Session #1

Fundamentals of Microeconomics

INTRODUCTION, THEORY OF DEMAND

September 29, 2019

Microeconomics is a science studying allocation of scarce resources

- Individuals, firms and governments have to decide about optimal allocation of resources, which are limited.
- Most often, these decisions concern questions about what kinds of goods or services should be produced, how they should be produced and how they should be distributed in the society.
- Individual decision makers interact, and based on these interactions, the market price of the good or service is determined.
- Organisation of the market (especially number of firms), information that consumers have and government interventions then determine how much profit individual participants gain, given the level of the market price.

Economic principles can be used to study different types of human activity

- They allow firms to understand the competition environment and to find ways to increase profitability using pricing strategies.
- They describe consumption decisions of household and thus also fluctuation of prices in competitive markets.
- They serve for evaluation of potential impact of policies proposed by governments.
- Moreover, they are used to study other social phenomena such as crime, employment or even sport.

- Course description
- Introduction to basic economic principles
- Definition of demand
- Demand elasticities

The course should make students acquire basics of economic thinking

- **Instructor:** Pavla Vozárová
  pavla.vozarova@fit.cvut.cz
- **Consultations:** Mondays 11:00-12:00, office A929
- **Course objectives:**
  - comprehend the basic economic thinking
  - have a clear understanding of the necessary terminology
  - place the studied concepts in the context of real life situations
- **Course structure:**
  - lectures illustrating the theoretical concepts and their practical applications
  - exercise solving and discussions over the studied topics
  - presentations by students

The course should make students acquire basics of economic thinking

- **Assessment:**
  - to get the assessment (pass/fail), a student must not skip more than 3 sessions (only exception are medical reasons) and he/she is required to do a short presentation (of sufficient quality) on a selected topic
  - to be allowed to take the exam, a student must pass the above mentioned assessment
  - a written exam will take place during the exam period (at least three dates will be proposed)
  - grading of the exam: A - 91-100%, B - 81-90%, C - 71-80%, D - 61-70%, E - 51-60%, F - less than 51%
- **Recommended materials:**
  - Jeffrey M. Perloff: *Microeconomics*
  - N. Gregory Mankiw: *Principles of Microeconomics*

The course should make students acquire basics of economic thinking

- **Outline of the course:**

1. Introduction, theory of demand
2. Profit maximization and theory of supply
3. Market equilibrium
4. Perfect competition
5. Monopoly
6. Game theory
7. Oligopoly
8. Price discrimination
9. Dynamic decision making
10. Uncertainty
11. Asymmetric information

- Course description
- Introduction to basic economic principles
- Definition of demand
- Demand elasticities

Economic models are based on decisions, interactions and aggregations

- Famous economist Gregory Mankiw formulated 10 basic principles of economics.
- First four principles describe the decision making processes of economic agents.
- Subsequent three principles explain how agents interact.
- Last three principles talk about rules applicable to the society as a whole.
- Principles no. 1 to 7 are the basis of microeconomics, principles no. 8 to 10 belong to the field of macroeconomics.

People face *trade-offs*.

EXERCISE: This year, the crop of limes was damaged by a bad weather. How do you think this affected the market for mojito? For rum? For gin?Why?

Principle 2

The cost of something is what you give up to get it.

- Economic agents evaluate costs of an item by the *opportunity costs* it implies.

EXERCISE: Imagine that you were offered business opportunity. You are asked to invest in building a motorcar attraction just outside of Prague. Estimated cost for the motorcar venue is 10 mil. CZK. Given the expected number of customers, you are said that this investment would bring you 500 ths. CZK per year after deducting variable costs. Should you go for it?

All of us face trade-offs and opportunity cost in our lives

- In 2008, the demand for MBA programs increased by 79% in US, by 77% in UK and by 69% in remaining european countries as compared to 2007.
- In the same year, these economies were heavily hit by the financial crises.
- With increasing unemployment, the opportunity costs of further studies have decreased.

PRINCIPLE 3

Rational people and firms think at the *margin*.

- Rational agents systematically and purposefully do the best they can to achieve their objectives.
- The optimal plan of action is adjusted by marginal changes.

EXERCISE: Imagine that you manage an airplane company. Average price per seat is estimated to be $500. Right before the departure, there are empty seats. If someone was interested in flying, but just for $300, would you sell the ticket? Why or why not?

Principle 4

People respond to *incentives*.

EXERCISE: It is common to link CEO's wage to firm's performance. Suppose that your CEO plans to retire in two years. Do you think it might influence his/her performance?

PRINCIPLE 5

Trade can make everyone better off.

EXERCISE: You are big IT corporation required to fulfill various regulatory requirements including complex tax reporting. Will you assing part of your programmers to do the taxes or outsource it to Big 4?

Principle 6

Markets are usually a good way to organise economic activity.

EXERCISE: Discuss how emission permits can help to determine fair price paid by polluters and why the system is currently failing to deliver desired results.

PRINCIPLE 7

Governments can sometimes improve market outcomes.

- There are situations (called *market failures*), in which the market solution is not socially optimal.
- Government policies should help to reach socially optimal outcomes.

EXERCISE: Use of cars is subject to various taxes and policies. Try to list few and discuss their usefulness and necessity.

Principles 8, 9 and 10

A country's standard of living depends on its ability to produce goods and services.

Prices rise when the government prints too much money.

Society faces a short-run trade-off between inflation and unemployment.

- We leave these principles to be discussed in macro classes
- We do not have to take all this too seriously: `https://www.youtube.com/watch?v=7u6Os0TDR6o` ;)

- Course description
- Introduction to basic economic principles
- Definition of demand
- Demand elasticities

Quantity demanded depends on the price of the good and other factors

- The quantity of good that consumers demand depends at the first place on its price. At lower prices, customers usually demand larger quantities.
- Other important factors are:
  - preferences of customers
  - information
  - price of related goods (complements and substitutes)
  - income
  - government rules and regulations

Demand function is the relation between quantity demanded, price and other factors

- General mathematical expression of demand function, where p is price, p_c is price of a complement good, p_s is price of a substitute good, and Y is income:

