Elasticity and its Applications

Principles of Micro, Lecture 3

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Price and Income Elasticities of Demand

Defining Elasticities

Which factors influenced demand?

The general setting: $D_x = f(p_x, Y, p_z, Y, p_x^{t+1}, \succeq, ...)$

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Income elasticity of demand

By how much (in percentage points) the quantity demanded changes if the income changes by 1 percent?

$$\epsilon_{Y}^{D_x} = \frac{\Delta D_x = ?\%}{\Delta Y = 1\%}$$

Cross-price elasticity of demand

By how much (in percentage points) the quantity demanded of good X changes if the price of good Z changes by 1 percent?

$$\epsilon_{p_z}^{D_x} = \frac{\Delta D_x = ?\%}{\Delta p_z = 1\%}$$

Types of Goods

With respect to the elasticities of demand

W.r.t. the income elasticity of demand:

$$\epsilon_Y^{D_x} \begin{cases} < 0 & \text{- inferior goods} \\ (0;1) & \text{- necessities} \\ > 1 & \text{- luxuries} \end{cases}$$

What does the increase in income mean for your firm?

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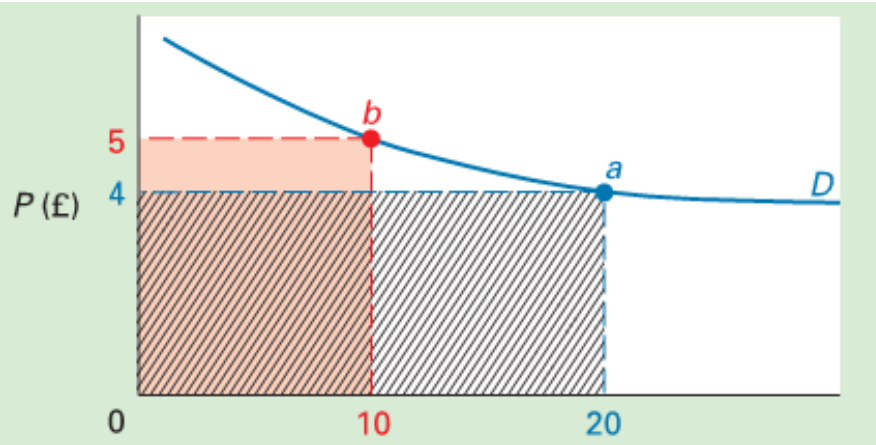
W.r.t. the cross-price elasticity of demand:

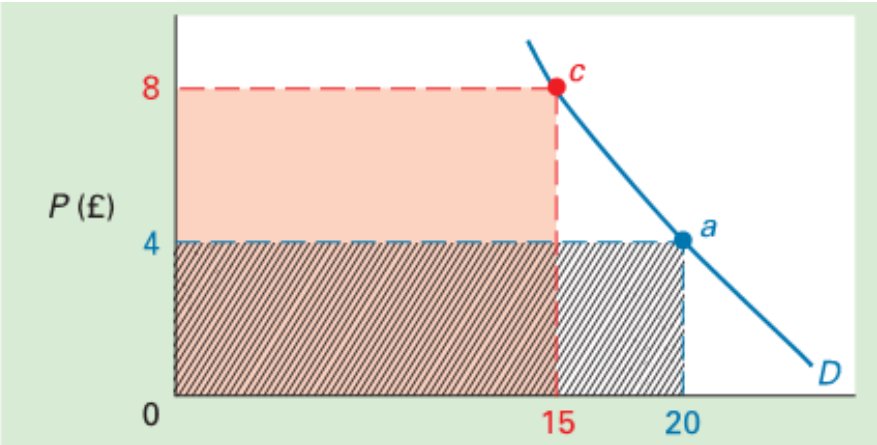
$$\epsilon_{p_z}^{D_x} \begin{cases} < 0 & \text{- complements} \\ > 0 & \text{- substitutes} \end{cases}$$

What does the increase in prices of related goods mean for your firm?

