Supply and demand: Price-taking and competitive markets

Economics

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UCL

Lecture 8

Context

Firms with market power can set their own price.

Market outcomes are generally not Pareto-efficient. *(Unit 7)*

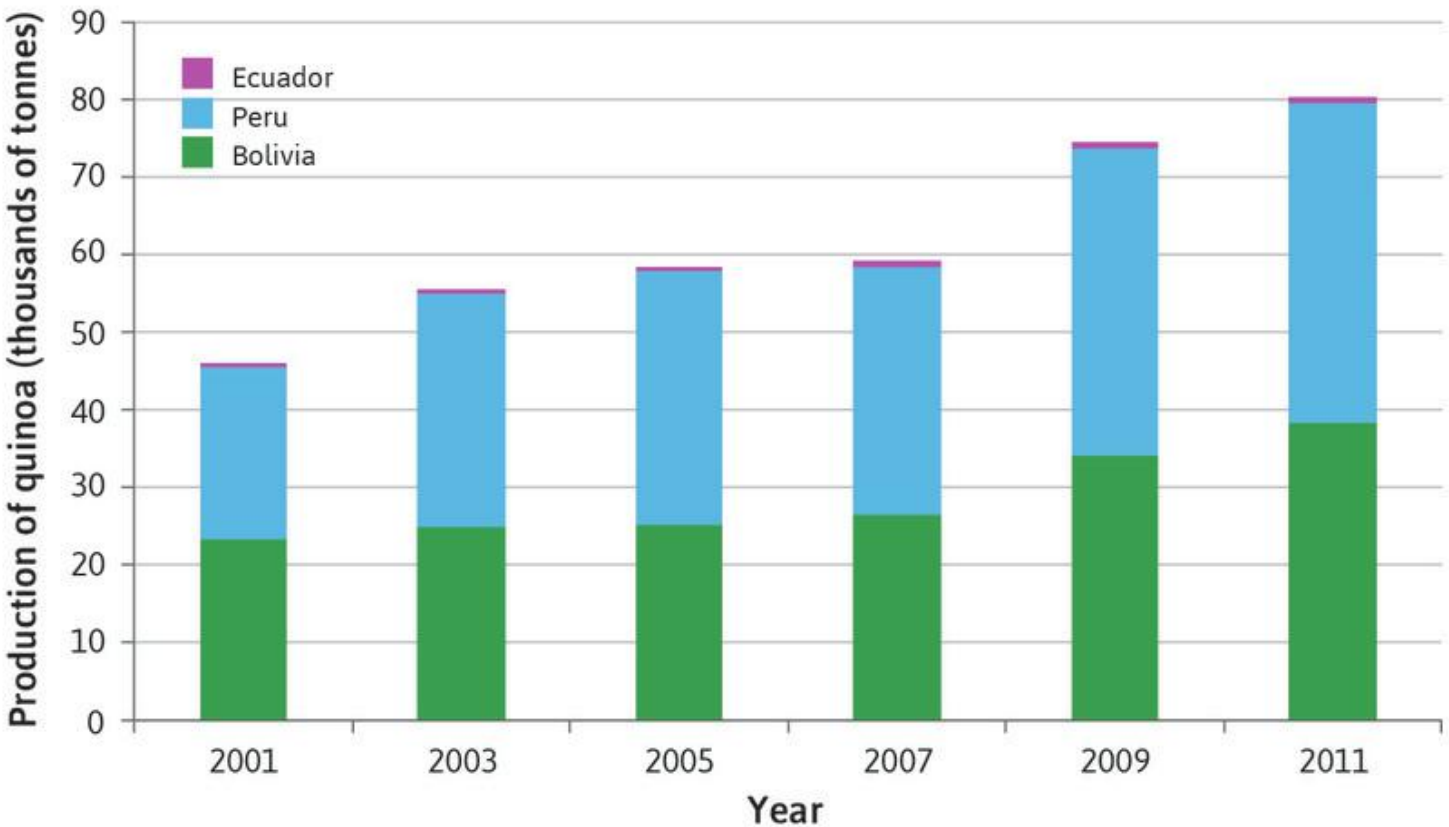
In reality, many firms are price-takers.

How does the behaviour of *market power firms* differ from *price-setting firms*?

Can *competition* improve market outcomes?

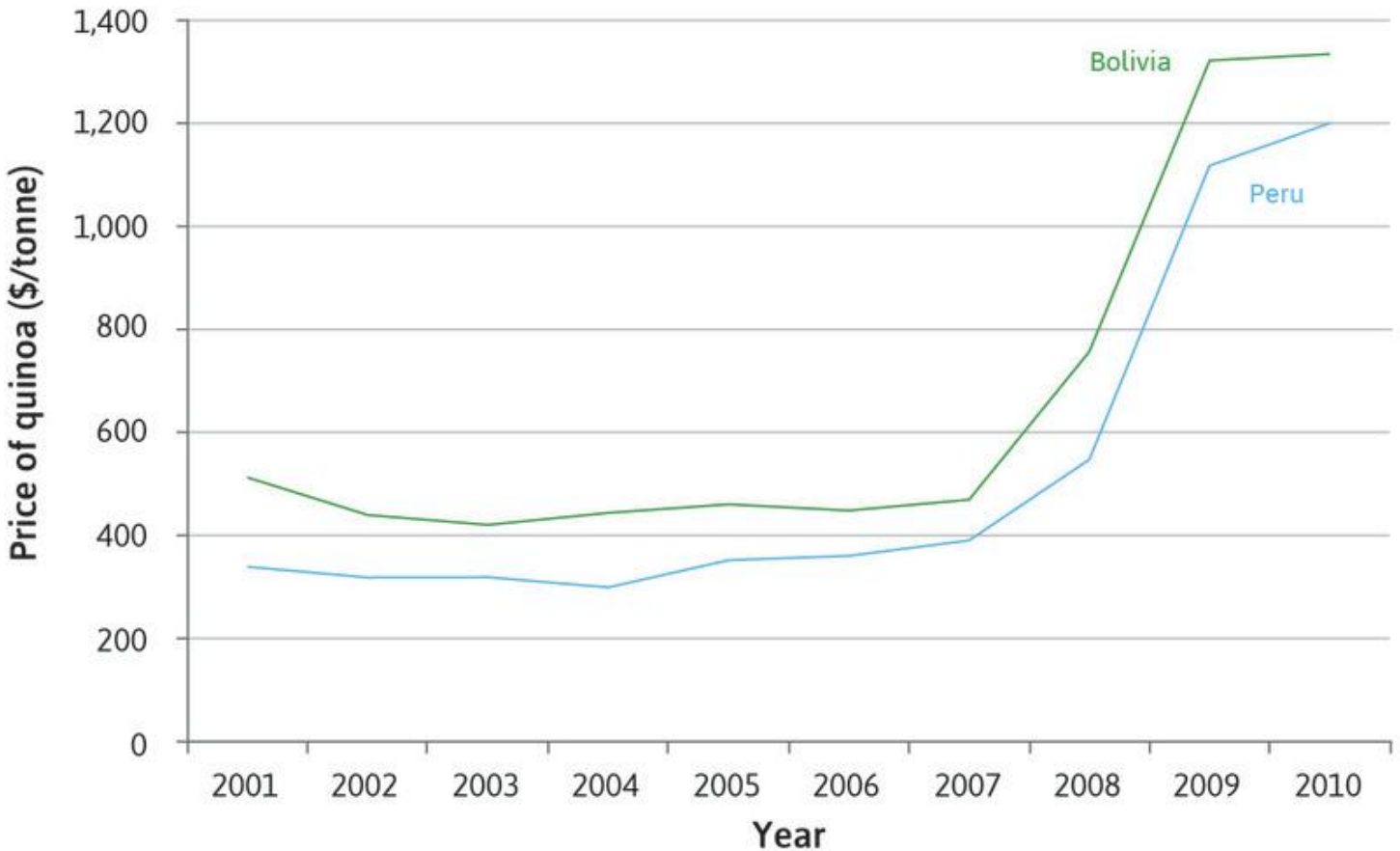
The quinoa fad

Countries producing quinoa



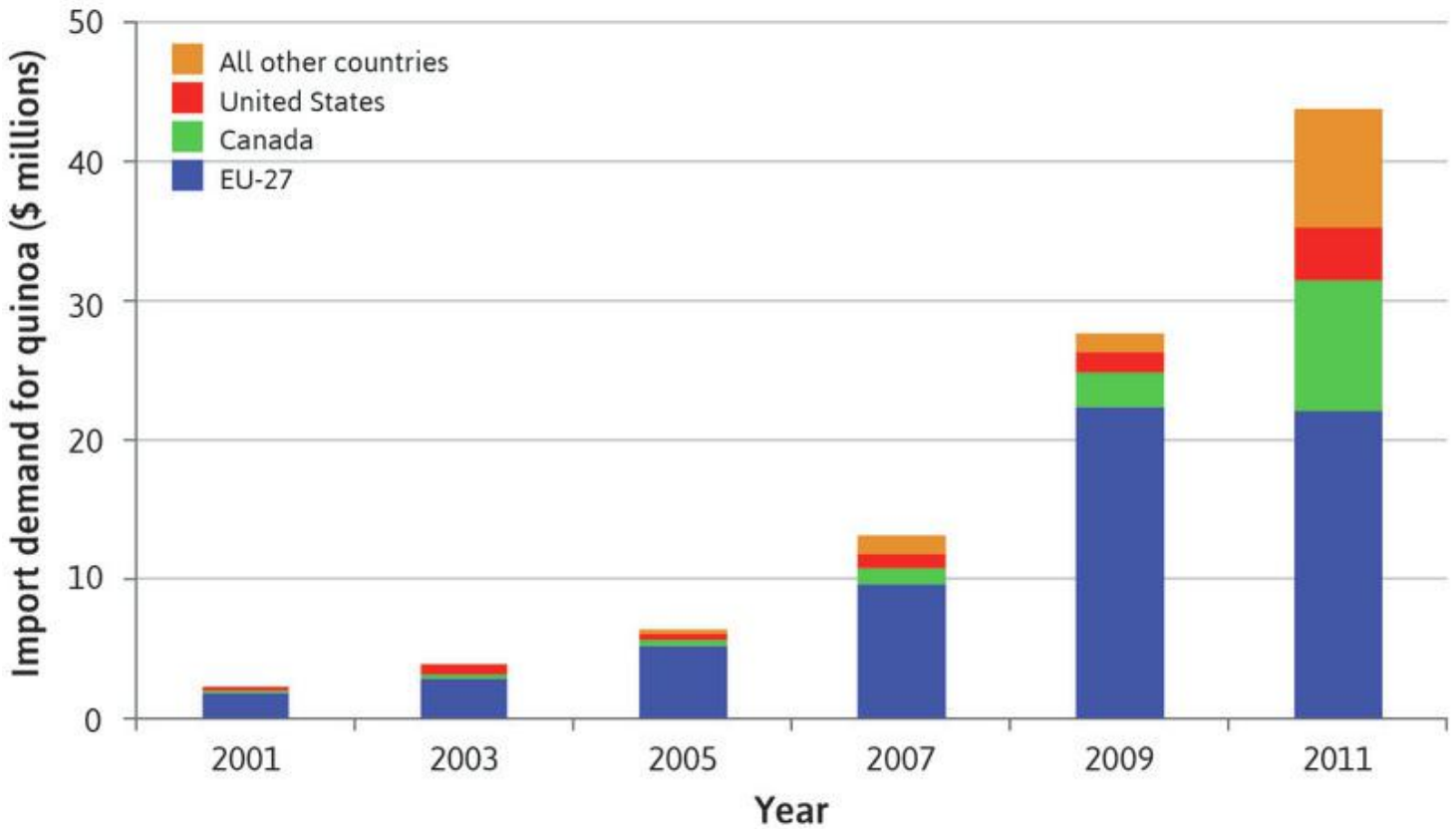
The quinoa fad

Price of quinoa



THE QUINOA FAD

Import demand for quinoa



Market Prices

Prices reflect changes in demand and supply for the whole industry

Nature of demand

- Consumer preferences
- Availability of substitutes?

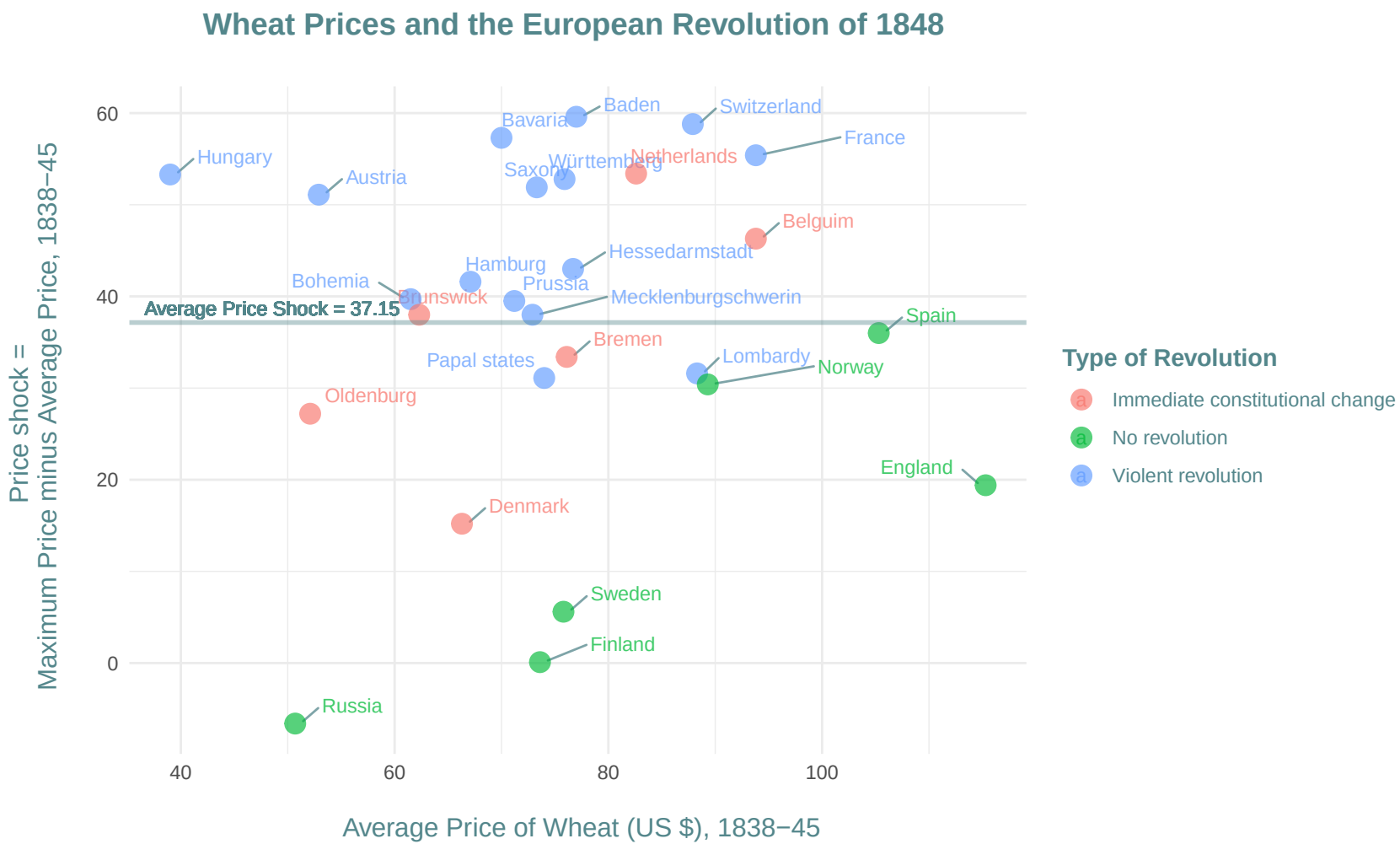
Nature of supply

- Returns to scale or size of firms
- Market power
- Bottlenecks

Persistent price rises can have far-reaching consequences on society and often lead to social unrest and revolutions

