The market for transport

EE382

- The law of demand and the main factors that impact upon the general demand for transport services as well as individual transport modes
- The theory of supply and the main factors that impact upon the supply of transport services
- The market and economic principles that underpin the provision of transport services and ensure that such services are provided to those that are willing and able to pay the market price
- The importance role of the price mechanism in balancing the needs of the users and providers of transport services
- That even where transport market are closely controlled and regulated by public authorities, underlying economic principles still apply

The market for transport

- The demand for transport
- The supply for transport

Market

- is a meeting place for buying and selling
- In a transport context a market is where the consumers of transport services are brought together with the provider of such services
  - Can involve a large number of different bodies, both public and private , all of which contribute different aspects to the activity

The demand for transport

Law of demand

- The Demand for a good is the number of units per unit of time that consumers purchase at any given price

- Demand is a result of consumers expressing their own preferences between goods at the relative prices that they face, taking into account all money that they have available to them

Demand for transport services

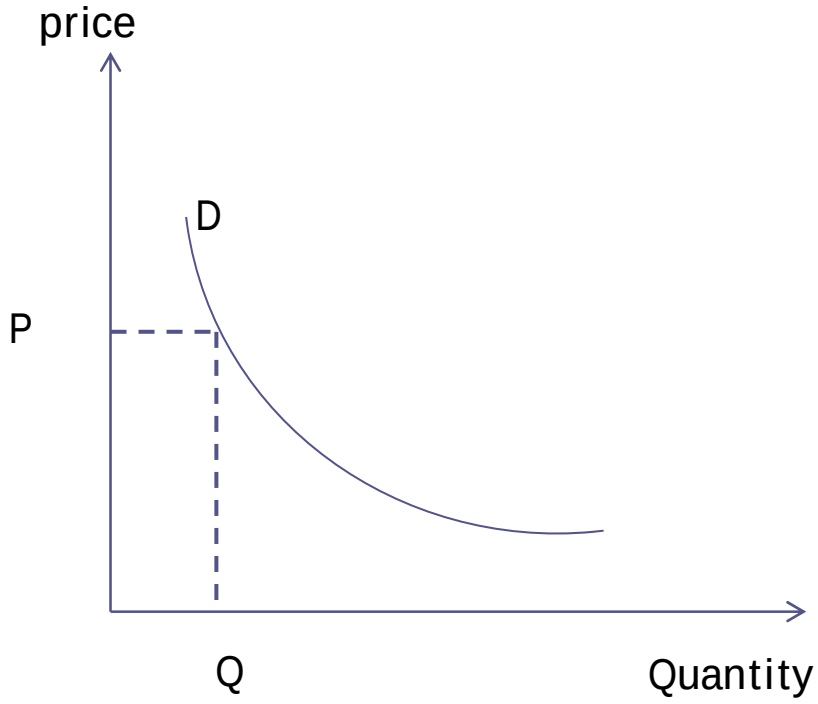
We start with the basic Assumption that the decision as to whether to travel or not is based solely upon the price of that journey

Economic rationality would state that as all individuals have a limited income, they will seek to maximize the benefit obtained from that income- utility (satisfaction) maximization

