Lecture 5: Elasticity

September 24, 2024

Overview

1. Administrative Notes
2. Ripped from headlines
3. Chapter 4 addendum: when both curves shift
4. Chapter 5: Elasticity
   - 4.1 Price elasticity of demand
   - 4.2 How businesses (and government) use demand elasticity
   - 4.3 Other demand elasticities
   - 4.4 Price elasticity of supply
   - 4.5 Importance of price elasticity of supply to government

Course Administration

1. Ripped from Headlines sign-up
   - You are responsible for being on the schedule
2. Lecture 6 (next class) will be a set of pre-recorded videos, posted by class time
3. Lecture 7 handout is posted – let's review
4. Midterm review, 10/9, 6 to 8 pm, 1957 E St. NW, Room 316
5. Lecture 8 is the midterm
6. Grades should be up in Blackboard
7. Ch. 5 End-of-Chapter problems posted as an assignment with no due date
8. Problem Set 5 posted as an assignment

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8. Problem Set 5 posted as an assignment
9. Any other questions or outstanding issues?

How What You're Learning is Policy-Relevant

Ripped from Headlines presentation(s)

As a reminder, next week

Send the article by Wednesday midnight for approval

Afternoon, joint presentation

Finder	Presenter
Sawyer S.	Matias B.
Yemi F.	Emma D.
Laiba K.	

Evening, individual presentation

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Check assignments for next week! I'll remind in recorded video.

Today's Ripped from the Headlines

Afternoon, joint presentation

Finder	Presenter
Matt W.	Riddhi P.
Raquel L.	Tosha S.
Sarah C.	

Evening, **joint** presentation

Finder	Presenter
Saumya M.	Sydney M.
	Jackie G.

Today

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2. Chapter 5: Elasticity
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Ch. 4: 4. When Both Supply and Demand Shift

What Should Have Been More Clear: What We Learn When S & D Shift

- I got multiple after-lecture questions about which shifts
- This is deducible from graphs – no need to memorize
- We will deduce two cases
- You are responsible for all 4

Demand Shifts Inward, Supply Shifts Outward

- Why might this happen?
- We learn that peaches give acne
- Weather is particularly good for peaches this year

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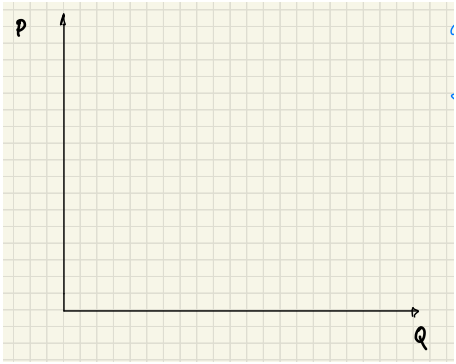
Where do demand and supply go?



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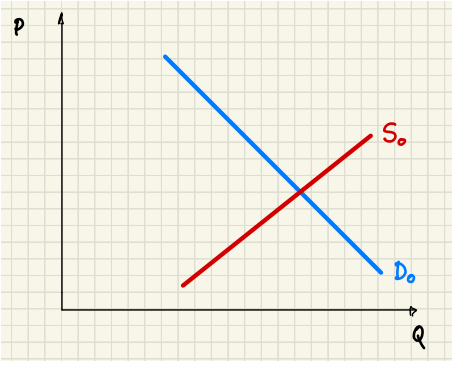

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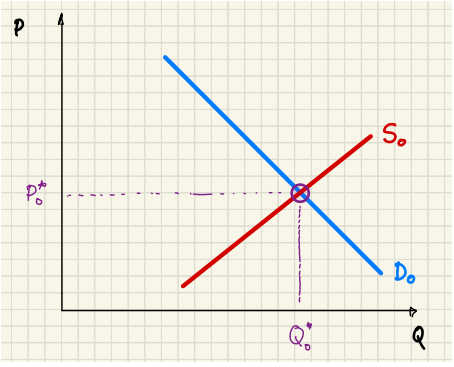
Where is new demand?