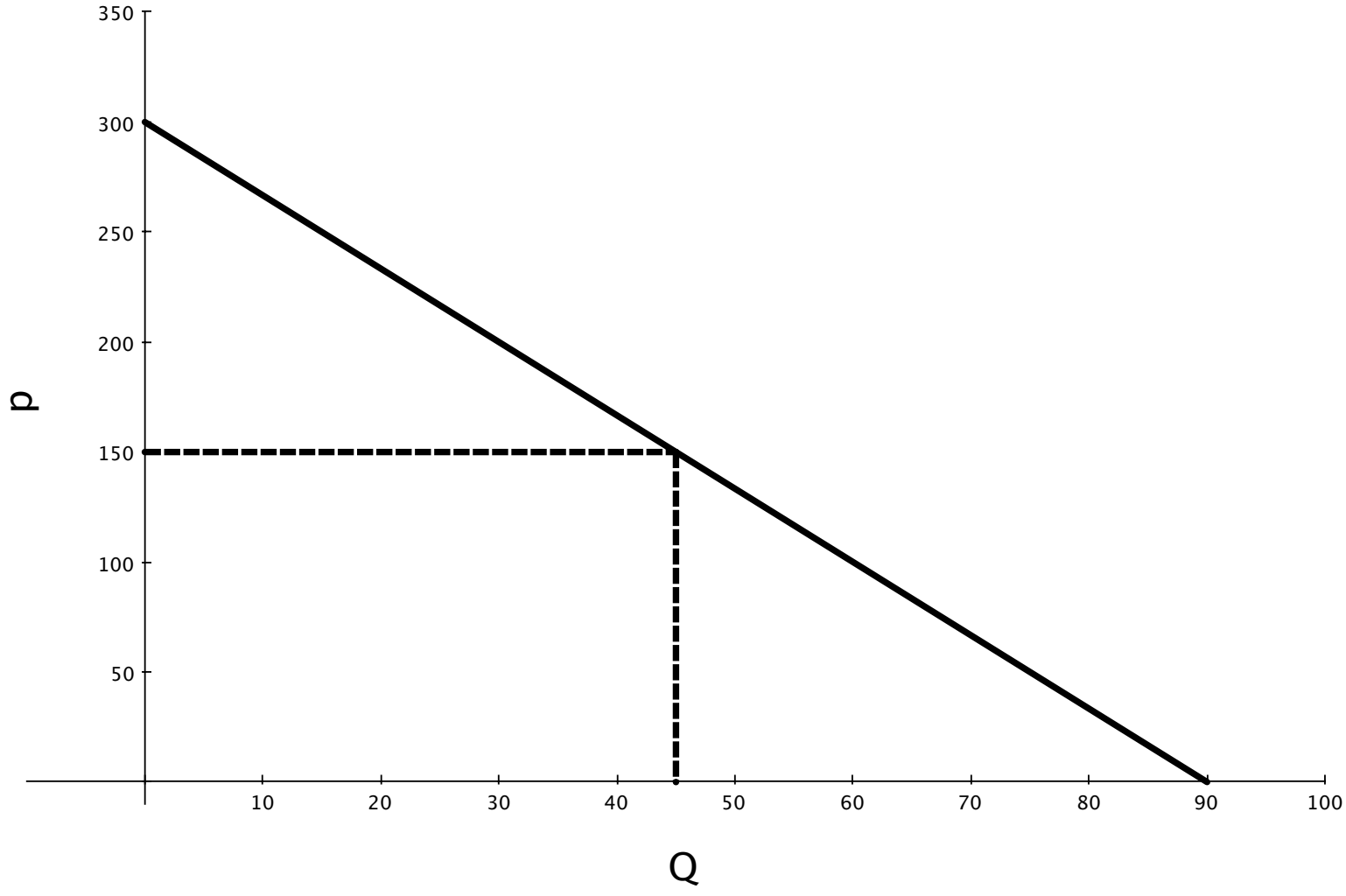
$$Q = D(p, p_c, p_s, Y)$$

- Example - demand for pork meat in the Czech republic (per capita and year):

$$Q = 22 - 0.3p - 0.1p_c + 0.2p_s + 8Y \ ,$$

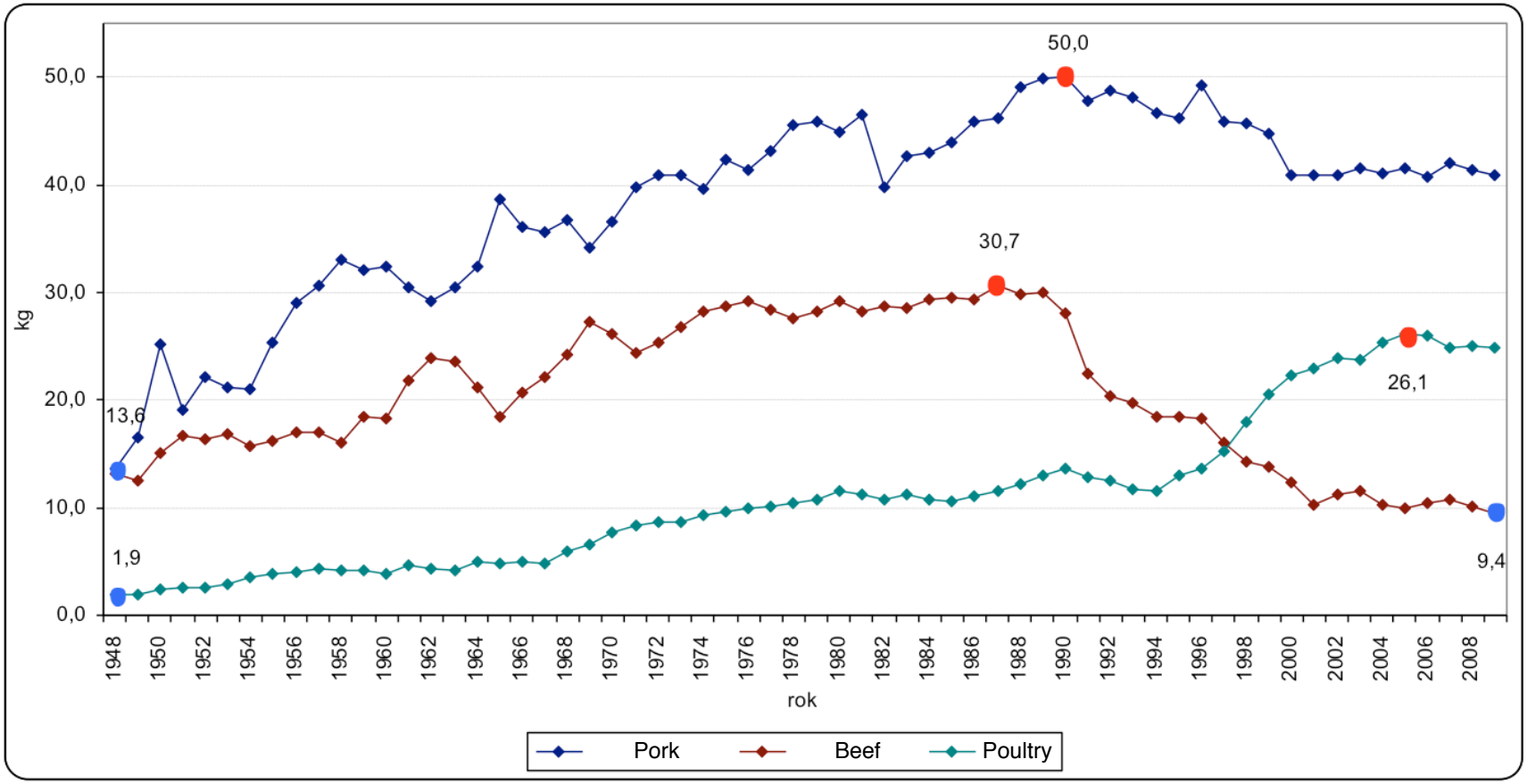
where the quantity Q is expressed in kilograms, p is the price of 1kg of pork in CZK, p_c is the price of 1l of beer in CZK, p_s is the price of 1kg of beef in CZK and Y is income in hundreds of thousands CZK.

