Session #2

Fundamentals of Microeconomics

MARKET EQUILIBRIUM

October 14, 2019

We will describe the equilibrium in the model of demand and supply

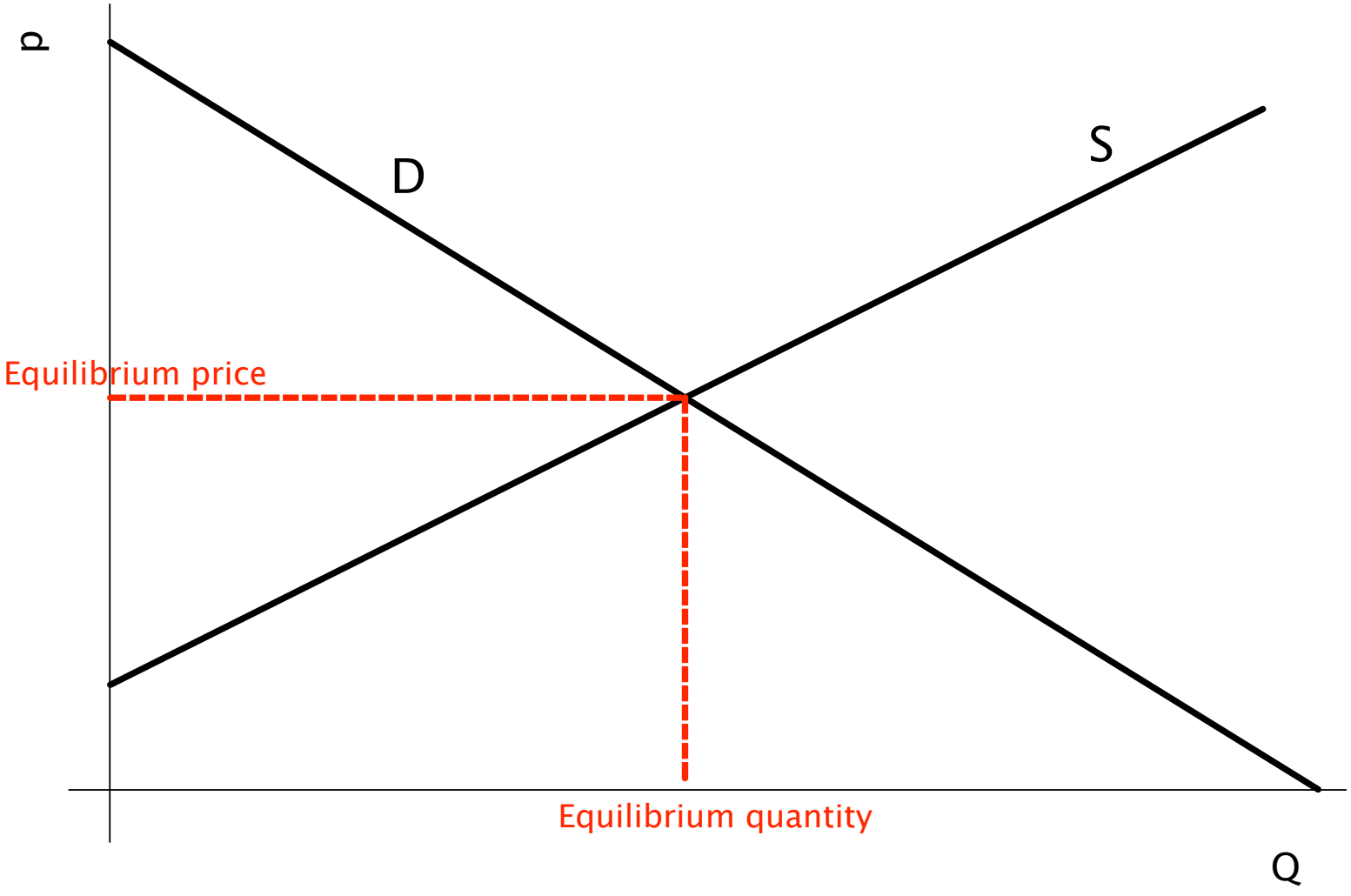
- Demand and supply curves represent the interaction between consumers and producers in the market.
- The demand curve indicates what quantities of good consumers will buy at different prices.
- The supply curve indicates what quantities of good producers will sell at different prices.
- Intersection of these two curves determine the equilibrium in the market - what quantity of good will be interchanged and what will be its actual price.

- Market equilibrium
- Market efficiency
- Price restrictions
- Taxes

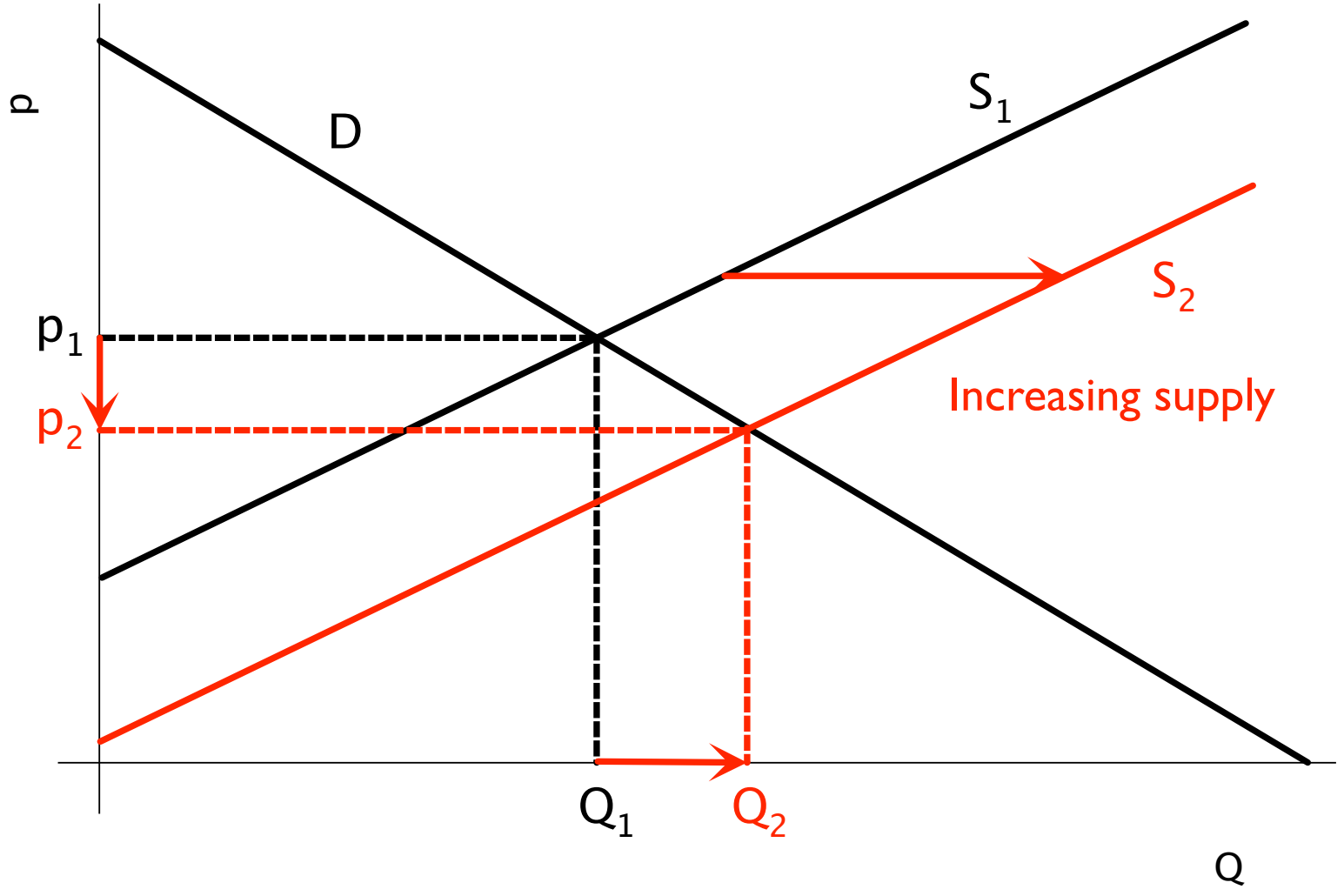
The market is in equilibrium when none of its participants want to change their behavior

- The market is in equilibrium when the quantity demanded is equal to the quantitiy supplied (graphically - when the demand and supply curves intersect).
- We call such quantity the *equilibrium quantity* and the corresponding price the *equilibrium price*.
- The market is driven to equilibrium by the forces of excess supply or excess demand.

THE MARKET IS IN EQUILIBRIUM WHEN NONE OF ITS PARTICIPANTS WANT TO CHANGE THEIR BEHAVIOR



Changes of supply and demand curves lead to changes in equilibrium



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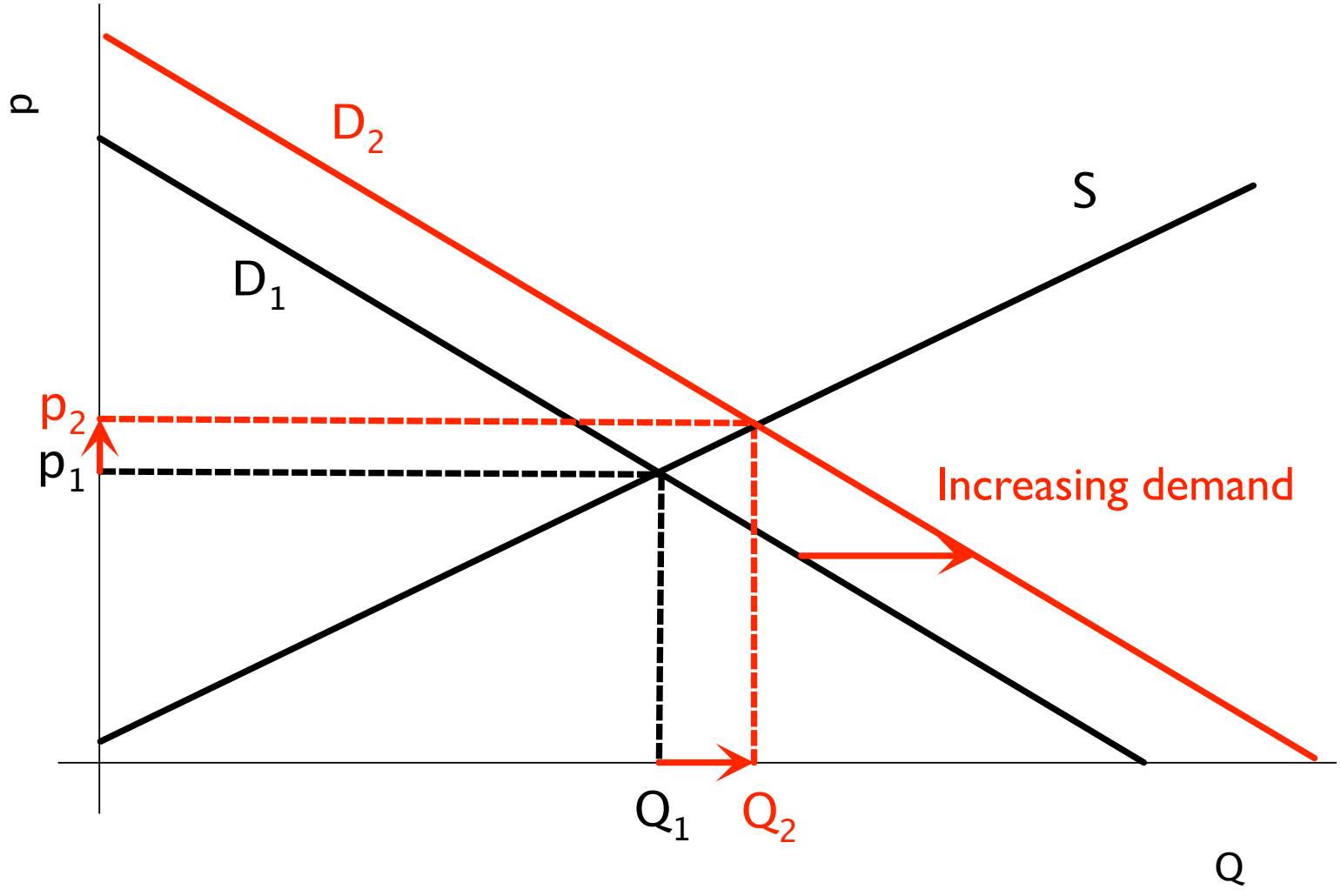


EXERCISE 1

Suppose that introduction of genetically modified corn lowers the costs of its production. At the same time, suppose that some customers are afraid to eat the corn produced in such way. Show graphically how the introduction of genetically modified corn affects the equilibrium price and quantity. Is there a unique answer?