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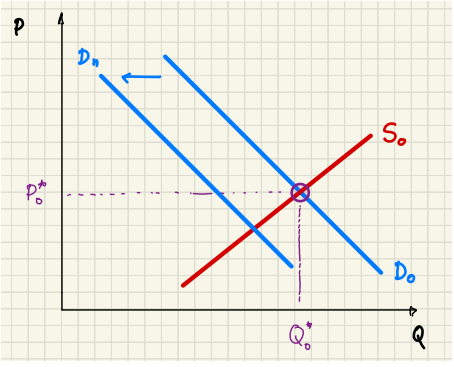

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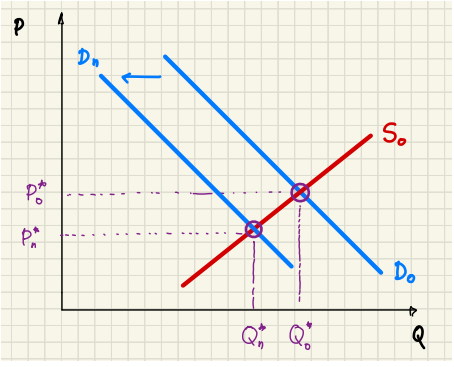
Where are new supply and equilibrium?



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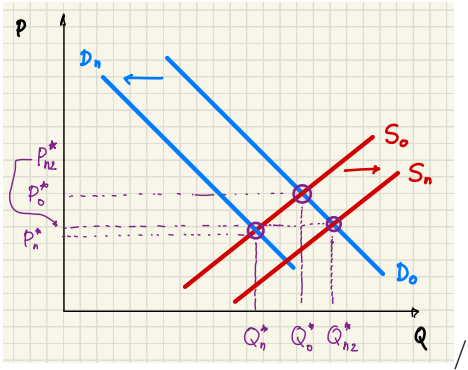

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In sum

- equilibrium price surely declines
- equilibrium quantity change unclear

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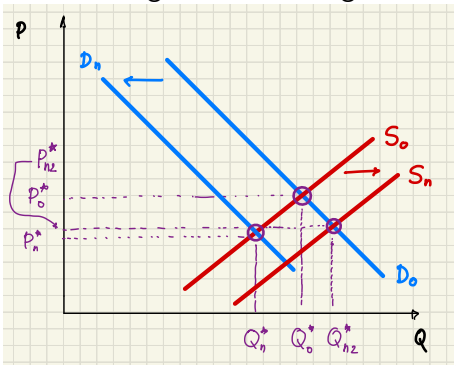

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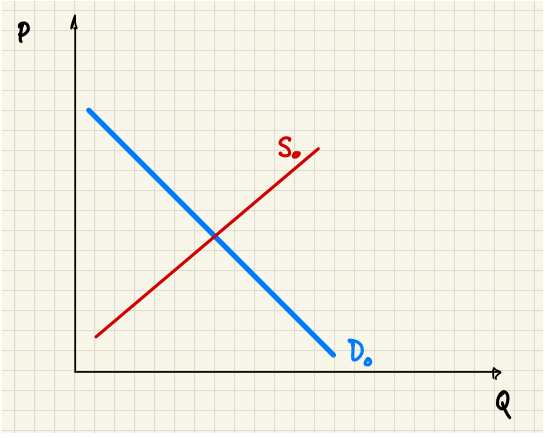

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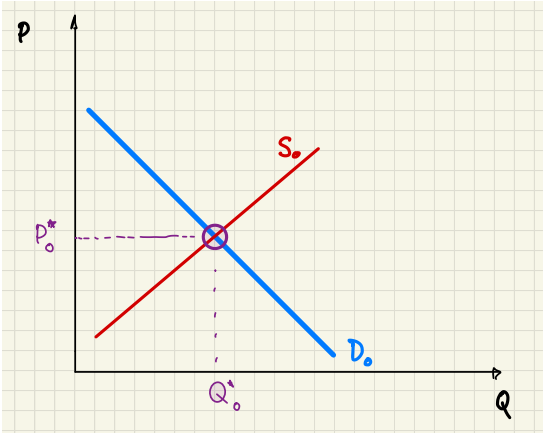