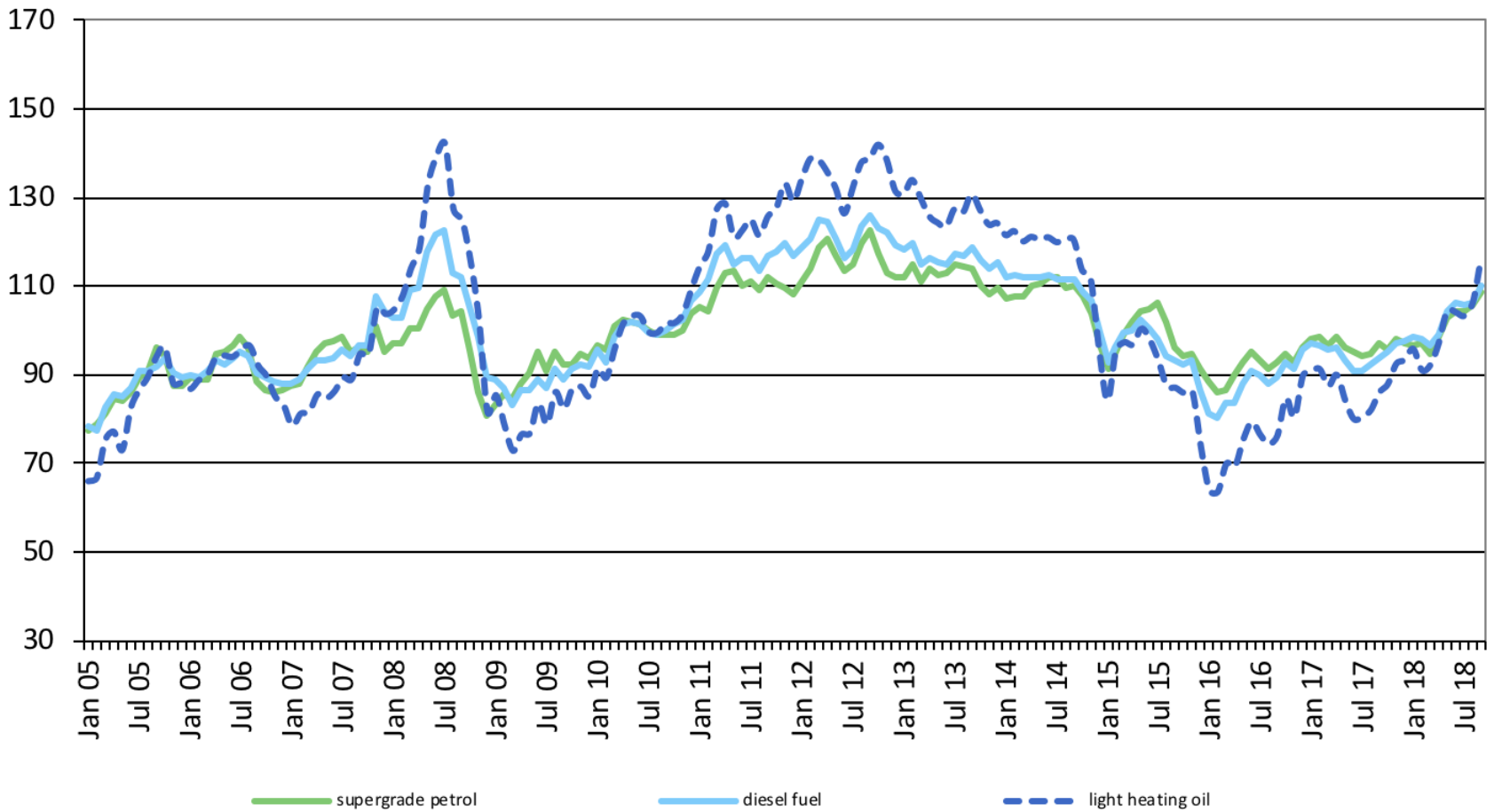
Price Shock and Type of Revolution

Violent revolution likely in areas with above *average price shock*



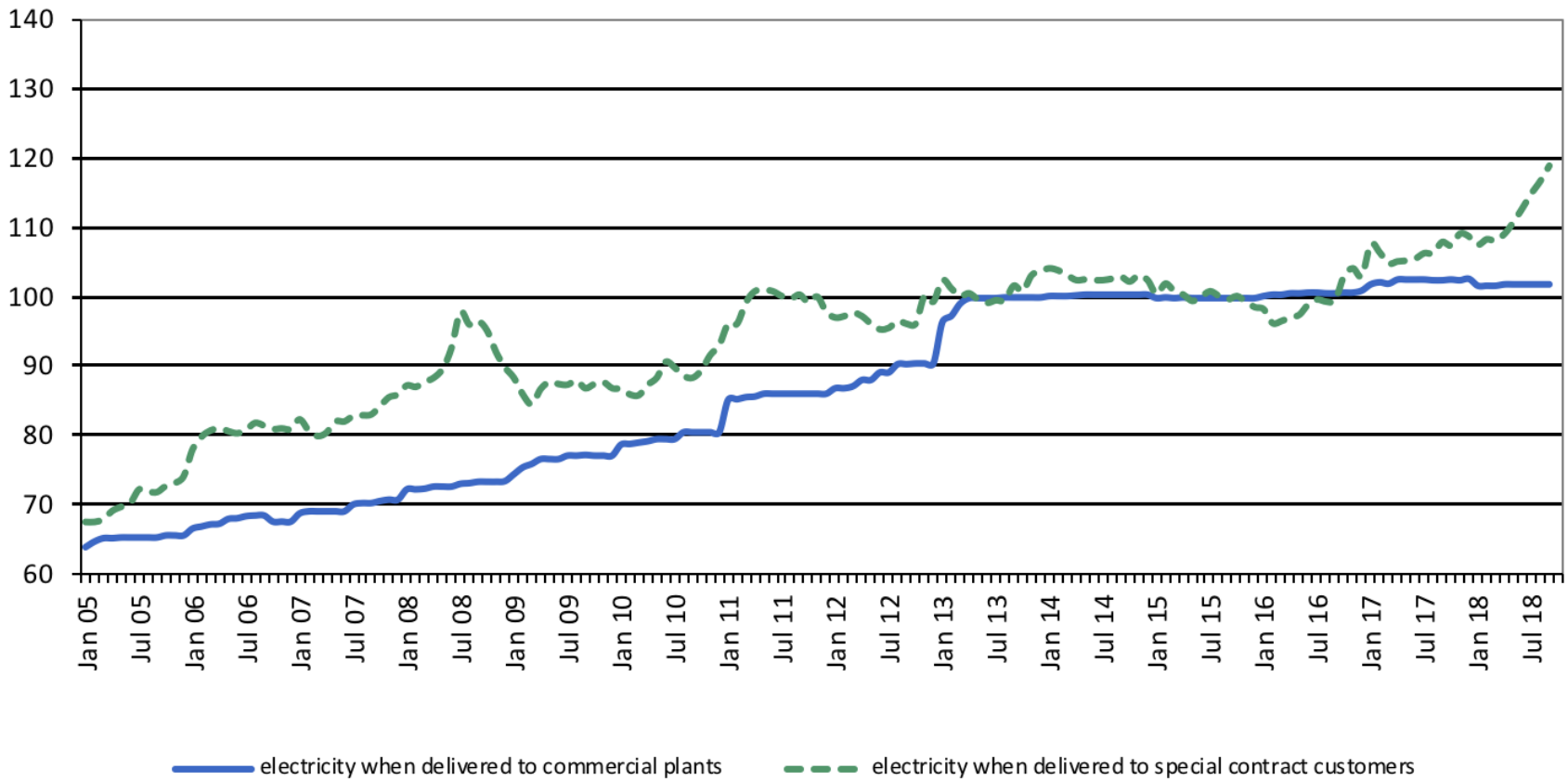
Fuel Prices & Gilets jaunes

Consumer price indices (2010=100) for petrol, diesel and light heating oil



Electric Shock

Producer price indices (2015=100) for electricity when delivered to commercial plants and customers

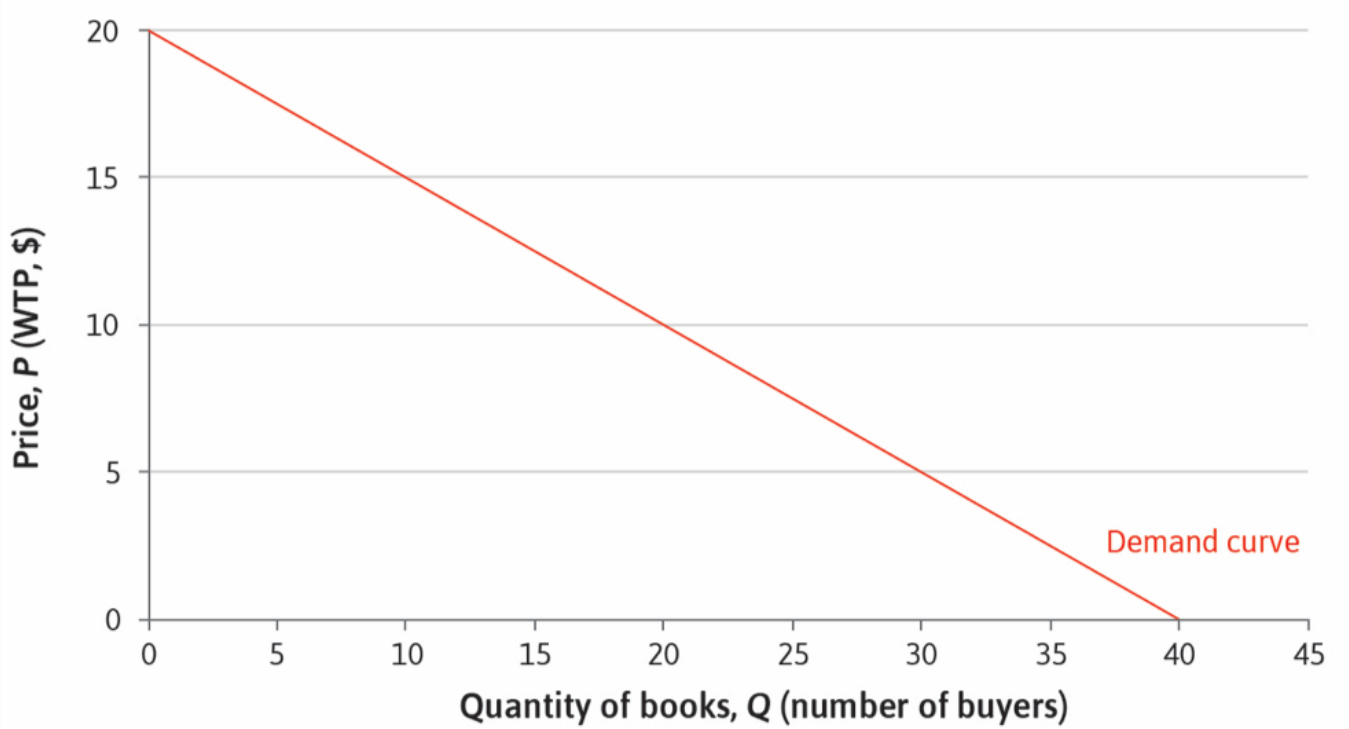


Demand curve

Demand curve: total quantity that all consumers together want to buy at any given price.

Represents the willingness to pay (WTP) of buyers.

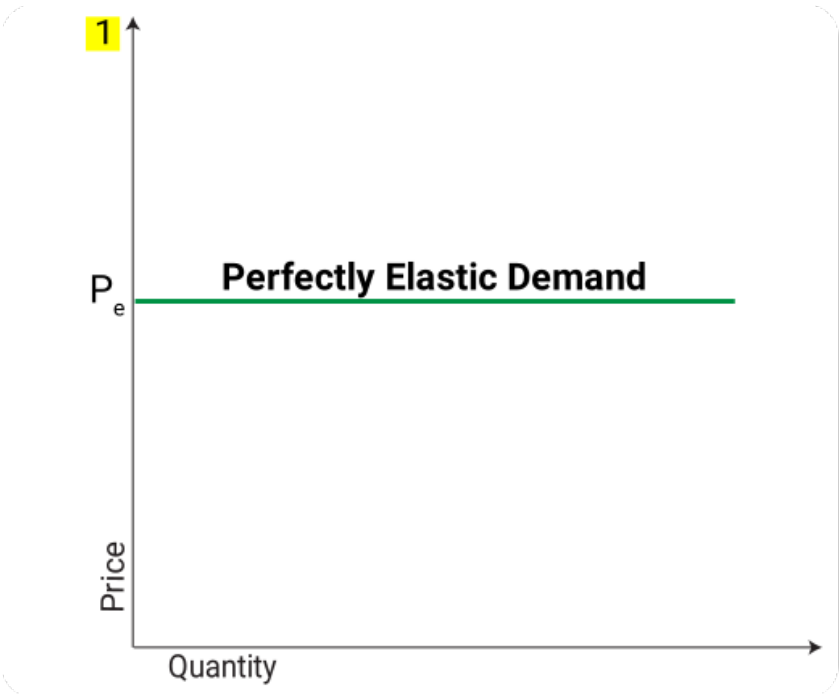
Example: Secondhand textbook market.

