Lecture 3(ii)

Announcements

Office hours today at usual time:
Wed 1:30-3:25

Office is 4-135 Hanson

Lecture

1. Elasticity special cases:
   perfectly inelastic
   perfectly elastic

2. Reading 2: Apply to midpoint formula to estimate short-run elasticity for gasoline

3. Estimate of long-run: compare Europe with US

Get units out by using percentages

Price elasticity of Demand (midpoint method)
(ugliest formula we see, all semster!)

$$= e^D$$

$$-\frac{\%\Delta Q^D}{\%\Delta P}$$

$$= -\frac{\dfrac{Q_2 - Q_1}{\frac{1}{2}(Q_2 + Q_1)}}{\dfrac{P_2 - P_1}{\frac{1}{2}(P_2 + P_1)}}$$

Perfectly Inelastic Demand

$e^D = 0$

Who is this man?

Hint: Something to do with demand elasticity for a rare drug.

Perfectly Inelastic Supply

$e^S = 0$

Examples:

Perfectly Elastic Demand
e^D = infinity

Examples:

In Between Cases

(1) When $e^D < 1$ we say
Demand is Inelastic

Total Spending = P*Q increases as P increases.

(2) When $e^D > 1$ we say
Demand is Elastic

Total Spending = P*Q decreases as P increases.

(3) When $e^D = 1$ we say
Demand is Unit Elastic

Apply midpoint formula to example

Gasoline Market in the US
June 2007 and June 2008

Time Period	Per Capita Daily Consumption of Motor Gasoline	Average Price Per Gallon in Dollars
June 2007	1.32	3.05
June 2008	1.26	4.07
Δ	–0.06	1.02
Average of Both Years	1.29	3.56
%Δ	–0.05	0.28

So

$$e^D = -\frac{\%\Delta Q^D}{\%\Delta P} = \frac{.05}{.28} = .16$$

Short-Run Demand is Inelastic

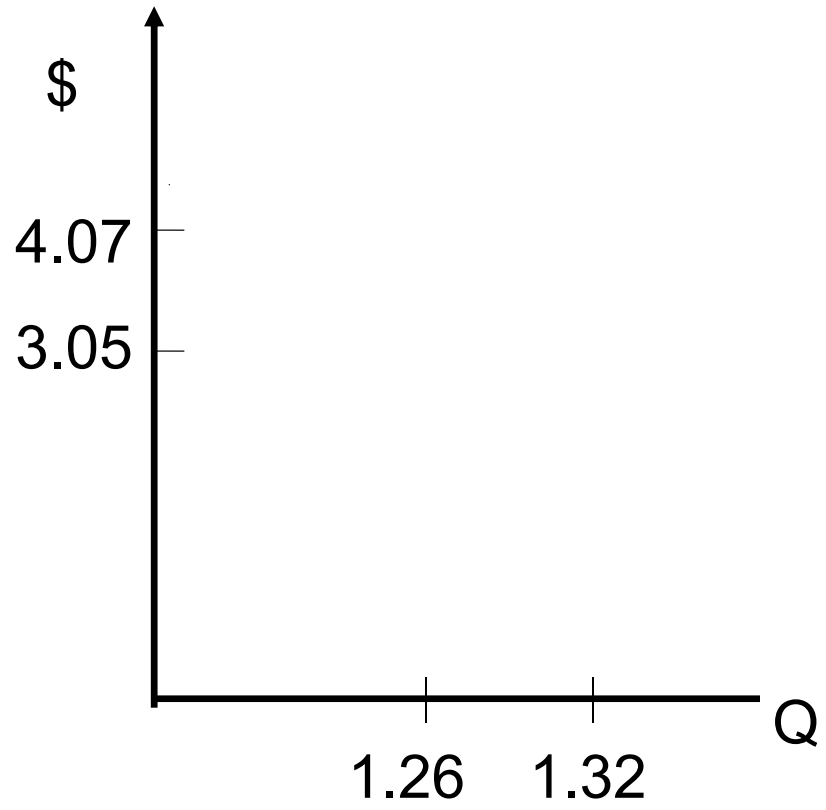
As price goes up,

Total Spending = P*Q increases.

Let's get back and talk about this back-of-the-envelope calculation.

When estimating demand elasticity, need to hold fixed other determinants of demand isolate impact of change in price.

Also need to take into account supply. Some of you might be thinking: "Why is what we calculated the elasticity of demand and not the elasticity of supply?"
Great Question!



Make Case:

Supply curve for **US market** did shift

US Demand Curve Did Not Shift (So movement along US Demand)

Have to argue that the determinants of demand (the things that make it shift) remained unchanged.

We can to more (with more work, more data, and more advanced econometric techniques).

But what we are doing here is sensible for a simple classroom example.

Let's go through the determinants of demand

1) Tastes of consumers

2) Number of consumers

3) Income

4) Prices of substitutes and complements.

With the help of the shale oil in North Dakota (and other new unconventional sources of oil), we have a chance to see how things go the other direction.

Let's look at a map of the wells in the Bakken

https://www.dmr.nd.gov/ndgs/bakken/GI%20SERIES/GI%20_149_Apr2015_36.pdf

Let's compare 2014 and 2015

Gasoline Market in the US
June 2014 and June 2015

Time Period	Per Capita Daily Consumption of Motor Gasoline	Average Price Per Gallon in Dollars
June 2014	1.18	3.70
June 2015	1.25	2.78
Δ	0.07	–0.92
Average of Both Years	1.22	3.24
%Δ	0.06	–0.28

$$e^D = -\frac{\%\Delta Q^D}{\%\Delta P} = \frac{.06}{.28} = .20$$

Pretty good stuff for a back of the envelope calculation!

Elasticity we have estimated is a short-run elasticity

Consumers have not had much time to make a response.

Over a long period of time, is gas is significantly higher in price:

- Consumers will buy different cars
- Might live different places
- Society might change laws, like lower the speed limit.

For the long-run elasticity, need to compare cases where prices have been different a long time.

Enter Reading 2

"Fuel Consumption in Europe and the U.S."

Europe has long taxed gasoline. What we pay here at the pump for the gas, wouldn't pay the tax in the Europe.

The tax here is (per gallon):

Federal	18.4 cents
State (MN)	28.5
Total (MN)	46.9

(24 cents more in CA)

Country	Average Price $US per Gallon	Consumption Per Capita Gallons Per Day
United States	2.80	1.29
Selected Countries in Europe		
Norway	7.00*	.30
United Kingdom	6.90	.28
Germany	6.88	.25
France	6.37	.15
Spain	5.13	.15
Italy	6.50	.21
Some Other Countries		
Japan	4.49	.33
Mexico	2.45	.29
China	2.29	.04

Country	Per Capita GDP ($1,000)
United States	45.5
Selected Countries in Europe	
Norway	51.9
United Kingdom	35.7
Germany	34.3
France	32.7
Spain	31.6
Italy	30.4
Some Other Countries	
Japan	33.6
Mexico	14.0
China	5.3

Table 3: Price and Per Capita Quantity Consumed of Gasoline
The United States and Norway in 2007

Time Period	Per Capita Daily Consumption of Motor Gasoline	Average Price Per Gallon in Dollars
United States	1.29	2.80
Norway	.30	7.00
Δ	-.99	4.20
Average of Both Years	.80	4.90
%Δ	-1.24	.86

So: Elasticity(long run) = %ΔQ/%ΔP = 1.24/.86= 1.44

Is this valid?

1) Is Supply Curve is shifting between these two countries?

2) Is Demand Curve staying fixed?

A) Income

B) Price of Substitutes

C) Other Factors