ch 6 Elasticity

- Price elasticity of Demand
- other Demand Elasticities
  - Cross-Price Elasticity of Demand
  - Income Elasticity of Demand
- Price Elasticity of Supply

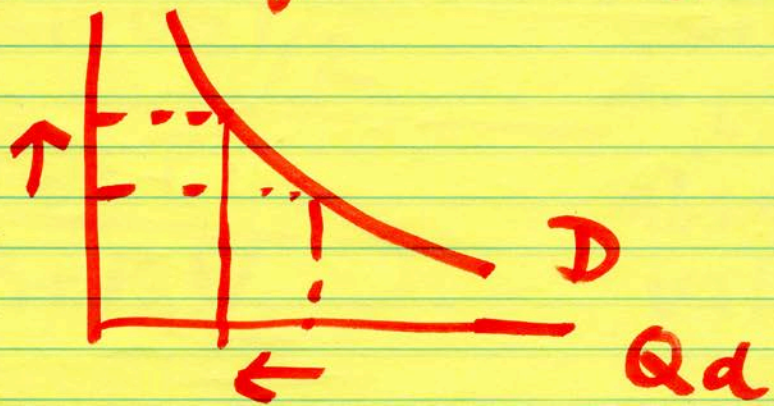
Price Elasticity of Demand

$$\left| \frac{\text{\% change in Quantity demanded}}{\text{\% change in Price}} \right|$$

or

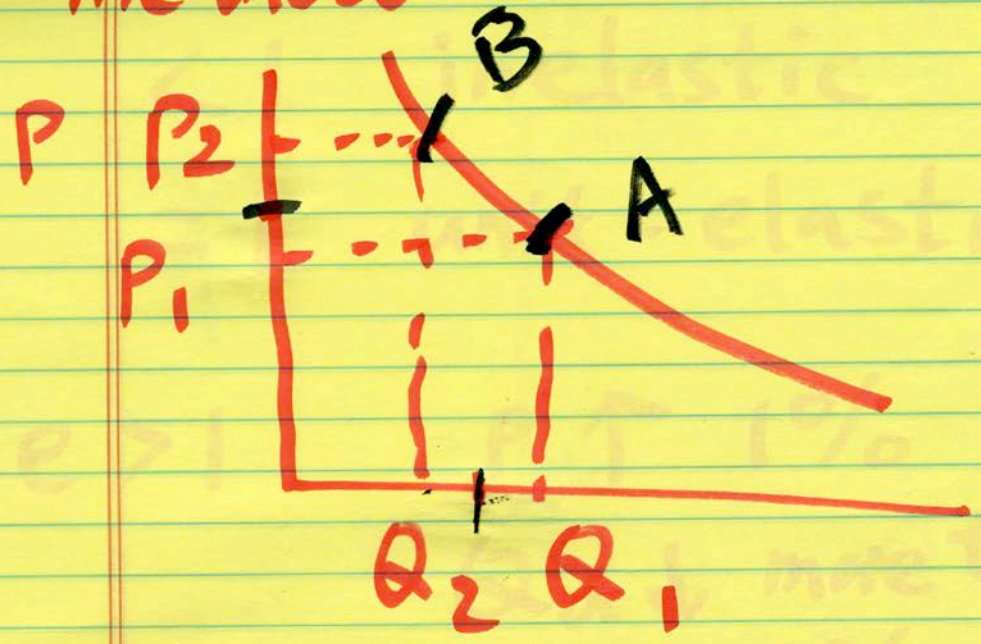
$$\left| \frac{\%\,\Delta \text{ in } Q_d}{\%\,\Delta \text{ in } P} \right|$$

drop the negative sign



- Price changes by 1% what is the % change in Q_d?
- How responsive is quantity demanded to a change in Price
- along the D-curve