Demand curve plots the relation between price and quantity (all other factors fixed)



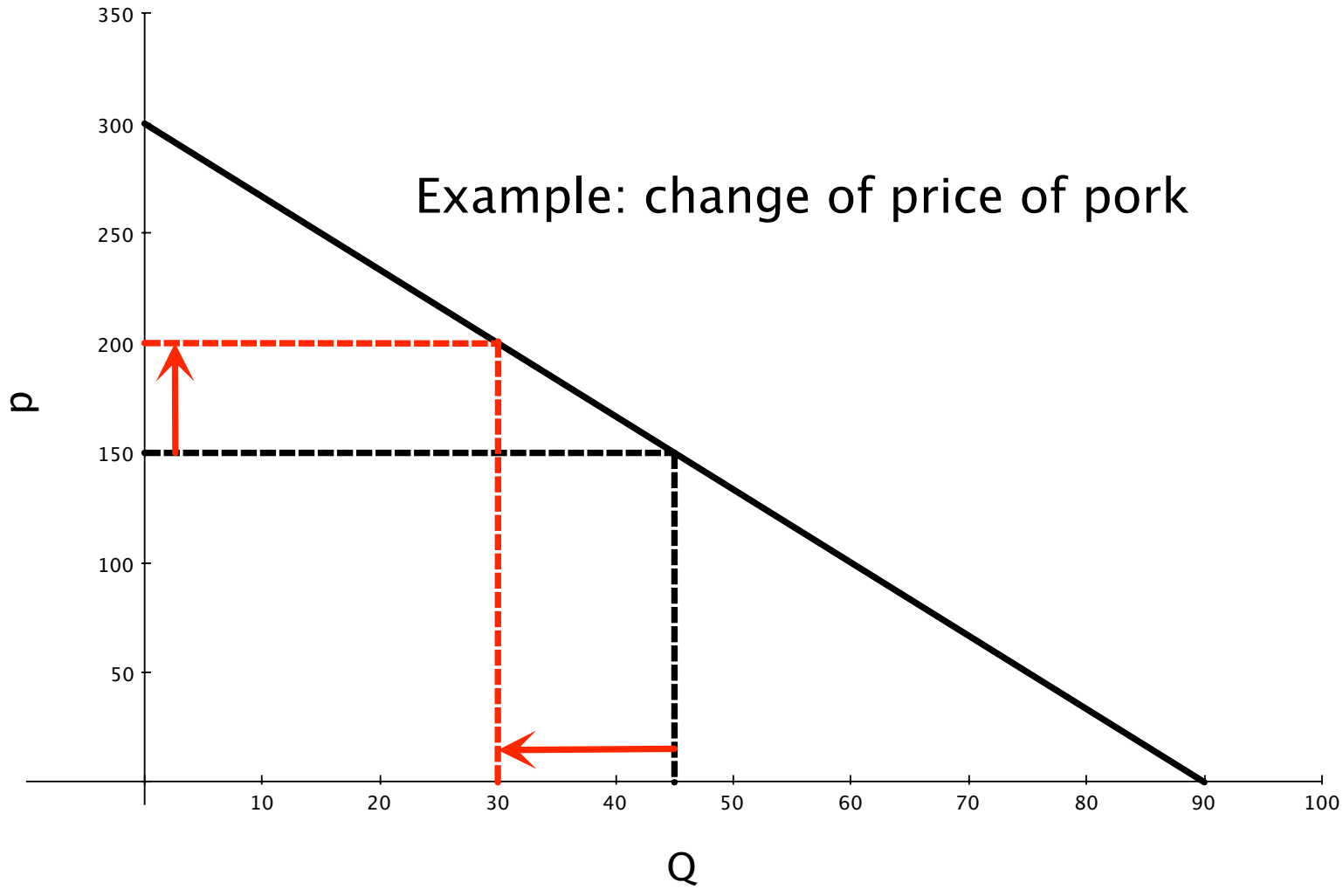
Demand curve allows to explain changes in quantity of consumed good

Meat consumption in the Czech Republic in 1948-2009 (kg per capita)