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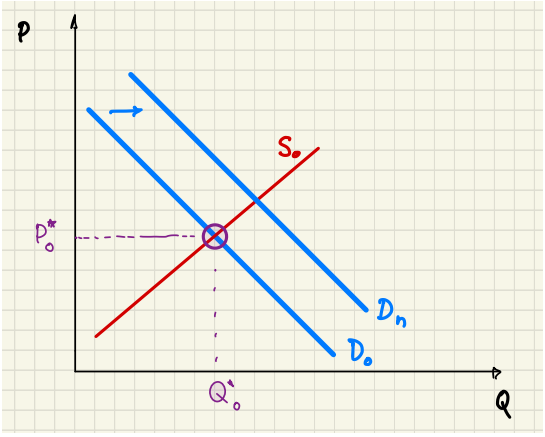

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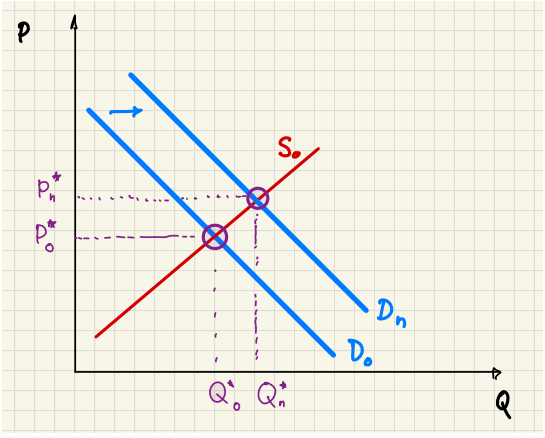

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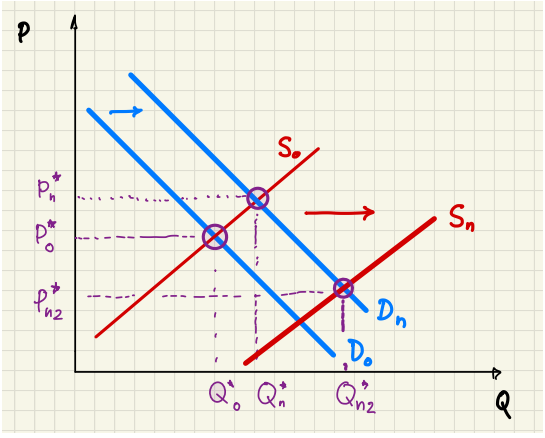

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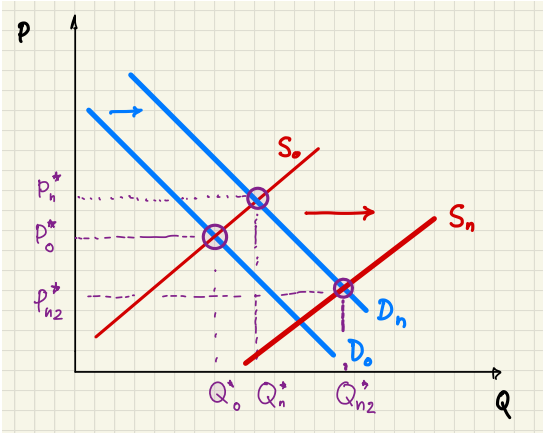

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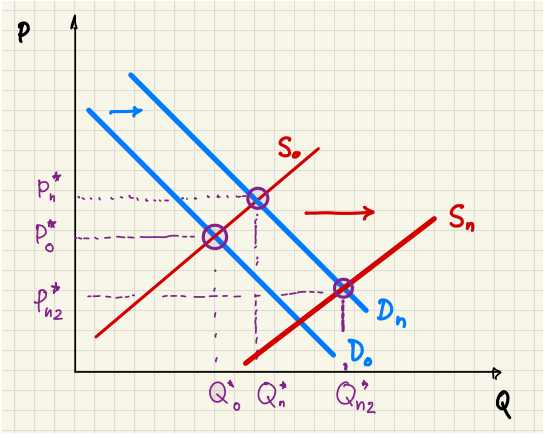

Ch. 5: 1. Price Elasticity of Demand

Small Math Aside: Absolute Value

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- We write $|a|$ – the vertical bars are the absolute value sign

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- Absolutely crucial for policy decisions
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- Absolutely crucial for policy decisions
- Formally, percentage change in one value relative to percentage change in another
- In math, elasticity is

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

- Δ is capital Greek letter delta, denoting change

Price Elasticity of Demand

- How responsive are consumers to a change in price?

$$E_D = \frac{\%\Delta Q_D}{\%\Delta P}$$

- Is $E_D > 0$? or ≤ 0?