- Use the midpoint method



$$-\frac{\frac{Q_2 - Q_1}{(Q_1 + Q_2)/2}}{\frac{P_2 - P_1}{(P_1 + P_2)/2}}$$

add negative sign or absolute value

$e > 1$ elastic

< 1 inelastic

$= 1$ unit-elastic

$e > 1$ P ↑ 1%

Q_d ↓ more than 1%

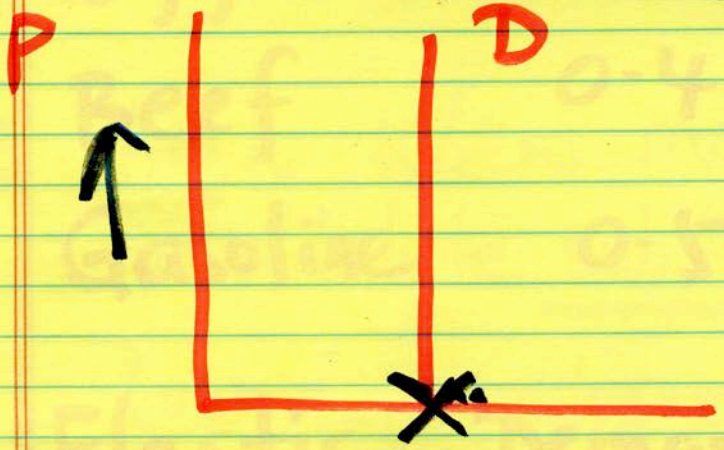
< 1 P ↑ 1%

Q_d ↓ less than 1%

$= 1$ P ↑ 1%

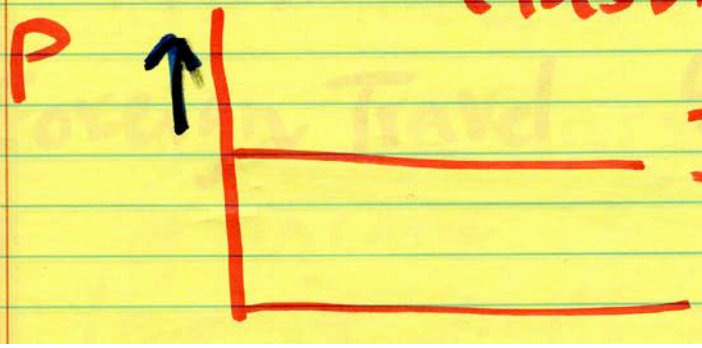
Q_d ↓ 1%

$e = 0$ perfectly inelastic



$P \uparrow \quad \Delta Q^d = 0$

$e = \infty$ perfectly elastic



Inelastic Demand	
Eggs	0.1
Beef	0.4
Gasoline	0.5
Elastic Demand	
Housing	1.2
Restaurant meals	2.3
Foreign Travel	4.1

Factors Affecting Price Elasticity of Demand

- e high when many available substitutes

  low no close substitutes

- e high with luxury

  low necessity

- e high if large share of income

  low if small share

e tends to increase as consumers have more time to adjust to a price change

Other Properties

e and Total revenue

TR = P × Q

$e = 1$ P ↑

TR unΔed

$e > 1$ P ↑

TR ↓

$e < 1$ P ↑

TR ↑

Other Demand Elasticities

- Cross-Price Elasticity of Demand

$$e_{A,B} = \frac{\%\,\Delta \text{ in demand for A}}{\%\,\Delta \text{ in P of B}}$$