1. on the inputs side of the market
2. on the output side of the market

Own-Price Elasticity and Revenues of the Firm





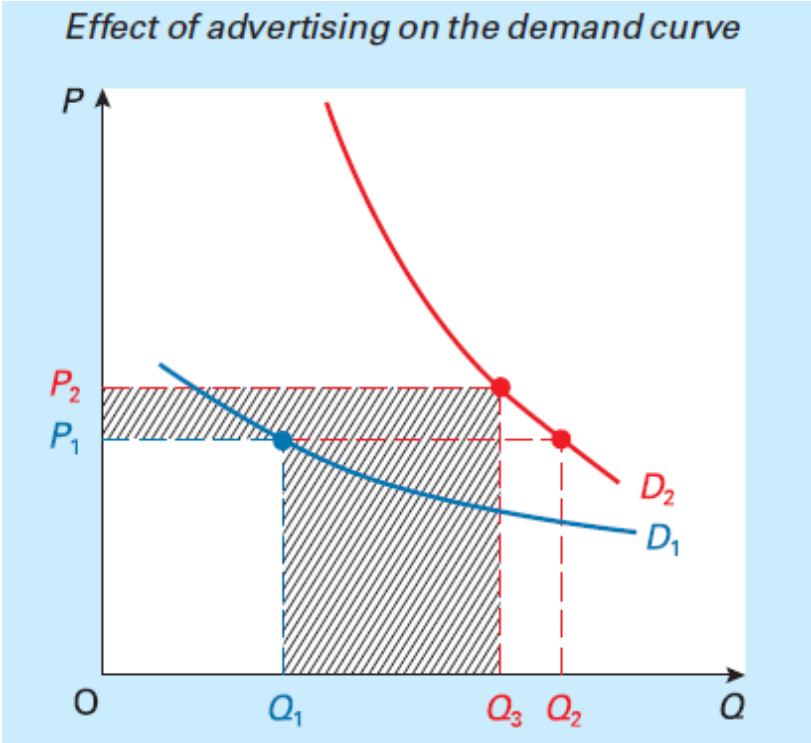
How does your own price relate to the revenues of the firm?

$$|\epsilon_{p_x}^{D_x}| \begin{cases} < 1 & \text{lower price means lower revenues} \\ > 1 & \text{lower price means higher revenues} \end{cases}$$

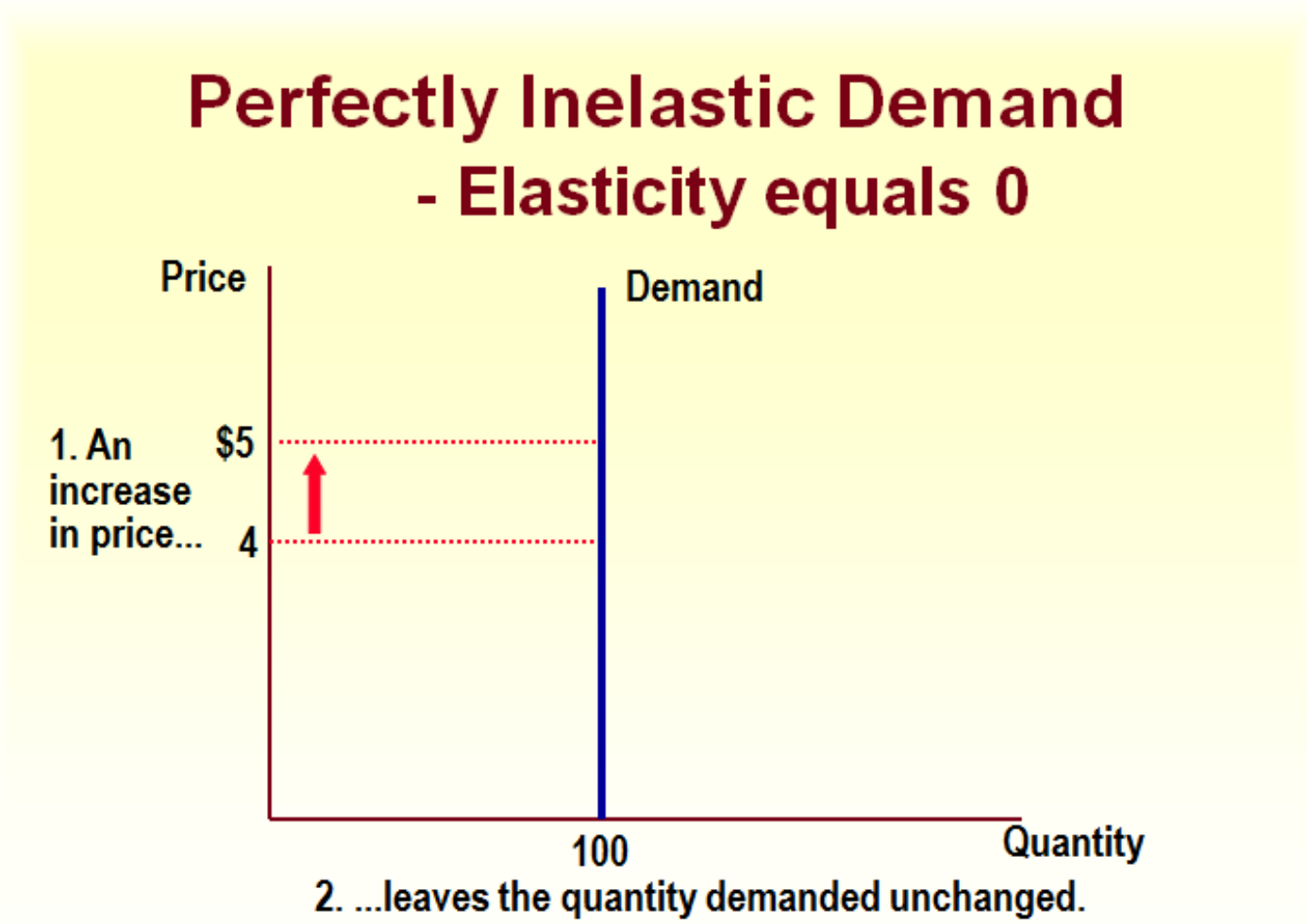
Exercise: Draw a graph relating demand, PED, and Revenues for the firm.