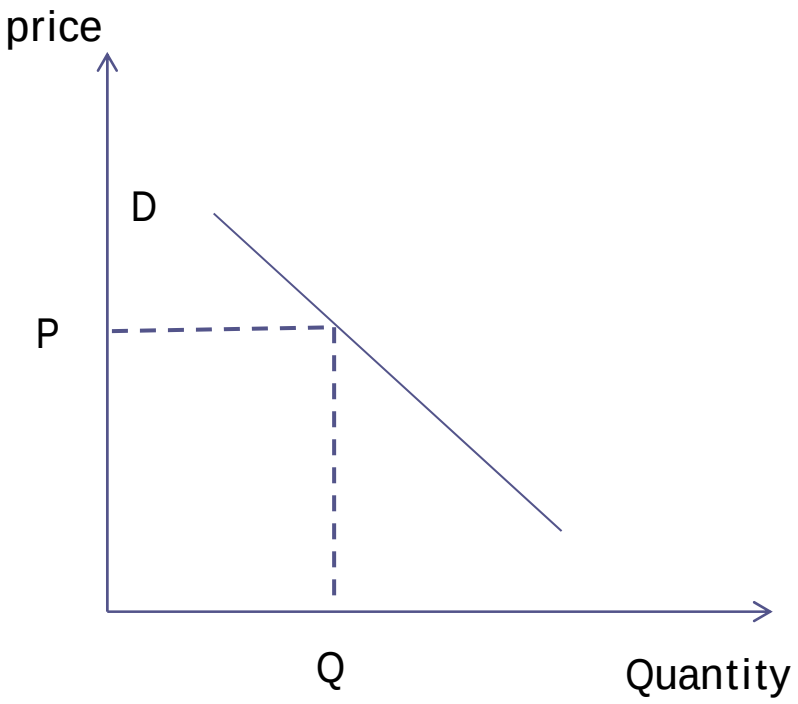
If the price of a particular mode of transportation was to rise we would expect demand to fall as individuals switch to alternative modes or do something else with their income that gives them greater satisfaction

Basic relationship between the price and the quantity demanded for transport services

Theoretical



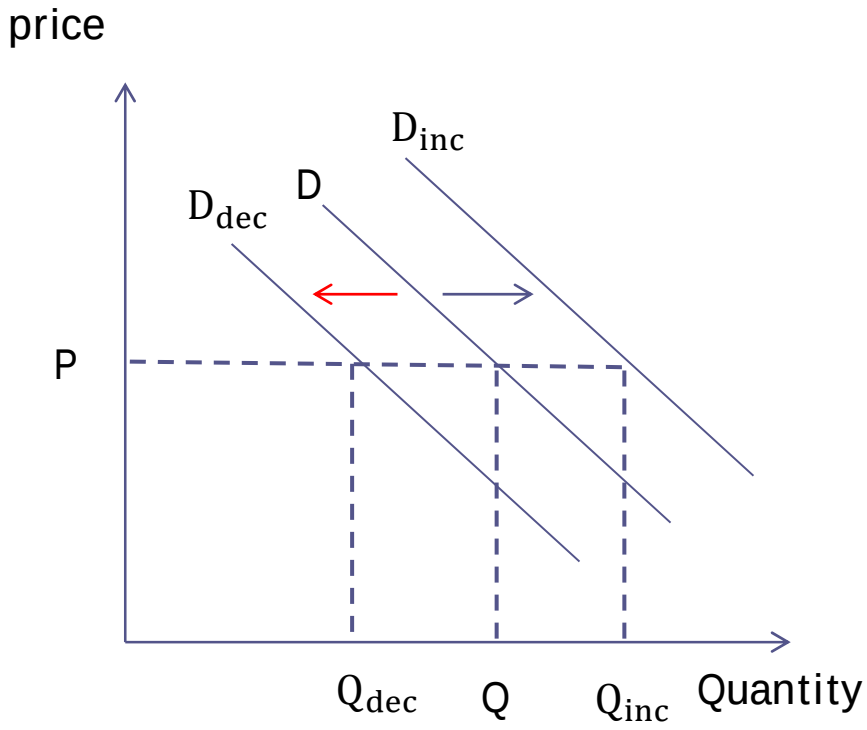
Simplified



- The demand curve gives the basic price/quantity demanded relationship

- Relaxation of that underlying assumption allows other determinants of demand to be introduced into the analysis

Income



If everything else remained equal,

- increase in incomes would enable more people to afford the use of transport services and hence increase demand
- Decrease in incomes would be expected to have the opposite effect

