Utility and Consumer Demand

Ch. 6 – We'll come back to Ch. 5 later

Utility

- Something's usefulness
- Or, the amount of satisfaction you get from an item
- You can create a monetary value to describe satisfaction
- Some would say that everything has its price. Everything!?

Law of DMU

- Total Utility
- Diminishing marginal utility
  - The more consumption the smaller the increase in total utility
- IOW: The more I have the less useful it becomes, the less satisfied I am

Measuring Utility

- Monetary units aren't constant
- Arbitrary #'s work well
- Marginal Utility
- Examples in your book
  - Water(free good), Pizza/Videos

Scarcity is our lot

- B/C things cost money we have to choose, but we will want to maximize total utility!
- We can do this if where MU/$ is equal for all items in want.
  - MU/P=MU/P

Income Effect

- All this relates to QD
- If price falls for an item I will have left over money, making me feel wealthier and thus allowing me to increase Total Utility by purchasing more of a product. Which product I buy depends on which one offers more MU

Examples

- Pizza/Videos - $8/$4 – same MU
  - Graph demand from MU
  - Combination of products that max. TU with a $20 budget.
- Student Practice (1st part of Assign. #4)
  - Bsk. Of Wings/Bsk. of Fries
  - MU for wings starts higher.
  - $5 for each - $25 budget

Consumer Surplus

- The amount of money b/w your max. price and actual price.
- Most products will give you a consumer a surplus
- This works for individuals and for entire markets.

Elasticity

A measure of Responsiveness: How much of an effect is generated by the cause?

Price Elasticity of D

- This measures the responsiveness of consumers to a change in price (QD)
- When the P changes how will that effect how much I purchase?
- PEd=%change QD/%change P

Test #1: The Formula Test

- **Generalize the price elasticity formula**
  - **If the price drops from p to p', other things constant, the quantity demanded increases from q to q'**
  - **The change in price can be represented as Δp and the change in quantity as Δq**

$$E_D = \frac{\frac{\Delta q}{(q+q')/2}}{\frac{\Delta p}{(p+p')/2}}$$

Price Elasticity of Demand

- **Because the average quantity and average price are used as a base for computing percent change, the same elasticity results whether going from the higher price to the lower price or the other way around**
- **Since the focus is on the percent change, we need not be concerned with how output or price is measured**

Price Elasticity of Demand

- Elasticity expresses a relationship between two amounts
  - The percent change in quantity demanded
  - The percent change in price
- Because the law of demand states that price and quantity demanded are inversely related, the change in price and the change in quantity demanded have opposite signs ➔ the price elasticity of demand has a negative sign

Price Elasticity of Demand

- Since constantly referring to elasticity as a negative number gets cumbersome, we will discuss the price elasticity of demand as an absolute value ➔ positive number
- For example, absolute value of the elasticity for tacos computed earlier will be referred to as 0.5 rather than –0.5

Example

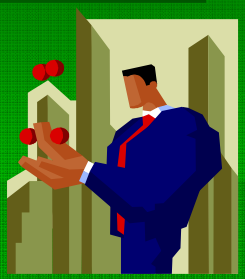
- Milk increases from $2 to $2.20
- QD falls from 100m to 95m
- What is Ed?
- -.5

PE_D is simply a measure of Consumer Response

- QD is affected by price.
- Elasticity is a measure of how much QD is affected by price.
- The more sensitive the change in QD, the more elastic it is.
- If a product is not very sensitive, then it is said to be inelastic.