Factors Affecting the Own-Price Elasticity of Demand

1. Advertising:

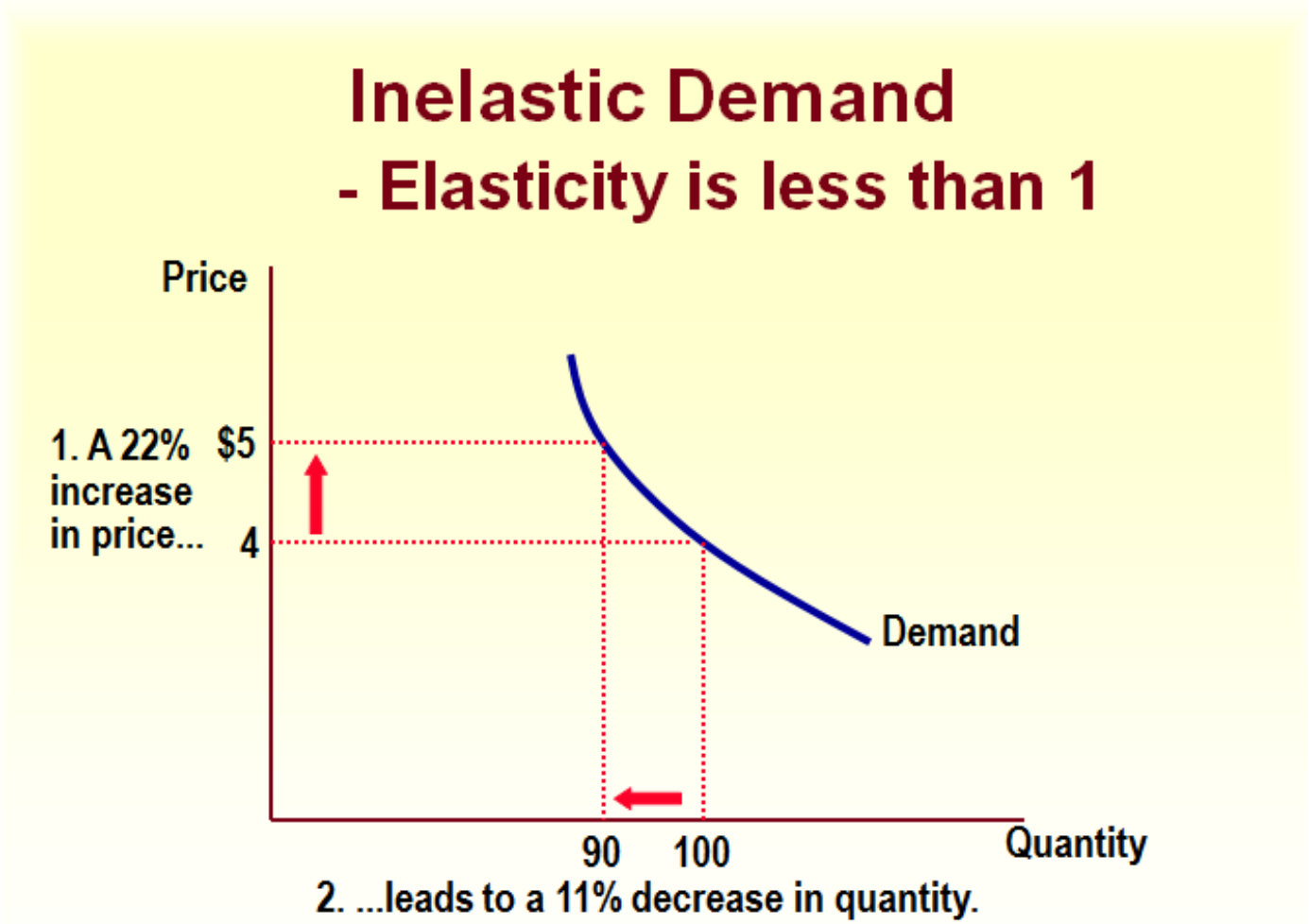


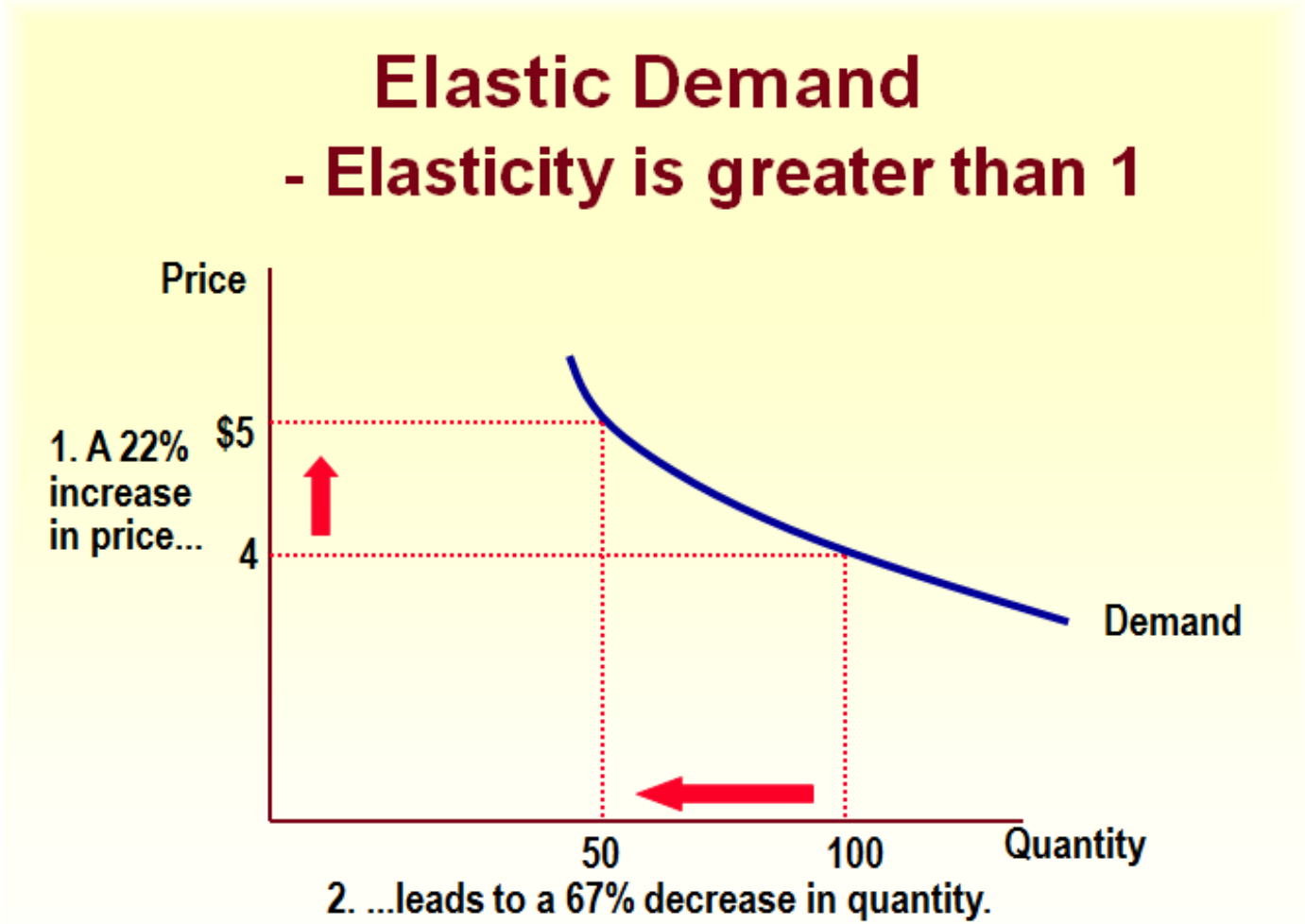
2. Availability of substitutes: *Supertalents? Dinner at home and at the restaurant?*
3. Share of income and expenditures the good occupies: *food; toothpicks; aglets*
4. Time-frame: food today; food in a month