Increases in income

- Will cause an overall increase in the demand for transport services
- May not be expected to have a uniform impact across all transport modes
- The demand for some may actually be expected to fall such as the demand for bus services whereas the demand for private transport, rail services, freight services and air services may all be expected to rise with an increase in income
- Normal good vs. Inferior good

The price of other goods and services

Substitute goods

- Inter modal - the bus verses the train, the bus verses the car
- Intra modal- the blue bus verses the red bus

- The closeness of the substitute goods will determine the actual size of the impact on the market

- Example- the demand for bus services, a rise in the price of rail travel will cause the demand curve for bus services to shift to the right

Complementary goods

- Goods or services that are consumed at the same time
- The price of petrol may expected to impact upon the use of car, as fuel costs are one of the major determinants of private monitoring
- Increase in the price of petrol would cause a shift of the demand curve for private motoring to the left
- Some consumers will be more conservative with their car usage whilst others may take their car off the road or sell it and use public transport

Fashions or Trends

- A rise in environmental awareness – may cause a decrease in demand for transport services or switch to less environmentally harmful modes of transport – private to public transport

- Through advertising consumer awareness of good or service can be raised and the positive attributes associated with consumption reinforced

Expectations of future price rises

- An individual may delay purchasing a motor vehicle if the situation regarding the future price of oil is unknown
- A daily commuter may purchase a one-year season ticket if fares are expected to rise in the foreseeable future
- Individuals may pull forward purchases where prices are expected to rise in the future, thereby increasing demand
- Individuals will delay purchases where prices are expected to fall in the future, hence decreasing demand

Population changes

- If a particular population expands, the quantity of transport demanded in the area inhabited by that population is also likely to increase, and vice versa

Example

- Transport for London anticipated that between 2006 and 2025 the population of London will increase from 7.5 to 8.3 million
  - Increase the demands on London's transport systems

Population effects

- If a transport product becomes less popular, perhaps due to it becoming less fashionable or because of a health or safety scare, the quantity demanded of it is likely to fall

Speed

- Producers and their employees are likely to want to minimize transport time as it is often a source of reduced, or even wasted, productivity; and passengers travelling for social reasons will often view the journey time as cutting into their time of enjoyment at the destination

Reliability

- Passenger often have scheduled appointments to meet and freight companies are constrained by production deadlines, especially with the development of just-in-time production methods

Security

- Passengers are becoming increasingly aware of, and concerned about, the security of their transport, especially with the recent growth of terrorism
- Freight companies can insure against loss and damage of products in transit, but it causes disruption to their production lines which can have wider business costs
- Both consumer types will consider security levels seriously when deciding upon their chosen mode of transport

Three factors that need to be considered when examining the demand for transport services

- Demand for transport is a derived demand
- Demand for transport is time specific
- Demand for transport follows peaks and troughs

Demand for transport is a derived demand

- Modern life is structured around accessing goods and services that are outside of the home and require some form of transport in order to be obtained
- An individual's demand for transport is instigated through their demand for something else
- The need to work in order to earn an income generates a demand for transport
- Demand for transport is therefore said to be a derived demand

Demand for transport is time specific

- When transport services are demanded they are demanded NOW

- The demand for transport has a very short expiry date, and due to the derived nature of demand, once that expiry date has passed then the need to make that particular journey will almost certainly no longer exist