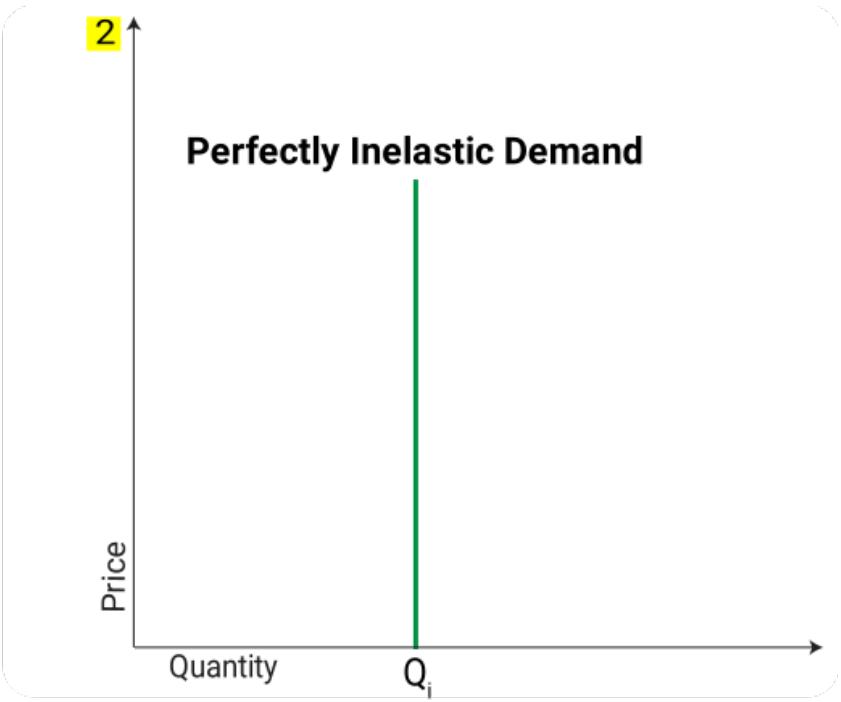


Demand Curve Elasticity

Perfectly elastic demand: consumers are ready to consume everything that is supplied at given price

Perfectly inelastic demand: consumers buy same quantity irrespective of the price



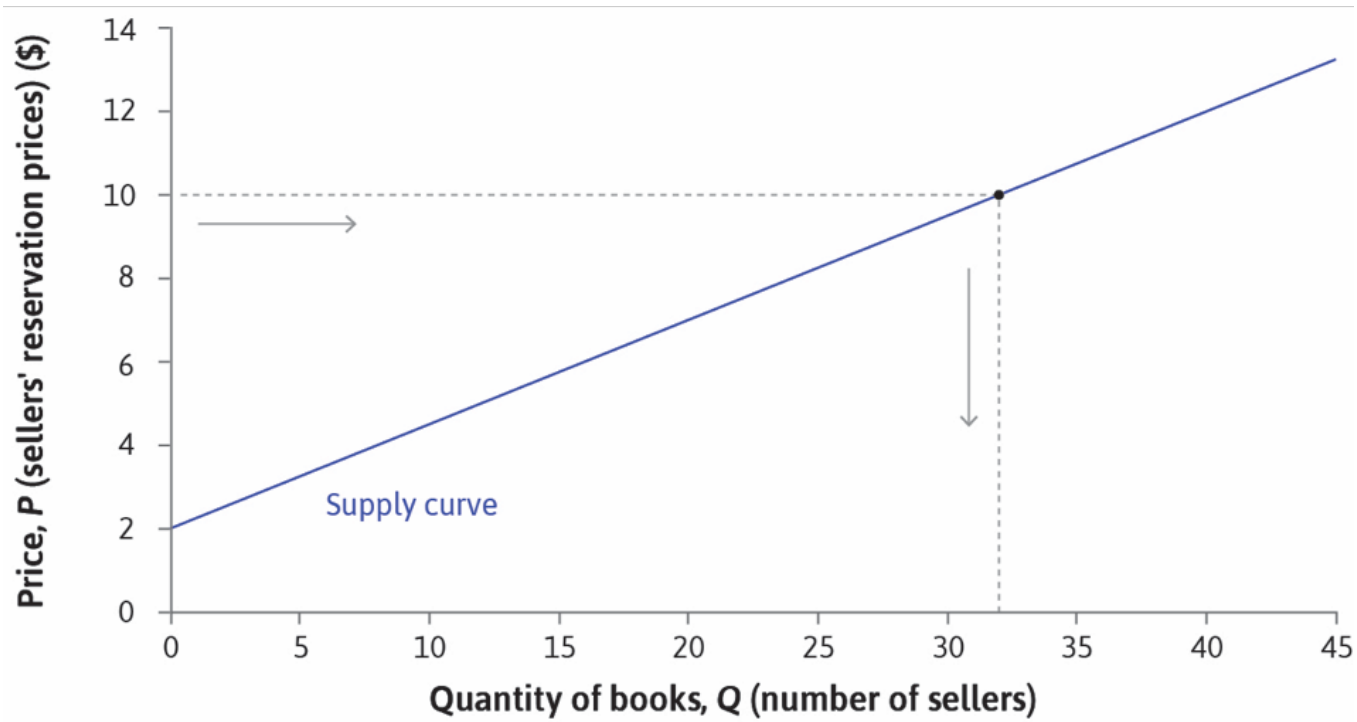


Supply curve

Supply curve: total quantity that all firms together would produce at any given price.

Represents the willingness to accept (WTA) of sellers.

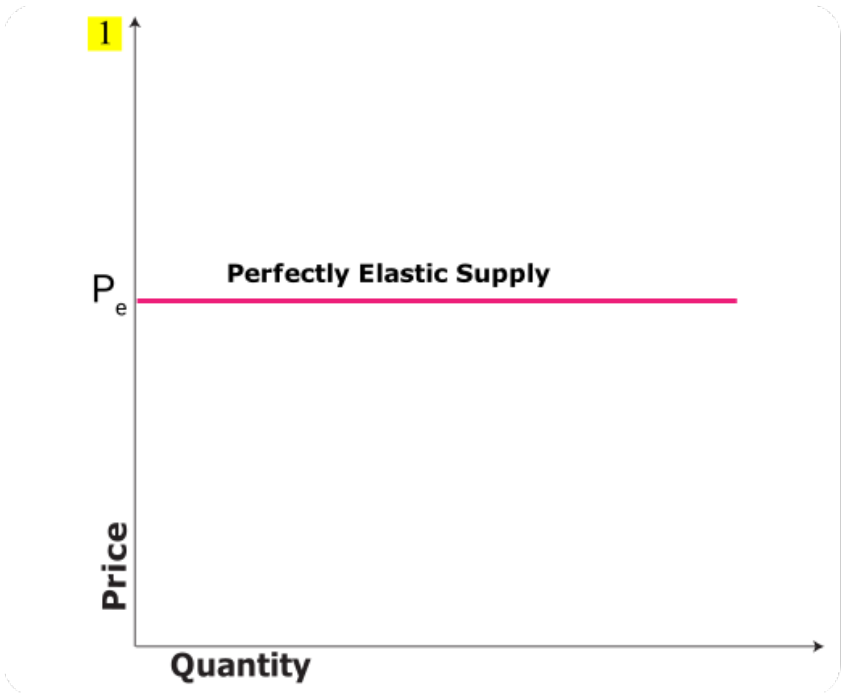
Sellers may have different reservation prices.

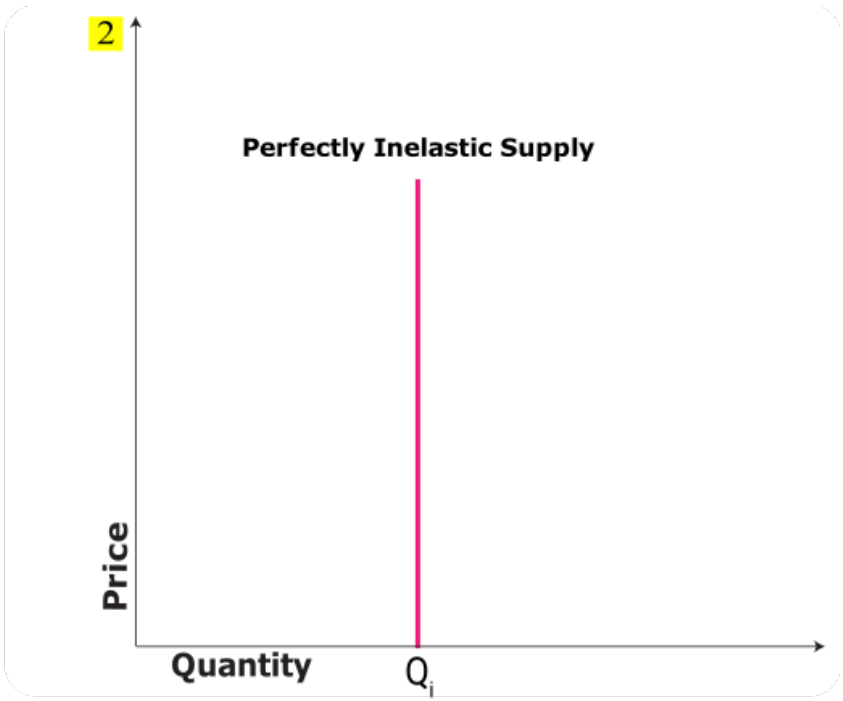


Supply Curve Elasticity

Perfectly elastic supply: suppliers are ready to supply as much as consumers demand at a given price

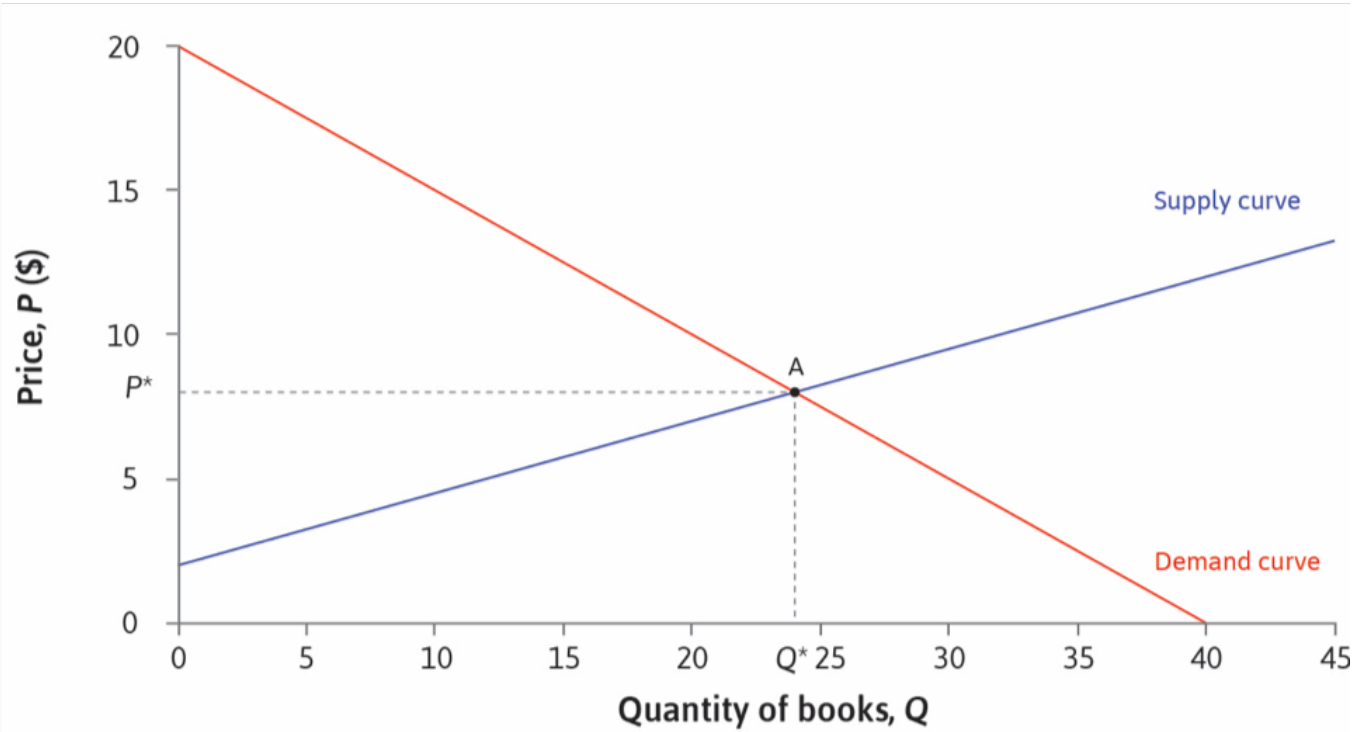
Perfectly inelastic supply: suppliers supply same quantity irrespective of the price





Equilibrium price

At the equilibrium (market-clearing) price, supply equals demand.

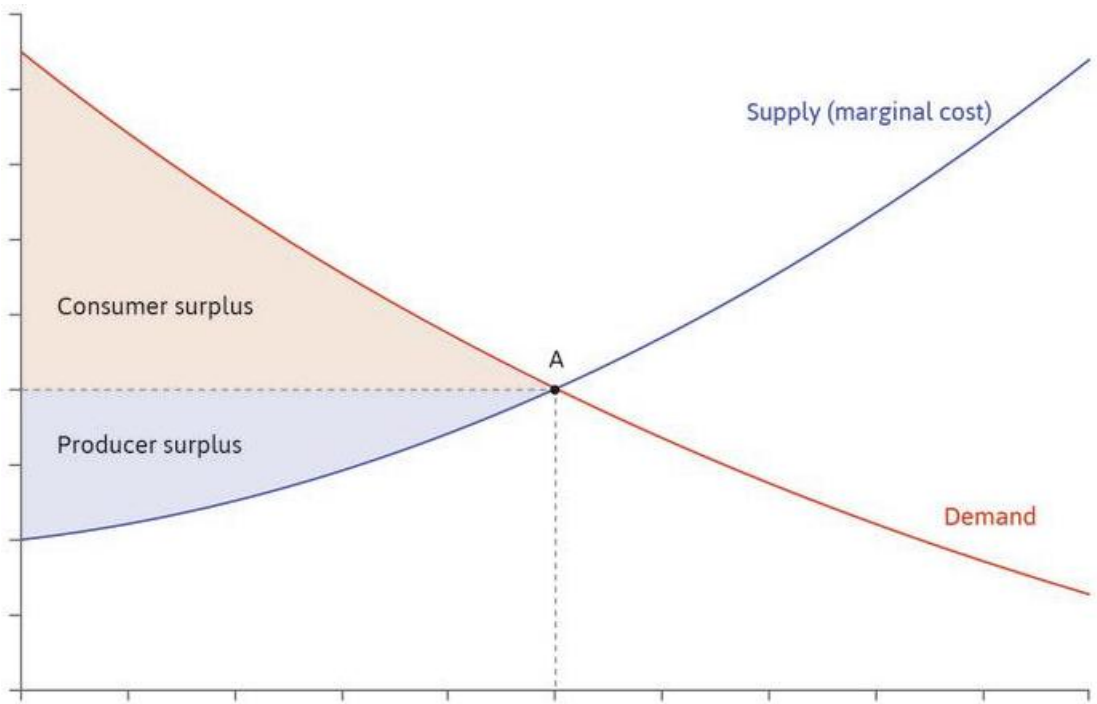


Any other price is not a *equilibrium*, e.g. if price was above P^*, then there would be *excess supply*, so some sellers could benefit from charging a lower price.