- substitutes > 0 +ve

$P_{tea} \uparrow \quad Q_{d\,tea} \downarrow$

$\therefore D_{cof} \uparrow$

- complements < 0 -ve

$P_{hot\,dogs} \uparrow \quad Q_{d\,h.d} \downarrow$

$D_{buns} \downarrow$

Other Demand Elasticities

- shift of D

Income Elasticity of Demand

$$e_I = \frac{\%\Delta \text{ in } D}{\%\Delta \text{ in } I}$$

normal $e_I > 0$

inferior $e_I < 0$

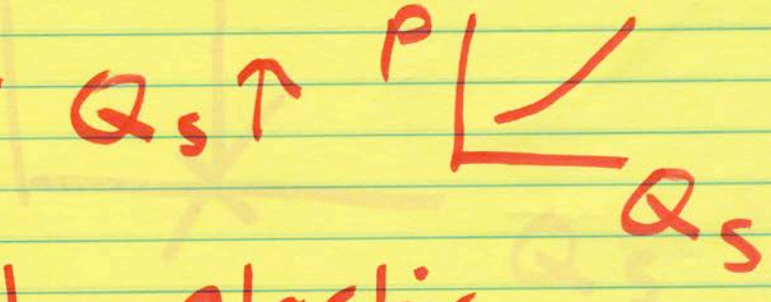
income-elastic $e_I > 1$

income-inelastic $1 > e_I > 0$

Price Elasticity of Supply

$$e^s = \frac{\%\ \Delta \text{ in } Q_s}{\%\ \Delta \text{ in } P}$$

$P \uparrow \; Q_s \uparrow$

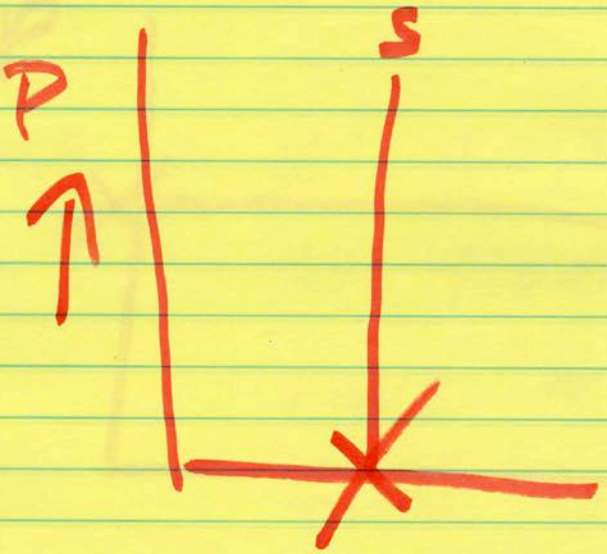


$e^s > 1$ elastic

$= 1$ unit-elastic

< 1 inelastic

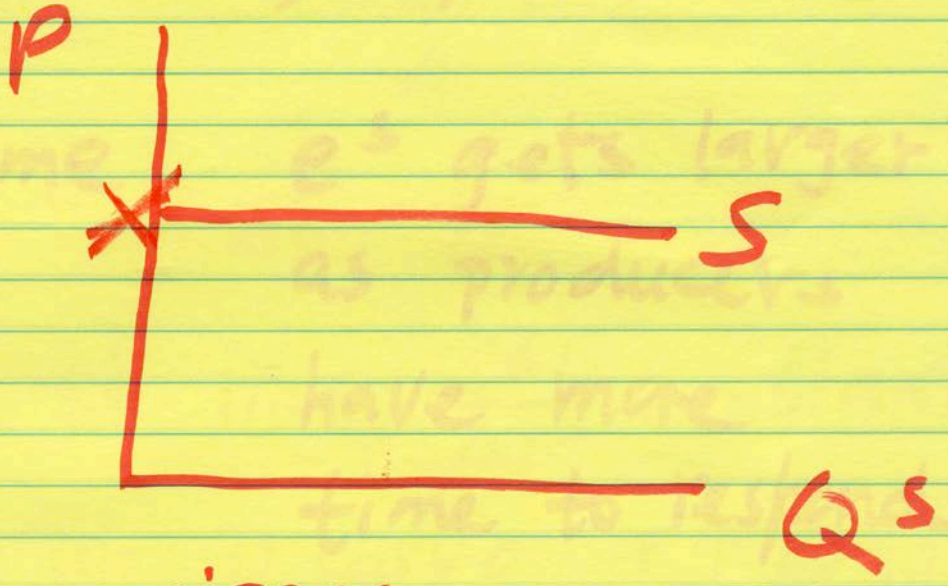
$e^s = 0$ Perfectly inelastic



cell phone frequencies

$e^s = \infty$

perfectly elastic



- pizzas
- world supply of shirts

Factors AFFecting e^s

- Availability of Inputs
- Time — e^s gets larger as producers have more time to respond