Price Elasticity of Demand

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Working Through an Elasticity Calculation

If the price of peaches increases by 5%, how much does total peach consumption change?

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$$\%\Delta P = \frac{5}{-0.82} = -6$$

Drawing Perfectly Inelastic and Perfectly Elastic Demand (or Supply)

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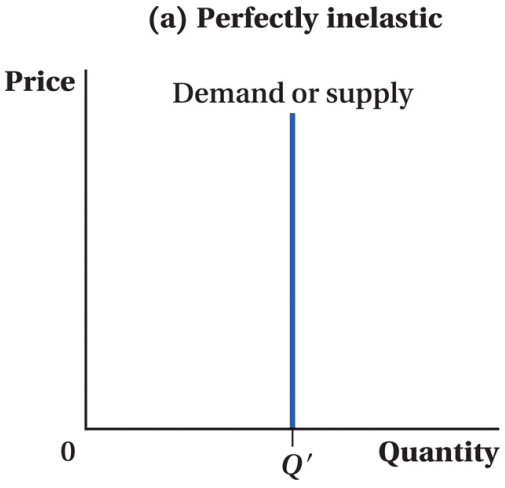

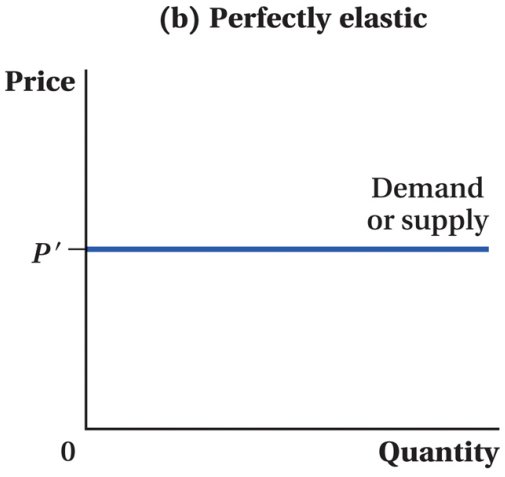

Return to Middle School Math: Which Slope is Bigger?

- Slope m is

$$m \equiv \frac{\text{rise}}{\text{run}}$$

- Or, slope m is

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- Remember that that the slope of a demand curve is negative
- Bigger slope is the one closer to zero

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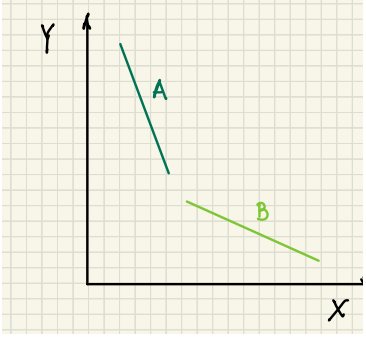

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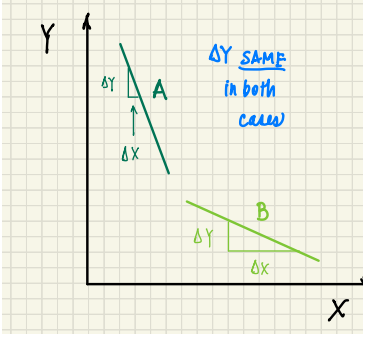
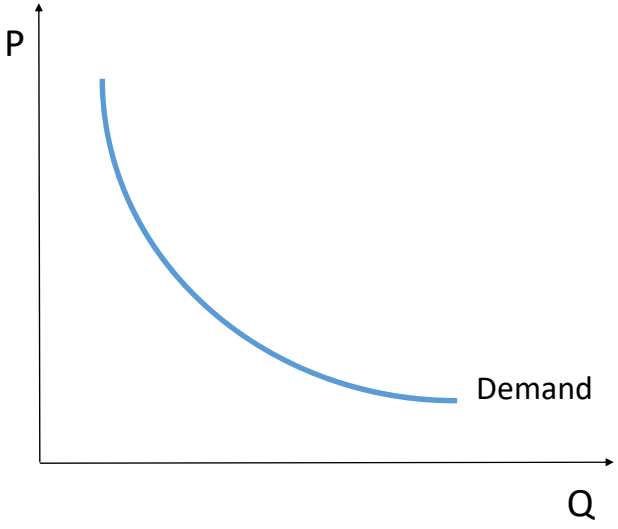