Consumer surplus (CS): the total difference between willingness-to-pay and purchase price

Producer surplus (PS): the total difference between revenue and marginal cost

$$\begin{aligned} \textit{Total surplus} &= \textit{Consumer surplus} + \textit{Producer surplus} \\ &= \textit{Total gains from trade} \end{aligned}$$



Perfect competition

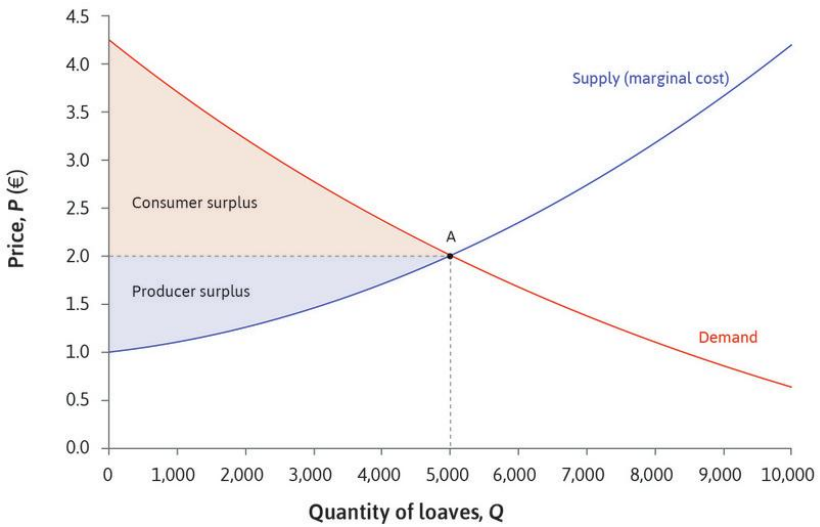
A perfectly competitive market has the following properties:

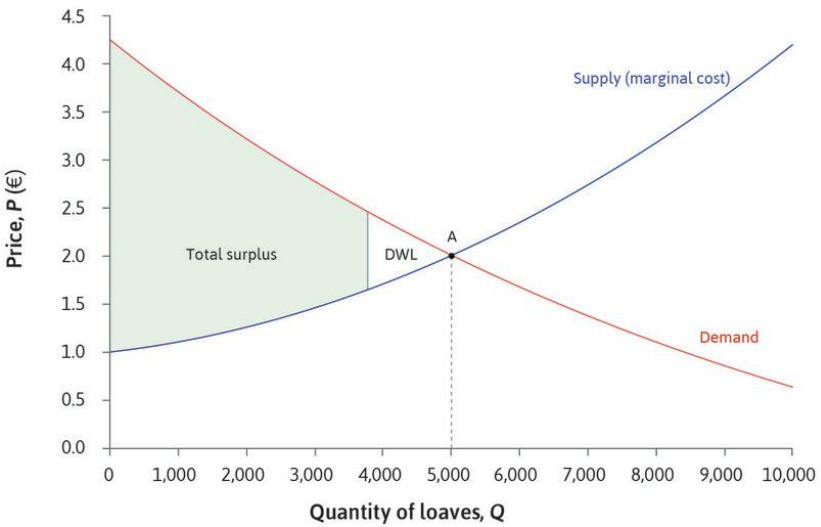
- *No market power*, i.e., no one has power to influence the market
  - Very *large number* of potential buyers and sellers
  - Buyers and sellers are all *price-takers*
  - No role for *strategic interaction*
- *No collusion*
  - Buyers and sellers all act independently of one another and can't *coordinate* amongst themselves
- *Homogeneous* goods and services being exchanged in the market
- *Law of One Price:* All transactions take place at a single price.
  - Price information easily available to buyers and sellers and there are no *unexploited arbitrage opportunities*

Perfect competition & Pareto efficiency

Competitive equilibrium allocation, i.e., equilibrium in the perfectly competitive market, exploits all possible *gains from trade* and thus is *Pareto efficient allocation*.

Deadweight loss is a loss of total surplus relative to a Pareto-efficient allocation (A).





Perfect competition & Pareto efficiency

Competitive equilibrium is *Pareto Efficient* if these conditions hold:

Price-taking

Homogenous goods, i.e., no differentiated products

Law of One Price: All transactions take place at a single price.

No one has *market power*

A complete contract

A complete contract between buyer and seller about goods being exchanged, i.e., *no hidden information*

No effects on others

No externalities

Price-taking firms

A *price-taking firm* accepts the price in the market.

A price-taking firm has *no market power*

It cannot benefit from *deviating* from the market price, and cannot influence the market price because it has no market power.

A price-taking firm

chooses the quantity it sells and

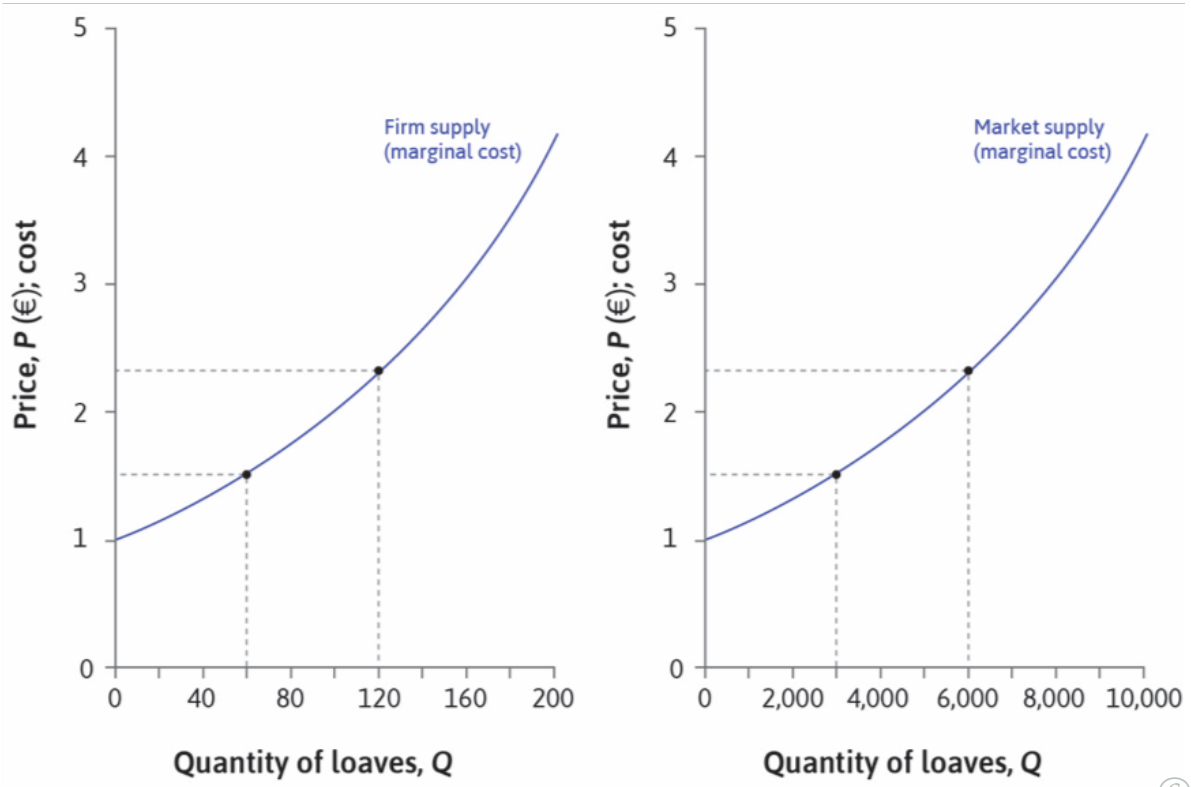
cannot *choose the price* its sells at

Price-taking firms: Market supply curve

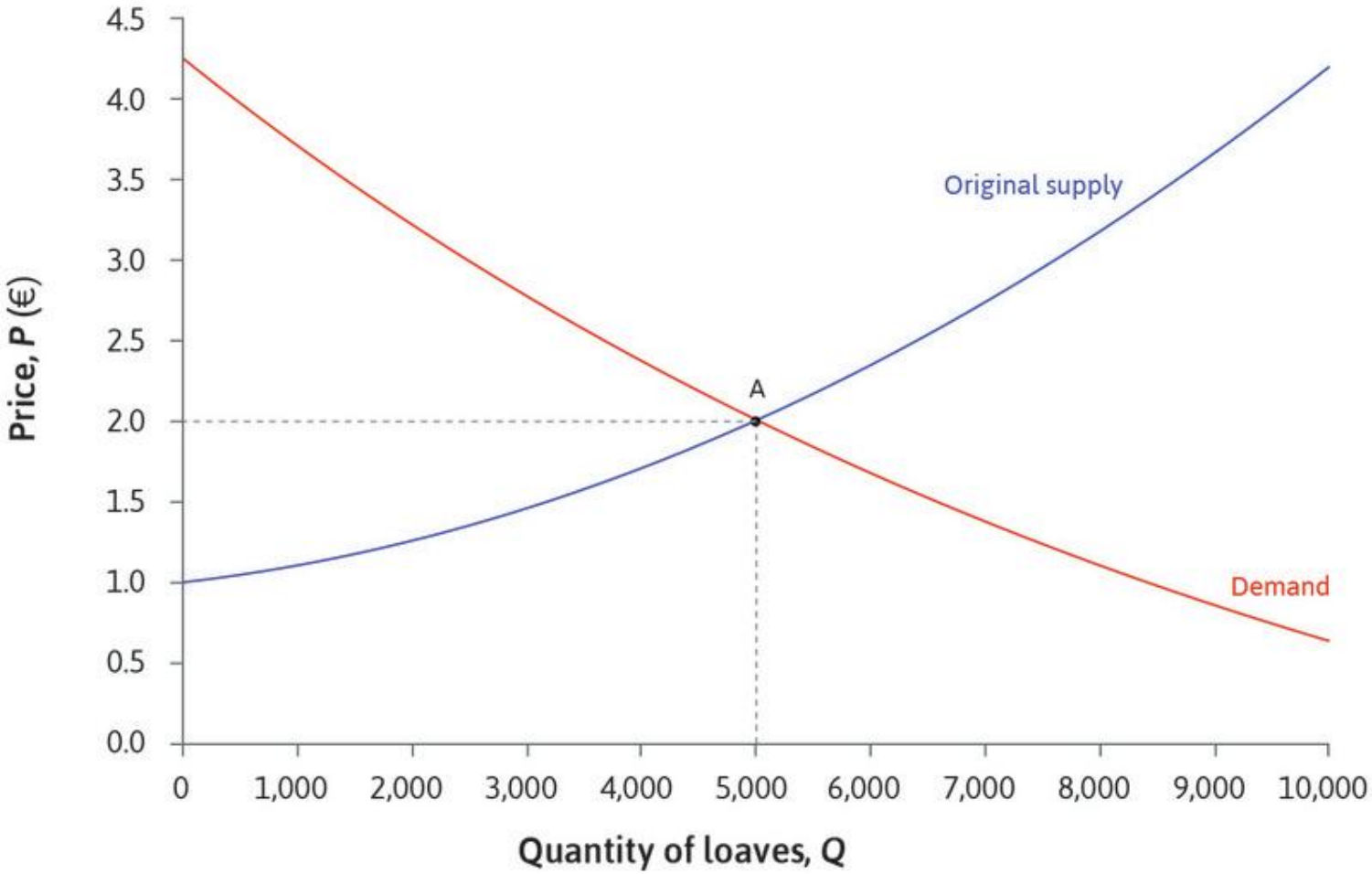
Market supply curve: the total amount produced by all firms at each price.

If firms have identical cost functions,

market supply curve = *market marginal cost curve*.

