Topic 4 – Elasticity

Big Question – How *responsive* are consumers and producers to changes in price?

I. Total Revenue

<u>Discussion Question</u>**:** Imagine you are the author of a book who gets a royalty payment of 10% of the total receipts (number sold * price) from the sale of the book. You get a phone call from your publisher telling you they are increasing the price of your book from $25 to $30. Should you be happy about this?

TR = ____________

Effect of a price increase on TR

1.

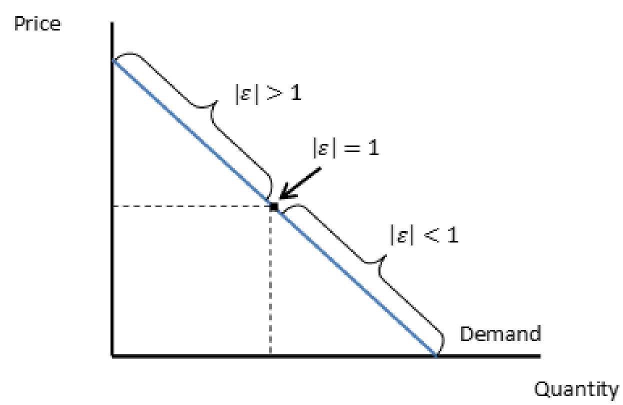
2.

II. Price Elasticity of Demand

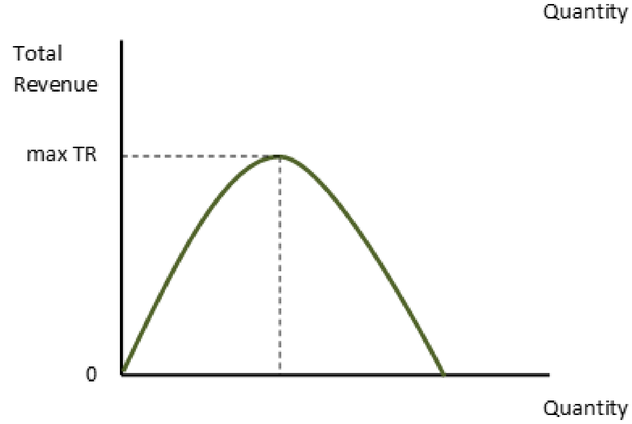
1. Definition: Price elasticity of demand measures how ________________________ changes in response to a change in the __________________ of a product.

$$\boxed{\varepsilon = \frac{\%\Delta Q}{\%\Delta P}}$$

2. Interpretation
   i. Elastic Demand: $|\varepsilon| > 1$



   ii. Inelastic Demand: $|\varepsilon| < 1$



   iii. Unit Elastic Demand: $|\varepsilon| = 1$

3. Calculation

Example: Imagine that you run a small bakery. In March the price of a cupcake was \$2, and you sold 40 per day. In April you increased the price of cupcakes to \$3 and you sold 30 per day.

Old	New
P =	P =
Q=	Q=

$$\%\Delta = \frac{(New - Old)}{Old}$$

a. Did your revenue increase or decrease?

b. Based on your answer to (a), do you think demand was elastic or inelastic prior to the change in prices?

c. Find the percent change in sales from March to April.

d. Find the percent change in price from March to April.

e. What was the price elasticity of demand when the price was \$2?

$$\varepsilon = \frac{\%\Delta Q}{\%\Delta P} = \frac{(\mathrm{Q_{New}} - \mathrm{Q_{Old}})/\mathrm{Q_{Old}}}{(\mathrm{P_{New}} - \mathrm{P_{Old}})/\mathrm{P_{Old}}}$$

Two Equations:	$\varepsilon = \dfrac{\%\Delta Q}{\%\Delta P}$	$\varepsilon = \_\_\_\_\_ \cdot \_\_\_\_\_\_\_\_\_\_\_\_\_\_$

Example: Suppose that supply and demand are given by the following equations.

Supply: P = 20 + 3Q
Demand: P = 120 – 2Q

a. Find the price elasticity of demand at equilibrium using the percent change equation.

Old	New
P =	P =
Q =	Q =

b. Find the price elasticity of demand at equilibrium using the slope of the line.

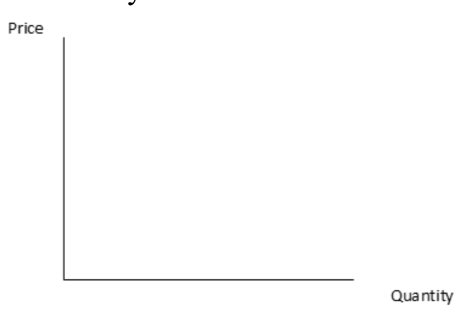
c. Is demand elastic, inelastic, or unit elastic at this point?

d. Will total revenue increase or decrease if supply increases?

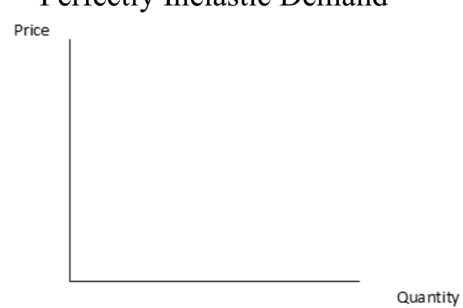
e. At what price would total revenue be highest?

