Supply and Demand: Price and Quantity Determination in Competitive Markets
Starring

- Demand
- Supply
- Equilibrium and Disequilibrium
Featuring

- The Law of Demand
- $D = D(P\text{ENTE})$
- The Tendency of Supply
- $S = S(p\text{ent})$
- Equilibrium/Disequilibrium
In Four Parts

Demand
Supply
Equilibrium/Disequilibrium
(current show)
Changes in Equilibrium
What Is Equilibrium?

- It is a situation that exists in a market when the plans of buyers are consistent with the plans of sellers.
- Or, at the prevailing price, quantity demanded equals the quantity supplied.
- Another, wider, view of equilibrium is when the action taken leads to consequences that are expected, there is no incentive to change.
Notes About the Concept of Equilibrium

- First, there should be no prior judgement about whether a given equilibrium is good or bad.
- Second, markets not in equilibrium are in Disequilibrium.
  - Shortages, or
  - Surpluses
The Ethics of Equilibrium

- William Lynch’s (1742-1820) early American tribunals dispatched swift results with bodies soon coming to rest (an equilibrium) but most have rejected this as a good form of justice.

- Competitive equilibrium, under certain conditions, is efficient.
  - Given scarcity, efficiency is a desirable social objective.

- It is the consequences of equilibrium we have to judge, not the state itself.
Many Processes Are Not in Equilibrium

- The one constant is change
- In economics change is purposeful and may often be modeled successfully
- Equilibrium results from a given change, an end state implied by these models
- Many economic processes tend toward equilibrium
Disequilibrium

- Usually markets are tending toward equilibrium driven by the forces of supply and demand
  - Prices are used as a rationing mechanism
- Changing demand or supply conditions create incentives for buyers and sellers to change their behavior
- Disequilibrium is characterized by
  - Excess demand—a shortage, or
  - Excess supply—a surplus
- Price controls (ceilings or floors) lead to shortages or surpluses
Shortage

- Shortage - when $Q_D > Q_S$ at current market price
  - Amount of shortage = $Q_D - Q_S$

- Note - it is *not* correct to say demand exceeds supply, but rather quantity demanded exceeds quantity supplied
Surplus

- Surplus - when $Q_S > Q_D$ at current market price
  
  Amount of surplus = $Q_S - Q_D$

- Note - it is not correct to say supply exceeds demand, but rather that quantity supplied exceeds quantity demanded
There are two types of price controls - price ceilings and price floors
Price Ceilings

- **Price ceiling** - sets a maximum price that is allowed by law
- Result of price ceiling
  - Stay at a permanent shortage situation
- Note that a price ceiling *can* be any price the government chooses. It is, however only effective if it is below the equilibrium price
- Examples include maximum rents for apartments and UMR parking permits
Price Floors

- **Price floor** - sets a minimum price that is allowed by law

- **Result of price floor**
  - Stay at a permanent surplus situation

- **Note that a price floor can be any price the government chooses. It is, however only effective if it is above the equilibrium price**

- **Examples include agriculture price supports and the minimum wage**
Equilibrium in the Market

- Equilibrium - where quantity demanded equals quantity supplied
- Equilibrium price ($P^*$) - price where equilibrium occurs
- At $P^*$ there is no incentive for buyers or sellers to change their behavior. Their plans are consistent.
Equilibrium, Graphically
Equilibrium in the Market

What occurs at equilibrium

- **Demand side** - those who get the good are those *willing and able* to pay the $P^*$
- **Supply side** - only those sellers which are able to produce at or below the cost of $P^*$ will remain in business
- **Prices ration** available supply to those who value the good highest
Tendency Toward Equilibrium in the Market

- Note that if the price is below $P^*$ then there will be a shortage causing price to rise.
- If the price is above $P^*$ then there will be a surplus causing price to fall.
- Self interest generates these price changes.
An Example--UMR Student Parking

- It is easiest to see the tendency toward equilibrium by looking at a good that is not rationed by price--student parking.
- First, ask whether demand and supply curves are typical.
- Demand--is there an inverse relationship between the number of parking spots wanted by UMR students and the price of the slots? Clearly YES.
- Upward sloping supply? Again yes, the more the administration could extract from students, the less important it would be for them to provide parking for staff and faculty.
UMR Student Parking Market in Equilibrium

Use the hypothetical $P^*$ and $Q^*$ as benchmarks. Where are actual $P$ and $Q$ relative to $P^*$ and $Q^*$?
Where Are Actual P and Q Relative to P* and Q*?