Shortcuts

- If Ed is > 1, D is E
- If Ed is = 1, D is Unit Elastic
- If Ed is < 1, D is inelastic



Test #2: The four tailed test

Question	Elastic	Inelastic
Large % of Budget?	YES	NO
Time to delay purchase?	YES	NO
Need or want?	WANT	NEED
Are there many substitutes?	YES	NO

Substitutes and their effects on elasticity

- Demand tends to be elastic when there are many substitutes, and visa-versa. (Trash)

Trash Example

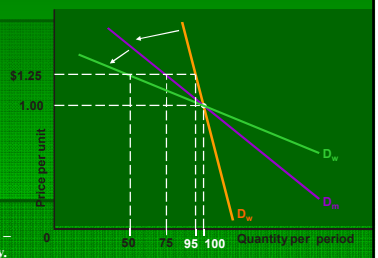
- Charlottesville, VA tries to slow trash production.
  - Raises prices for collection.
- There are few substitutes for trash collection.
  - Demand for that is inelastic
- However, found that it does increase recycling/illegal dumping

Exhibit 5: Demand Becomes More Elastic over Time

Initial price = $1.00
D_w = the demand curve one week after the price change
D_m = one month after
D_y = one year after.

Suppose the price now increases to $1.25. The more time for consumers to respond to price increase, the greater the reduction in quantity demanded.

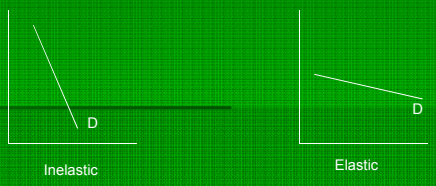
D_w shows that one week after the price increase, the quantity demanded has not changed much – in this case from 100 to 95 per day. Conversely, after one month, the quantity demanded has declined to 75, and after one year to 50 per day.



Note that among these demand curves and over the range starting from the point where the demand curves intersect, the flatter the demand curve, the more price elastic the demand.

Test # 3: The Quick and Dirty

There is a relationship b/w slope and elasticity. When measuring slope by %change, it is the Inverse of the elasticity.



Test #4: The Total Revenue (TR) Test

- These relationships can be tied together by looking at a linear demand curve
- A linear demand curve is simply a straight-line demand curve
- Exhibit 2 presents these ideas
- Unit Elastic Point is max. TR!!!

Exhibit 2: Demand, Price Elasticity and Total Revenue

Panel (a) shows the linear demand curve and panel (b) shows the total revenue generated by each price-quantity combination along the demand curve.

Since the demand curve is linear, its slope is constant → a given decrease in price always causes the same unit increase in quantity demanded.

The price elasticity of demand is greater on the higher-price end of the demand curve than on the lower-price end.

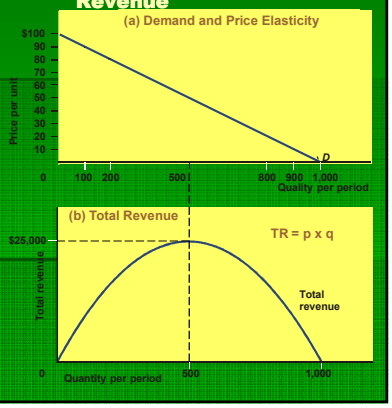


Exhibit 2: Demand, Price Elasticity and Total Revenue

Consider a movement from point *a* to point *b* on the demand curve. The 100-unit increase in quantity demanded is a percent change of 100/150 = 0.67 while the $10 drop in price is a percent change of 10/85 = 12% → the price elasticity of demand here is 5.6

Between points *d* and e on the lower end, the 100-unit quantity increase is a percent change of 100/850 = 12% and the $10 price decrease is a percent decline of 10/15 = 67% → a price elasticity of 0.2

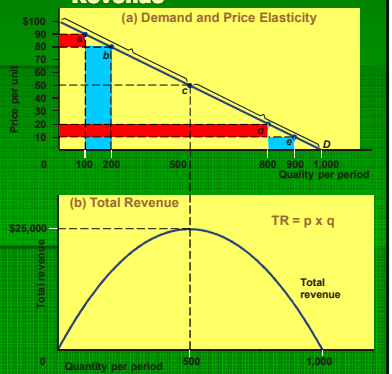


Exhibit 2: Demand, Price Elasticity and Total Revenue

Demand becomes less elastic as we move down the curve. Halfway down, the elasticity equals 1.0. Since we have a linear demand curve, the slope is constant but the elasticity varies → slope is not the same thing as elasticity.