4. Relative Price Elasticities

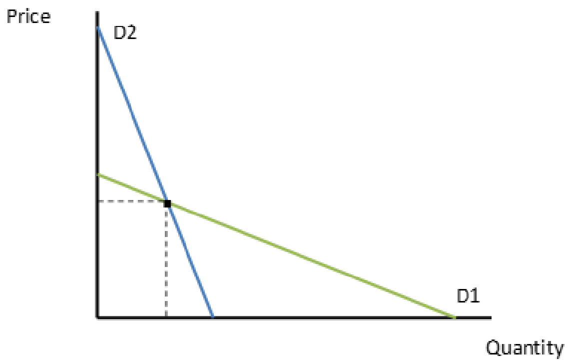
Perfectly Elastic Demand



Perfectly Inelastic Demand



Which is more elastic D1 or D2?



5. Determinants of the Price Elasticity of Demand

   a.

   b.

   c.

Analysis: Here's why Netflix won't raise prices again in 2020
By, Adam Levy, October 24, 2019, USA Today

Netflix announced four price increases for its service within the 58 months from April 2014 to January 2019. Management says it'll ask for higher prices at some point in the future, but pushing another increase in 2020 seems unlikely. Here are three reasons why Netflix won't raise its prices again next year.

1. It front-loaded the most recent price increase
The price hike Netflix announced at the start of the year was its biggest ever. What's more, the most recent price increase made it the first time any Netflix streaming subscription wasn't available for $8 per month. The lowest-priced plan increased to $9 per month this year. The higher prices have translated into strong revenue growth despite Netflix's subscriber growth slowdown.

2. Retention challenged by current pricing
Netflix's management finally admitted to something that was obvious in its second-quarter earnings report: The new pricing has increased subscriber churn. "There's a little more [price] sensitivity. We're starting to see a little touch of that," CEO Reed Hastings said on the company's earnings call. That comment indicates Netflix might have to take a breather on price increases as consumers adjusted to its current pricing.

3. New competitors with low price points
Perhaps the biggest challenge facing Netflix pricing in 2020 is the emergence of several new competitors, most with lower prices. Apple and Disney will debut their streaming video services next month priced at $4.99 and $6.99 per month, respectively. Consumers only have so much they can spend on discretionary purchases like streaming entertainment.

Right now subscribers are telling Netflix it needs to let off the gas on the price increases. Higher churn rates and strong interest in forthcoming competition shows Netflix is nearing the upper limit of its pricing power for right now. This year's price hike should be enough to hold it over through 2020, even with further increases in content spending.

1. How did the 2019 price increase affect Netflix's revenue?

2. How did the 2019 price increase affect the number of subscribers?

3. Do you think demand for Netflix was elastic or inelastic before the 2019 price increase?

4. How has increased competition in streaming affected the elasticity of demand for Netflix?

III. Cross Price Elasticity of Demand $\boxed{\varepsilon_{XP} = \frac{\%\Delta Q_1}{\%\Delta P_2}}$

1. Definition: Cross price elasticity measures how ______________________________________

   responds to changes in the ____.

2. Interpretation

   i. Substitutes

   ii. Complements

Example: According to a Honda press release, sales of the fuel-efficient four-cylinder Honda Civic rose by 7.1% from 2005 to 2006. Over the same period, according to data from the U.S. Energy Information Administration, the average price of regular gasoline rose from \$2.27 per gallon to \$2.57 per gallon. Calculate the cross-price elasticity of demand between Honda Civics and regular gasoline.

IV. Income Elasticity of Demand

1. Definition: Income elasticity measures how ________________________ responds to changes

   in _________________________.

$$\boxed{\varepsilon_I = \frac{\%\Delta Q}{\%\Delta I}}$$

2. Interpretation

   i. Normal Goods

   ii. Inferior Goods

   iii. Necessities

   iv. Luxuries

Example: Calculate the Income Elasticity of Demand for McChicken Sandwiches at an income of \$10,000. Based on your answer, are McChicken Sandwiches normal and inferior goods?

	McChicken Sandwich	
Income	Price	Quantity
\$10,000	\$1.00	300
\$15,000	\$1.00	250

V. Price Elasticity of Supply

1. Definition: Price elasticity of supply measures how ________________________ changes in response to a change in the __________________ of a product.

$$\varepsilon_S = \frac{\%\Delta Q}{\%\Delta P}$$

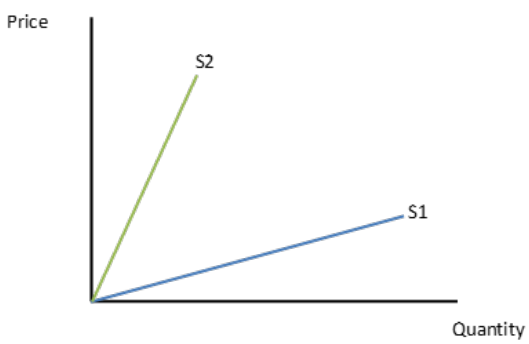
2. Interpretation:
   i. Elastic: $|\varepsilon| > 1$
   ii. Inelastic: $|\varepsilon| < 1$

3. Relative Price Elasticities

Perfectly Elastic Supply

Perfectly Inelastic Supply

Which is more elastic S1 or S2?



4. Determinants of the Price Elasticity of Supply
   a.
   b.
   c.

Example: Suppose that supply and demand are given by the following equations. Calculate the price elasticities of both supply and demand at the equilibrium point. Which is more elastic?

Supply: P = 60 + Q
Demand: P = 180 – 2Q

IV. Assignments
   a. Video Assignment due on Brightspace at 11:00pm on 1/31/20
   b. Problem Set 4 due on Brightspace at 11:00pm on 2/3/20