EXERCISE 2

A survey shows an increase in drug use by young people. In the ensuing debate, two hypotheses are proposed:

1. Reduced police efforts have increased the availability of drugs on the street.
2. Cutbacks in education efforts have decreased awareness of the dangers of drug addiction.

- Use supply and demand diagrams to show how each of these hypotheses could lead to an increase in quantity of drugs consumed. (You should draw two diagrams - one for each hypotheses.)
- How could information on what has happened to the price of drugs help us to distinguish between these explanations?

EXERCISE 3

Some occupations require a special license which limits the number of people working in the given profession. Denote by Q the number of people in the particular occupation and by p their wage, and show on a supply-demand diagram how decreasing the number of issued licenses (e.g. imposing stricter exams) impacts the equilibrium if

1. the obligation to have a license limits only the number of people in that occupation
2. the exam also raises the average quality of people in that occupation, thereby also affecting demand.

EXERCISE 4

What is the effect of a United States quota on sugar on the equilibrium in the U.S. sugar market?

Hint: The answer depends on whether the quota binds (is low enough to affect the equilibrium).

- Market equilibrium
- Market efficiency
- Price restrictions
- Taxes

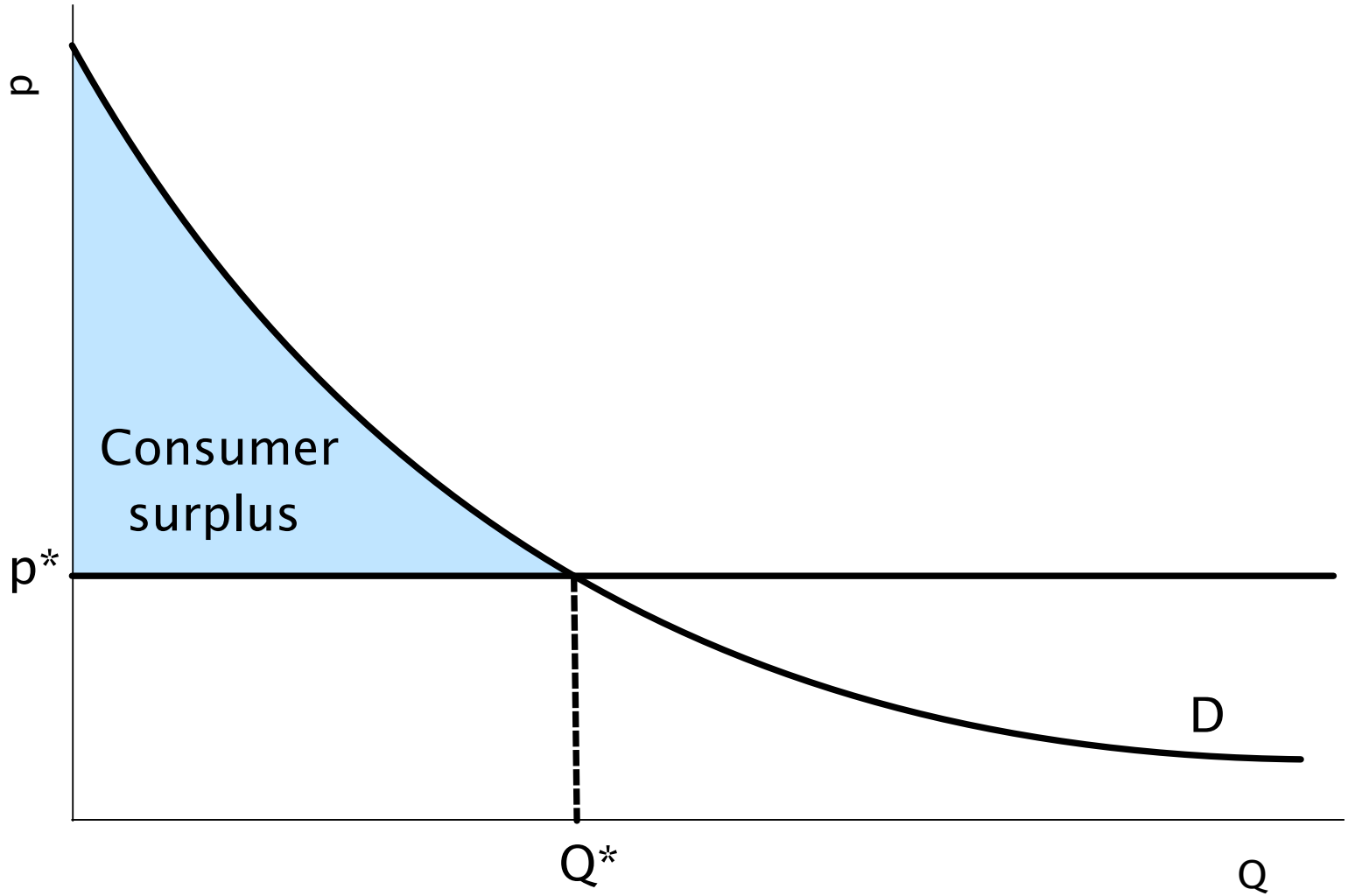
In the following section, we will define the concept of consumer and producer surplus

- We will explain how consumer surplus measures the well-being of consumers and producer surplus measures the well-being of producers.
- In both cases, the surplus will be the difference between the actual price in the market and the price consumers and producers are willing to accept.
- We will define welfare of the society as the sum of consumer and producer surplus.
- Finally, we will talk about welfare maximization in efficient markets.

We measure consumer surplus as the area below the demand curve

- We define the consumer surplus as the difference between the utility from a good and the price that has to be paid to obtain in.
- The utility from a good is measured as the sum that the consumer is willing to pay.
- The demand curve expresses the maximum willingness to pay for each additional unit of good to be consumed.
- Consumer Surplus (CS) can be thus measured as the area below the demand curve D and above the line representing the equilibrium price p^*, up to the equilibrium quantity Q^*.

We measure consumer surplus as the area below the demand curve



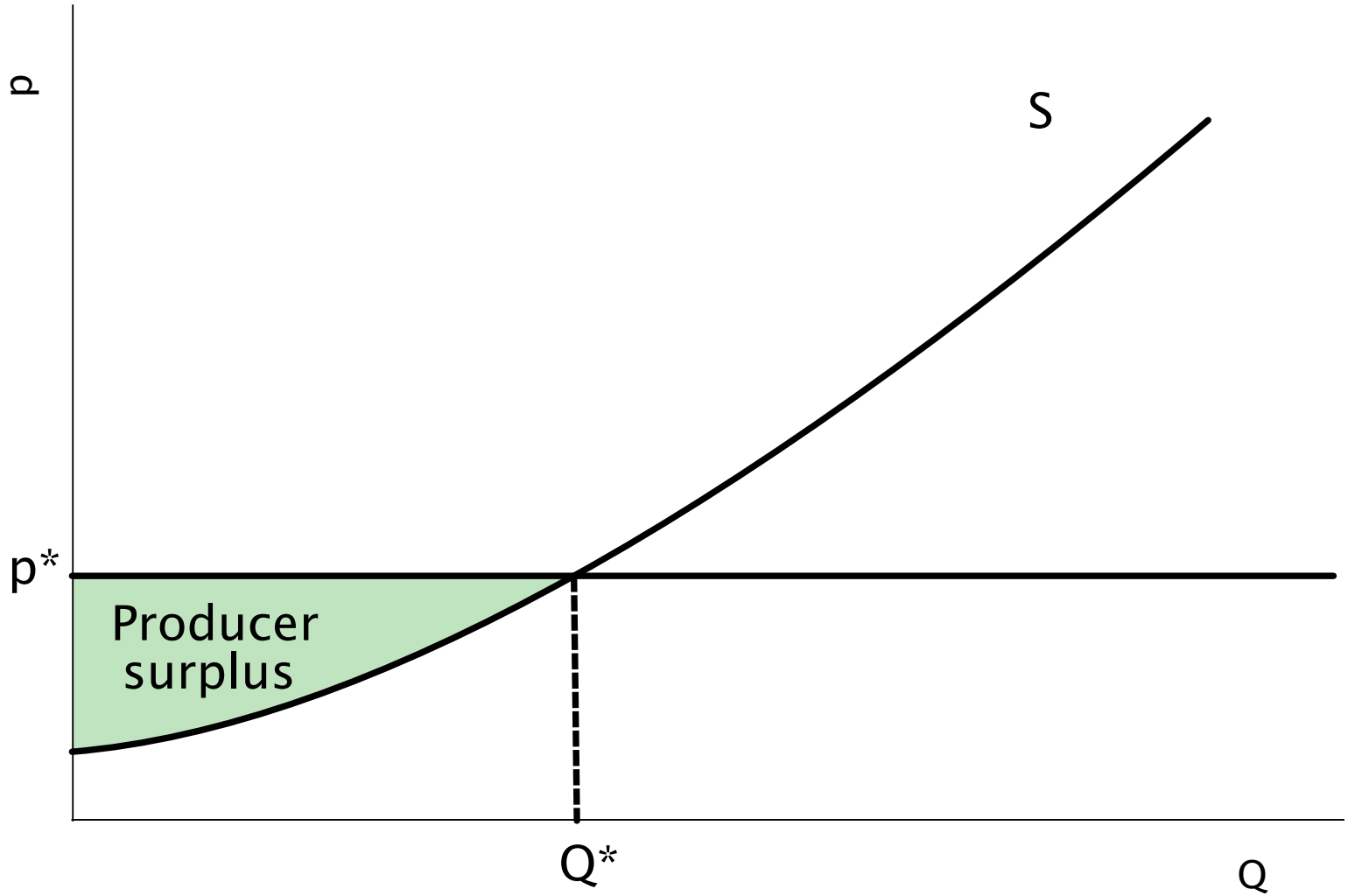
EXCERCISE 5

An early freeze in California sours the lemon crop. Explain what happens to consumer surplus in the market for lemons. Explain what happens to consumer surplus in the market for lemonade. Illustrate your answers with diagrams.

We can use the supply curve to evaluate the producer surplus

- Producers are affected by changes in equilibrium as well.
- We define the producer surplus as the difference between the price at which the firm actually sells the good and the price at which it would be willing to produce it.
- The supply curve expresses the minimum price at which the firm is willing to produce the good.
- Producer Surplus (CS) can be thus measured as the area above the supply curve S and below the line representing the equilibrium price p^*, up to the equilibrium quantity Q^*.

We measure producer surplus as the area above the supply curve



EXCERCISE 6

Suppose the demand for French bread rises. Explain what happens to producer surplus in the market for French bread. Explain what happens to producer surplus in the market for flour. Illustrate your answers with diagrams.

The goal of a social planner is to maximize total welfare of the society

- Equilibrium in the market can by changed by different shocks given by a sudden change of market conditions (often due to government regulations).
- We are interested in evaluating how these changes affect consumers and producers.
- We would like to know under what conditions the joint welfare of consumers and producers is maximized - this is the role of a *social planner*.