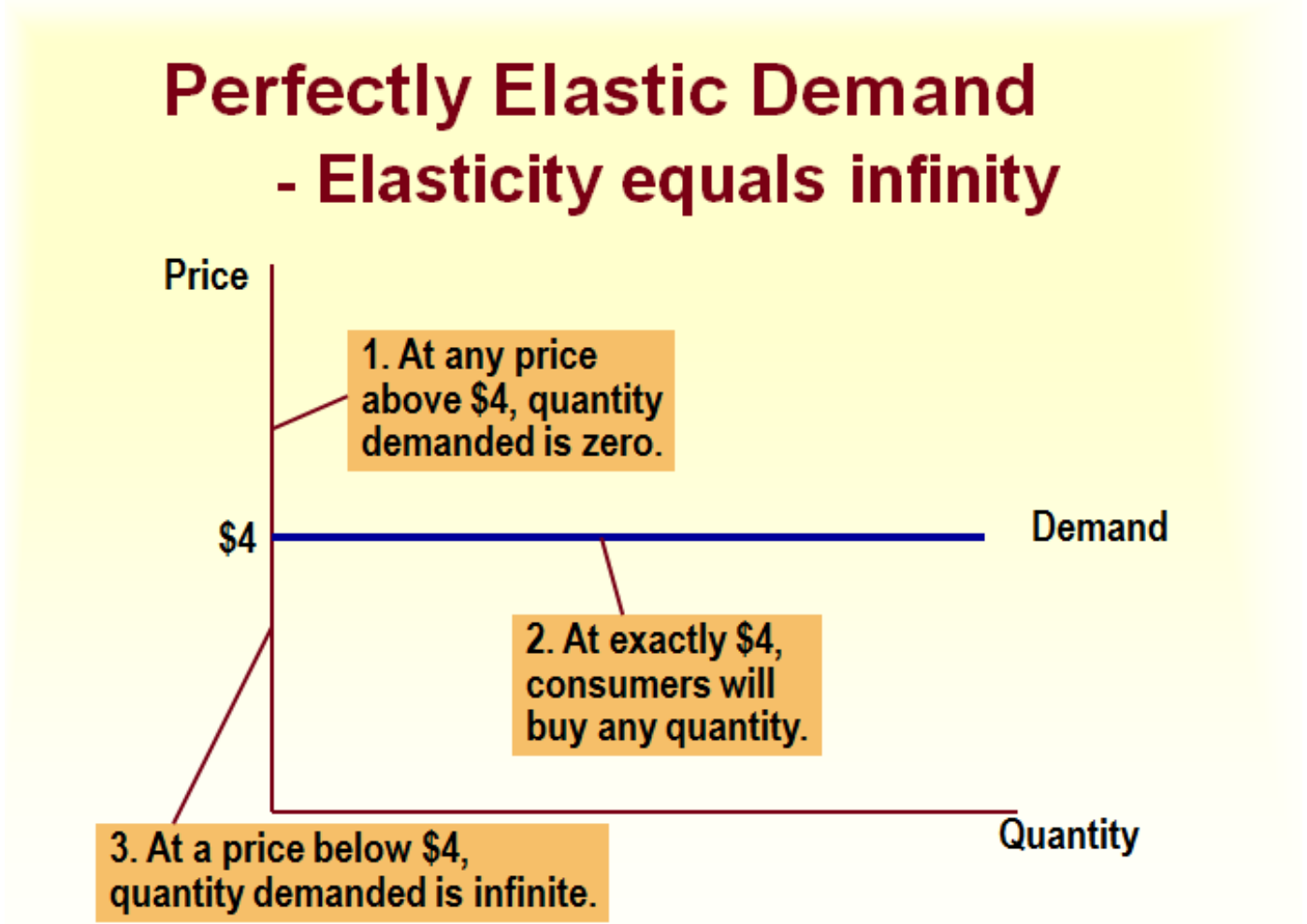


Various Demand Curves

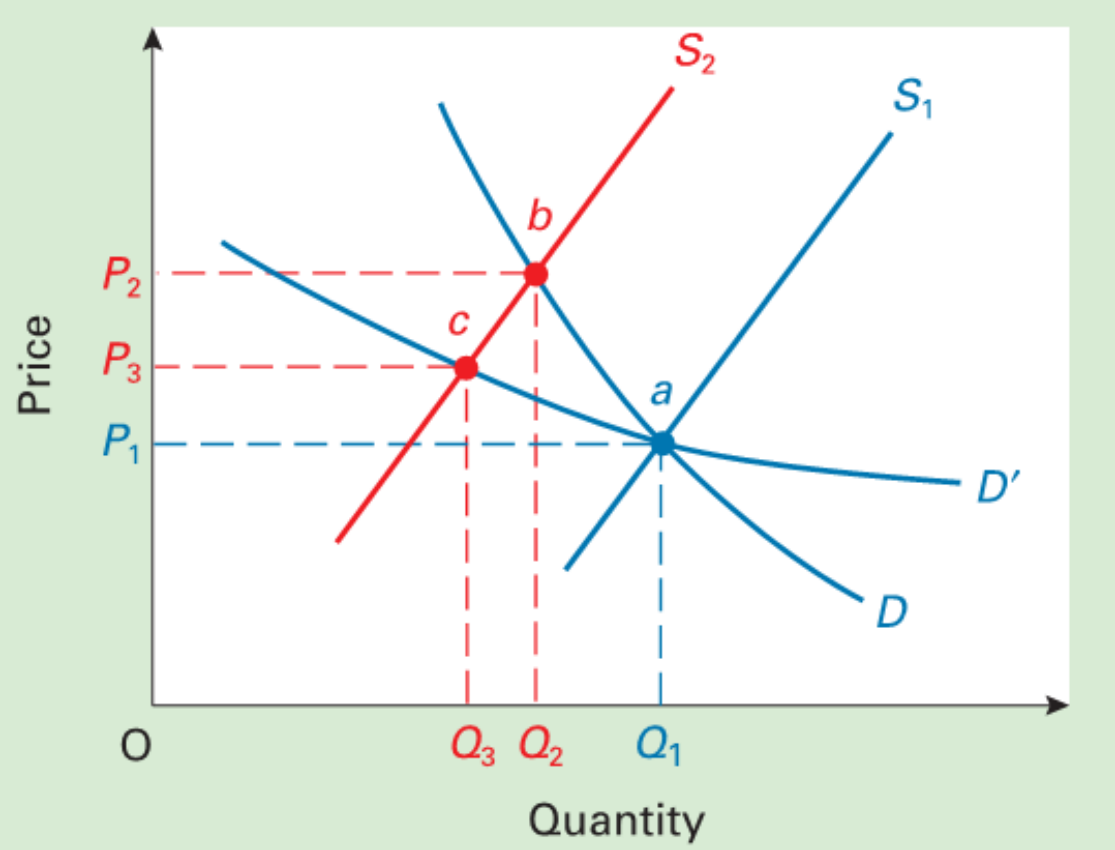
Inelastic Demand







Elasticity and Market Equilibrium



How does the Equilibrium outcome depend on the own-price elasticity?

Recall the PED formula. Which way do you go: A to B or B to A? Are the elasticities the same? How to avoid the problem?

The midpoint formula:

$$\epsilon_{p_x}^{D_x} = \frac{\frac{\Delta Q}{(Q_1+Q_2)/2}}{\frac{\Delta P}{(P_1+P_2)/2}}$$

Exercise: Design your own example by using the original formula and the midpoint formula. Notice the differences.