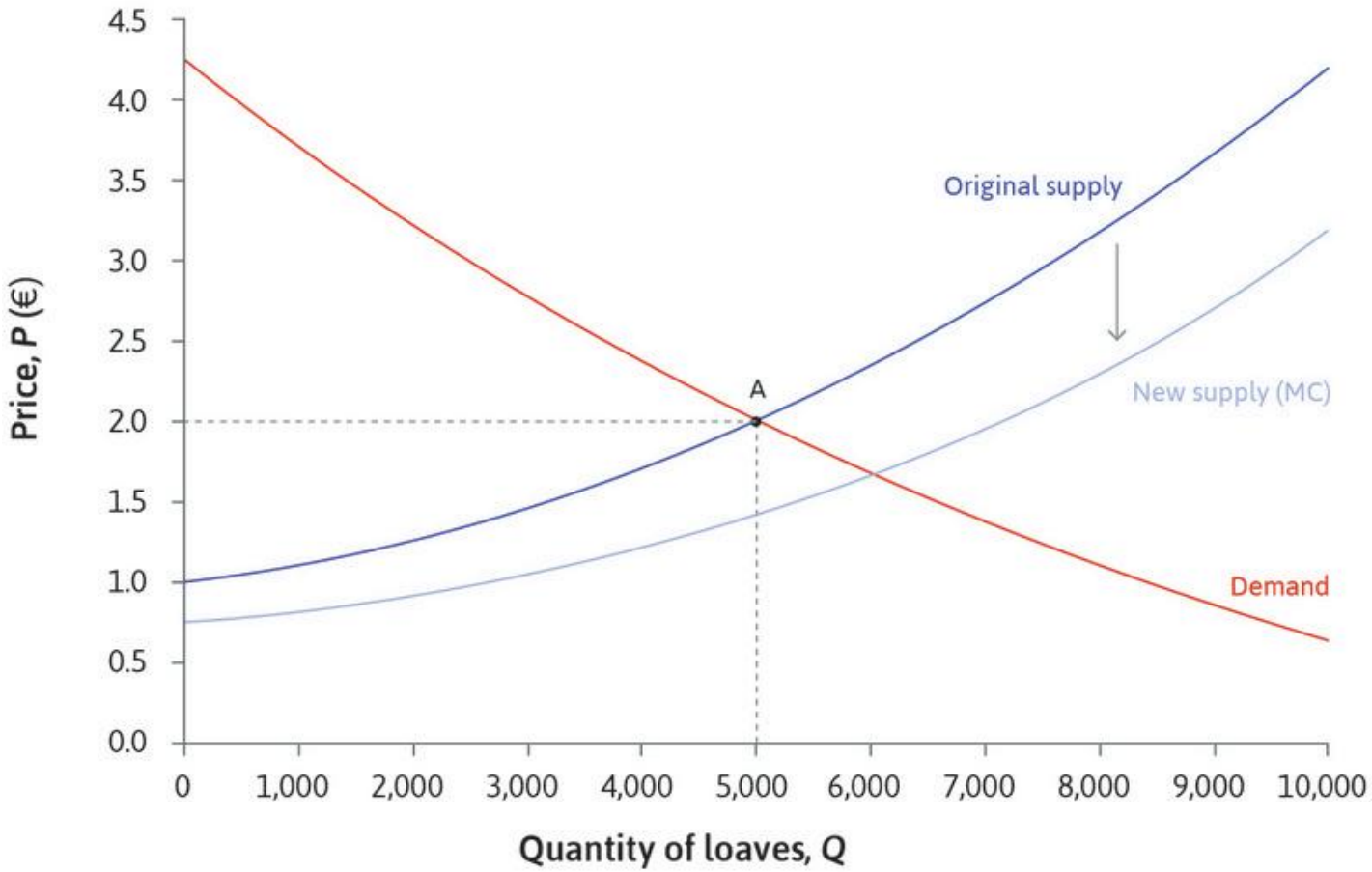


Competitive Equilibrium



Competitive Equilibrium

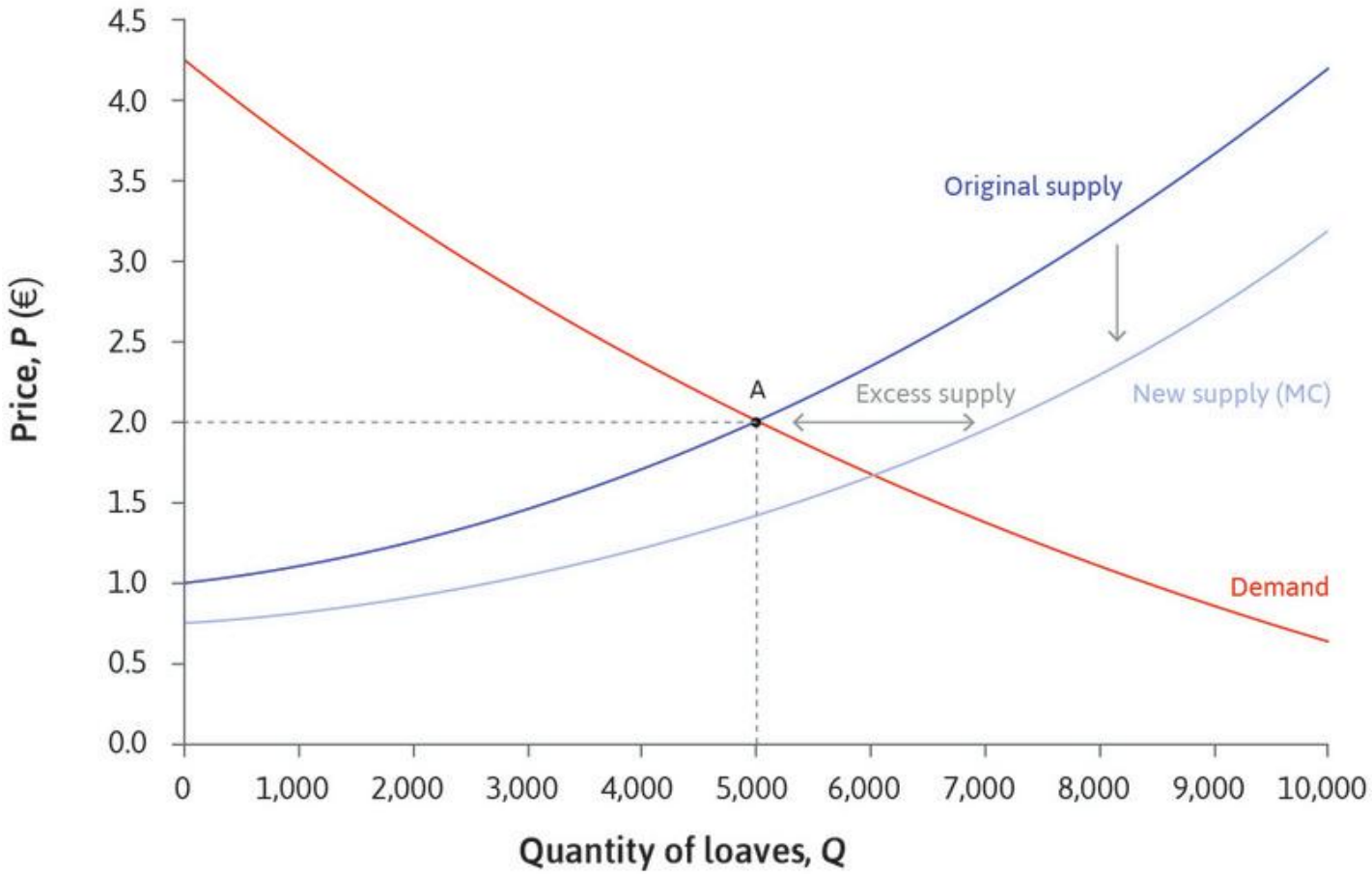
Increased supply either due to *new technology* that becomes available or *fall in input prices*



Competitive Equilibrium

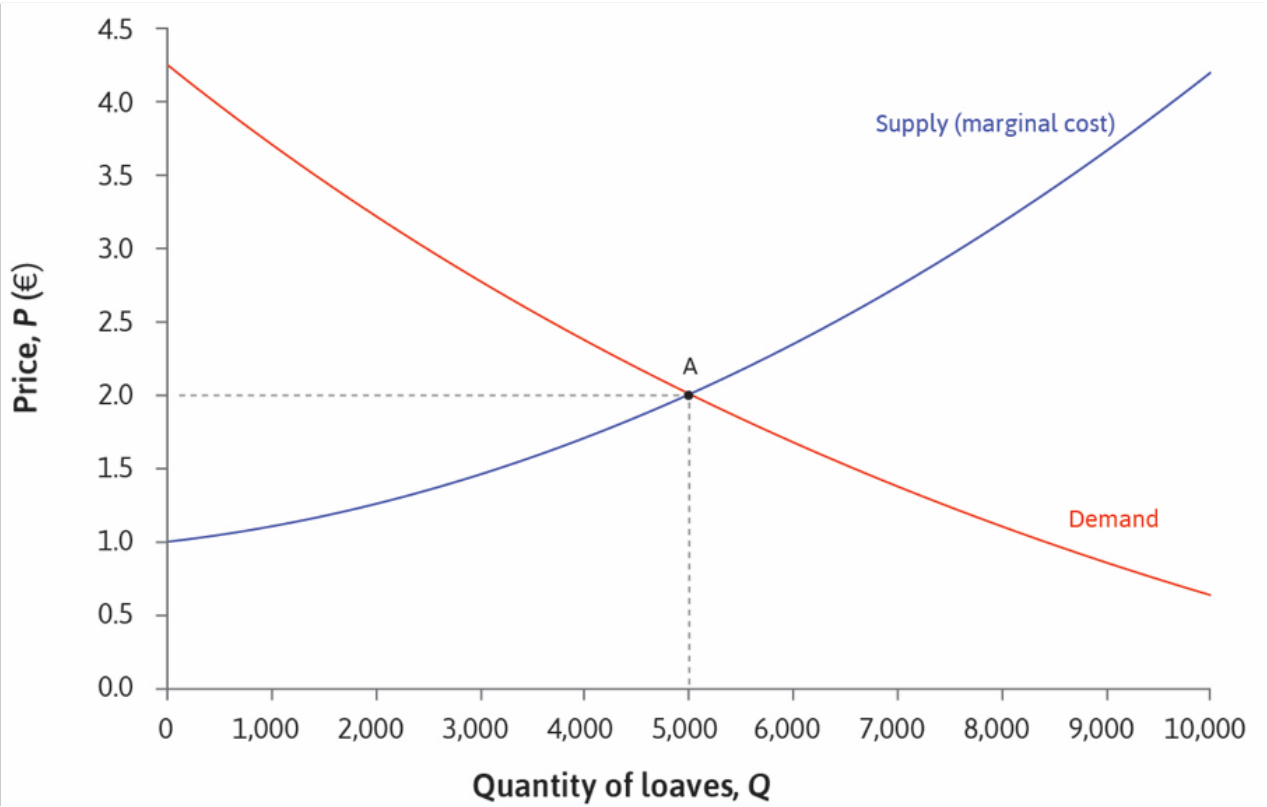
Excess supply at the going market price (move along demand curve)

Price falls to a new equilibrium



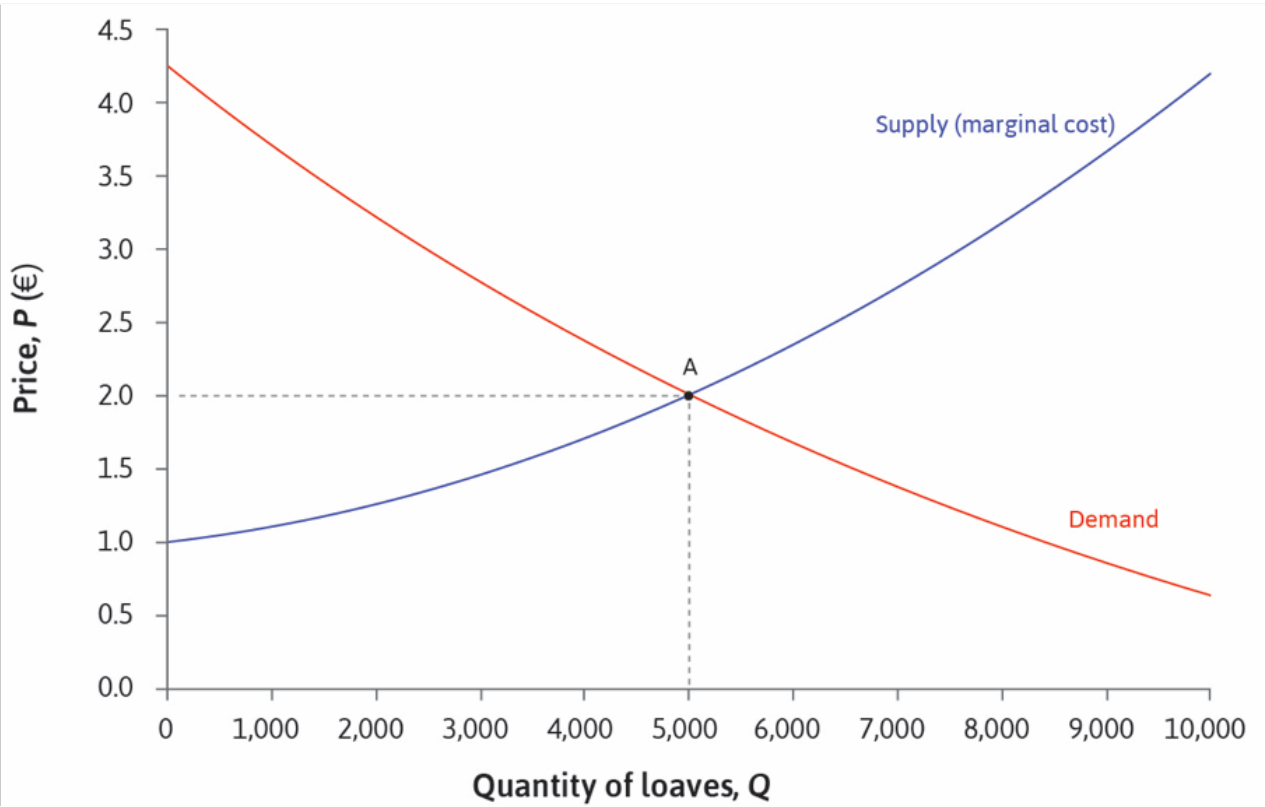
Competitive equilibrium: Characteristics

- All gains from trade are exploited in equilibrium:
  - no deadweight loss
- Equilibrium allocation is Pareto efficient



COMPETITIVE EQUILIBRIUM: CAVEATS

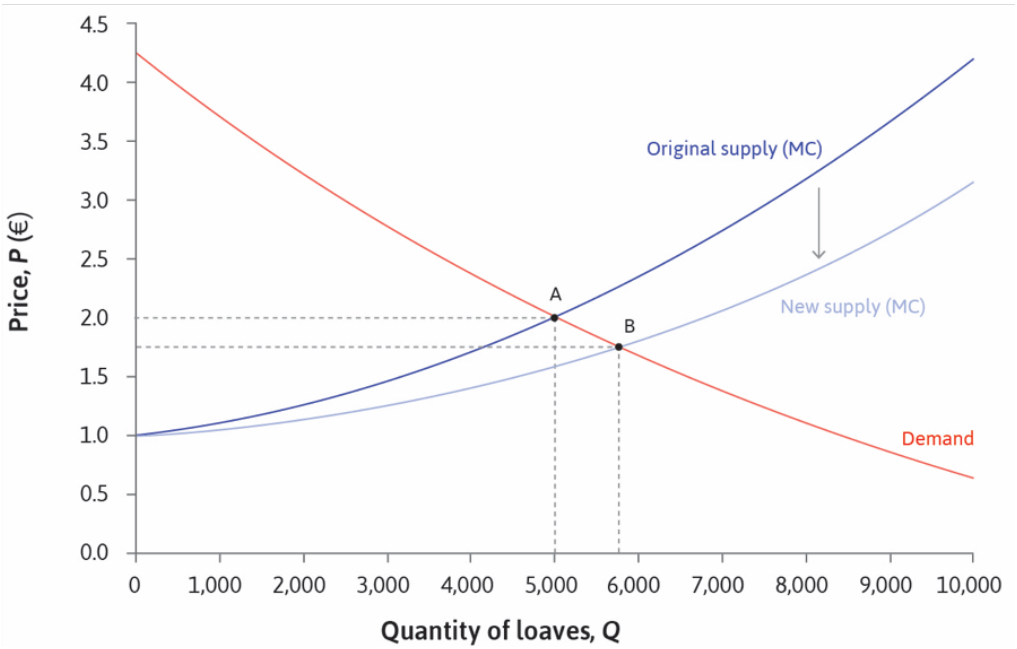
Fairness: The distribution of total surplus depends on the elasticities of demand and supply (share of total surplus inversely related to elasticity)



Exogenous Shock

The entire supply or demand curve can shift due to *exogenous shocks* e.g. technological change, popularity

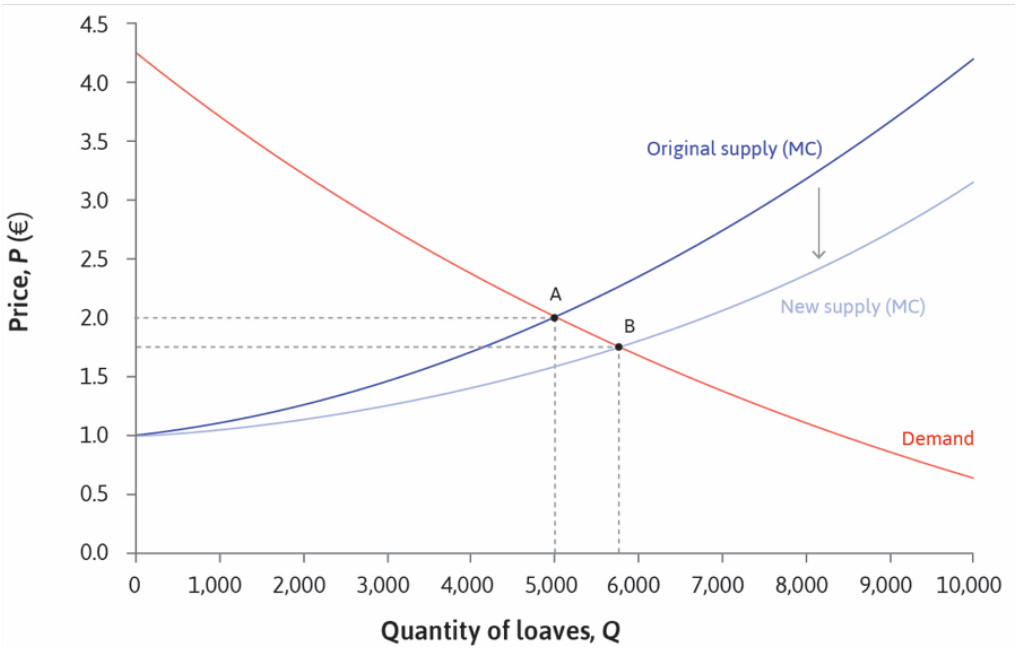
Buyers and sellers adjust their behaviour so that the market clears.