We measure welfare of the society as the sum of consumer surplus and producers surplus

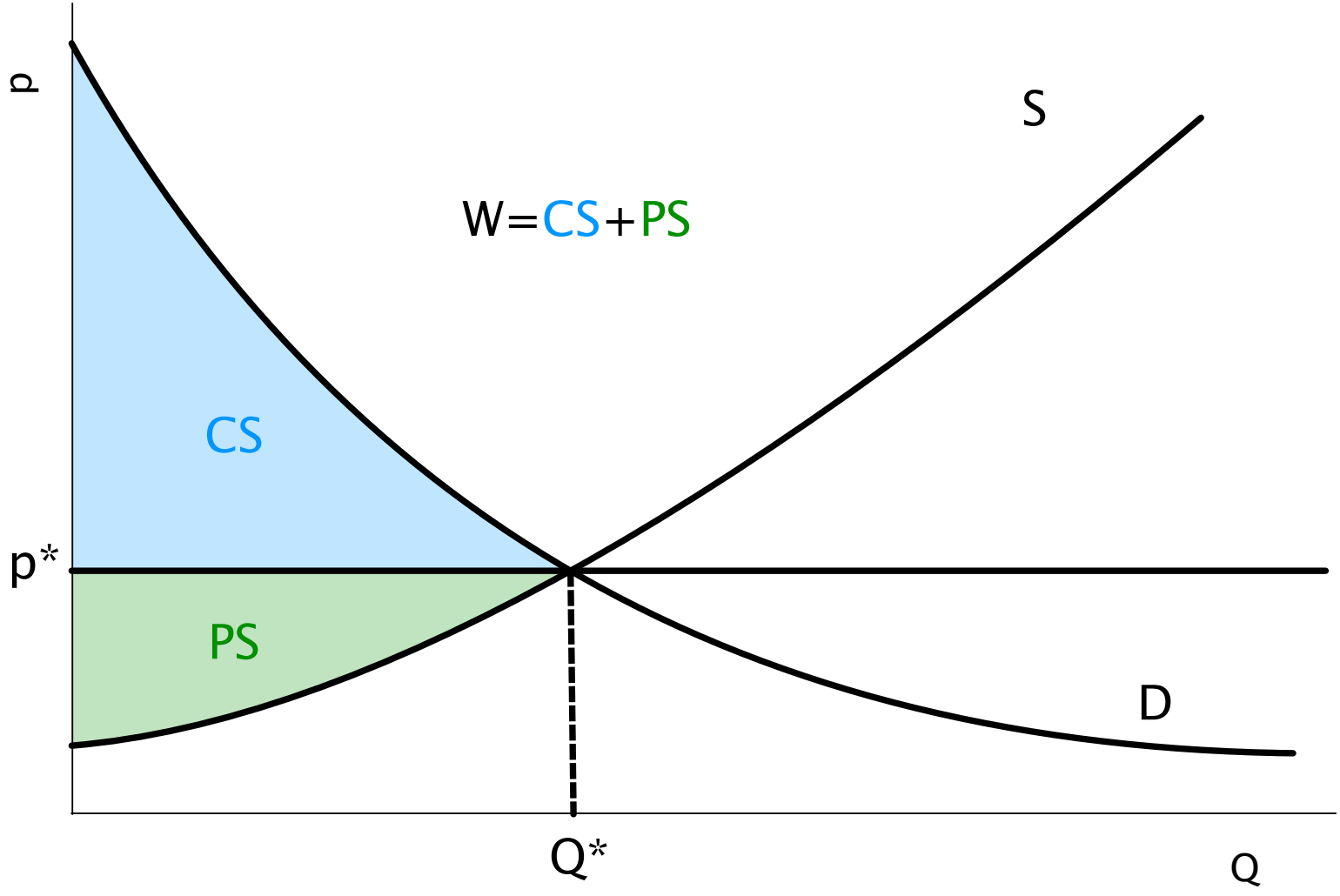
- One commonly used measure of society welfare (W) is the sum of consumer surplus and producer surplus:

$$W = CS + PS \ .$$

- This measure implicitly weights the well-being of consumers and producers equally.
- In case when government imposes taxes (T) on consumers or producers, they are included in the society's welfare (in general we include in welfare all revenues and expenses of government) :

$$W = CS + PS + T \ .$$

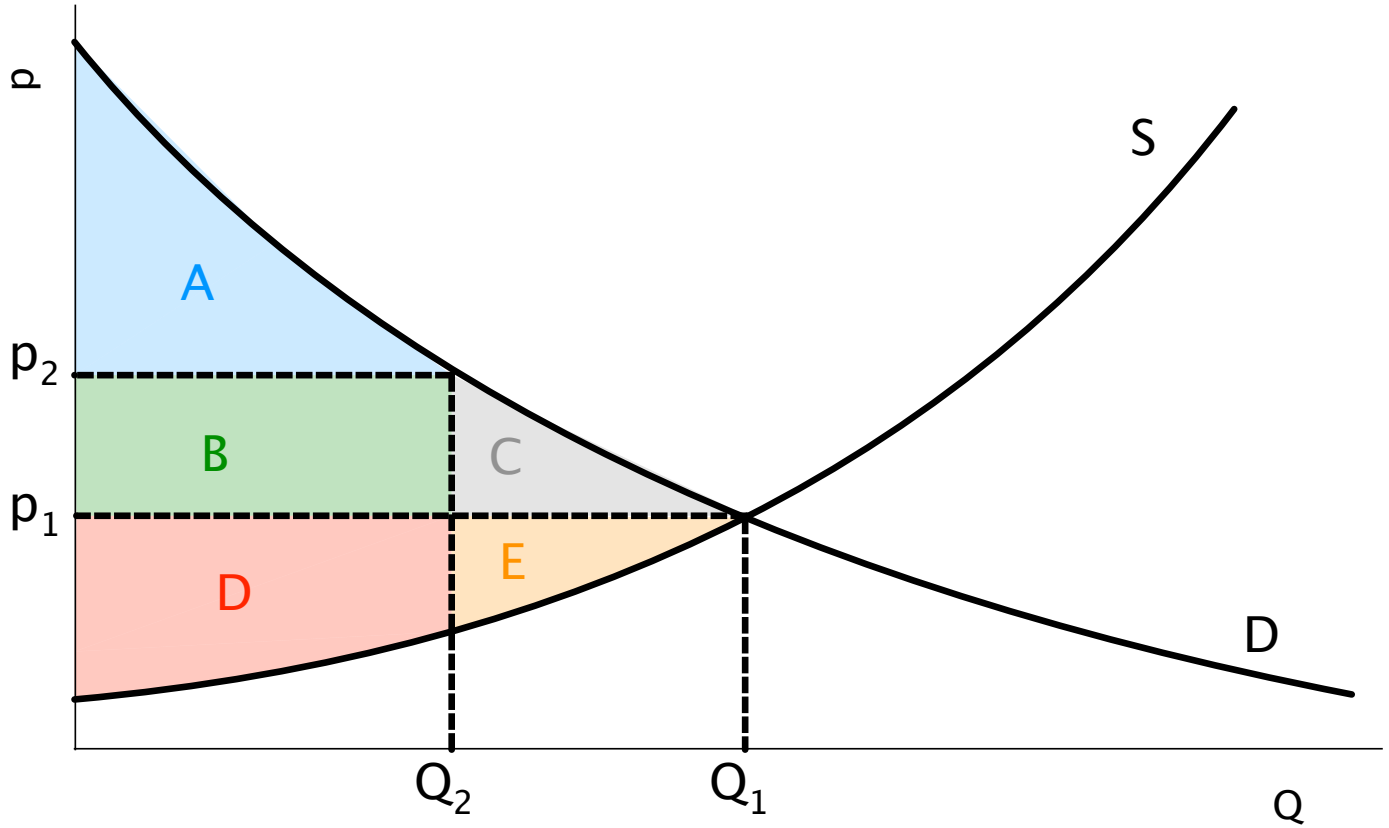
We measure total welfare as the sum of consumer surplus and producers surplus



Optimal allocation in a free market maximizes total welfare

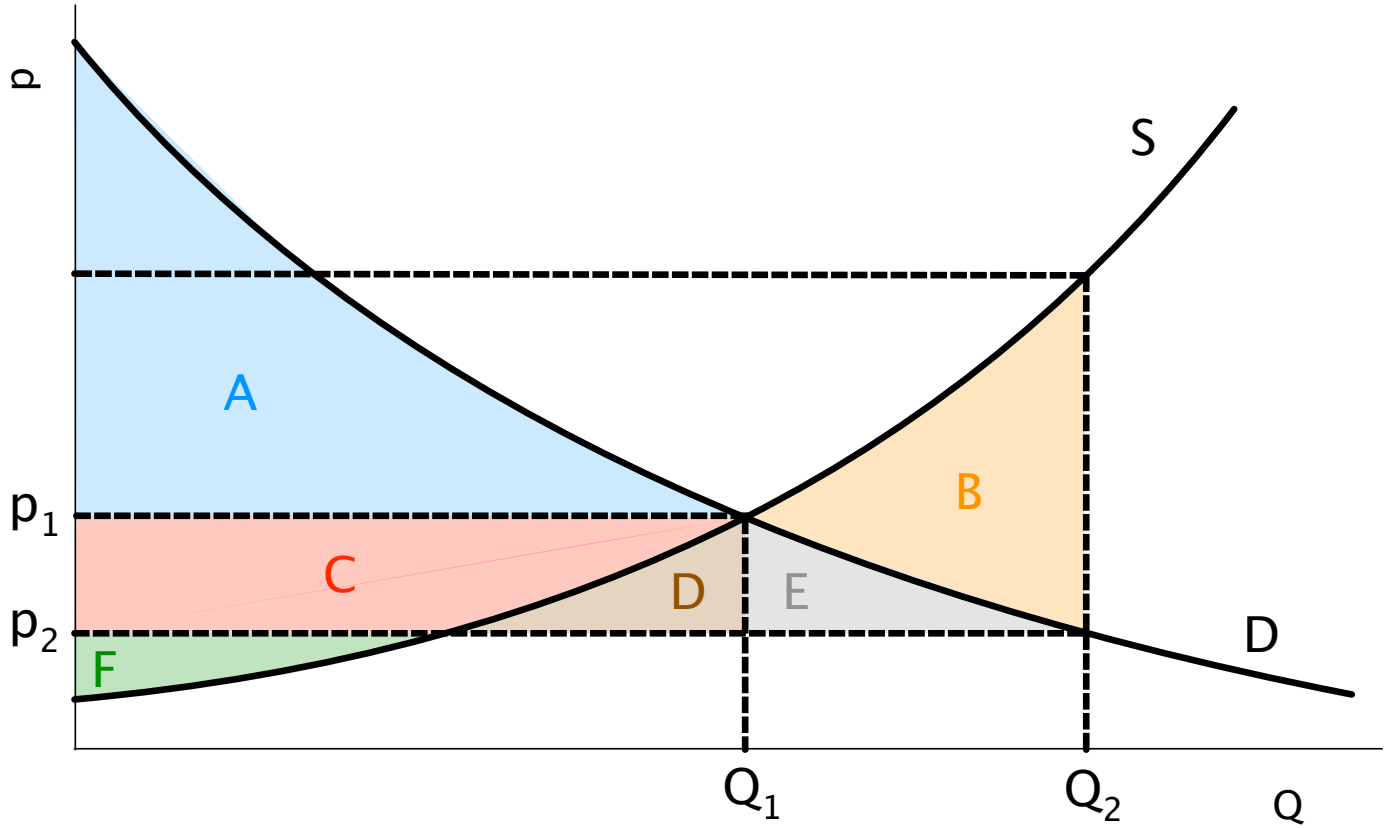
- Suboptimal production leads to a situation in which:
  - some consumers have no access to the good at all and the remaining ones have to buy it at a price which is too high;
  - some firms are excluded from the market;
  - this decrease of welfare is not compensated by increased surplus of producers who can sell at higher prices.
- Production above the optimal level leads to a situation in which:
  - all firms have to sell at lower price;
  - for some firms, such low price does not cover production costs;
  - this decrease of welfare is not compensated by increased consumer surplus.
- Part of welfare is thus lost - we talk about a *Deadweight Loss* (DWL).