Elasticity with Non-Linear Demand Curves



A non-linear demand curve

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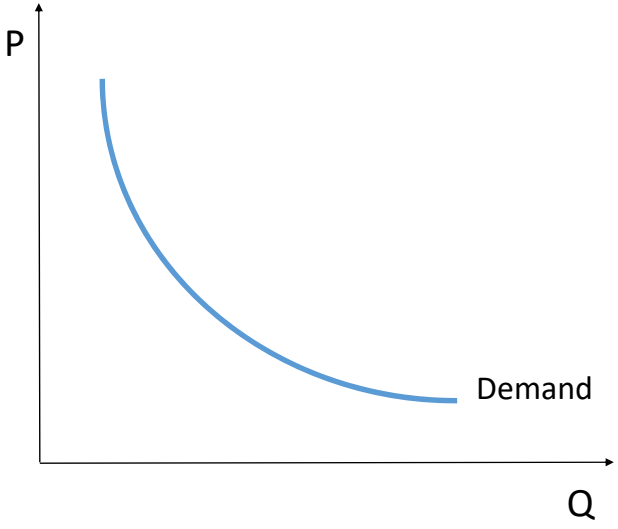

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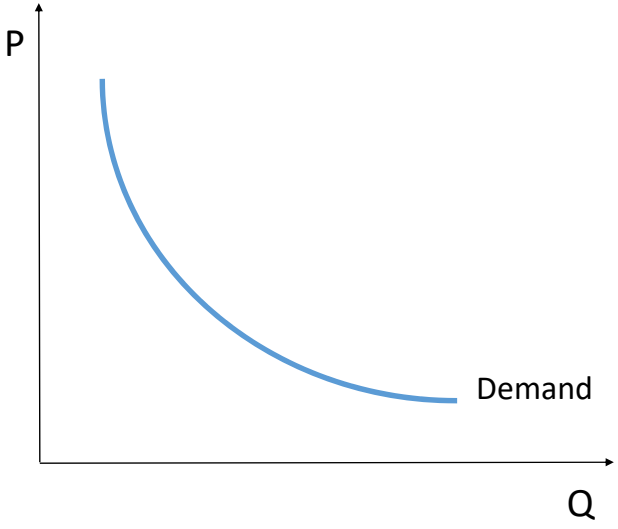
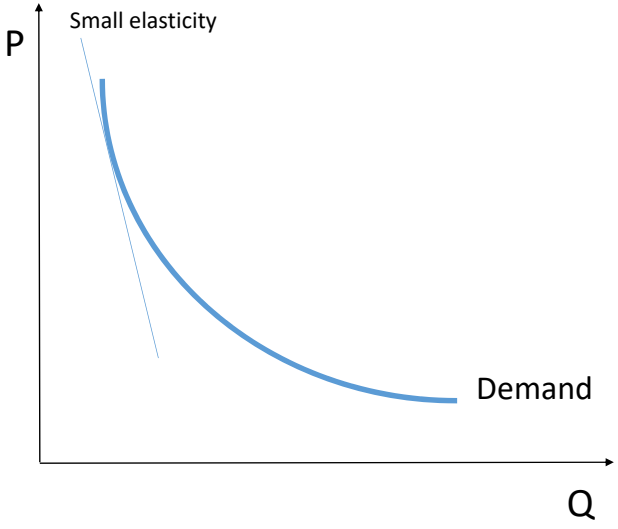


A non-linear demand curve
Elasticity is the slope of the curve
Where on the curve is demand most inelastic?

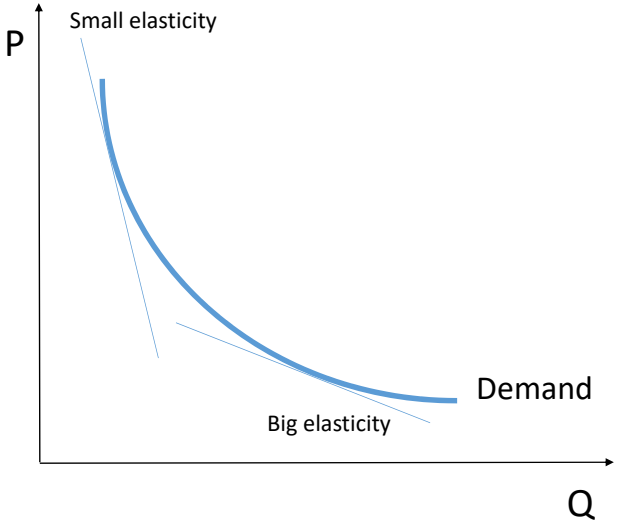
For Non-Linear Demand Curves, Elasticity is the Slope