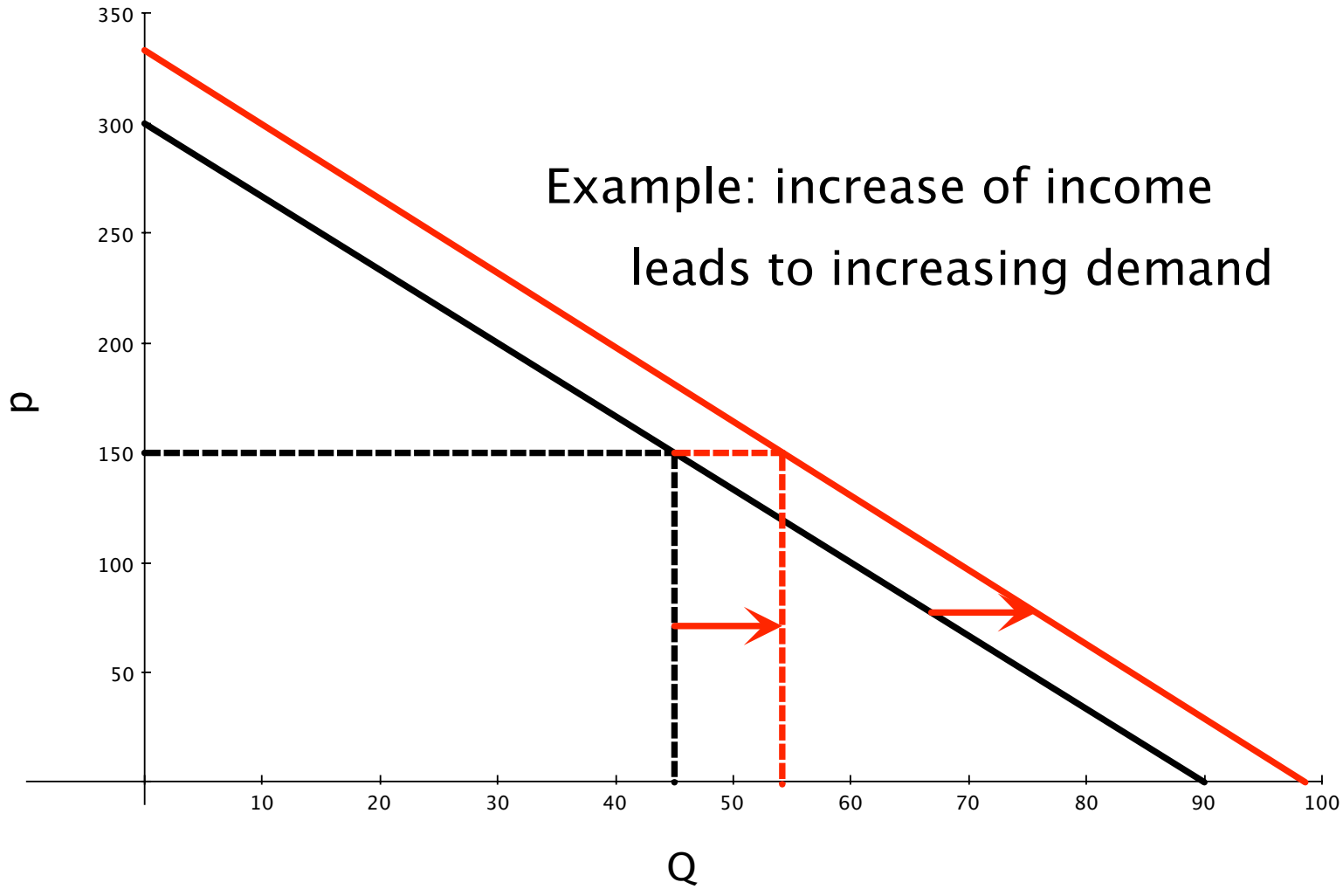


- **EXCERCISE:** Explain changes in meat consumption.

Change of the price of good implies movement along the demand curve



Change of other factors implies shift of the demand curve



EXCERCISE

Suppose that the demand function for pork (per year) is given by the equation

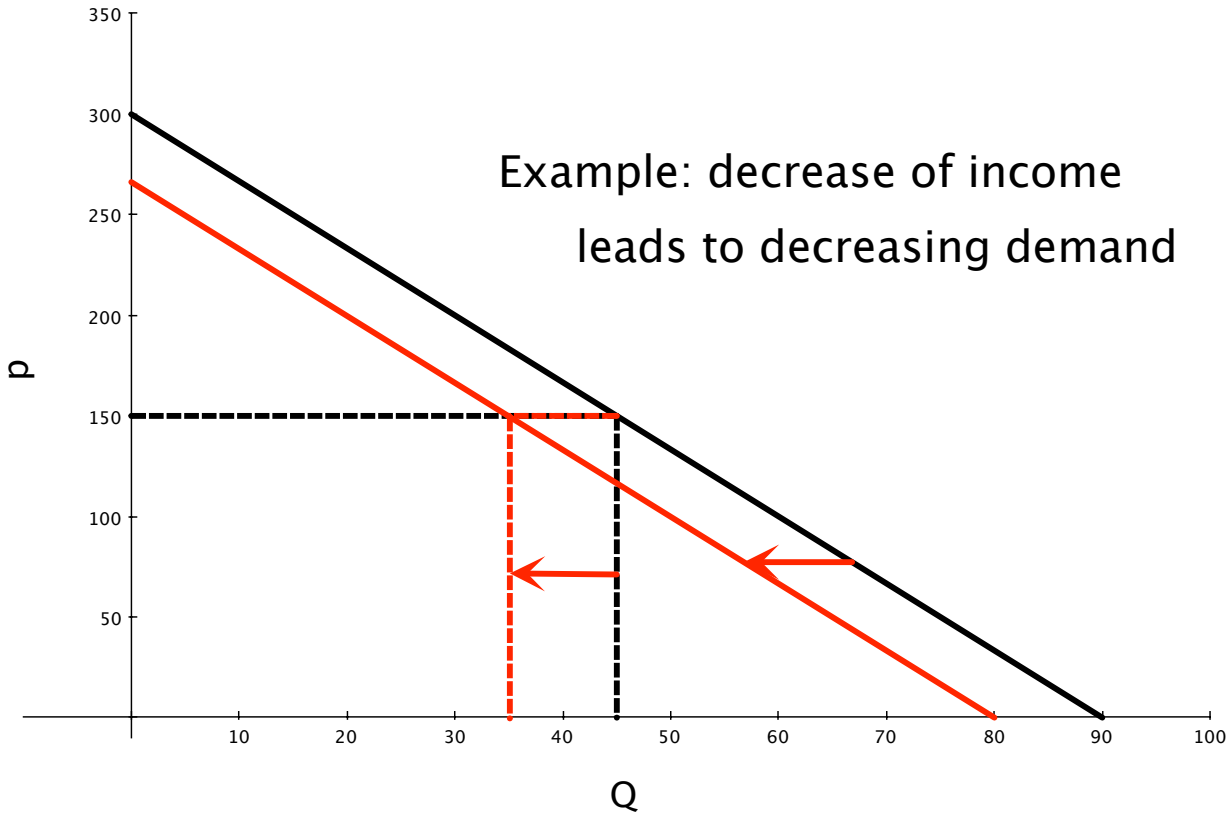
$$Q = 286 - 20p \ ,$$

where Q is measured in millions of kilograms and p is the price per kilogram in dollars.