Suboptimal production leads to decrease of welfare



	Q_1 (market)	Q_2 (deviation)	Change
CS	A+B+C	A	ΔCS=-B-C
PS	D+E	B+D	ΔPS=B-E
W=CS+PS	A+B+C+D+E	A+B+D	Δ W=-C-D=DWL

Production over optimal level leads to decrease of welfare



	Q_1 (market)	Q_2 (deviation)	Change
CS	A	A+C+D+E	ΔCS=C+D+E
PS	C+F	F-B-D-E	ΔPS=-B-C-D-E
W=CS+PS	A+C+F	A+C+F-B	ΔW=-B=DWL

EXCERCISE 7

The cost of producing flat-screen TVs has fallen over the past several decades. Lets consider some implications of this fact.

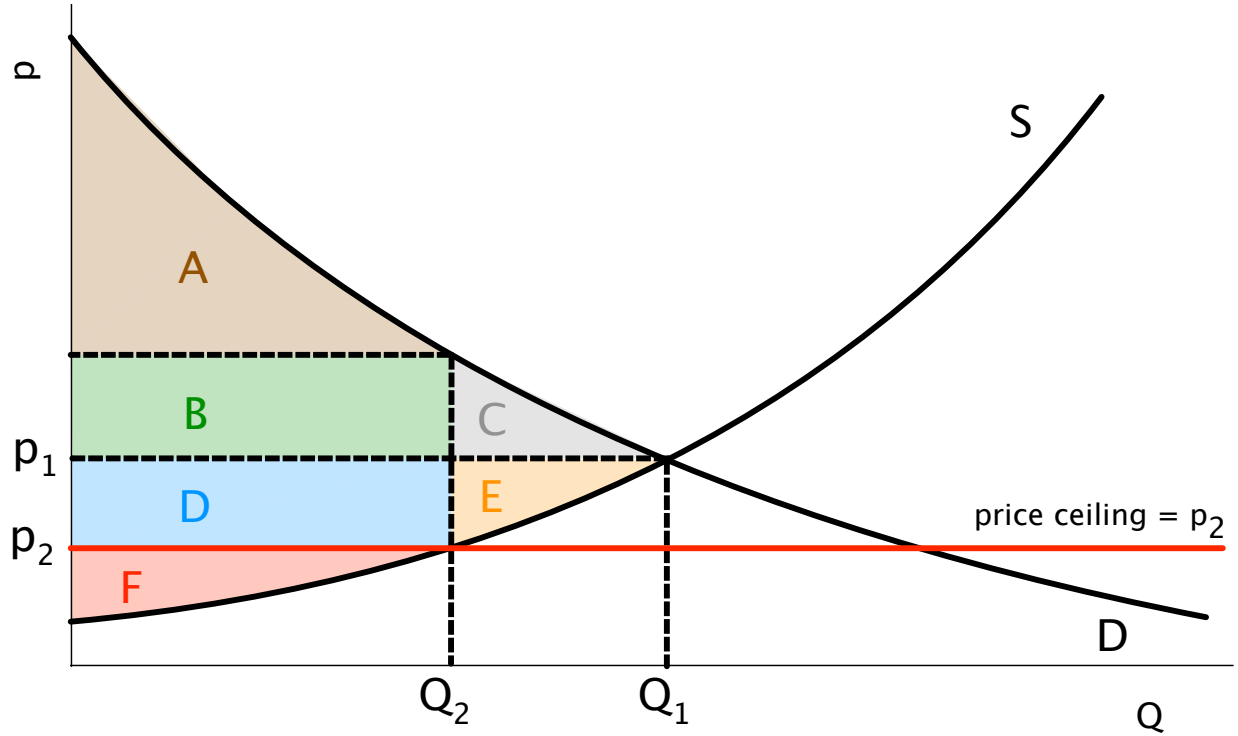
1. Draw a supply-and-demand diagram to show the effect of falling production costs on the price and quantity of flat-screen TVs sold.
2. In your diagram, show what happens to consumer surplus and producer surplus.
3. Suppose the supply of flat-screen TVs is very elastic. Who benefits most from falling production costs - consumers or producers of these TVs?

- Market equilibrium
- Market efficiency
- Price restrictions
- Taxes

Government can introduce price ceiling or price floor

- One of the mechanisms through which government can regulate market outcome is a legal limit on price.
- Price ceiling is a legal maximum on the price at which a good can be sold.
- Price floor is a legal minimum on the price at which a good can be sold.

Introduction of price ceiling reduces producer surplus and society's welfare



	Q_1 (free market)	Q_2 (regulation)	Change
CS	A+B+C	A+B+D	ΔCS=D-C
PS	D+E+F	F	ΔPS=-D-E
W=CS+PS	A+B+C+D+E+F	A+B+D+F	ΔW=-C-E=DWL

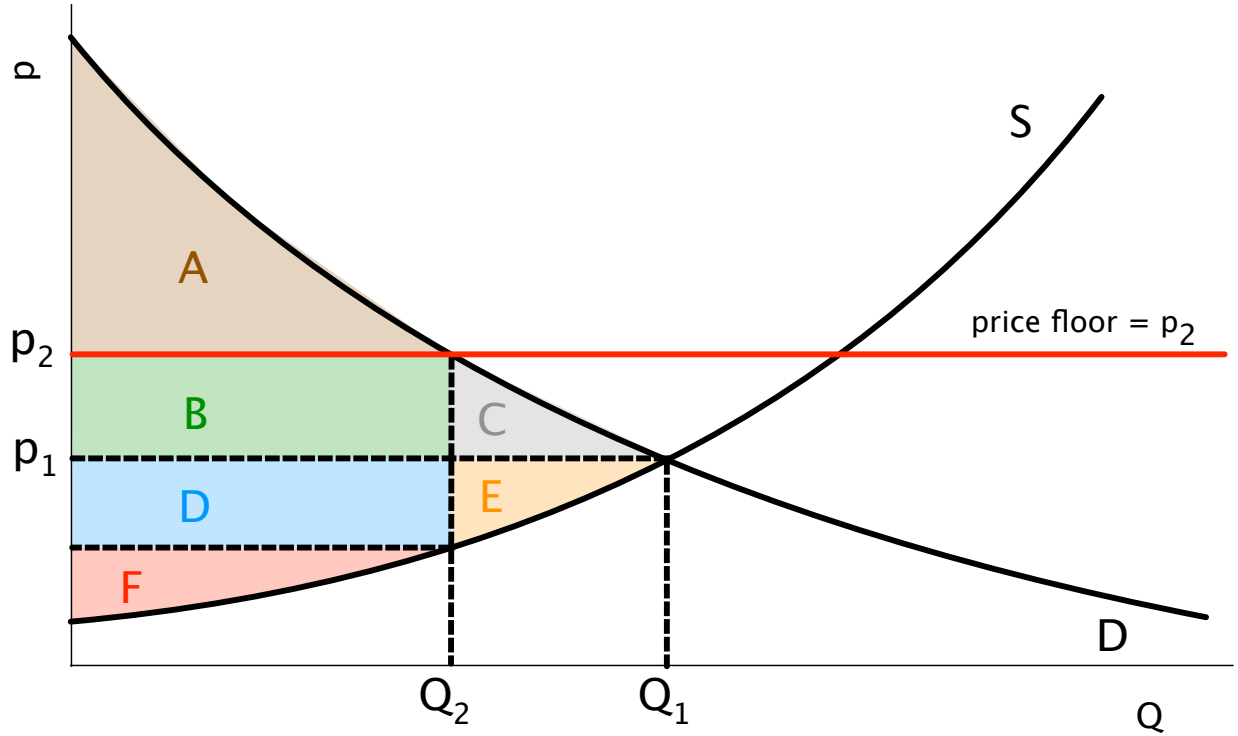
EXCERCISE 8

One common example of a price ceiling is rent control. In many cities, the local government places a ceiling on rents that landlords may charge their tenants. Show the effect of rent control on market equilibrium for two cases:

1. supply and demand are inelastic (short run);
2. supply and demand are elastic (long run).

In both cases, suppose that the regulation is binding.

Introduction of price floor reduces consumer surplus and society's welfare



	Q_1 (free market)	Q_2 (regulation)	Change
CS	A+B+C	A	ΔCS=-B-C
PS	D+E+F	B+D+F	ΔPS=B-E
W=CS+PS	A+B+C+D+E+F	A+B+D+F	ΔW=-C-E=DWL

EXCERCISE 9

An important example of a price floor is the minimum wage. Minimum wage laws dictate the lowest price for labor that any employer may pay.

1. Show the effect of minimum wage on market equilibrium when regulation is binding.
2. Consider the situation when regulation is not binding. Suppose that the economic crisis hits the country and several businesses have to close. Can this make the regulation binding?

In extreme cases, government intervention can have catastrophic consequences

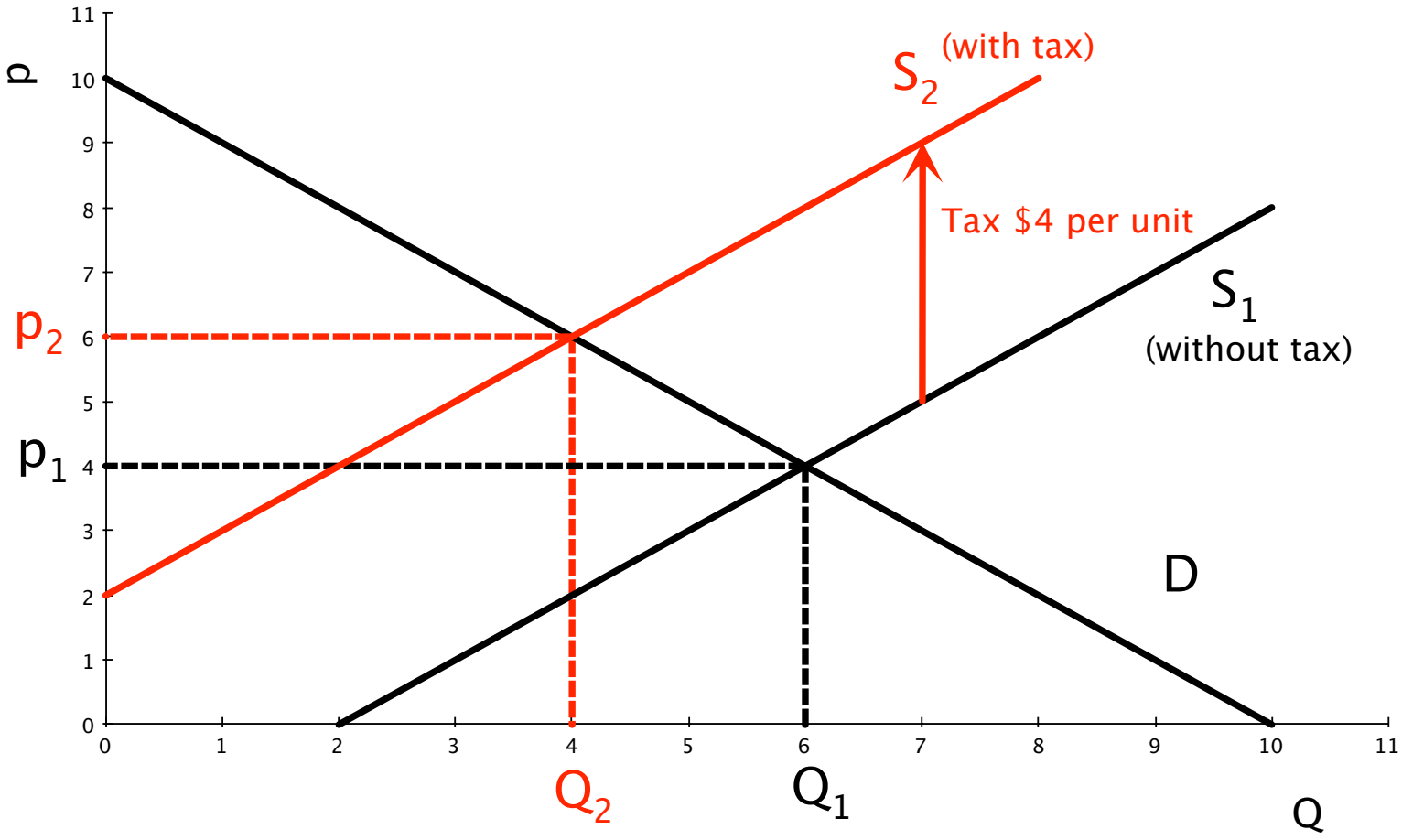
- In 2007, the dictator Robert G. Mugabe ordered a general decrease of prices by up to 70%.
- This regulation was followed by a partial economic collapse of the country.
- According to international organizations, in 2008, 5 millions of people in Zimbabwe were under risk of death by starvation.