Changes in supply: Firm Entry or Exit

The supply curve can also *shift* due to market *entry* or *exit*.

If existing firms are earning *economic rents* and *costs of entry* are not too high, other firms may enter the market.



Taxes

Throughout history, governments have used taxes to raise revenue.

Taxes increase prices at each quantity

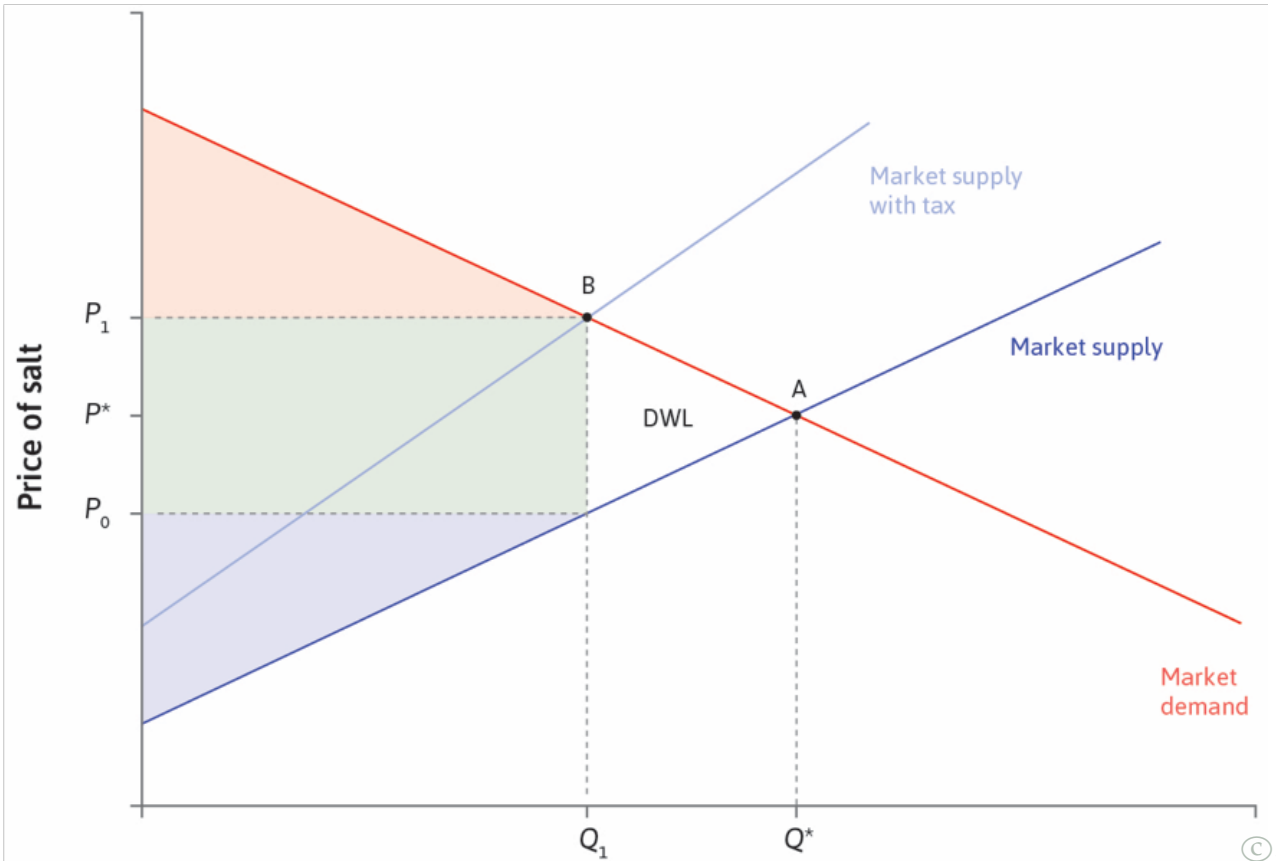
- Taxes on suppliers shift the supply curve
- Taxes on consumers shift the demand curve

Taxes and dead-weight loss

Taxes lower surplus:

Consumer surplus *(red)* Producer surplus – *(purple)*

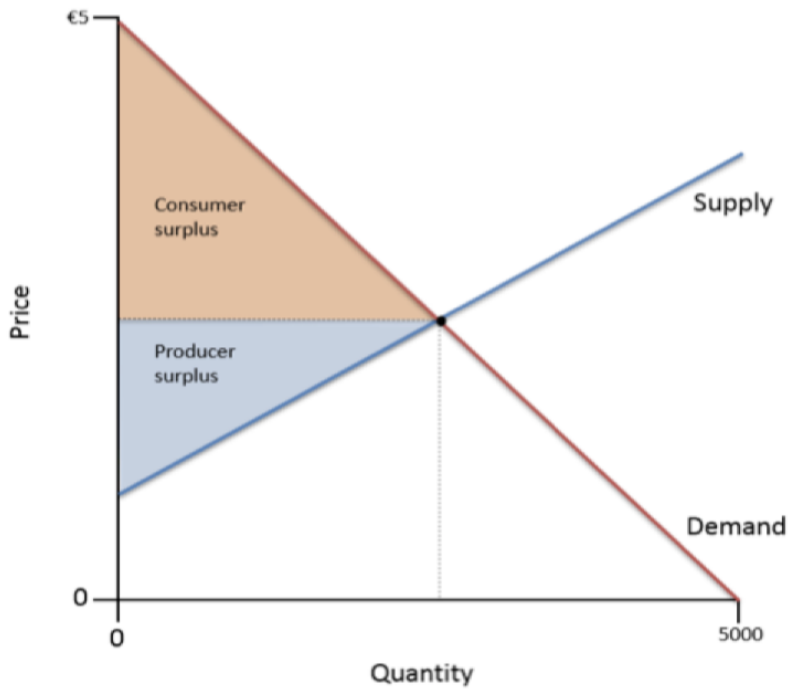
Government revenue – *(green)* *Deadweight loss* – *(white triangle)*

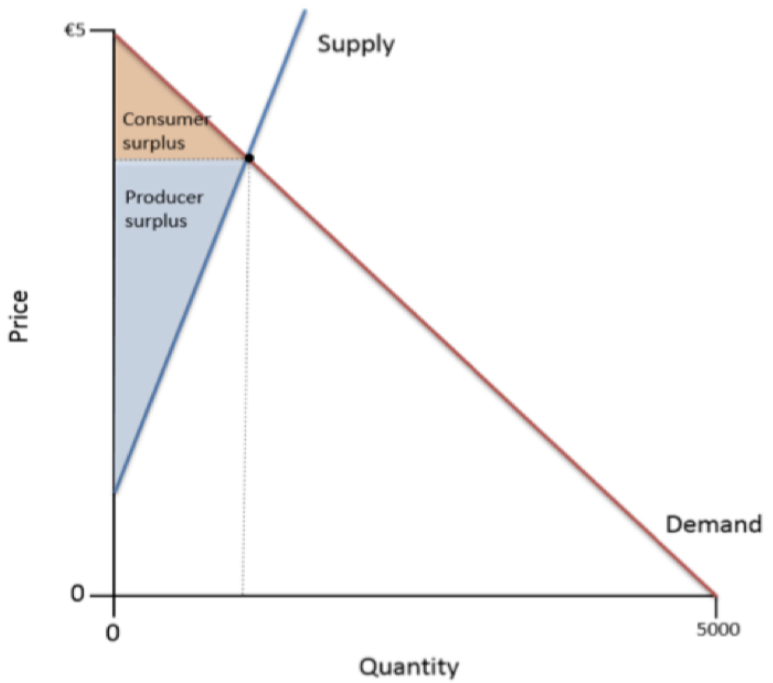


Surplus and Elasticity

Tax incidence depends on relative elasticity of consumers and producers.

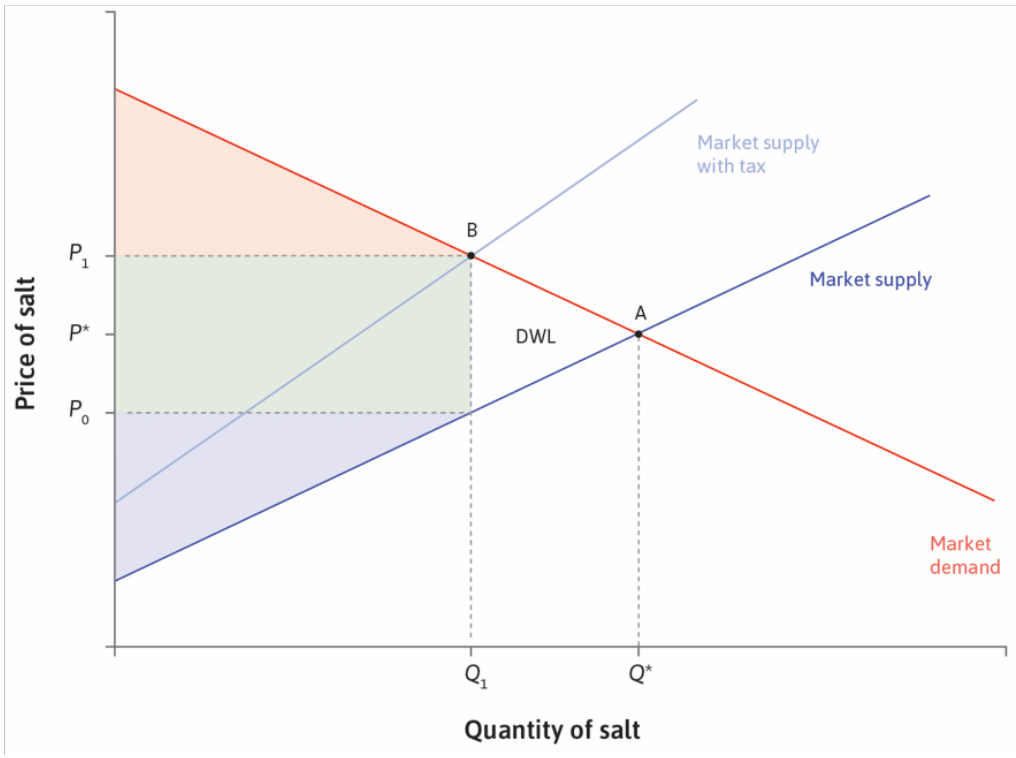
The *relatively inelastic group* obtain more *surplus* and has *more to loose* if a tax is applied.





Taxes: Welfare effects

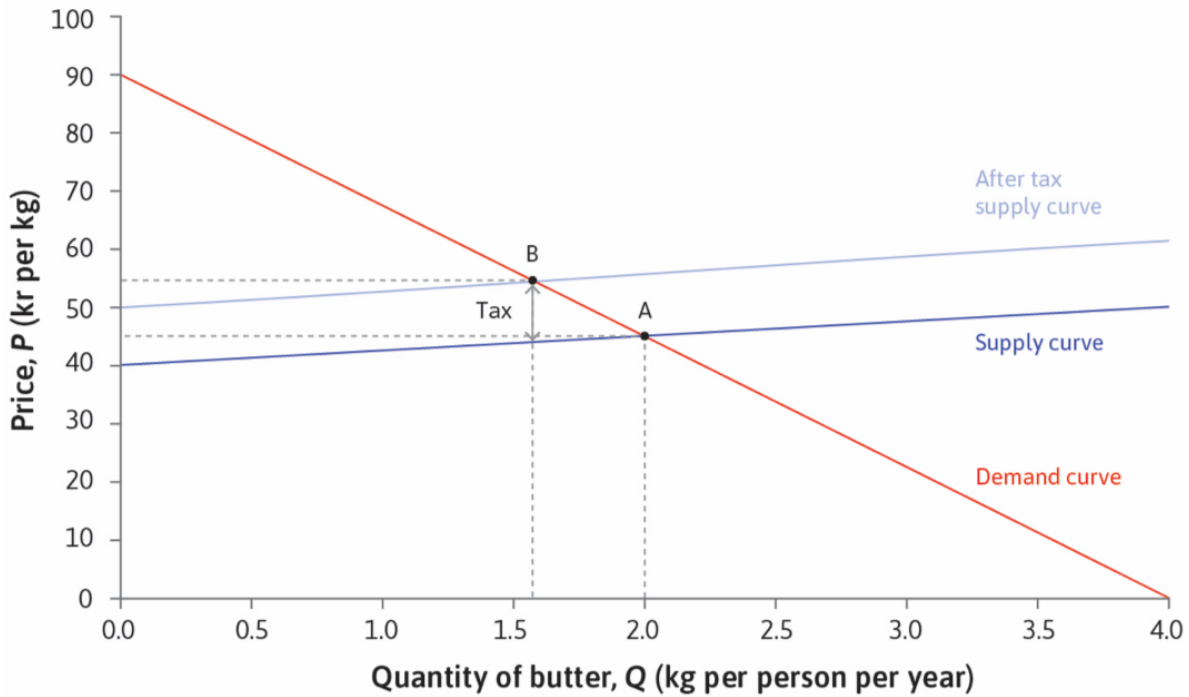
Taxes can still raise welfare if governments use tax revenue to provide beneficial goods/services, *e.g., health, public transport.*



Example: Denmark's butter tax

In 2011, Denmark introduced a tax (per kg) on saturated fat, which was equivalent to 22% of the average butter price.

Consumption of butter and related products fell by 15-20%.



But the tax was eventually removed due to the administrative burden of collecting it.