When prices are high

- slope of demand is farther from zero
- demand is relatively inelastic
- change in P gives small change in Q

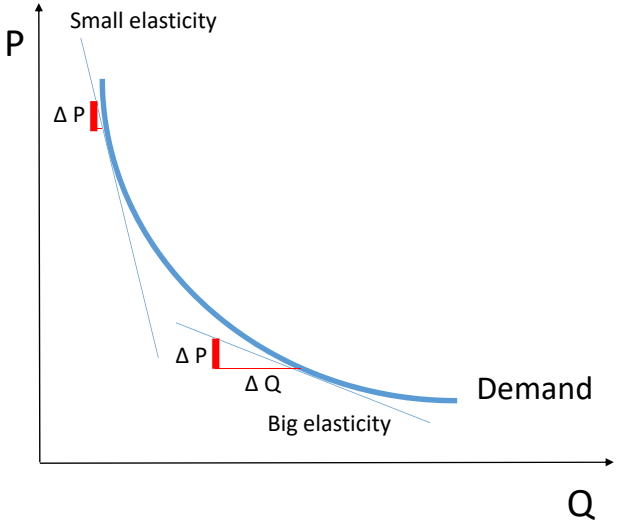
For Non-Linear Demand Curves, Elasticity is the Slope



When prices are low, demand is more elastic, or larger in absolute value

- slope of demand closer to zero
- demand is relatively elastic
- change in P gives big change in Q

For Non-Linear Demand Curves, Elasticity is the Slope



The more vertical line gives a smaller change in quantity for the same change in price

For Linear Demand Curves, Elasticity is **Not Exactly** the Slope

- But we won't pay too much attention to this oddity

Determinants of the Price Elasticity of Demand

Substitution, substitution, substitution

Determinants of the Price Elasticity of Demand

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1. More elastic E_D with more competing products

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Elasticity differs by person, product and price

Ch. 5: 2. How Businesses (and Government) Use Demand Elasticity

Firm Revenue

revenue $\equiv$ price * quantity

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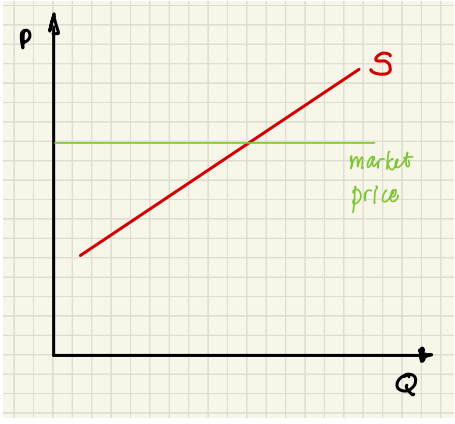

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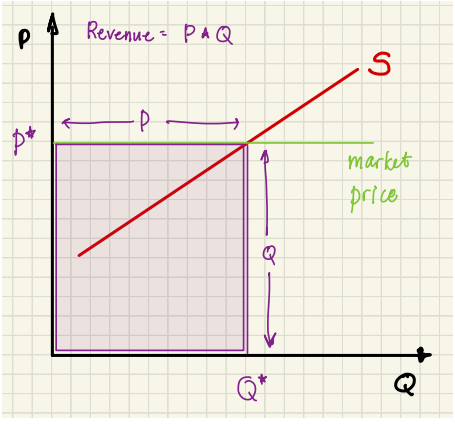

All Else Equal, Lower Elasticity Lets Firms Increase Prices

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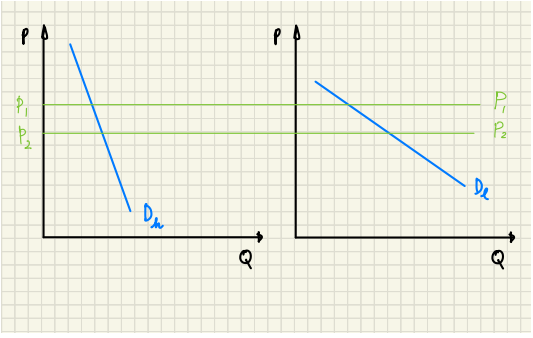