- Market equilibrium
- Market efficiency
- Price restrictions
- Taxes

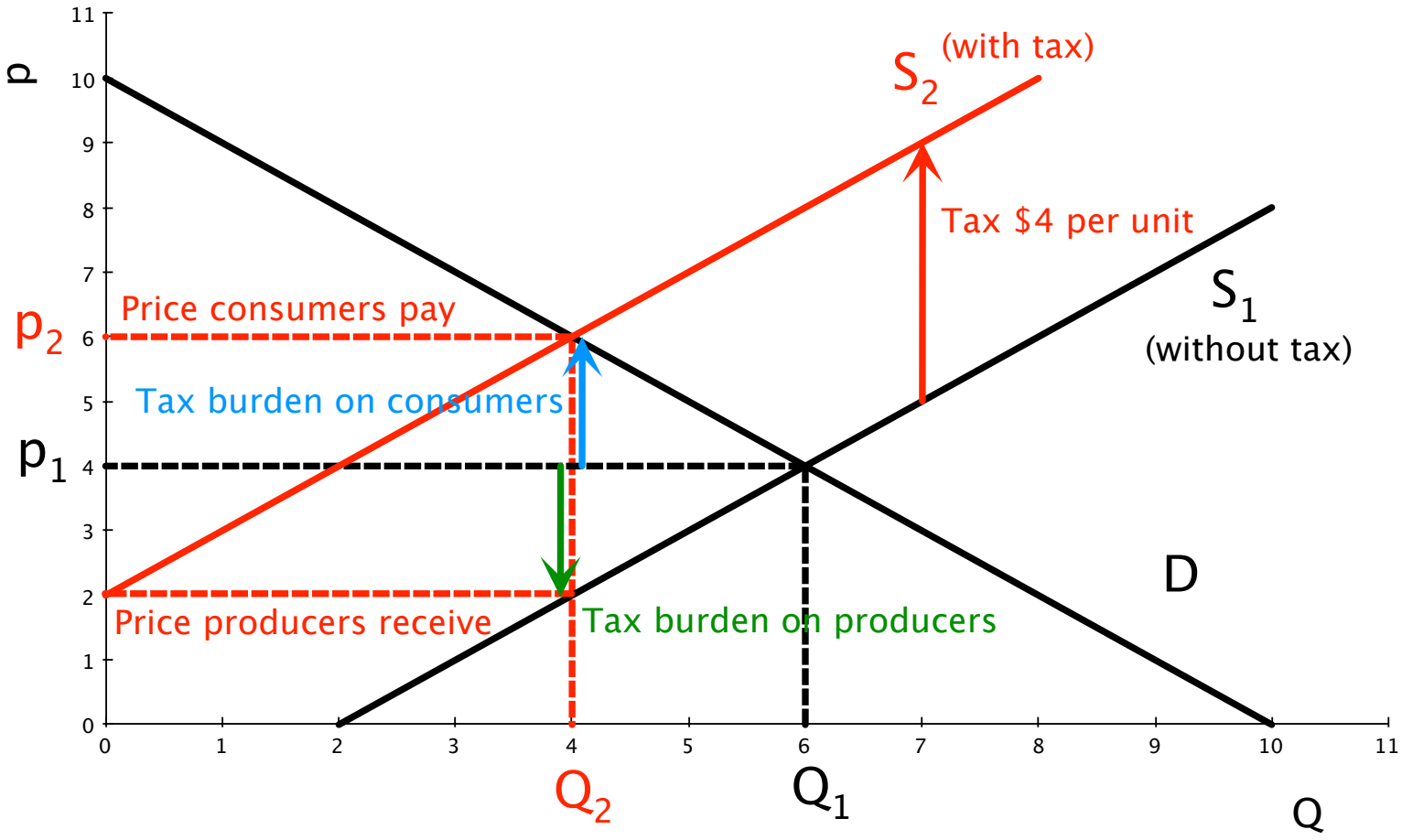
Taxes serve to redistribute resources between consumers, producers and government

- Taxes are a very important policy instrument that allow to raise government revenue.
- They impose a burden on all participants in a market (both consumers and producers).
- The manner in which the burden of a tax is shared among market participants is called *tax incidence*.
- In this course, we will discuss *specific taxes* - defined as a fixed amount for each unit of a good or service sold.
- Such tax can be imposed on both producers and consumers - both cases imply the same tax incidence.

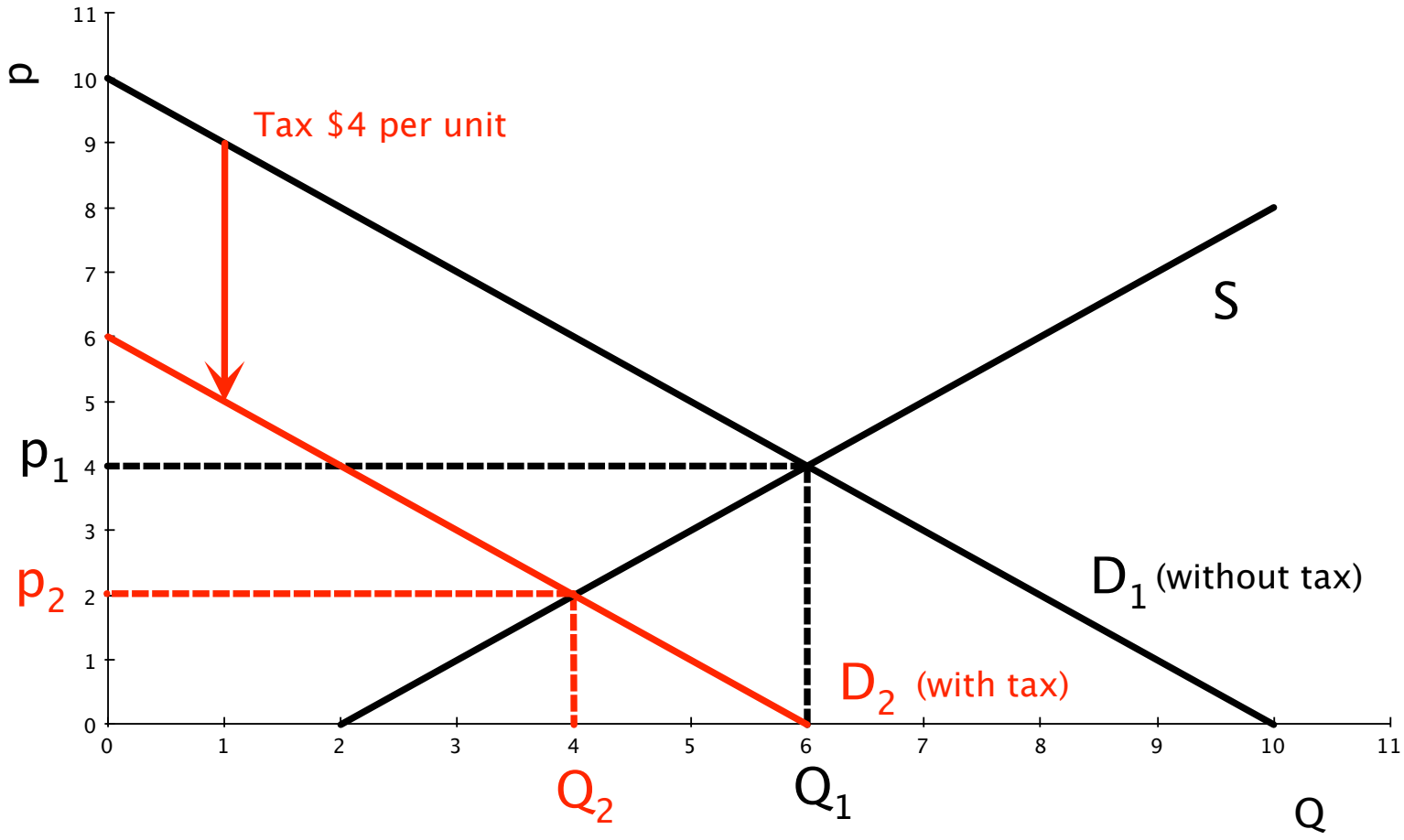
Tax imposed on producers increases their costs and reduces supply



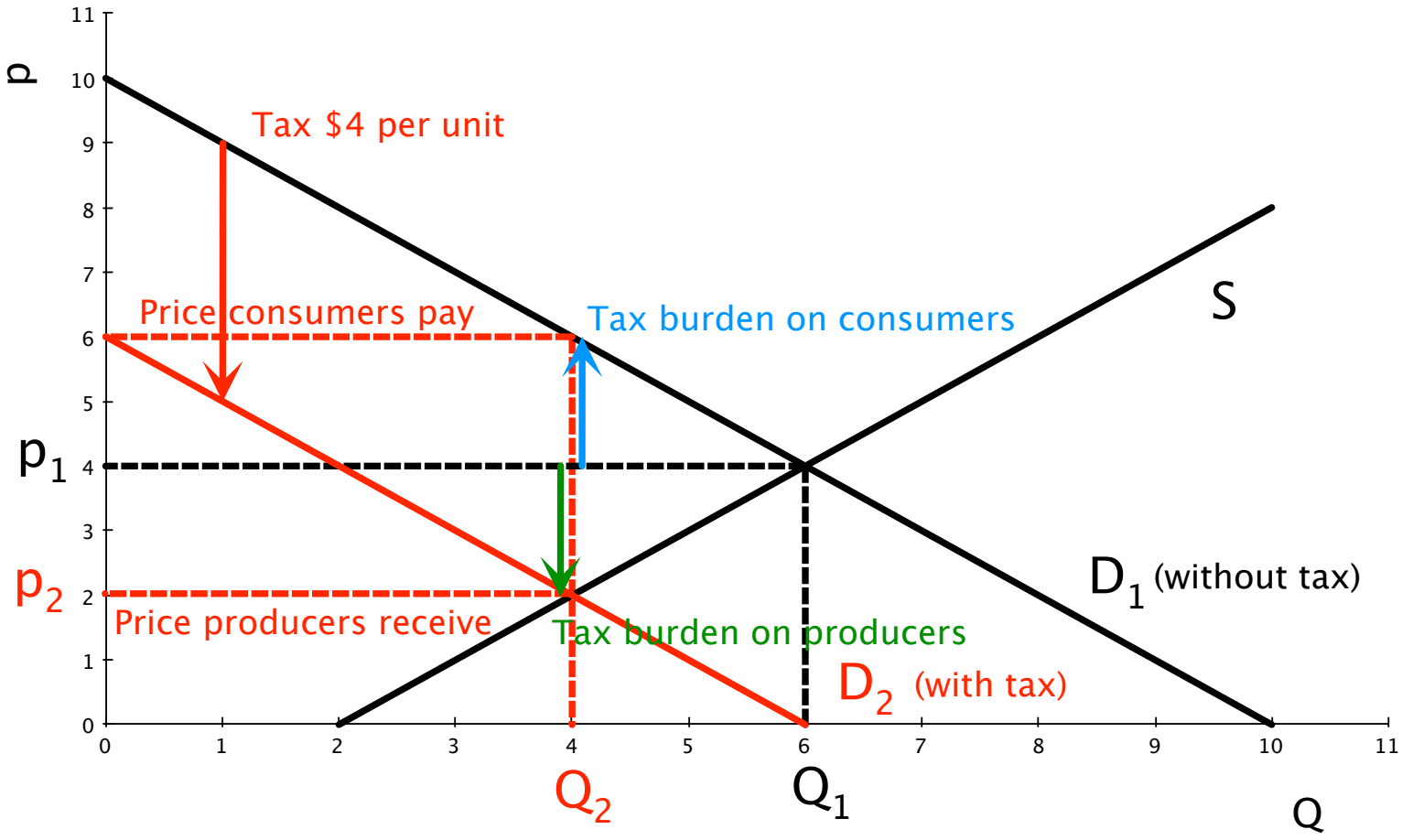
Reduced supply increases price that consumers pay - tax burden is shared