Where demand is elastic, a decrease in price will increase total revenue because *the gain in revenue from selling more units* exceeds *the loss in revenue from selling at the lower price.*

Where demand is inelastic, a price decrease reduces total revenue because *the gain in revenue from selling more units* is less than *the loss in revenue at the lower price.*

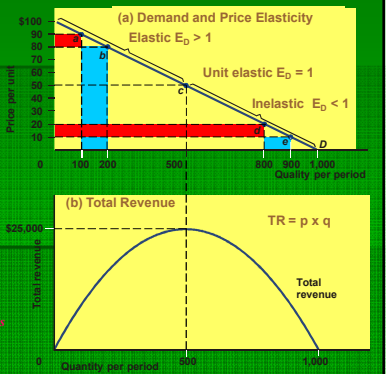
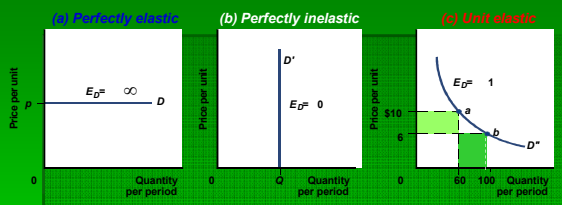


Exhibit 3: Constant Elasticity Demand Curves



Demand curve in (a) indicates consumers will demand all that is offered at the given price, p. If the price rises above p, quantity demanded drops to zero → *perfectly elastic demand curve*.

Demand curve in (b) is vertical, quantity demanded does not vary when the price changes → no matter how high the price, consumers will purchase the same quantity → *perfectly inelastic demand curve*.

(c) shows a *unit-elastic demand curve* where any percent change in price results in an identical offsetting percent change in quantity demanded.

Exhibit 6: Selected Price Elasticities of Demand

Product	Short Run	Long Run
Cigarettes (among adults)	—	0.4
Electricity (residential)	0.1	1.9
Air travel	0.1	2.4
Medical care and hospitalization	0.3	0.9
Gasoline	0.4	1.5
Milk	0.4	—
Fish (cod)	0.5	—
Wine	0.7	1.2
Movies	0.9	3.7
Natural gas (residential)	1.4	2.1
Automobiles	1.9	2.2
Chevrolets	—	4.0

Using Ed

- Predicting changes in QD
  - Book examples: Ed= (%ΔQD) / (%ΔP)
  - EX. 1.:College tuition: $4,000 - $4,400
  - PED for college tuition is 1.40
  - EX. 2.: Ed of young drinkers 1.30 and then there is an %20 increase in beer prices due to tax

Price Elasticity of Supply

- Prices are signals to both sides of the market about the relative scarcity of products
- High prices discourage consumption but encourage production
- The *price elasticity of supply* measures how responsive producers are to a price change

Price Elasticity of Supply

- The *price elasticity of supply* equals the percent change in quantity supplied divided by the percent change in price
- Since the higher price usually results in an increased quantity supplied, the percent change in price and the percent change in quantity supplied move in the same direction → the price elasticity of supply is usually a positive number
- Exhibit 7 depicts a typical upward-sloping supply curve

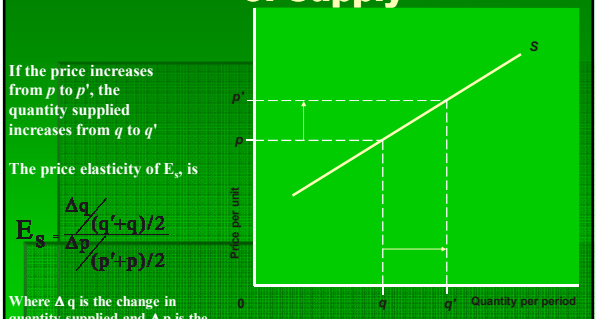
Exhibit 7: Price Elasticity of Supply

If the price increases from p to p', the quantity supplied increases from q to q'

The price elasticity of E_s is

$$E_s = \frac{\Delta q / (q'+q)/2}{\Delta p / (p'+p)/2}$$

Where Δq is the change in quantity supplied and Δp is the change in price.



