the domestic Q_S
    - Now $Q_S > Q_D$
      - Difference between qty. supplied and qty. demanded is exported to other countries
      - Exports = $Q_S - Q_D$



Ch. 8: Modeling Exports, con't

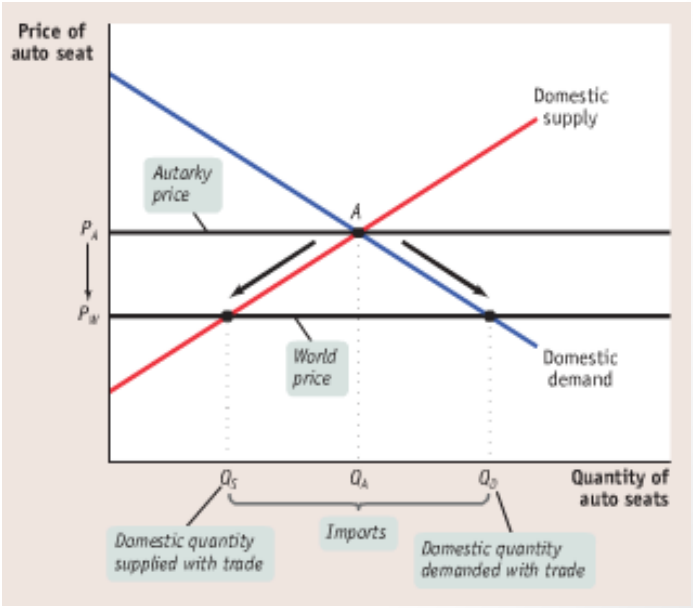
- Surplus analysis
  - How does consumer surplus, producer surplus and total surplus change from autarky to a case of exporting?
    - For domestic producers: receiving a higher price and selling more
      - Producer surplus increases
    - For domestic consumers: paying a higher price and buying less
      - Consumer surplus decreases…
      - …but total surplus will still increase!



	Changes in surplus	
	Gain	Loss
Consumer surplus		− X
Producer surplus	X + Z	
Change in total surplus	+ Z	