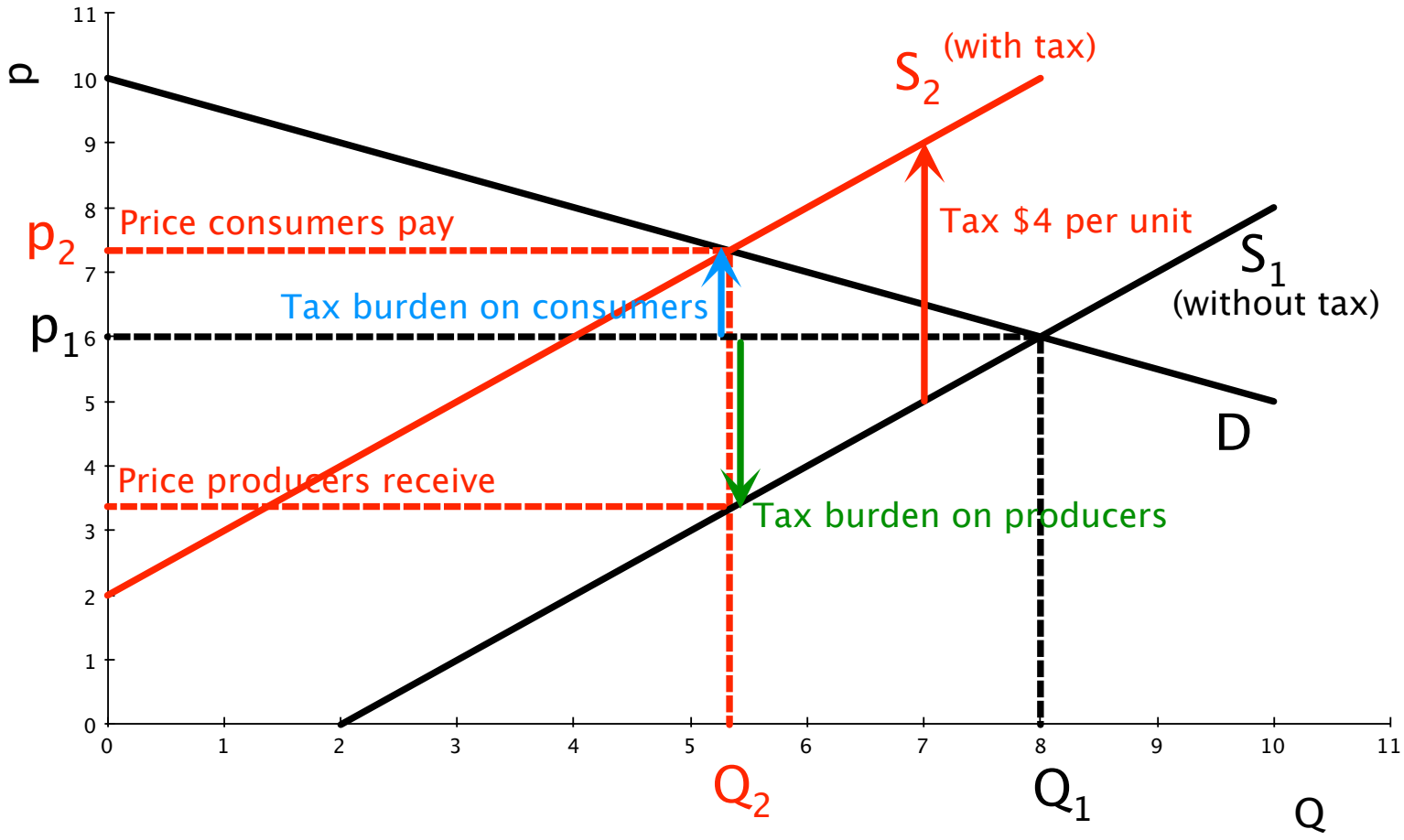
Tax imposed on consumers decreases their willingness to pay and reduces demand



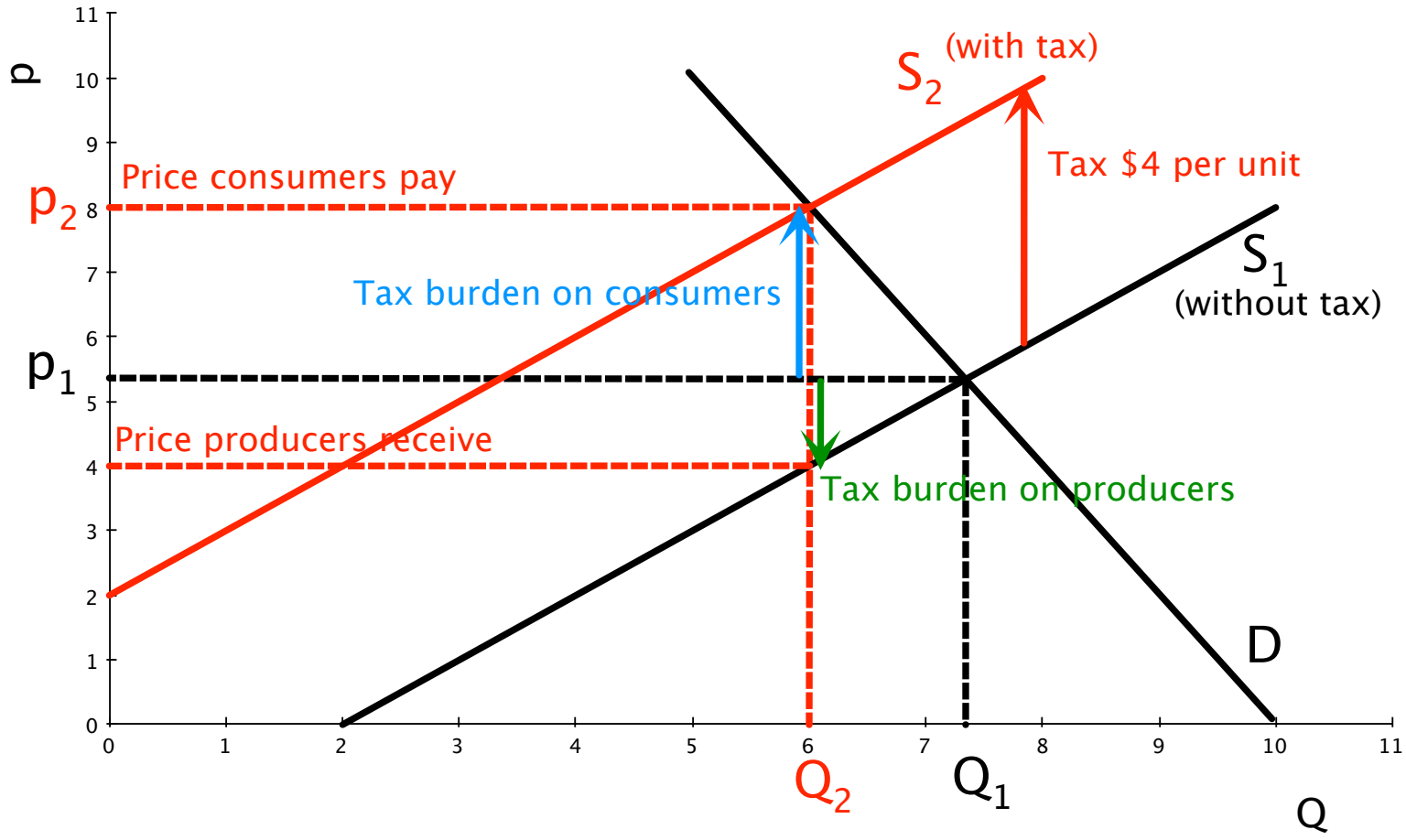
Reduced demand decreases price that producers receive - tax burden is shared



TAX BURDEN ON CONSUMERS IS SMALLER IF DEMAND IS MORE ELASTIC THAN SUPPLY



Tax burden on consumers is larger if demand is less elastic than supply



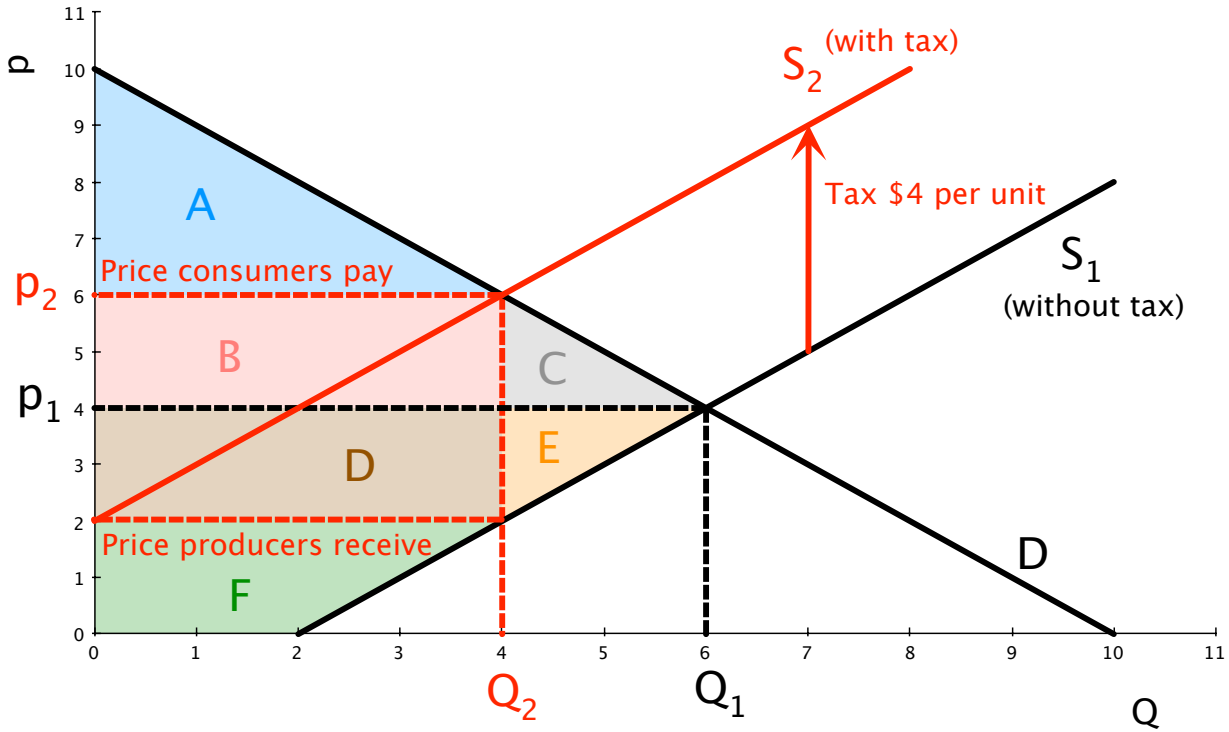
In markets with taxation, tax revenue is accounted for in the society's welfare

- In case when government imposes taxes (T) on consumers or producers, they are included in the society's welfare (in general we include in welfare all revenues and expenses of government) :

$$W = CS + PS + T \ .$$

- Taxes increase government revenue, but they decrease consumer and producer surplus.
- We will show that the overall impact on welfare is negative.