Iso-profit lines

$$\begin{aligned}\text{Profits} &= \text{Total Revenue} - \text{Total Cost} \\ &= \text{Price} \times \text{Quantity} - \text{Total Cost}\end{aligned}$$

Divide both sides with Quantity

$$\frac{\text{Profits}}{\text{Quantity}} = \text{Price} - \frac{\text{Total Cost}}{\text{Quantity}}$$

$$\frac{\text{Profits}}{\text{Quantity}} = \text{Price} - \text{Average Cost}$$

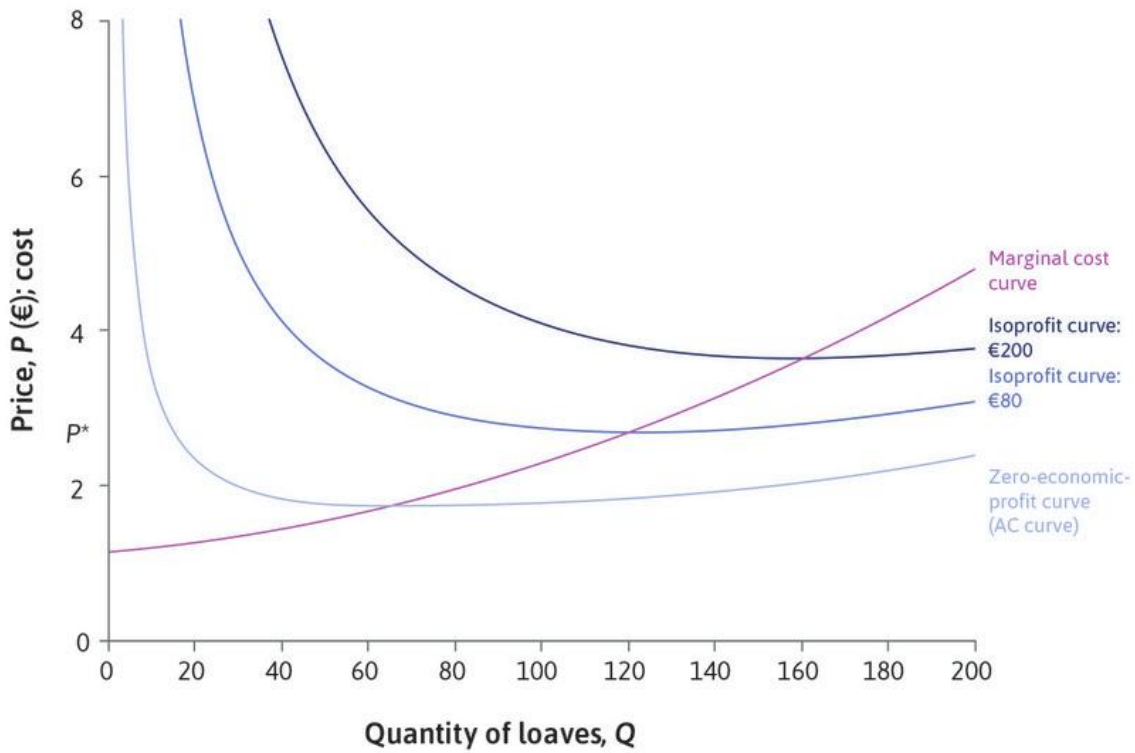
For constant level of profits:

$$\text{Price} = \frac{\text{Constant Profits}}{\text{Quantity}} + \text{Average Cost}$$

Iso-profit lines

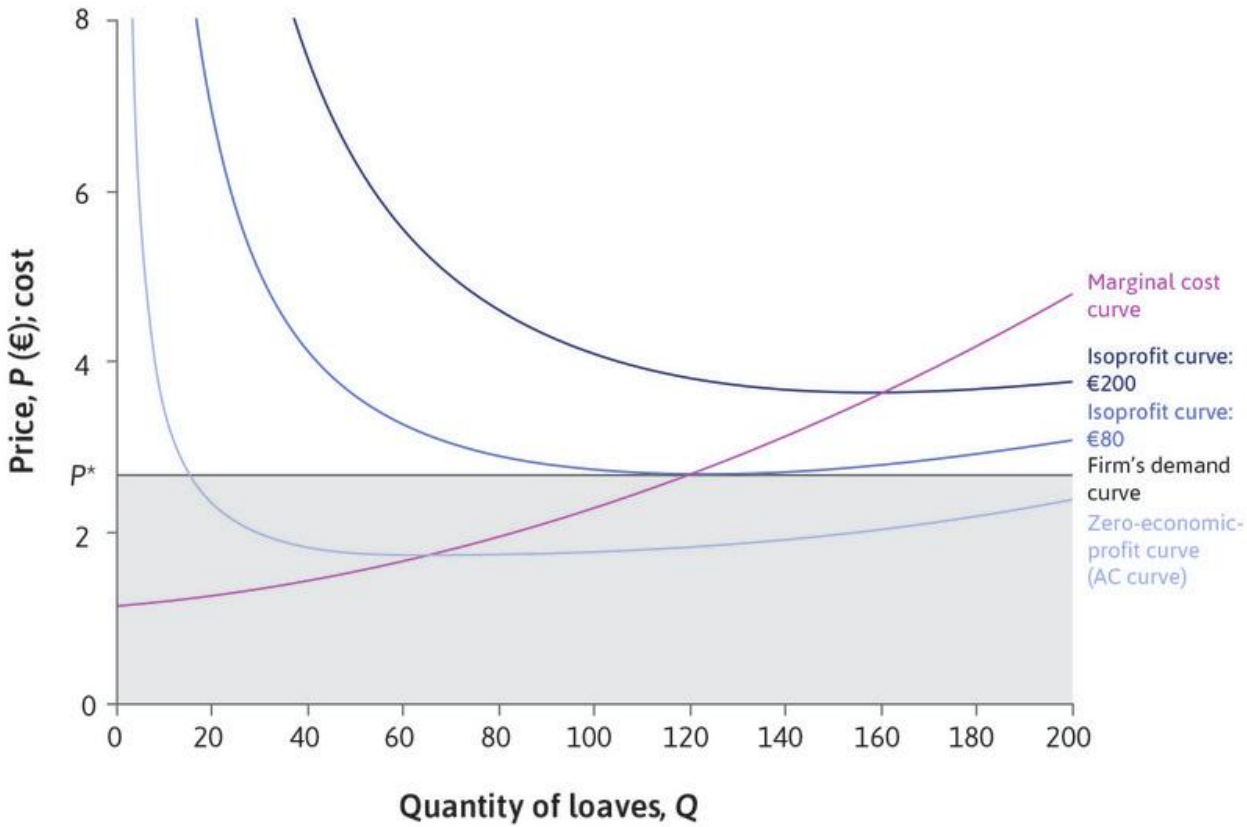
Price is *profit per unit produced* plus *average cost*

$$\text{Price} = \frac{\text{Constant Profits}}{\text{Quantity}} + \text{Average Cost}$$



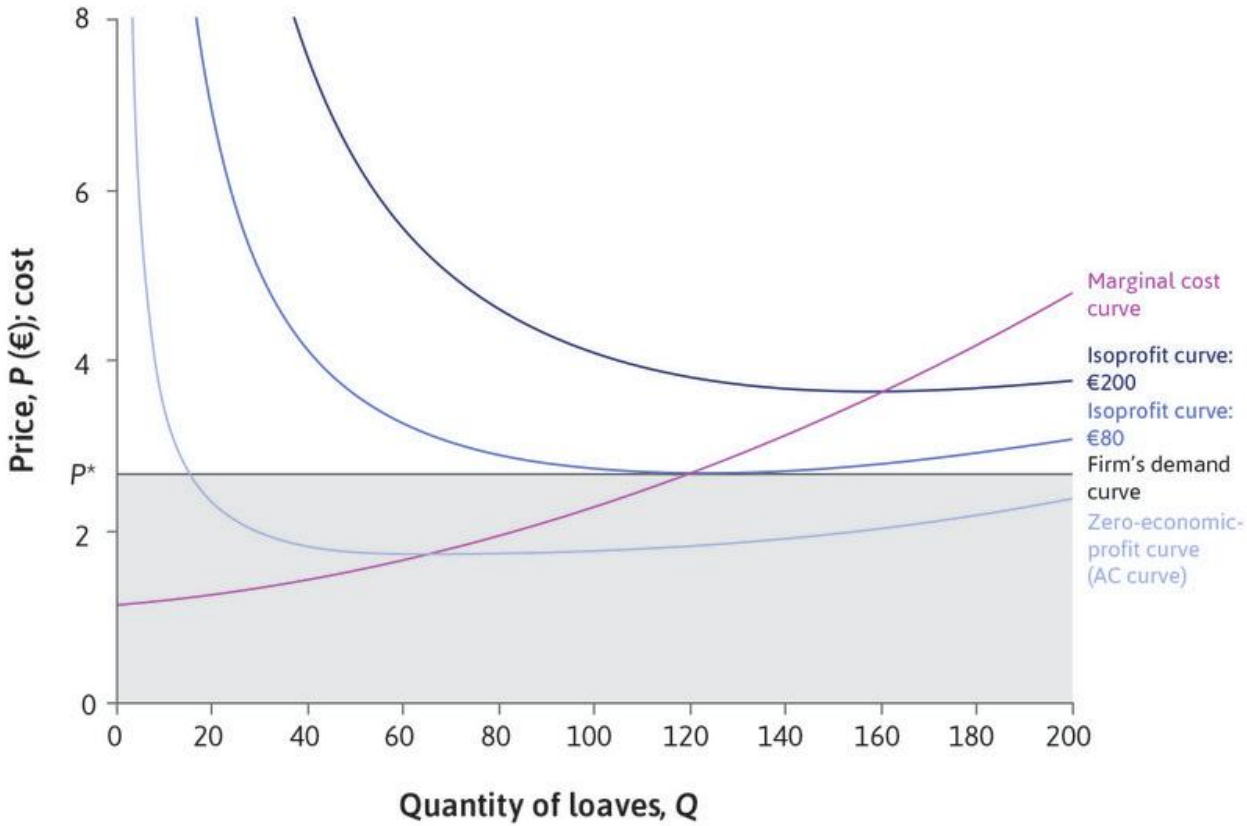
Iso-profit lines with elastic demand

Perfectly elastic demand: consumers are ready to consume everything that is supplied at given price



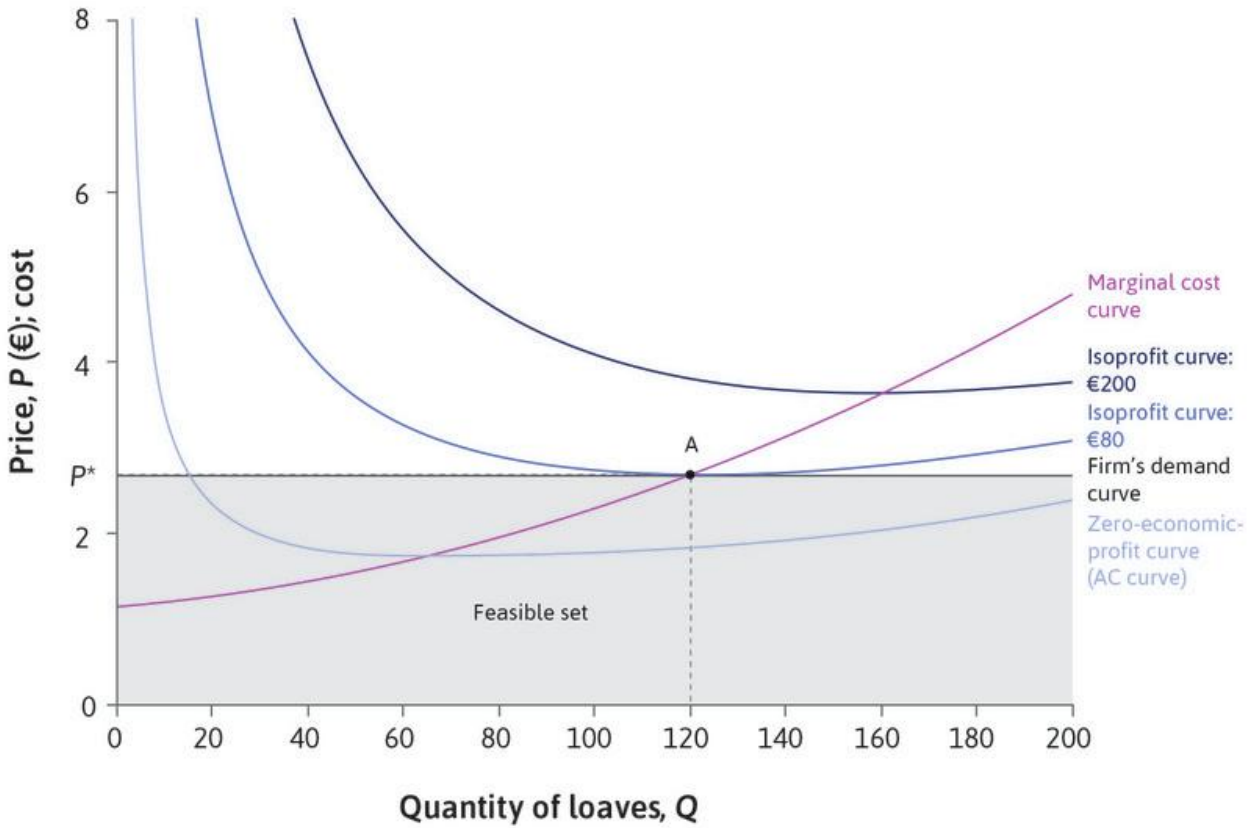
Iso-profit lines with elastic demand

Supply Curve: the supply curve coincides with the marginal cost curve (supplier always minimise their average cost)



Iso-profit lines with elastic demand

Maximise *profits* where iso-profit lines are tangent to demand curve



Firm with market-power

A *firm with market-power* restricts the quantity it supplies in order to increase and ultimately maximise its profits (choose higher iso-profit lines)