1. Plot this demand function on a diagram.

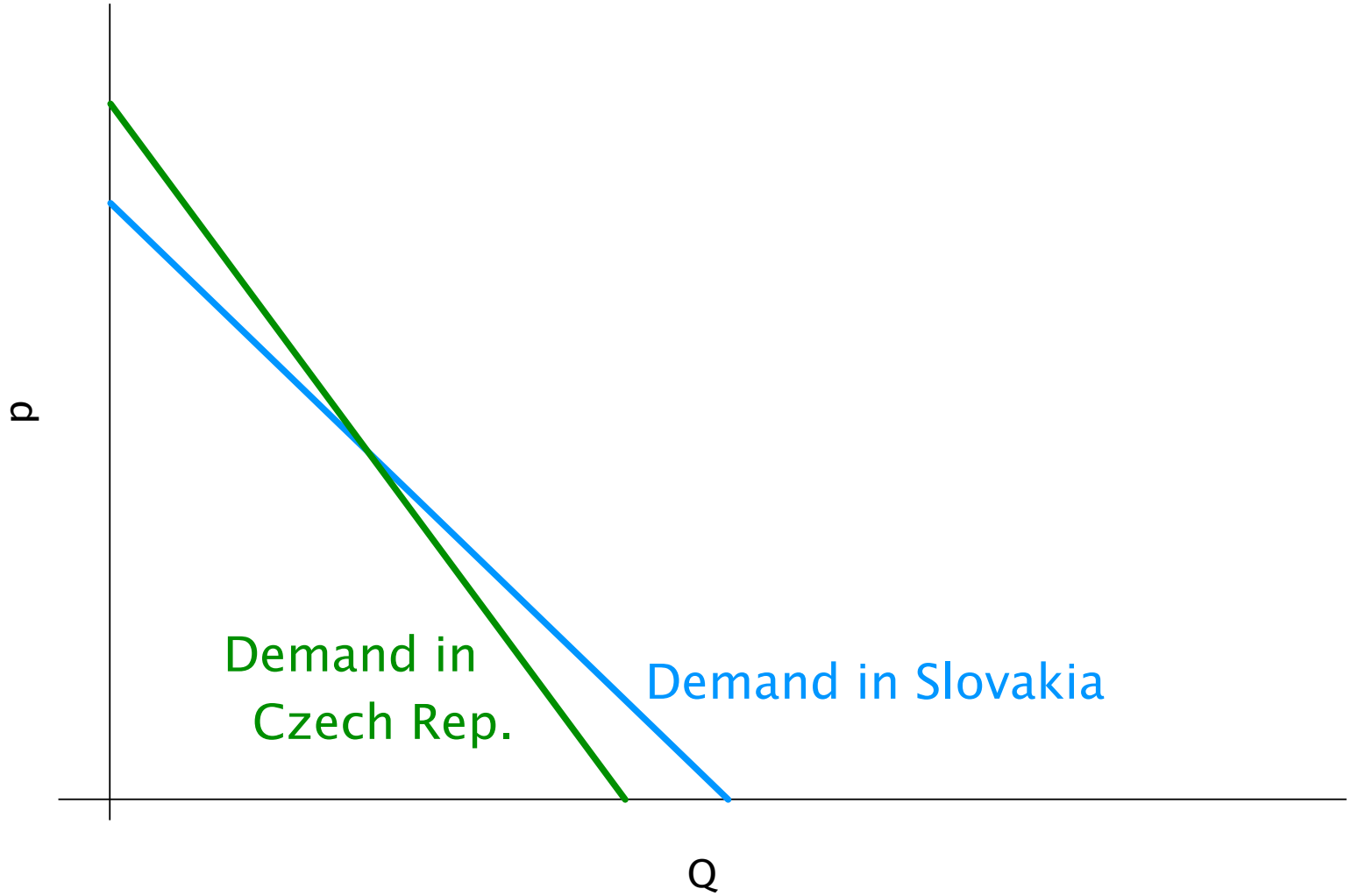
2. Find how much the price would have to rise for consumers to want to buy 2 million fewer kg of pork per year (both analytically and graphically).

Change of other factors implies shift of the demand curve

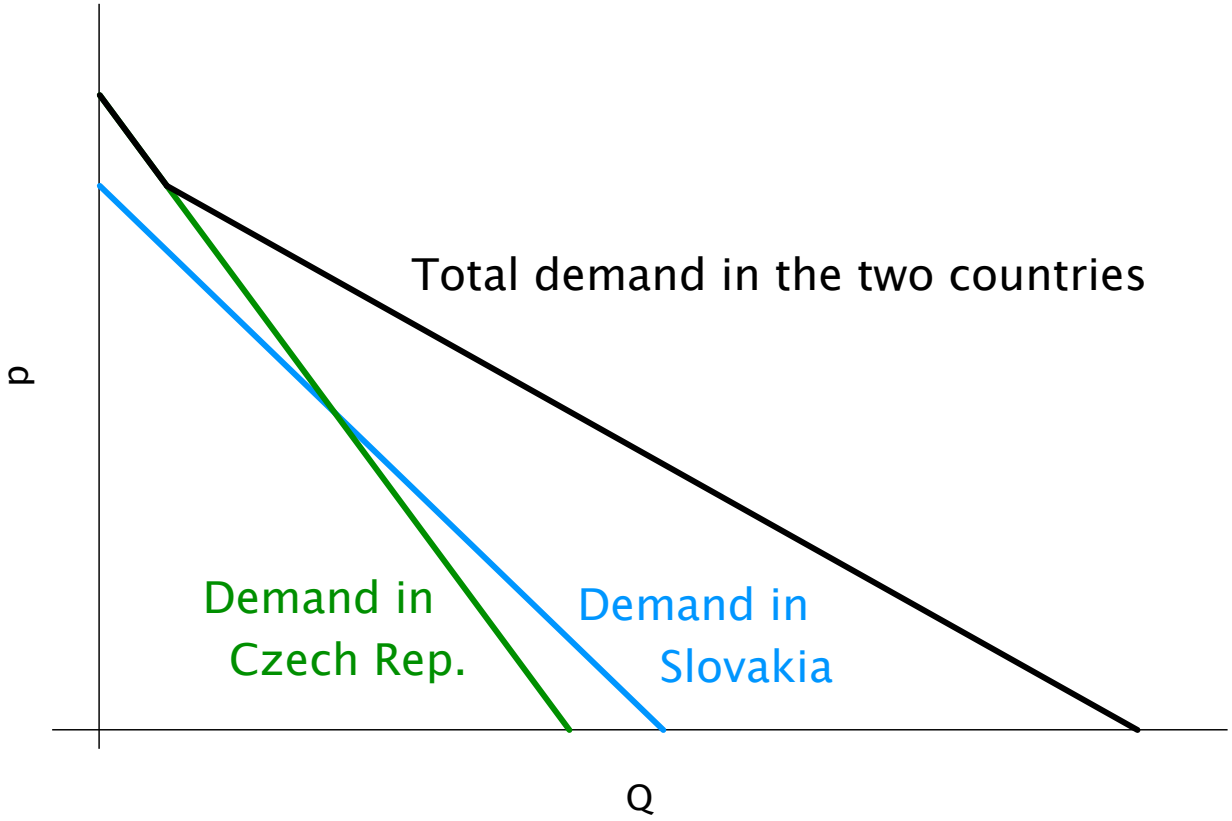


EXCERCISE: Discuss other factors than decrease of income with similar effect on demand curve.

Given the traditional representation, we add the demand curves horizontally



Given the traditional representation, we add the demand curves horizontally



EXCERCISE: Customers from which country will buy product if the price is too high? Why it may be so?

EXCERCISE

The demand function for movies is

$$Q = 120 - p$$

for college students and

$$Q = 120 - 2p$$

for other town residents. What is the total demand function? Use a diagram to illustrate your answer. What are the implications for customer composition at various prices?