Taxes reduce consumer and producer surplus and imply deadweight loss

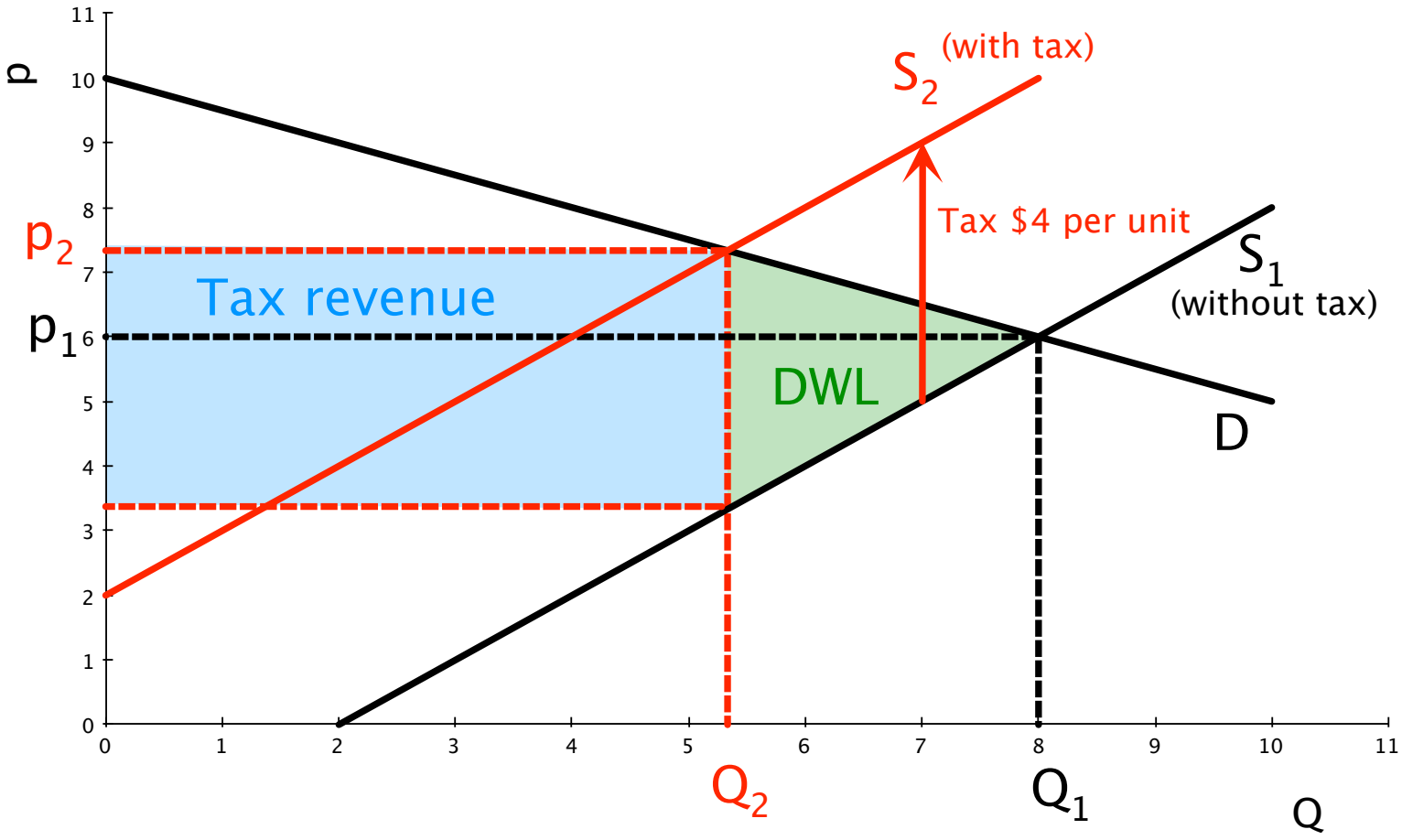


	Q_1 (without tax)	Q_2 (with tax)	Change
CS	A+B+C	A	ΔCS=-B-C
PS	D+E+F	F	ΔPS=-D-E
T	none	B+D	ΔPS=B+D
W=CS+PS+T	A+B+C+D+E+F	A+B+D+F	ΔW=-C-E=DWL

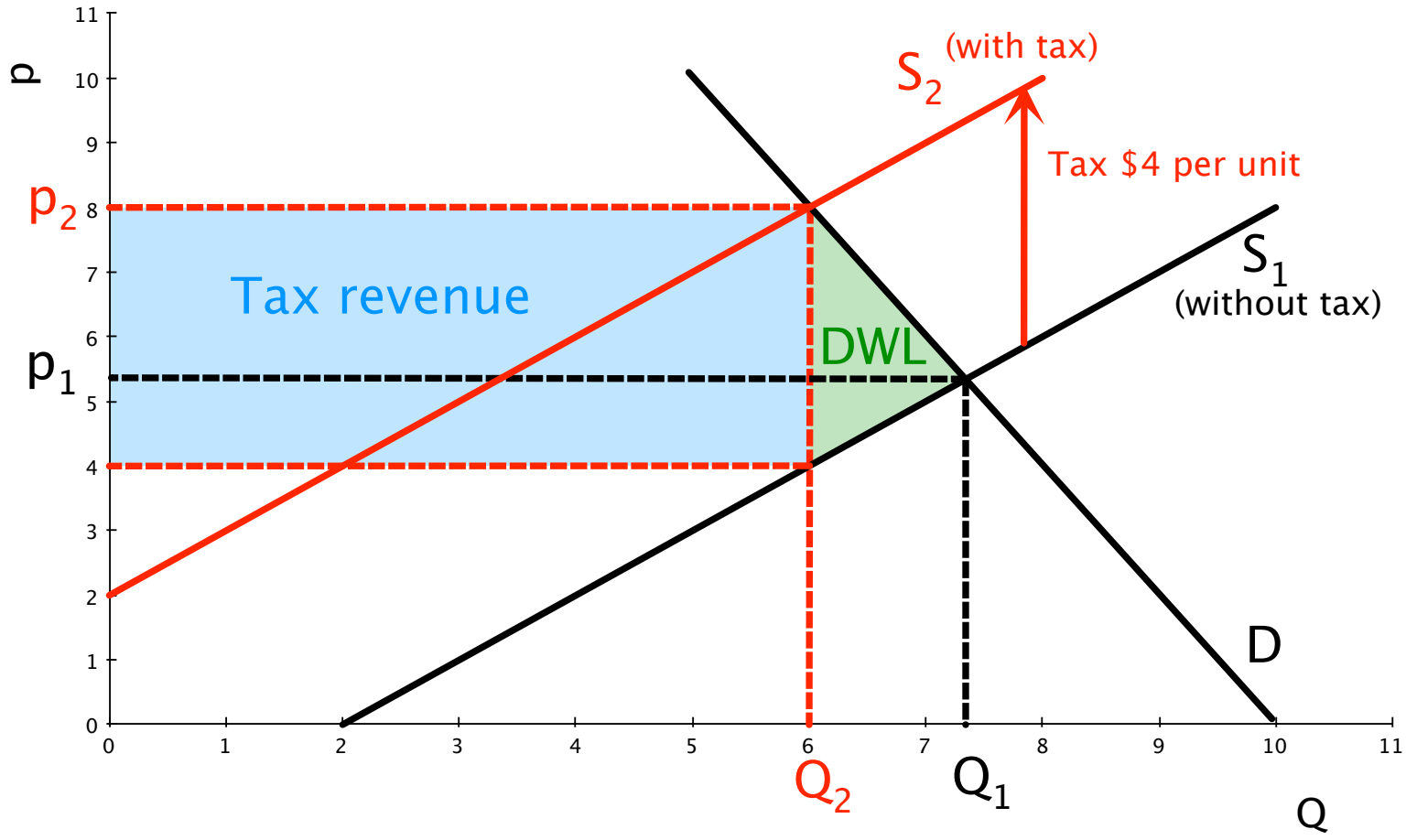
Taxes reduce consumer and producer surplus and imply a deadweight loss

- In a market with taxation, part of the welfare is transferred from customers and producers to government.
- Taxes prevent consumers and producers from realizing some of the transactions.
- These transactions that are cancelled do not generate neither consumer/producer surplus nor government revenues.
- Thus taxes lead to deadweight loss.
- Deadweight loss is larger (compared to tax revenues) in markets with elastic demand and/or supply.

Deadweight loss is larger in markets with more elastic demand



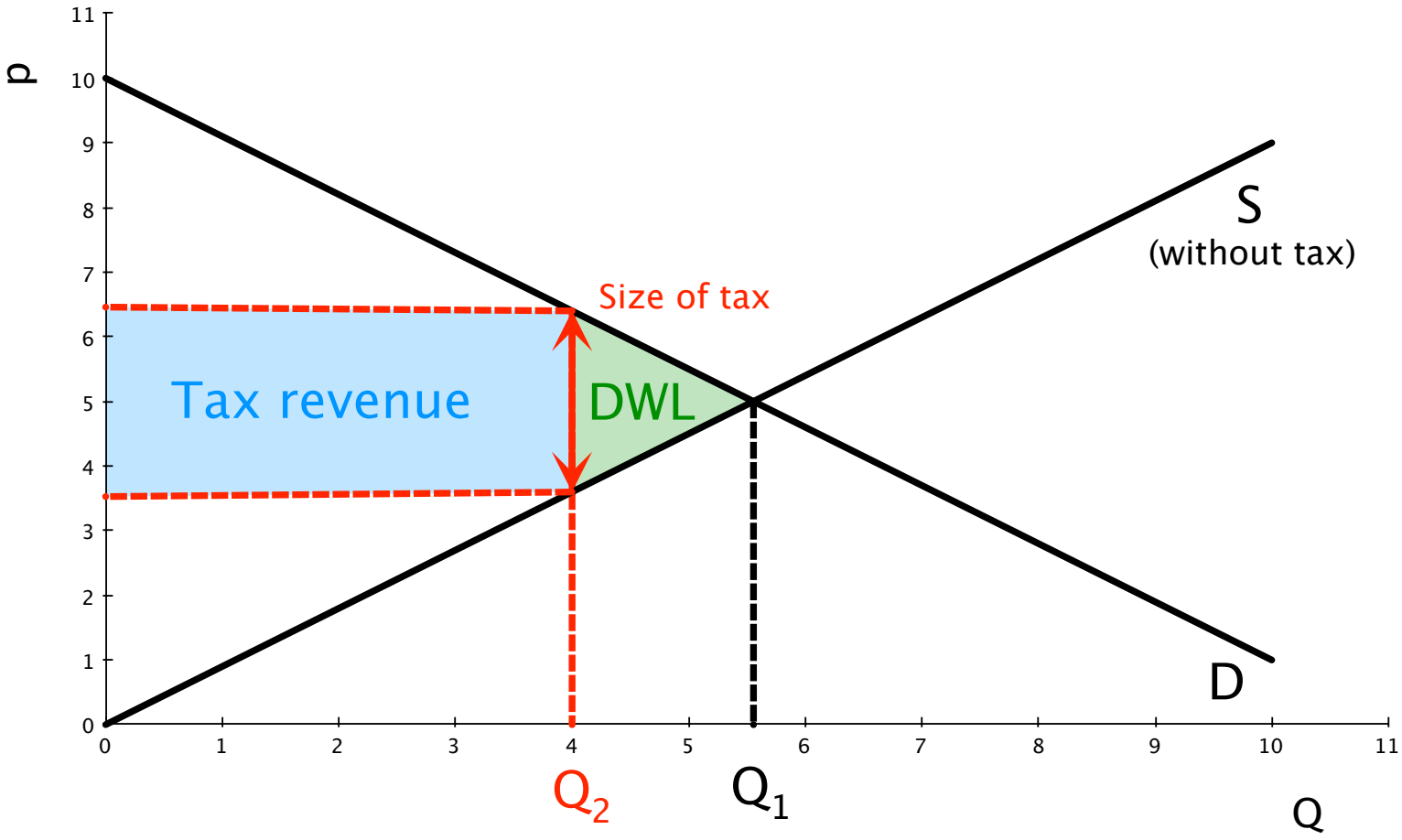
Deadweight loss is smaller in markets with less elastic demand