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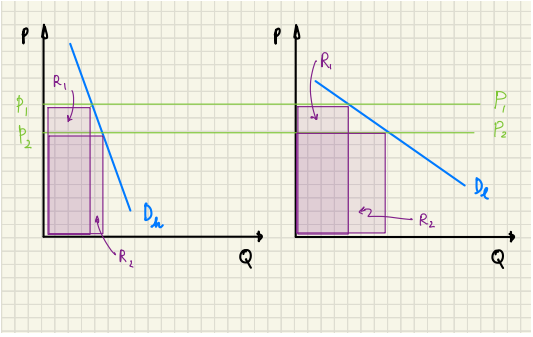

What Does This Mean for Firms and Governments?

For businesses

- If your customers are inelastic, consider raising prices

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- If your customers are elastic, consider lowering prices

What Does This Mean for Firms and Governments?

For businesses

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What Does This Mean for Firms and Governments?

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- If your customers are elastic, consider lowering prices
- What market should a firm be more interested in entering: an inelastic or elastic market? inelastic one

For governments

- Suppose the government adds to supply. Will this cost the government more money in an inelastic or elastic market?

Ch. 5: 3. Other Demand Elasticities

Two Additional Elasticities Firms (and Governments) Should Keep in Mind

1. Cross-price elasticity of demand
2. Income elasticity of demand

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- If E^D_{XY} is positive, are X and Y substitutes or complements?

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- If E_{XY}^D is positive, are X and Y substitutes or complements?
- If E_{XY}^D is negative, are X and Y substitutes or complements?
- What if your demand for X and Y is entirely unrelated?

Cross-Price Elasticity of Demand and Policy

- Why does the envelope lobbyist hang out with the adhesive lobbyist?

Cross-Price Elasticity of Demand and Policy

- Why does the envelope lobbyist hang out with the adhesive lobbyist?
- Why might electricians support EV subsidies?

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Cross-Price Elasticity of Demand and Policy

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- Why might electricians support EV subsidies?
- Why do economists generally advocate for broad-based taxes?
- Other policy examples?

2. Income Elasticity of Demand

- We are interested in the income elasticity of demand

$$E_I^D = \frac{\%\Delta Q^D}{\%\Delta I}$$

- What do you consume more of as your income increases?

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Income Elasticity of Demand for Fresh Peaches

Table 10. Quantity of peaches eaten fresh per $100 of income
444 families, Salt Lake City, Utah, 1947

Income range	Number of families	Average consumption per family	Median income	Consumption per $100 income
Dollars	number	pounds	dollars	pounds
Less than 1,376	34	20	920	2.2
1,376-2,300	40	26	1,990	1.3
2,301-2,476	46	22	2,400	0.9
2,476-2,975	41	24	2,740	0.9
2,976-3,275	41	26	3,000	0.9
3,276-3,600	50	32	3,500	0.9
3,601-4,575	40	27	3,980	0.7
4,576-6,075	54	38	5,000	0.8
6,076-9,975	49	38	7,500	0.5
9,976 and over	49	40	12,000	0.3

- From a 1947 thesis about the peach market
- How can we characterize income elasticity of demand for peaches?

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- From a 1947 thesis about the peach market
- How can we characterize income elasticity of demand for peaches?
- Compare change in peach consumption to change in income

Ch. 5: 4. Price Elasticity of Supply

Price Elasticity of Supply

- How responsive are producers to a change in price?

$$E_S = \frac{\%\Delta Q_S}{\%\Delta P}$$

- Is $E_S > 0$? or < 0?