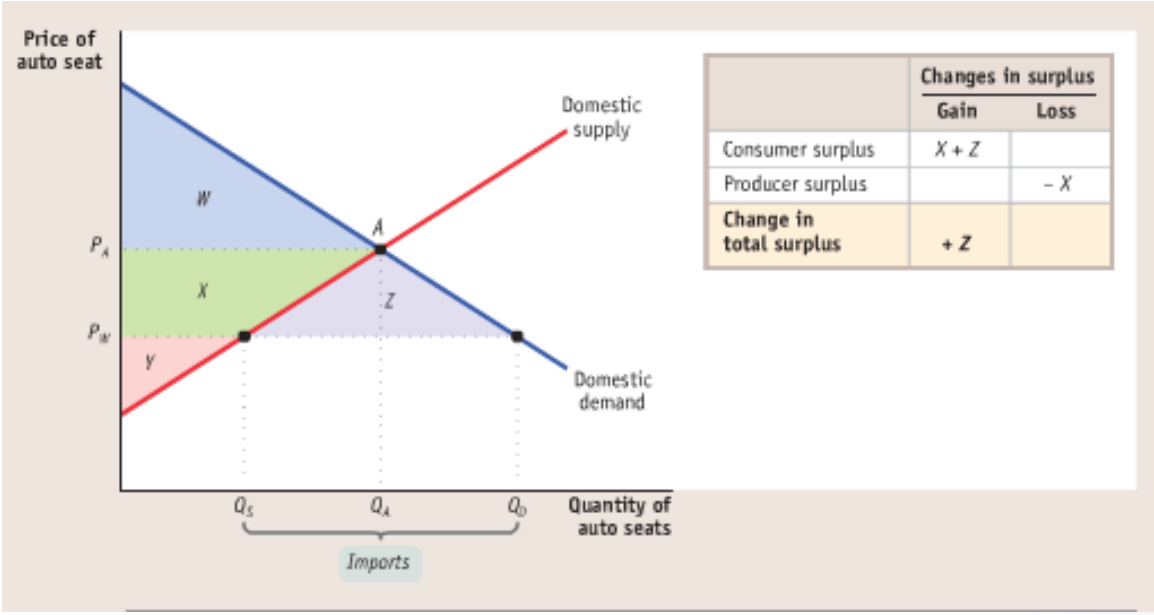
Ch. 8: Modeling Imports

- When will a country import a good?
  - When the world price, P^W, is less than the autarky price, P^A
    - Buying a good from abroad is only attractive to consumers if it costs less than the domestically produced alternative
  - We assume that domestic consumers can buy as much of the good as they want at the world price
    - Country's consumption decisions do not affect P^W
- Going from autarky to importing
  - Price falls from the PA to PW
  - Decrease in price to PW ➔
    - ↑in domestic Q_D; ↓ in domestic Q_S
    - Now $Q_D > Q_S$
      - The difference is made up by imports from abroad
      - Imports = Q_D-Q_S



Ch. 8: Modeling Imports, con't

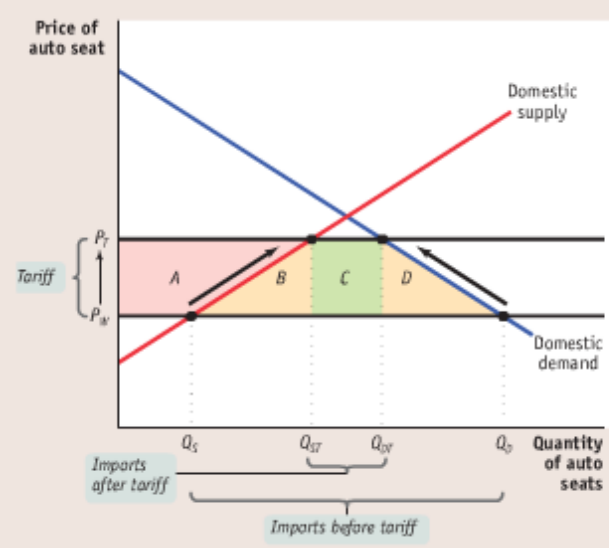
- Surplus analysis
  - How does consumer surplus, producer surplus and total surplus change from autarky to a case of importing?
    - For domestic consumers: paying a lower price and buying more
      - Consumer surplus increases
    - For domestic producers: receiving a lower price and selling less
      - Producer surplus decreases…
      - …but total surplus will still increase!



	Changes in surplus	
	Gain	Loss
Consumer surplus	X + Z	
Producer surplus		– X
Change in total surplus	**+ Z**	

Ch. 8: Modeling a Tariff

- What is a tariff?
  - Tariff: excise tax levied only on imported foreign goods
  - A policy of free trade is one free of tariffs and other policies aimed at influencing the amount of imports and exports
- Under free trade, price will be equal to the world price…
  - …but this is not the case with a tariff!
    - Tariff pushes up the price of goods to $P^T = P^W$ + tariff
  - Higher price ➔
    - Fewer imports ($\uparrow Q_S; \downarrow Q_D$)
    - Higher producer surplus
    - Tax revenue
    - Lower consumer surplus
  - Net effect of tariff ➔ lower total surplus
    - Tariffs create DWL



	Changes in surplus	
	Gain	Loss
Consumer surplus		−(A + B + C + D)
Producer surplus	A	
Government revenue	C	
Change in total surplus		−(B + D)

Ch. 8: Import Quota

- What is an import quota?
  - Direct limit on the quantity of an imported good/service
- What is the effect of an import quota?
  - Almost the exact same effect as a tariff!
  - Reduce the amount of imports via a quota
    - ➔ pushes up price
    - Higher price ➔ ↑PS ↓CS and ↓TS
- Difference between a tariff and a quota
  - There is no tax revenue under a quota
  - Instead, what would have been tax revenue becomes quota rents
    - These rents almost always accrue to foreigners ➔ quota rents are an additional DWL from the domestic point of view
    - DWL under a quota is larger than the DWL under a tariff (for a given level of imports)