- Course description
- Introduction to basic economic principles
- Definition of demand
- Demand elasticities

Elasticity of demand compares relative changes of quantity and price (in %)

- We define the elasticity of demand ε as:

$$\begin{aligned} \varepsilon &= \frac{\text{percentage change of quantity demanded}}{\text{percentage change of price}} \\ &= \frac{\Delta Q/Q}{\Delta p/p} \ . \end{aligned}$$

- Elasticity of demand thus expresses how sensitive to changes in price consumers are.
- In applications, we will compute the elasticity using:

$$\varepsilon = \frac{(Q_2 - Q_1)/Q_1}{(p_2 - p_1)/p_1} \ .$$

Usually, elasticity of demand is not constant with respect to equilibrium price

- The elasticity of demand attains (usually) different values along the demand curve.
- With respect to the value of the coefficient, we talk about:
  - perfectly elastic demand ($\varepsilon = -\infty$)
  - elastic demand ($-\infty < \varepsilon < -1$)
  - unit elastic demand ($\varepsilon = -1$)
  - inelastic demand ($-1 < \varepsilon < 0$)
  - perfectly inelastic demand ($\varepsilon = 0$)
- We observe constant elasticity only for extreme cases of horizontal and vertical demand curves and for the special case of the so called constant elasticity demand.

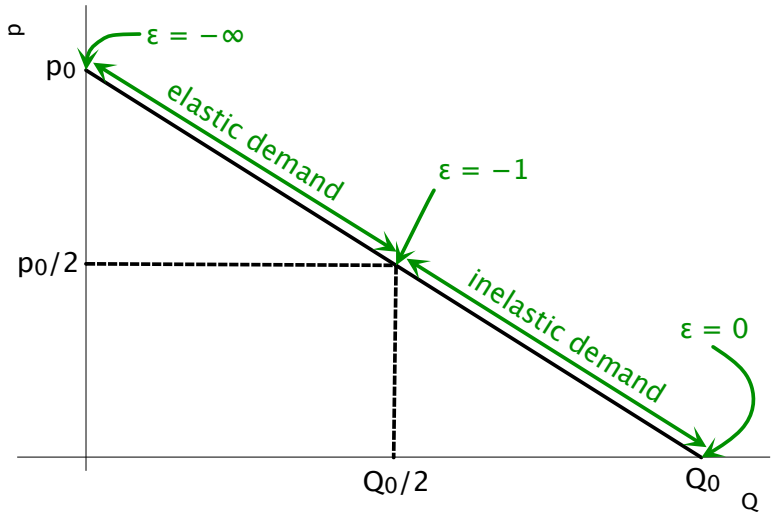
EXCERCISE

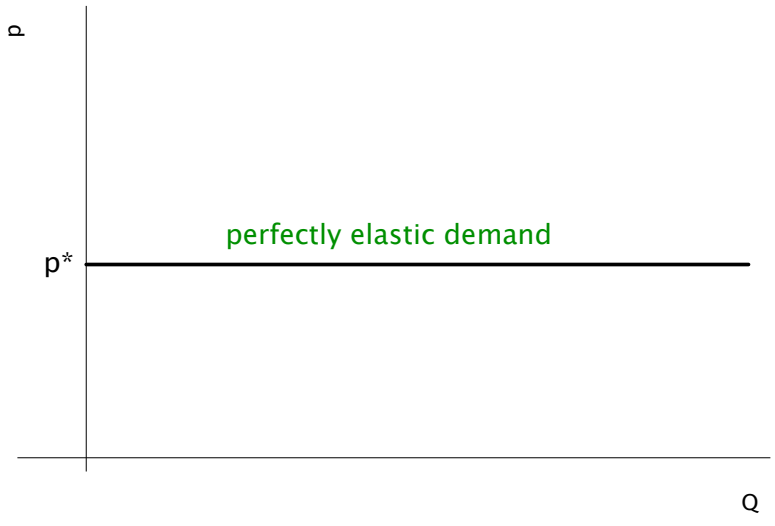
Suppose that business travelers and vacationers have the following demand for airline tickets from New York to Boston:

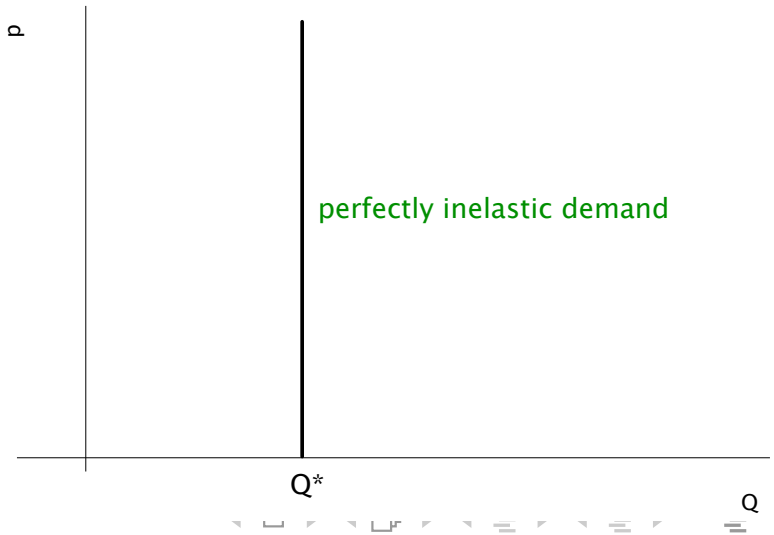
Price	Tickets demanded (business travelers)	Tickets demanded (vacationers)
$150	2100	1000
$200	2000	800
$250	1900	600
$300	1800	400

- A the price of tickets rises from $200 to $250, what is the price elasticity of demand for (i) business travlers and (ii) vacationers? What would the answer be for a change from $250 to $300?
- How can your findings help airlines with pricing? Should there be different pricing schemes during the work days and during the weekend?