- If you said “less than,” go to the head of the class.
- Administration policy regarding allocation of scarce parking slots creates a shortage.
- In effect there is a price ceiling imposed by UMR.
Shortage

- There are a lot more students wanting to buy parking permits than UMR is willing to sell.
- Why? Because at the current price, the quantity demanded is quite high. But UMR does not want to sell that many at such a low price.
Shortage Shown Graphically

\[ P_a = \text{actual price} \]
\[ Q_a = \text{actual quantity sold} \]

Note the quantity supplied is the quantity sold: \[ Q_S = Q_a \]
When Price Is Not Used As a Rationing Device Shortages Tend to Persist

- Students may act politically
  - Letters to *the miner*
  - Through student government
- Students may exit the market--transfer to another school
- These are explicit reactions. An advantage of price rationing is it is done implicitly
How Price Rationing Eliminates Shortages

Buyers who expected to buy are unsatisfied.

Sellers find they have more buyers than supply.
Shortage Eliminated Through Price Increases

- Sellers find little resistance to price increases
- Buyers can’t get all they want and are willing to pay more
- \( P \) will increase
  - Quantity demanded will fall
  - Quantity supplied will increase
- The process continues until an equilibrium is established by price rationing
How Price Rationing Eliminates Shortages

Quantity demanded falls as price rises
Quantity supplied increases as price rises
Price continues to rise until:

\[ Q_{D} = Q_{S} \]
The Role of Prices

- Convey information
  - When gasoline prices fell below $1.00 in Rolla, it told us something about gas--use more

- Rationing device
  - The price is what determines who can have the good
Student Parking

- Not rationed by price but by some type of administrative decision
  - We use queuing (first come--first served)
- Other common rationing devices
  - Alphabetical
  - The government decides based on need
  - Height
  - Gender
  - Age
  - Location
  - Rank or position
Advantages/disadvantages of Queuing

- Queuing typically favors those who value time less than those that value time more
- Queuing leads to an outcome that is inefficient
  - Some students who get parking permits value them less than some students who do not get permits
Surplus, Revisited

- Surplus - when $Q_S > Q_D$ at current market price
  
  Amount of surplus = $Q_S - Q_D$

- Note - it is *not* correct to say supply exceeds demand, but rather that quantity supplied exceeds quantity demanded
Surplus Shown Graphically

- \( P_a = \) actual price
- \( Q_a = \) actual quantity sold

Note the actual quantity sold equals the quantity demanded

\( Q_a = Q_D \)
Surplus Through Legislated Price Floors

- Price floor - sets a minimum price that is allowed by law
- Result of price floor
  - No tendency for price to play its rationing function
- Note that a price floor can be set at any price, but is only effective if it is above the equilibrium price
Price Floor Examples

- **Agriculture support prices**
  - Price of wheat supported at 80% of parity
    - 100% parity: setting the price of farm commodities so they have the same purchasing power they had in the golden age of agriculture 1910-1914
    - FAIR act of 1996

- **Minimum wage legislation**
  - The conventional story
  - Renewed debate
Agriculture Price Supports

- **FAIR**: federal agricultural improvement and reform act, signed by president Clinton in 1996
  - **FAIR**: link to the U.S. Dept. Of agriculture to find out more
  - The act moves to replace price supports with direct subsidy of farm income phased out over time
One policy has taxpayers buying the surplus, $Q_s - Q_a$, paying $P_a \times (Q_s - Q_a)$.
Deficiency payments are (P_t - P_a) x Q_a

\[ \text{Deficiency payments} = (P_t - P_a) \times Q_a \]
Inefficiencies of Pre FAIR Act Agriculture Policy (Gov. Purchases)