Determinants

- The elasticity of supply indicates how responsive producers are to a change in price
- Their responsiveness depends on how easy it is to alter output when price changes
  - If the cost of supplying additional units rises sharply as output expands, then a higher price will elicit little increase in quantity supplied
  - But if the marginal cost rises slowly as output expands, the lure of a higher price will prompt a large increase in output

Length of Time

- Just as demand becomes more elastic over time as consumers adjust to price changes, supply also becomes more elastic over time as producers adjust to price changes
- The longer the time period under consideration, the more able producers are to adjust to changes in relative prices
- Exhibit 9 illustrates this

Price-Change Formula

- You can predict price change when you have a ΔD or a ΔS and you know both the Es and the Ed
- $\%\Delta P = \frac{\Delta D \text{ or } \Delta S}{(Es + Ed)}$

Income Elasticity of Demand

- The *income elasticity of demand* measures how responsive demand is to a change in income
- Measures the percent change in demand divided by the percent change in income
- Categories
  - Goods with income elasticities less than zero are called *inferior goods* → demand declines when income increases

Income Elasticity of Demand

- *Normal* goods have income elasticities greater than zero → demand increases when income increases
  - Normal goods with income elasticities greater than zero but less than 1 are called *income inelastic goods* → demand increases but not as much as does income
  - Goods with income elasticity greater than 1 are called *income elastic* → demand not only increases when income increases but increases by more than does income
- Exhibit 10 presents some income elasticity estimates for various goods and services

Exhibit 10: Selected Income Elasticities of Demand

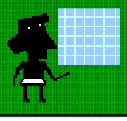
Product	Income Elasticity	Product	Income Elasticity
Private education	2.46	Physicians' services	0.75
Automobiles	2.45	Coca-Cola	0.68
Wine	2.45	Beef	0.62
Owner-occupied housing	1.49	Food	0.51
Furniture	1.48	Coffee	0.51
Dental service	1.42	Cigarettes	0.50
Restaurant meals	1.40	Gasoline and oil	0.48
Shoes	1.10	Rental housing	0.43
Chicken	1.06	Beer	0.27
Spirits ("hard" liquor)	1.02	Pork	0.18
Clothing	0.92	Flour	–0.36

Cross Price Elasticity

- -By Kiefer O'Connor, Vince Blake and Leah Chapman
- How a change in the price (P) of one product will affect the demand (D) for another.
  - Ex:
    - Price of coke with lemon changes demand of original coke…


BOOK Definition

- The percentage change in the demand of one good divided by the percentage change in the price of another good.



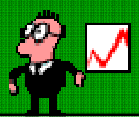
← Another cool video

EQUATION

- % ΔD / % ΔP
- The numerical value can either be positive, negative, or zero.
  - Positive= substitutes
  - Negative= compliments
  - Zero= unrelated

Substitute

- Increase in the price of Coke leads to an increase in the demand of Pepsi.
  - Coke prices goes from $3 to $5
  - Demand of Pepsi goes from 2 twelve packs to 5 twelve packs



← A cartoon version of Mr. Frank, with less hair and a weird nose…

Compliment

- Increase in the price of gas leads to a decrease in the demand of tires.
  - Less people driving= less need to buy tires.

Oh look, there he is again

Don't pay attention to the sweet rims just the tires

UNRELATED

- Most of the goods to be compared selected at random are unrelated, so they have no cross-price elasticity of demand.

← Unrelated picture

Quiz

1. Change in Price of a product affects the change in _____ for another.
   - A. Elasticity
   - B. Price
   - C. Demand
   - D. Quality
2. When the numerical value is positive, the products are _____.
   - A. Unrelated
   - B. Compliment
   - C. Substitutes

3. To find Cross-Price Elasticity of Demand, you Divide % Δ D by _____.
   - A. % Δ QD
   - B. % Δ Q
   - C. % Δ P
   - D. % Δ KO
4. If the Cross-Price Elasticity of Demand is Unrelated, the value is _____.
   - A. Positive
   - B. Negative
   - C. Zero
   - D. False

5. In order to find the Cross-Price Elasticity of Demand you must have price and _____.
   - A. True
   - B. False
   - C. Answer Not Here

END