Own-Price Elasticity of Supply

Defining supply elasticity

The general model: $S_x = f(p_x, E\{p_x{}^{t+1}\}, p_i, T, N, \pi_{alt}, ...)$

Supply elasticity

A measure of how much supply reacts to changes in its factors

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Price elasticity of supply

By how much (in % points) does supply change if price changes by 1%

$$\epsilon_{p_x}^{S_x} = \frac{\Delta S_x = ?\%}{\Delta p_x = 1\%}$$

Factors influencing the PES:

1. time period: short Vs. long
2. spare capacity: small Vs. large
3. the state of the economy (related to capacity): boom Vs. downturn
4. the mobility of production factors

Supply elasticity

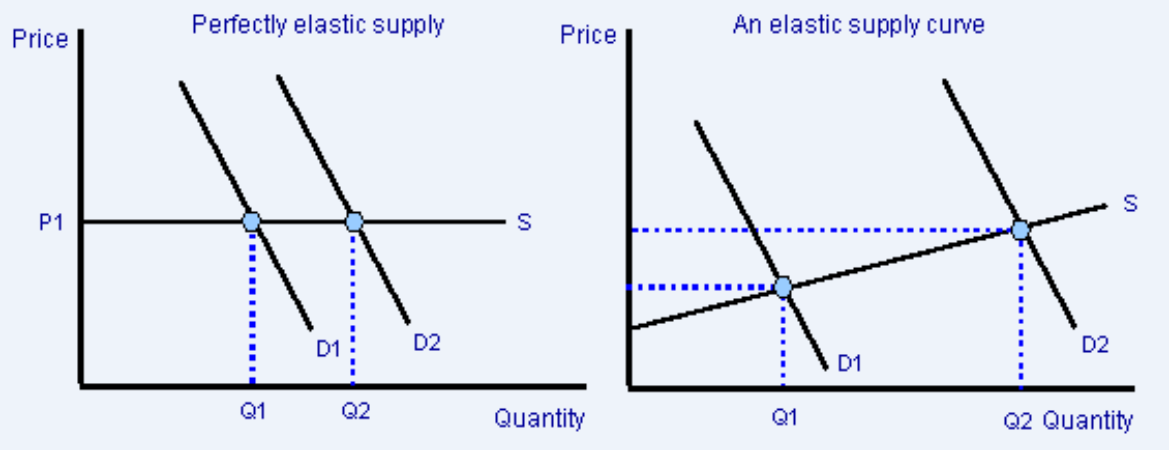
Two exercises

Based on your knowledge of PED, do the following:

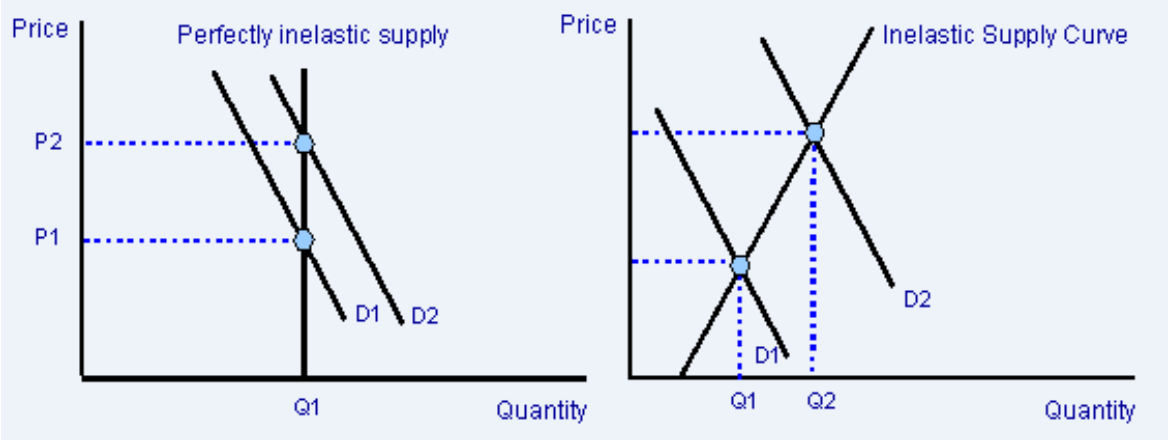
1. Use the midpoint formula to derive the PES for a given S curve.
2. Draw the variety of supply curves based on their elasticity.

Supply elasticity

A graphical representation



Elastic supply



Inelastic supply

Further Info

Reading:
M-T, ch.4: 72-95

Do not miss:
economist.com; wsj.com; cnbc.com