Demand elasticity with a St. line D

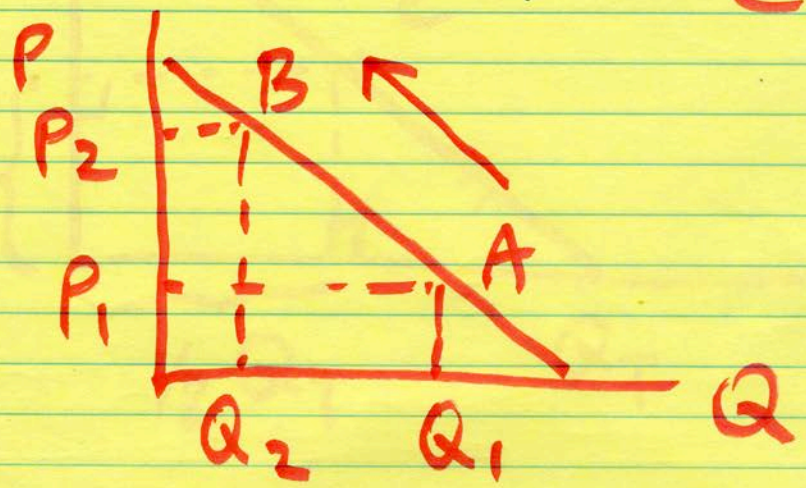
$$e = -\frac{\Delta Q/Q}{\Delta P/P}$$

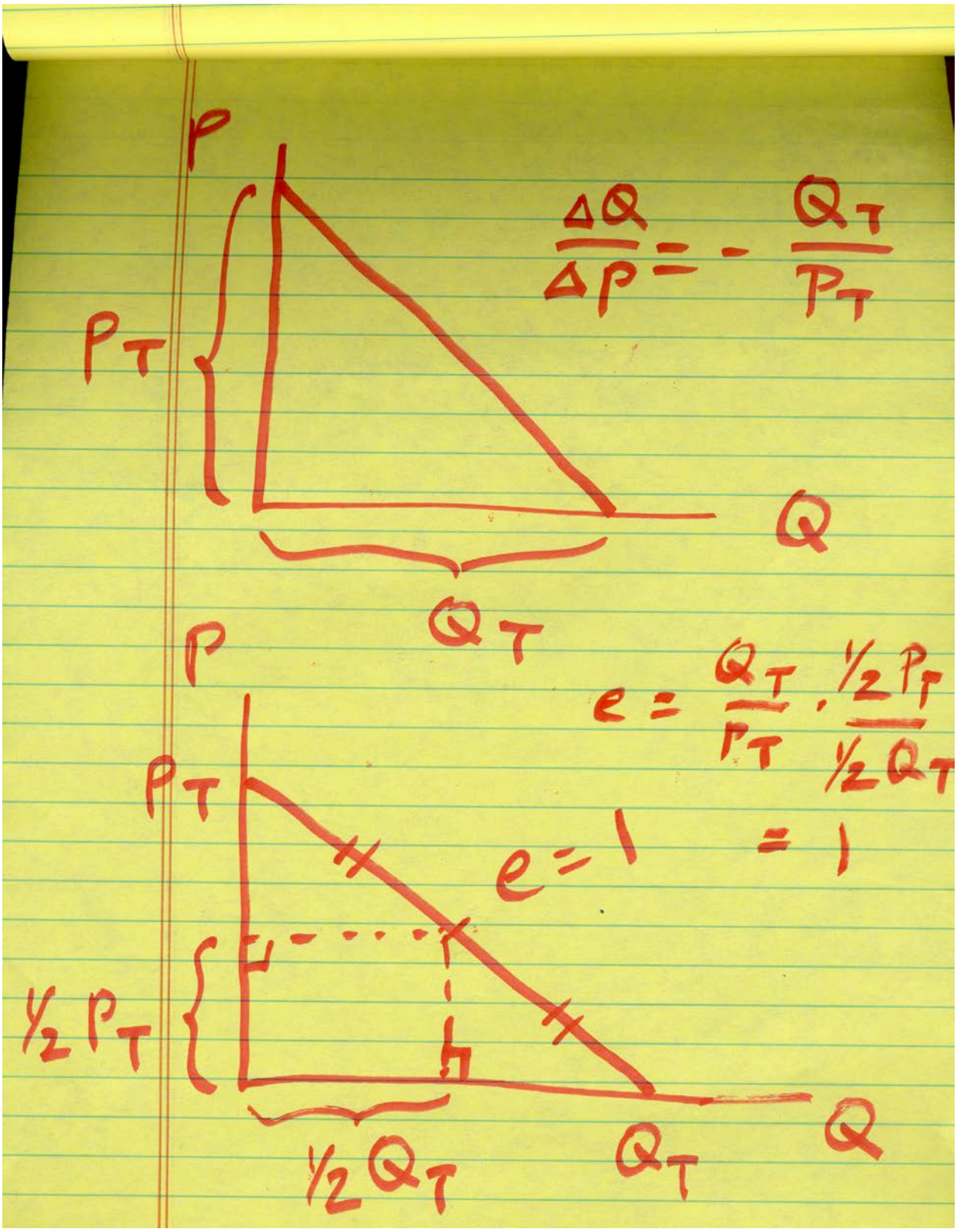
$$= -\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

For st. line $\frac{\Delta Q}{\Delta P}$ constant

Go up D curve, P↑ Q↓

e↑




P
P_T
Q
Q_T
$\frac{\Delta Q}{\Delta P} = -\frac{Q_T}{P_T}$
P
P_T
$\frac{1}{2}P_T$
$\frac{1}{2}Q_T$
Q_T
Q
$e = \frac{Q_T}{P_T} \cdot \frac{\frac{1}{2}P_T}{\frac{1}{2}Q_T}$
$e = 1$
$= 1$