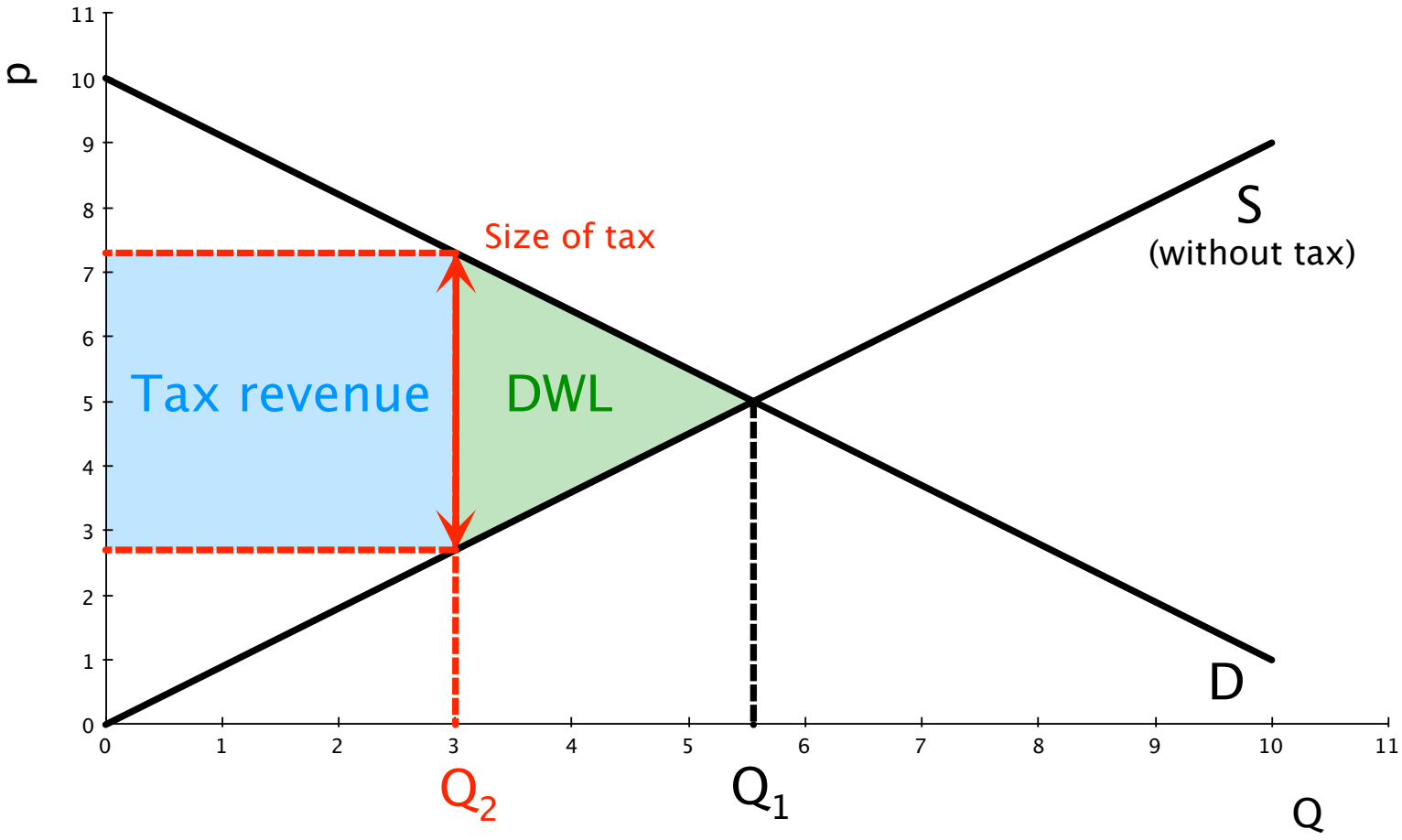
Size of tax revenue and deadweight loss vary with changing size of tax

- Higher taxation increases government revenues from one unit, but it also decreases number of units sold.
- Hence, very low taxes imply small government revenues because of small amount of money collected per unit.
- High taxes imply small government revenues because of small number of taxable units.
- Moderate taxes imply the largest tax revenues.
- This relationship between tax size and tax revenue is described by Laffer curve.
- Higher taxation reduces larger quantity of market transactions - leads always to larger deadweight loss.

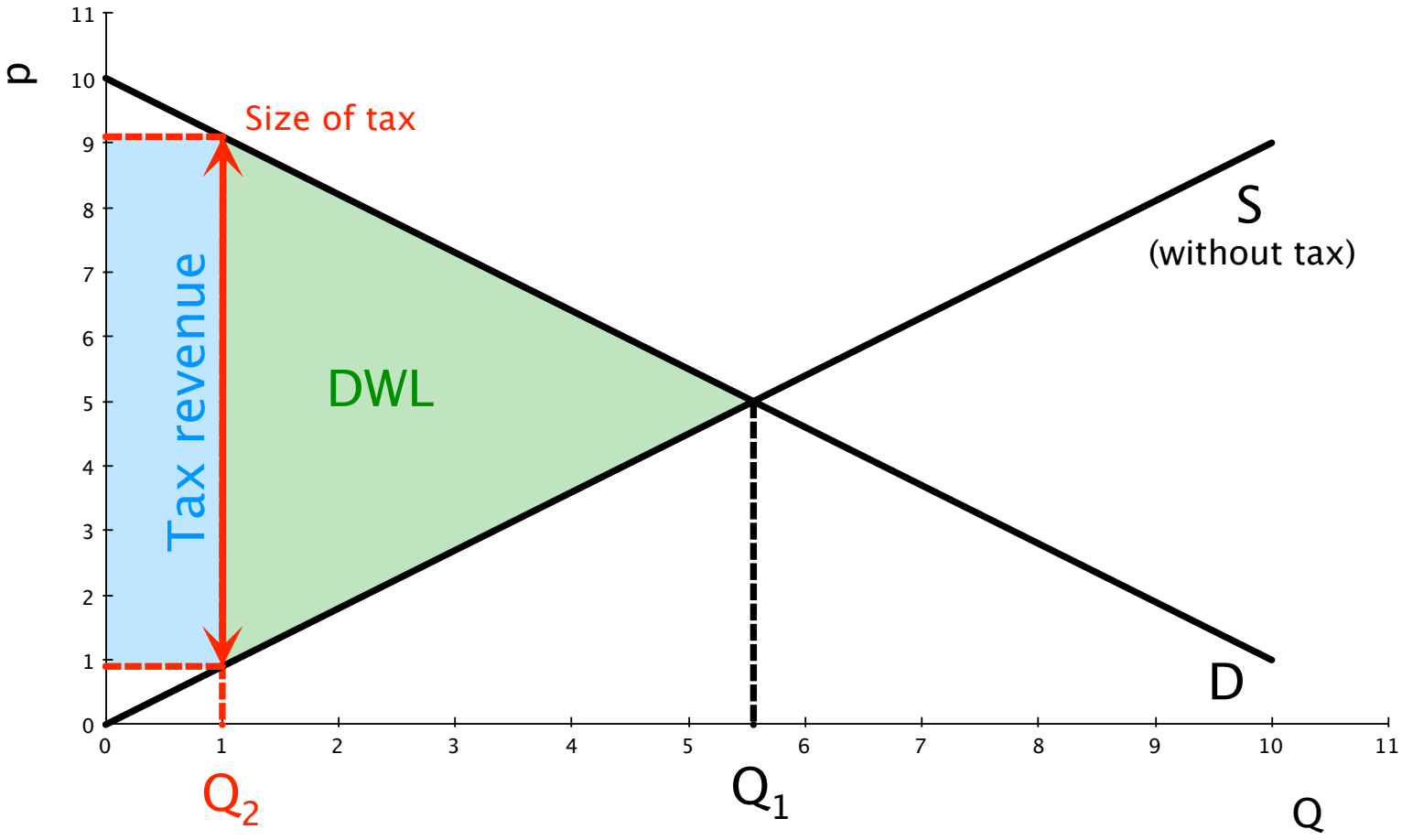
Size of tax revenue and deadweight loss vary with changing size of tax



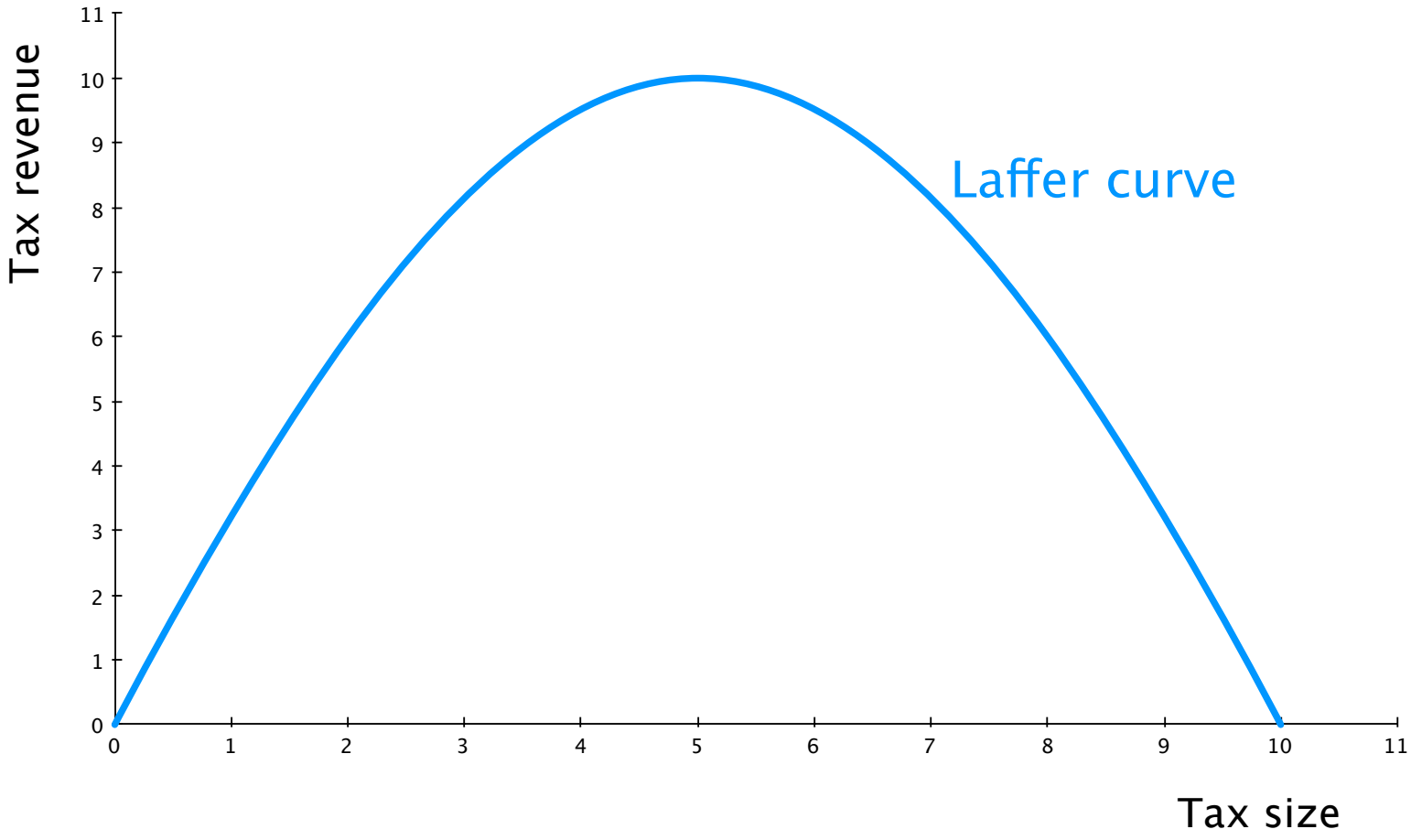
Size of tax revenue and deadweight loss vary with changing size of tax



Size of tax revenue and deadweight loss vary with changing size of tax



Laffer curve: tax revenue first increases then decreases with tax size



Putin grants Gérard Depardieu Russian citizenship after tax row

Depardieu is angered by French president François Hollande's attempt to raise taxes on the mega-rich to 75%

Associated Press in Moscow
guardian.co.uk, Thursday 3 January 2013 10.21 GMT

Gérard Depardieu has threatened to give up his French passport in protest at a proposed tax hike on the rich.
Photograph: Loic Venance/AFP/Getty Images

EXCERCISE 10

Read the article about tax on junk food proposed in Mexico (`http://www.forbes.com`, 28 October 2013) and answer the following questions:

1. What is new proposed tax policy in Mexico?
2. What is the main motivation of this policy?
3. According to the article, who will most likely bear the cost of this policy? Why?