Elasticity of Demand

So far we've seen that…

■ On the demand curve, when the price rises, the quantity demanded falls.

■ On the supply curve, when the price rises, the quantity supplied increases.

■ But by how much will the quantity demanded fall?

■ And by how much will the quantity supplied rise?

■ .

■ To answer these questions, we have to understand the concept of elasticity,…

■ …which measures the responsiveness of one variable to another as a ratio of *percentages*.

■ We begin with the *price elasticity of demand*.

● Sometimes we call it just the *"elasticity of demand."*

● Or maybe *"own-price elasticity of demand."*

Price Elasticity of Demand

■ The elasticity of demand tells us how sensitive the quantity demanded is to the good's price *at a given point on a demand curve*.

■ The price elasticity of demand ε is defined by:

result

$$\varepsilon = \frac{\underline{Percentage\ Change\ in\ Quantity\ Demanded}}{Percentage\ Change\ in\ Price}$$

cause

or equivalently by

$$\varepsilon = \frac{\%\Delta Q}{\%\Delta P}$$ Δ *means "change in"*

■ Note: Elasticity is *always* computed as a ratio of percentages, never as a ratio of amounts.

Example: Cigarettes

■ Suppose that when the price of cigarettes rises by 10%,…

■ the quantity of cigarettes demanded falls by 5%.

■ Then the elasticity of demand for cigarettes is:

$$\varepsilon = \frac{-5\%}{10\%} = -1/2$$

Example: Pork

- Suppose the price of pork falls by 2%, and the quantity demanded increases by 6% as a result.

- Then the price elasticity of demand for pork is…

$$\varepsilon = \frac{\quad\quad}{\quad\quad} =$$

- The own-price elasticity of demand is generally negative (when price rises, quantity falls).

- Economists sometimes drop the minus sign, because we *know* that the elasticity is negative,…

- but I will keep the minus sign most of the time!

Elasticity on a Graph

Emily's Demand for Milk

- Suppose the price of milk goes from \$.40 to \$.60.

- What is Emily's elasticity of demand when the price is \$.40?
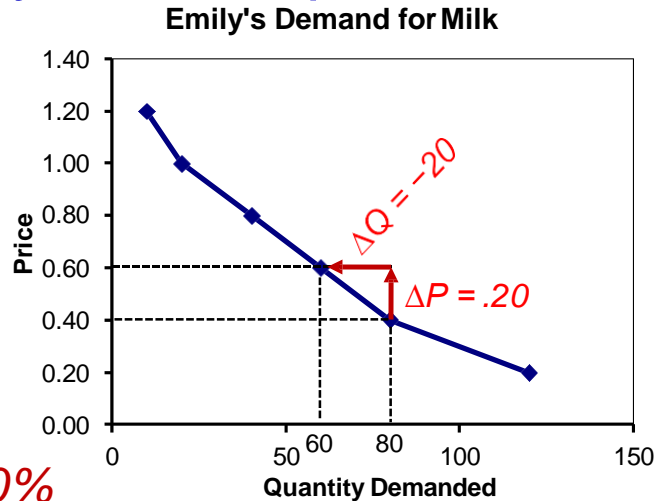
- *%ΔP = .20 ⁄ .40 = 50%*

- *%ΔQ = −20 ⁄ 80 = −25%*

- ε *= %ΔQ ⁄ %ΔP = −25% ⁄ 50% = −1 ⁄ 2*

Interpreting Elasticity of Demand

- Remember: $\varepsilon = \dfrac{Percentage\ Change\ in\ Quantity\ \ Demanded}{Percentage\ Change\ in\ Price}$

- We see whether $|\varepsilon|$ (the elasticity without the minus sign), is larger or smaller than 1.

  - For *|ε| > 1*, we say that demand is elastic.

  - For *|ε| < 1*, we say that demand is inelastic.

  - For *|ε| = 1*, we say that demand is unit-elastic.

Example: Ski Passes

■ What is the elasticity of demand for season ski-passes?