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- Is $E_S > 0$? or < 0? $E_S > 0$
- If producer can easily decrease production, what does this mean for $|E_S|$?
- The more easily the producer can change production, the larger $|E_S|$

Drawing Perfectly Inelastic and Perfectly Elastic Demand (or Supply)

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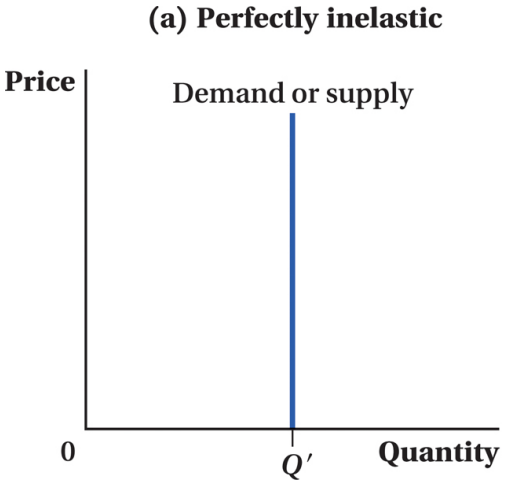

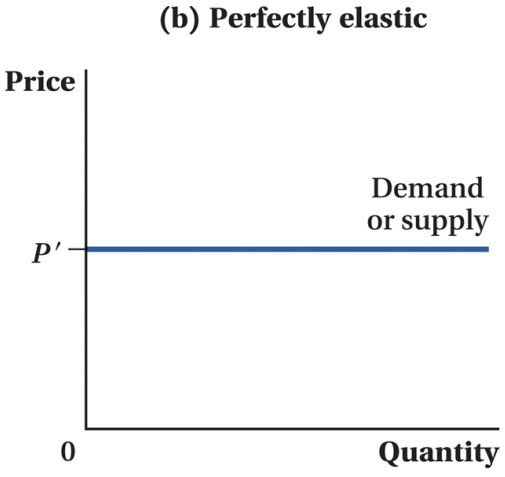

Elasticity with Non-Linear Supply Curves

Consider a non-linear supply curve

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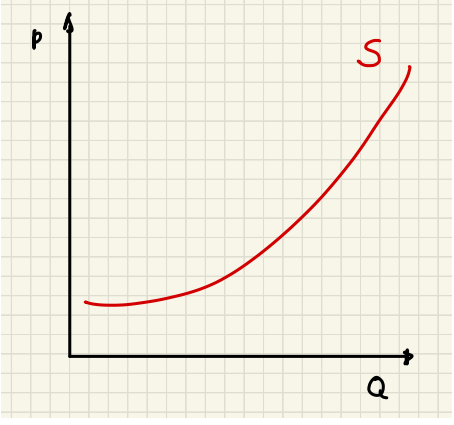
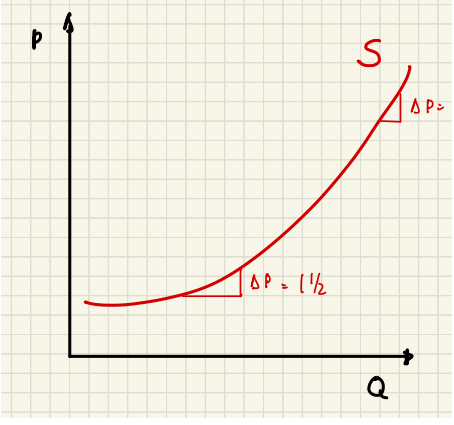
Which part is less elastic?



Elasticity with Non-Linear Supply Curves

Consider a non-linear supply curve

Which part is more elastic?



Determinants of the Price Elasticity of Supply

Substitution and flexibility: Can it make more or less? Make something else? Use different inputs to make the same thing?

Determinants of the Price Elasticity of Supply

Substitution and flexibility: Can it make more or less? Make something else? Use different inputs to make the same thing?

1. Inventories make supply more elastic
2. Easily available variable inputs make supply more elastic
3. Extra capacity makes supply more elastic
4. Easy entry and exit make supply more elastic
5. A longer time period makes supply more elastic

Recap

What We Did

- Defined price elasticity of supply and considered determinants
- Discussed role of E_D for firms and governments
- Defined
  - income elasticity of demand
  - cross-price elasticity of demand
- Defined price elasticity of supply and considered determinants and government implications

For Next Class

- Do problem set 5
- Work with classmates, me or TA on problems
- Check Ripped from Headlines assignments
- Article finders email me by Wednesday midnight
- Read Chapter 6
- Don't come to class next week!

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I will

- post these lecture notes on my webpage
- post link to lecture recording on Blackboard
- anything else?