Demand for transport follows peaks and troughs

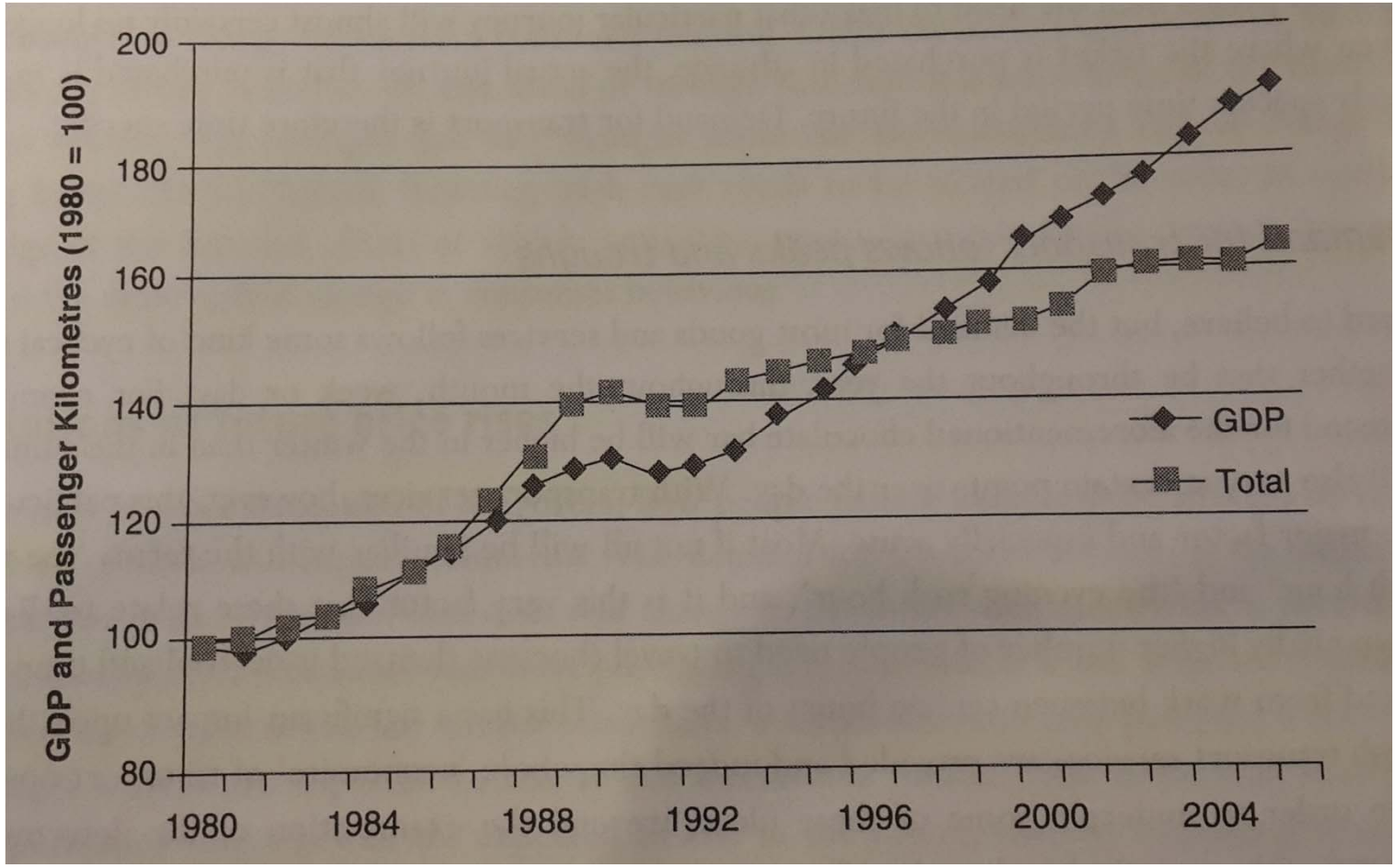
- The demand for most goods and services follows some kind of cyclical pattern
- The morning rush hour and the evening rush hour
- A substantially higher number of people need to travel to and from work between certain hours of day

Case study: Determinants of the demand for transport services- a practically based discussion on the effect of income on demand