	Price	Quantity
Old	$400	10,000
New	$380	12,000

$$\%\Delta P = (380 - 400)/400 = {-}5\%$$

$$\%\Delta Q = (12000 - 10000)/10000 = 20\%$$
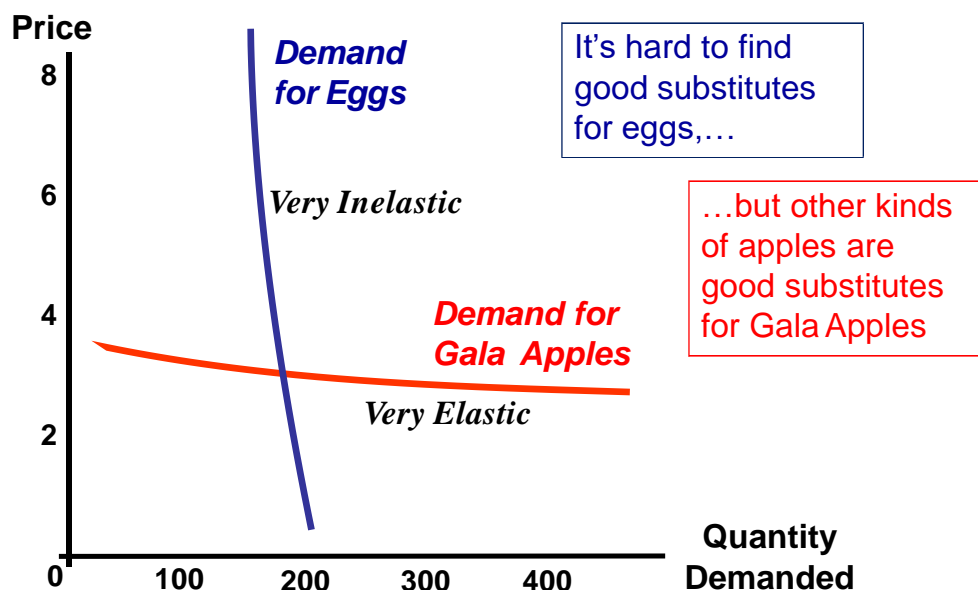
$$\varepsilon = \frac{20\%}{-5\%} = -4$$

So demand for ski passes at $400 is <u>elastic</u>.

What Determines Demand Elasticity?

■ Why is the demand for peas…

■ …so much more elastic than the demand for coffee?

- ● Availability of Substitutes: "Few things can give you such a good jolt as a shot of coffee" – but you can substitute other vegetables for peas.

■ The demand for Colombian coffee is more elastic than the demand for coffee in general,…

■ …because it's easier to substitute between different types of coffee than to substitute something else for coffee.

■ The demand for the product of a single firm is more elastic than that for the whole industry—for the same reason.

■ Why is the demand for housing…

■ …so much more elastic than the demand for coffee?

- ● **Budget Share:** Housing is expensive, and a large share of the budget,…

■ But the demand for edible salt is much less elastic than the demand for coffee, exactly because the budget share of salt is so small.

Example: Demand for Eggs and Demand for Gala Apples

Price

8

Demand for Eggs

It's hard to find good substitutes for eggs,…

6

Very Inelastic

…but other kinds of apples are good substitutes for Gala Apples

4

Demand for Gala Apples

2

Very Elastic

0   100   200   300   400

Quantity Demanded

Example: Elasticity of Demand for Rice

■ An Indian economics professor who lives and teaches in Canada, visited villages in India to conduct research.

■ Many people asked him the same question…

● "How many hours do you have to work in Canada to earn enough to buy a kilogram of rice."

● The professor was very embarrassed, because he had no idea of what the answer was.

- The professor eats lots of rice, but he doesn't even know the price of rice in his local Canadian food shop.
  - Why doesn't he know its price?
  - Do you think that most Indians know the price of rice in their shops?
- Whose demand for rice is more elastic?
  - the professor's?
  - the Indian villager's?
- If the price of rice in India jumps up, what do you think would happen?

Example: Mosquito Nets for Malaria Prevention*

suggested by Amrit Amirapu

- **According to WHO, malaria kills almost 700,000 people each year.**
  - Malaria is spread by mosquitoes.
  - Insecticide-impregnated nets can protect against malaria.
- **A 2010 study** finds that the elasticity of demand for the nets is very large!**
  - People are far more likely to accept and use the nets if they get them free, than if they have to buy them…
  - even when the price is very low.
  - What are the policy implications of the study?

** Cohen and Dupas, QJE, 2010, included in course website: CLASSES > Readings.

Measured Elasticities of Demand

* Broiler Chickens
   −0.5 to −0.6

* Petroleum (World)
   −0.4

* Car fuel
   −0.25 (Short run)
   −0.64 (Long run)

* Medicine (US)
   −0.31 (Insurance)
   **−.03 to −.06 (Pediatric
              Visits)**

* Soft drinks
   −0.8 to −1.0 (general)
   −3.8 (Coca Cola)
   −4.4 (Mountain Dew)

* Steel
   −0.2 to −0.3

* Eggs
   −0.1 (US)
   −0.35 (Canada)
   −0.55 (South Africa)

**http://en.wikipedia.org/wiki/
Price_elasticity_of_demand**

* Cigarettes (US)
   −0.3 to −0.6 (General)
   −0.6 to −0.7 (Youth)

* Alcoholic beverages (US)
   −0.3 (Beer)
   −1.0 (Wine)
   −1.5 (Spirits)

* Airline travel (US)
   −0.3 (First Class)
   −0.9 (Discount)
   −1.5 (for Pleasure)

* Rice
   −0.47 (Austria)
   −0.80 (Bangladesh)
   −0.80 (China)
   −0.25 (Japan)
   −0.55 (US)

* Cinema visits (US)
   −0.87

* Transport
   −0.20 (Bus travel US)
   −2.80 (Ford)

Clicker Question

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