- Government purchases of surplus
  - Perpetual surpluses
  - Price sends the wrong signal to farmers
    - Consumers buy only amount they value at target price, but farmers produce amount up to where their marginal cost equal the target price
    - The surplus costs more to produce than its worth measured by consumers willingness to pay
- Consumers and taxpayers lose more than farmers gain
Inefficiencies of Pre FAIR Act Agriculture Policy (Deficiency Payments)

- Government deficiency payments
  - Perpetual overproduction but no surpluses
  - Price sends the wrong signal to farmers
    - Consumers buy all that is brought to market, but marginal cost (= target price) exceeds the value consumers put on the good
    - On the margin the good costs more to produce than its worth
- Taxpayers lose more than consumers and farmers gain
Price Floors in the Unskilled Labor Market--the Minimum Wage

- When we look at the labor market it is similar to other supply and demand diagrams except for the labels:
  - $L$ - quantity of workers per period
  - $W$ - wages (the price we pay workers)
- It is also different because the suppliers of labor are person, not firms and the demanders of labor are firms.
Minimum Wage Legislation--the Conventional Story

The graph shows the relationship between wage and the number of workers. The wage is depicted on the y-axis, and the number of workers is depicted on the x-axis. The graph includes a wage floor, $W_{floor}$, and a wage rate, $W^*$, at which the market clears. The amount of unemployed workers increases as the wage rate increases above the wage floor. The points $L_D$, $L^*$, and $L_S$ represent different levels of employment corresponding to different wage rates.
Winners and Losers of the Minimum Wage--the Conventional Story

- Benefit - those who get higher wages
- Losers - those who can’t find jobs at the higher wage
- Losers - firms who must pay higher wages and consumers who have to pay higher prices due to the higher costs of the firm
- Inefficient since the sum of the loses exceeds the sum of the benefits
The Minimum Wage--a New Debate

- Any inefficiency that may be created is small
- Equity objectives are furthered by having a livable minimum wage
- Due to market power possessed by firms hiring minimum wage workers, an increase in the wage may increase employment
- Increased wages increase labor productivity by giving workers a stake in their effort
Demand and Supply of Unskilled Labor Are Steep

- Firms that hire unskilled labor are not very sensitive to small changes in the minimum wage, so the quantity demanded will not change much.
- Unskilled persons supply of labor are not very sensitive to changes in their wage.
- Thus any unemployment caused by increases in the minimum wage will be small.
Unskilled Labor Market

not this

but this

Amount of Unemployed Workers

Wage

$w^*$

$w_{\text{floor}}$

D

# of Workers/t

Amount of Unemployed Workers

Wage

$w^*$

$w_{\text{floor}}$

D

# of Workers/t
Equity Vs. Efficiency

- Equity objectives are furthered by having a livable minimum wage.
- This trade-off is in society's interest as we seek to do something about the growing inequality of incomes in the United States.
Monopsony Power

- Due to market power possessed by firms hiring minimum wage workers, an increase in the wage may increase employment
- You will discuss this in chapter 9
Efficiency Wage

- Increased wages increase labor productivity by giving workers a stake in their effort
- Increased productivity lowers cost offsetting, at least partly the higher wages due to increases in the minimum wage
How Price Rationing Eliminates Surpluses

Sellers who expected to sell are unsatisfied

Buyers find they have more sellers to choose from
How Price Rationing Eliminates Surpluses

Quantity demanded increases as price falls
Quantity supplied decreases as price falls
Price continues to fall until:

\[ Q_D = Q_S \]
Surplus Eliminated Through Price Decreases

- Buyers find little resistance to lower price offers
- Sellers can't sell all they want and are willing to accept less
- P will fall
  - Quantity demanded will increase
  - Quantity supplied will decrease
  - The process continues until an equilibrium is established by price rationing
The End