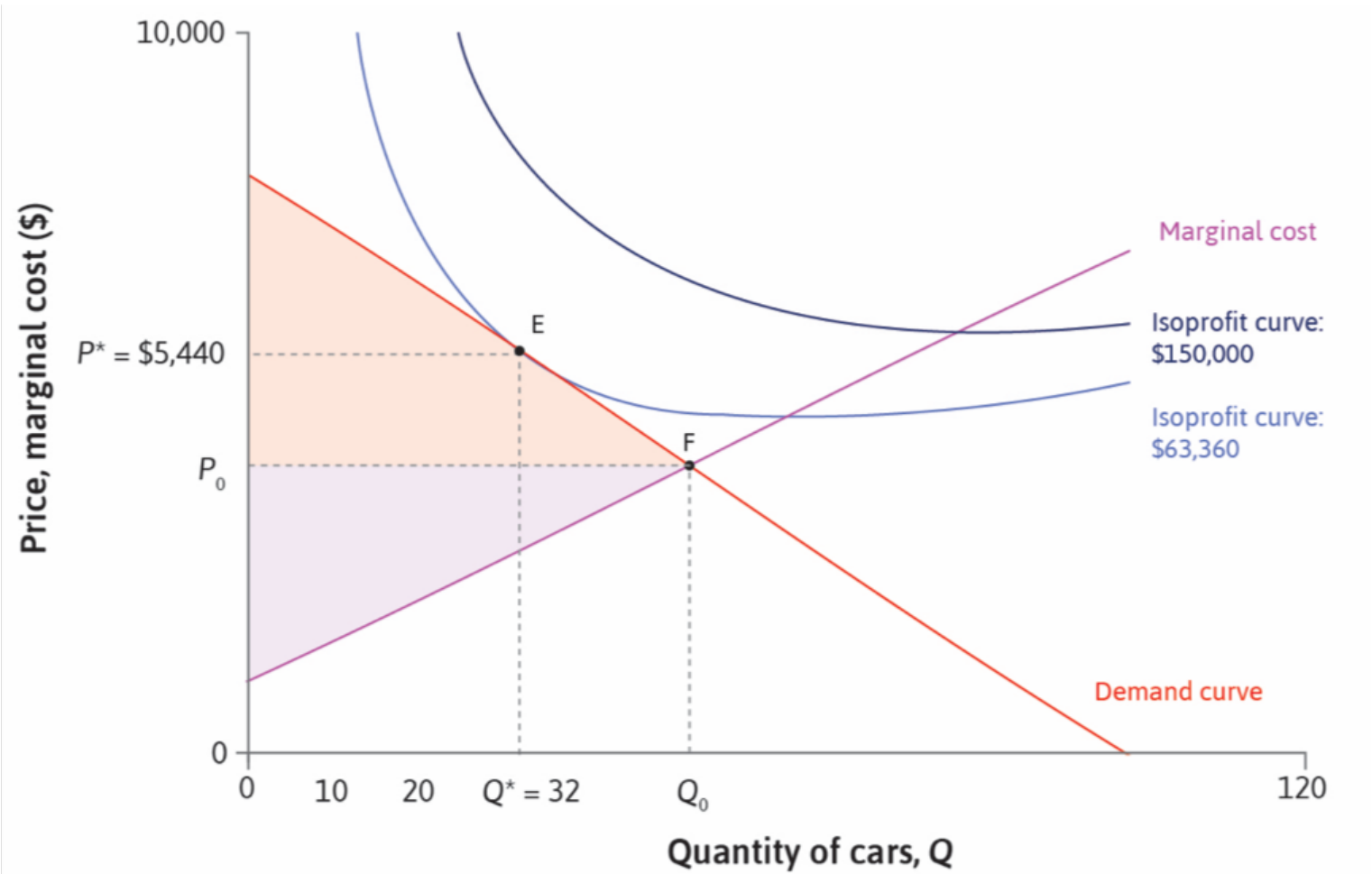
Source of market power emanates ultimately from the lack of available substitutes

differentiated products: goods that are not perfect subtitles

A firm with market power (monopoly) can choose *any price and quantity on the demand curve*

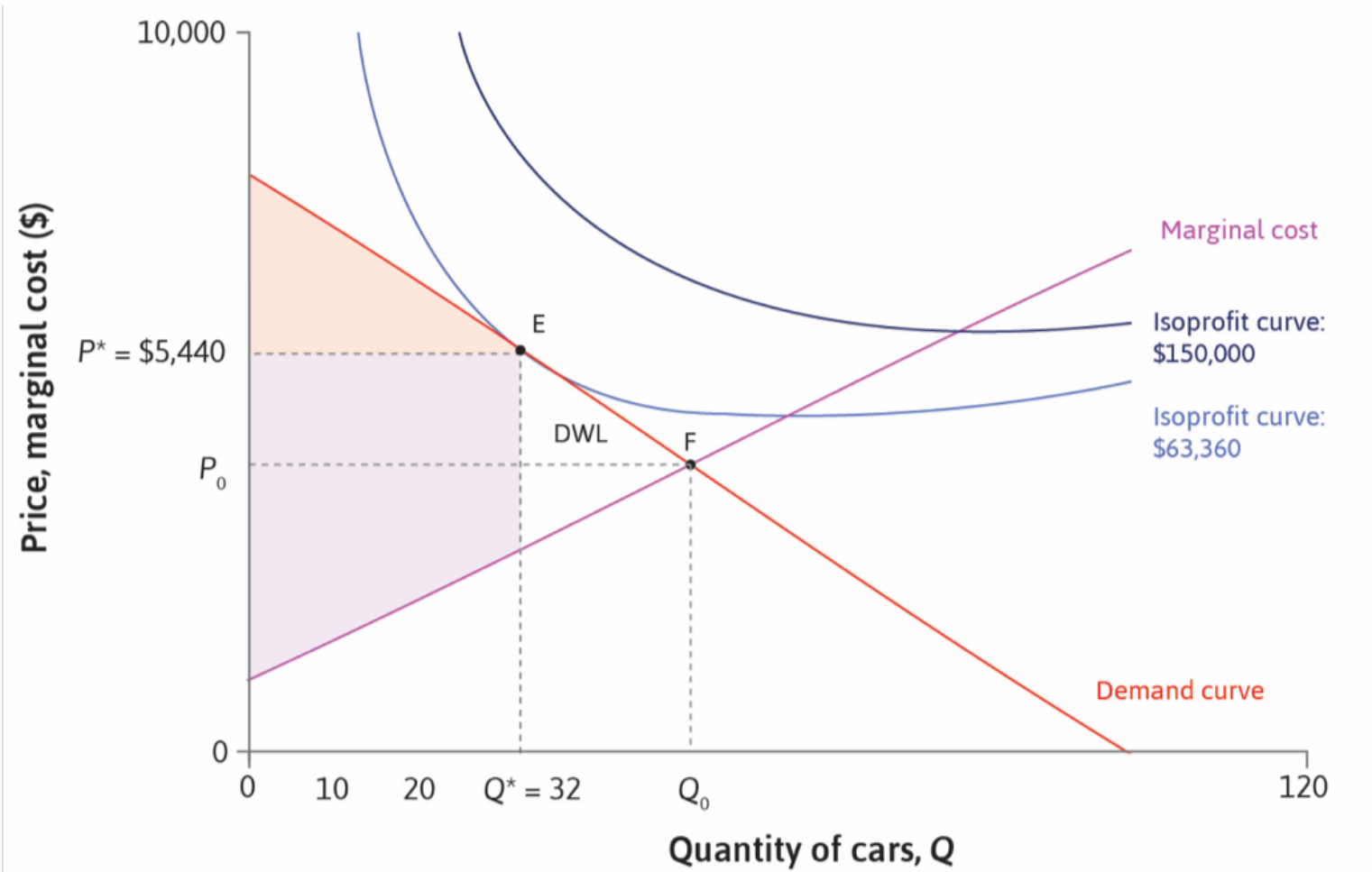
Iso-profit lines with market-power

If the demand curve was *not flat* and firm has some *market power*



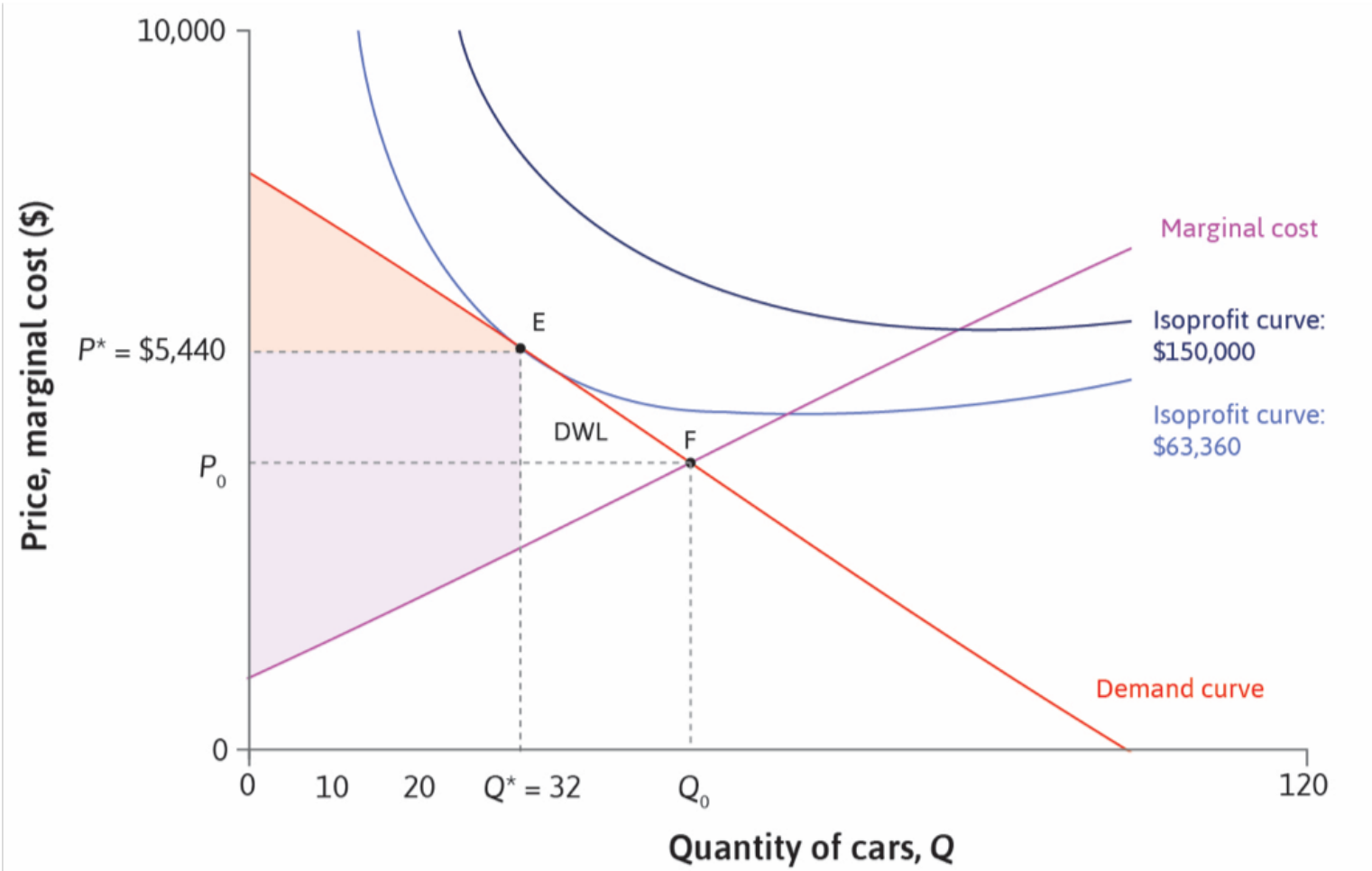
Deadweight loss is difference between current surplus (E) and the surplus in a *Pareto efficient allocation* (F)

Pareto efficient allocation is where demand meets the marginal cost



F is where society's surplus is maximised (*competitive equilibrium*)

E is where the firm's profits are maximised (*monopoly*)

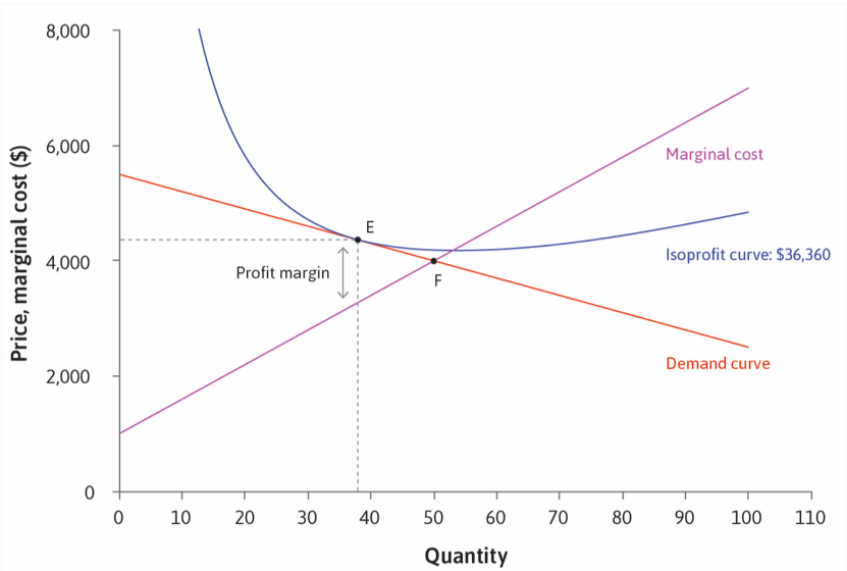


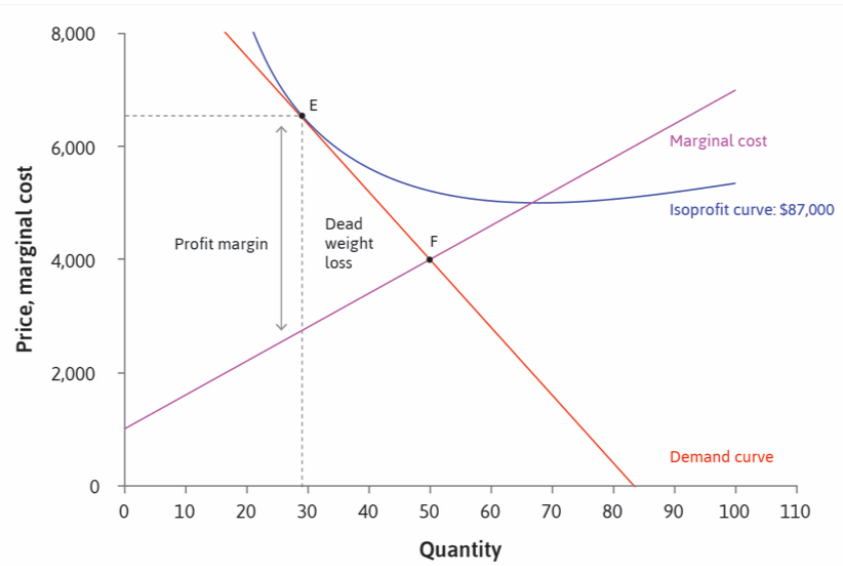
Elasticity and Deadweight loss

The *flatter* (more *elastic*) the *demand curve*,

the lower *firm's profit in monopoly* and

lower the *dead-weight loss*.





Market power

Price-Setting firms	Price-taking firms
(Market power)	*(Perfect Competition)*
MC $<$ Price	MC $=$ Price
Deadweight losses	No deadweight losses
(Pareto inefficient outcome)	*(Pareto efficient outcome)*
Firms earn economic rents	Firms earn no economic rents

Perfect competition may not hold completely in reality, but can be a good approximation to actual firm behaviour.

Summary

Competitive equilibrium

Firms are *price takers*

Firms maximise profits where MC = Price

Market power

Firms are *price setters*, i.e., they are able to set the price because of lack of perfect substitutes

Firms maximise profits where MC < Price

Taxes create deadweight loss and reduce the welfare of the society

Taxes spent well can increase welfare of the society and limiting the impact of the deadweight