SUPPLY AND DEMAND

Executive summary
- The demand curve represents the quantity buyers are willing to purchase at each price, holding constant factors other than price that might affect demand.
- The supply curve represents the quantity sellers are willing to part with at each price, holding constant factors other than price.
- Market forces lead toward an equilibrium where supply and demand cross.
- Changes in factors other than price lead to shifts in demand and/or supply curves, hence changes in the equilibrium.
- If the demand (supply) curve shifts, the impact is determined by the slope of the supply (demand) curve.

Exercises
For each of the following events, shift the appropriate supply and demand curves [markets in brackets]. What is the impact on price and output? Is the impact primarily on price or output?
- Fall in the NASDAQ [housing market in Palo Alto]
- Wireless bandwidth breakthrough [wireless web]
- More liberal Medicare [prescription drugs]

Suggestion: make up your own examples.

Application: rent regulation
- In NYC (and some other cities), rents are capped below their equilibrium level.
- What is the impact of rent regulation on market equilibrium?
- Who gains and who loses from rent controls?
- What are the goals of rent regulation? Are there any alternatives to achieve the same goals?

Tricky ones
- Microprocessors (CPUs):
  - Who's the consumer? How is demand determined?
- Textbooks
  - Who's the consumer? How price sensitive?
- Prescription drugs
  - Who's the customer? How price sensitive?
  - What if they're OTC?
- “The Sopranos” (cable TV show)
  - What's the demand? What's the revenue model?
Takeaways

- The supply and demand diagram is a framework for understanding markets.
- Inputs: characteristics of buyers and sellers (demand and supply curves).
- The quantitative impact of “shocks” depends on the sensitivity of buyers and sellers to changes in price (slopes of demand and supply curves).
- Market forces are often felt even when prices are “controlled” by regulation.

Executive summary

- In some markets, demand is sensitive to price, in others insensitive.
- We measure sensitivity with the “elasticity of demand”: the ratio of the percent change in quantity to the percent change in price along the demand curve.
- Elasticities are negative, since demand falls as price rises.
- The elasticity controls the change in revenue as price changes (if elasticity < -1, revenue rises when price falls).
- Consumer surplus is the value generated for consumers above what they pay (the area between the demand curve and the price).

Classifying demand

- Elasticity (of demand)
  - Define elasticity as a property of the demand curve:
    \[ e = \frac{dq}{dp} \left( \frac{p}{q} \right) \]
    \[ = \frac{(dq/q)}{(dp/p)} \]
    \[ = \frac{(?q/q)}{(?p/p)} \]
    \[ = \% \text{ ? in Quantity} / \% \text{ ? in Price} \]
  - Features:
    - Not the same as the slope
    - Independent of units
    - Note: \( (\frac{?q}{q} - e \frac{?p}{p}) \)

Examples

<table>
<thead>
<tr>
<th>Product</th>
<th>Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarettes</td>
<td>-0.5</td>
</tr>
<tr>
<td>US luxury cars in US</td>
<td>-1.9</td>
</tr>
<tr>
<td>Foreign luxury cars in US</td>
<td>-2.8</td>
</tr>
</tbody>
</table>
**Impact on revenue**

- Revenue = p x q
- We can show:
  \[ \text{\% in Revenue} = \text{\% in Price} \times (1 + e) \]
  \[ = \text{\% in Price} \times (1 + e) \]
- If price falls:
  - Revenue rises if e < -1
  - Revenue falls if e > -1
  - Revenue is unchanged if e = -1.

**Revenue examples**

- Cigarettes: if price falls 1%, revenue falls 0.5%
- US luxury cars: if price falls 1%, revenue rises 0.9%
- Foreign luxury cars: if price falls 1%, revenue falls 1.8%
- What about Monsanto’s Roundup?

**Consumer surplus**

- Surplus generated for consumers by market transactions
- Difference between price and “willingness to pay” (demand curve).
- Source of additional revenue in “price discrimination” schemes
- “Value in use” is consumer surplus + market value
- Consumer surplus and value-in-use are important measures of the efficiency of an economic system (eg, compare competition with monopoly, impact of taxes/tariffs).

**Consumer surplus diagram**

**Example: water and diamonds**

- Paradox of water and diamonds:
  - market value of diamonds is greater (say), but
  - value in use is greater for water

**Takeaways**

- The elasticity (of demand) is a useful measure of how sensitive buyers are to changes in price (more later).
- Consumer surplus measures the surplus value generated for consumers by market transactions (critical input to rationale for anti-trust/competition policy).