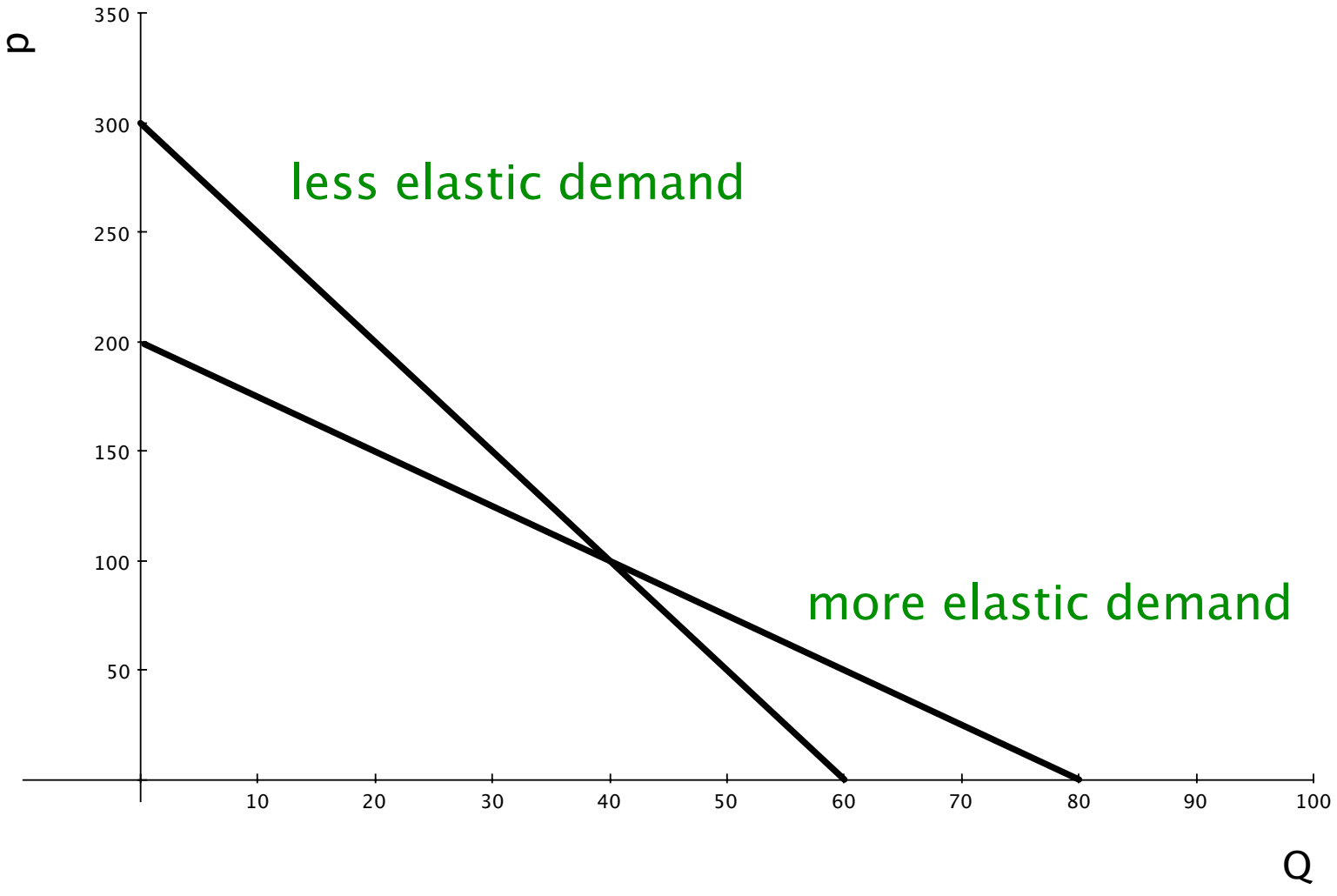
Elasticity of demand usually is not constant with respect to equilibrium price







We can compare different demand curves with respect to their elasticity



EXCERCISE

Consider public policy aimed at smoking.

1. Studies indicate that the price elasticity of demand for cigarettes is about -0.4. If a pack of cigarettes currently costs $2 and the government wants to reduce smoking by 20 percent, by how much should it increase the price?
2. Studies also find that the demand by teenagers is more elastic than the demand by adults. Why might this be true?

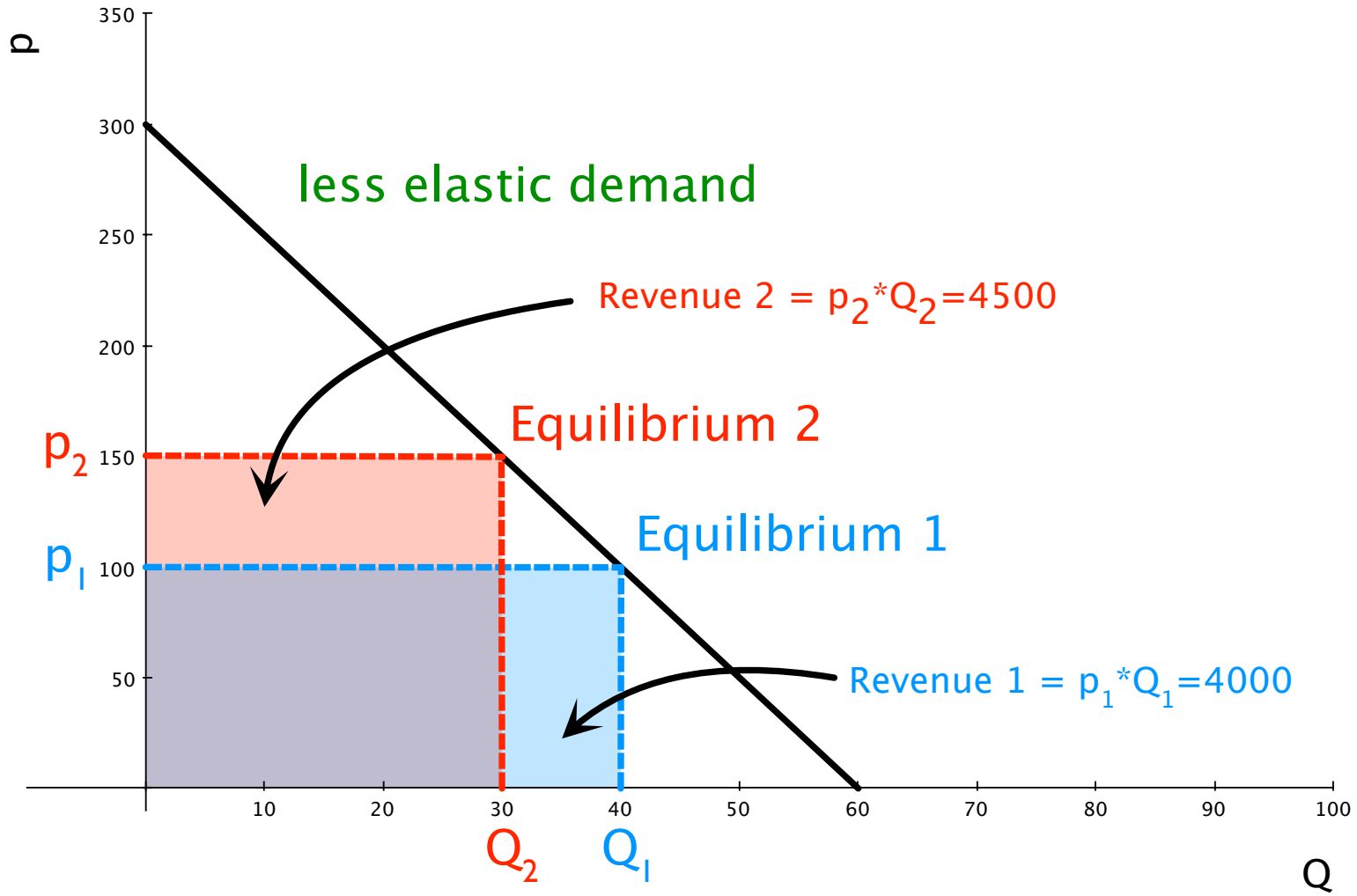
The change of total revenue in equilibrium depends on the elasticity of demand

- We define total revenue as quantity multiplied by price:

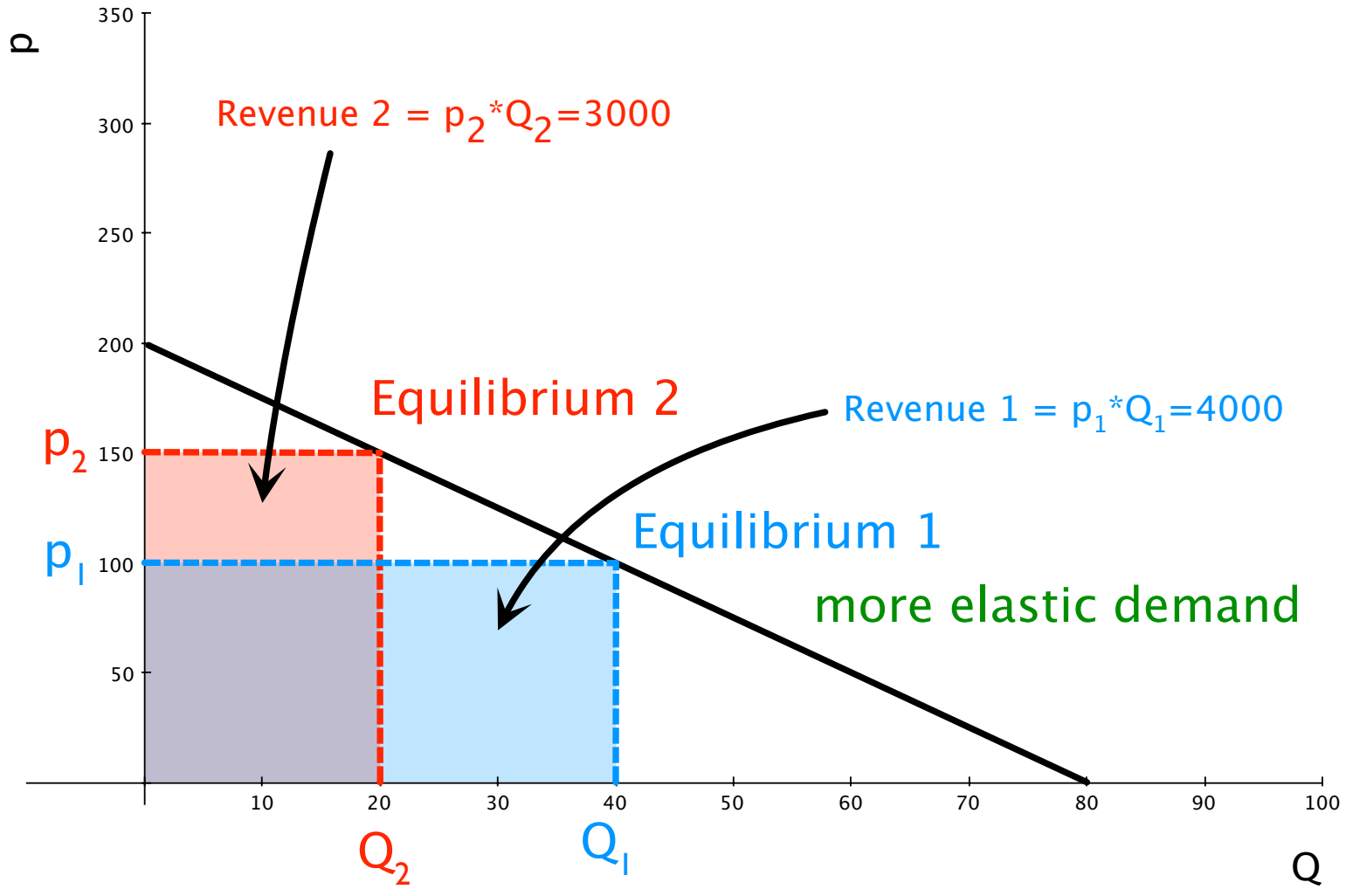
$$\text{Revenue} = p \cdot Q \ .$$

- For inelastic demand, the increase in price leads to smaller decrease in quantity demanded and the revenue rises (the increase of price offsets the decrease of quantity).
- For elastic demand, the increase in price leads to larger decrease in quantity demanded and the revenue falls (the increase of price does not offset the decrease of quantity).
- **EXCERCISE:** Return to the airline example and discuss effect of different pricing schemes on profit.

The change of total revenue in equilibrium depends on the elasticity of demand



The change of total revenue in equilibrium depends on the elasticity of demand



We have to take into account elasticities when evaluating changes of equilibrium

- In 2007, unusually low temperatures in California caused a sharp decline in supply of particular kinds of vegetables.
- Relatively inelastic demand curve resulted in a situation where the increase of prices more than compensated the decrease of volume of sold vegetables.

- Profits of producers of lettuce thus sky-rocketted due to the freezing weather.

In addition to price elasticity, we define also income elasticity of demand

- We define the income elasticity of demand ε_I as:

$$\begin{aligned} \varepsilon_I &= \frac{\text{percentage change of quantity demanded}}{\text{percentage change of income}} \\ &= \frac{\Delta Q/Q}{\Delta I/I} \ . \end{aligned}$$

- Income elasticity of demand thus expresses how sensitive to changes in income consumers are.
- If $\varepsilon_I > 0$, we talk about *normal goods*.
- If $\varepsilon_I < 0$, we talk about *inferior goods*.

EXCERCISE

Being in business with groceries like food and beverages is known to be highly competitive and thus requiring thoughtful pricing strategies responding to changes in customers income as well. Imagine that you are responsible for prices in TESCO.

1. TESCO sells wide variety of products, ranging from Tesco Value to Tesco Finest. Think how the share of customers interested in each category changes in times of recession and in times of economic prosperity.
2. What is the income elasticity of each of these customer types?
3. How can you use this information for your business?

Further, we define cross-price elasticity of demand

- We define the cross-price elasticity of demand ε_{12}

$$\begin{aligned} \varepsilon_{12} &= \frac{\text{percentage change of price of good 1}}{\text{percentage change of price of good 2}} \\ &= \frac{\Delta p_1/p_1}{\Delta p_2/p_2} \ . \end{aligned}$$

- Cross-price lasticity of demand thus expresses how sensitive to relative changes in prices consumers are.
- If $\varepsilon_{12} > 0$, we talk about *complement goods*.
- If $\varepsilon_{12} < 0$, we talk about *substitute goods*.

EXCERCISE

Lets us consider the case of iPhones and Android mobile phones.

1. Are iPhones and Android mobile phones substitutes or complements?
2. Are Android mobile phones among themselves substitutes or complements?
3. Discuss differences in price elasticities among these products.
4. How differences in price elasticities influence firms' profitability in this case?
5. How does it influence firms' pricing strategies?
6. How could manufacturers of Android devices improve their position?
7. Why is the success of these strategies limited so far?