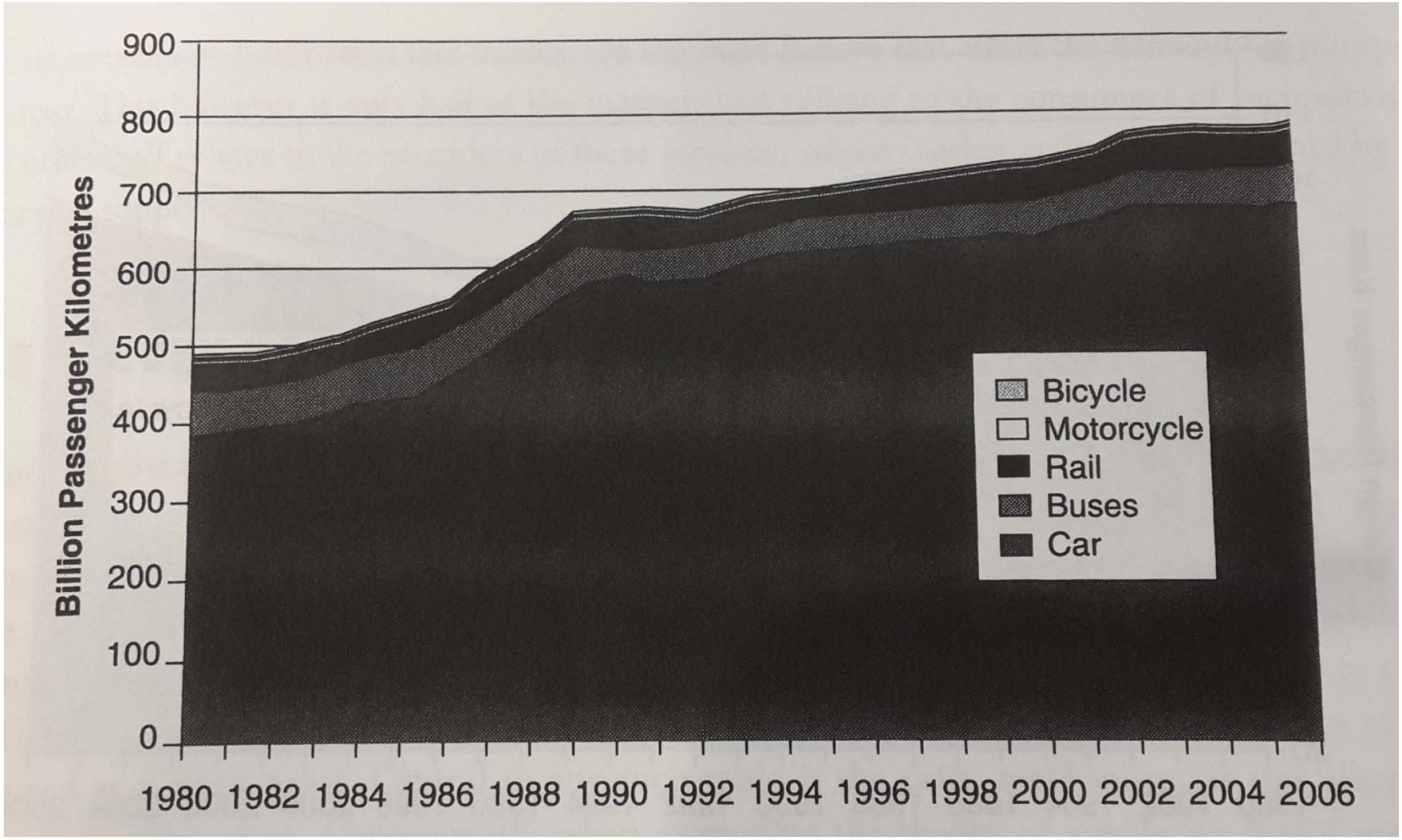
- Economic activity increases this increased trade creates a demand for the transport of goods and services from one location to another, thus creating increased demand for freight transport

- Passenger travel also increases for a number of reasons
  - Increased trade creates a need for more individuals to travel in the course or business
  - Higher incomes affect labor market and will almost certainly result in increased commuting as individuals travel further in order to access higher paid jobs
  - Higher incomes require more spending and this in turn requires more transport

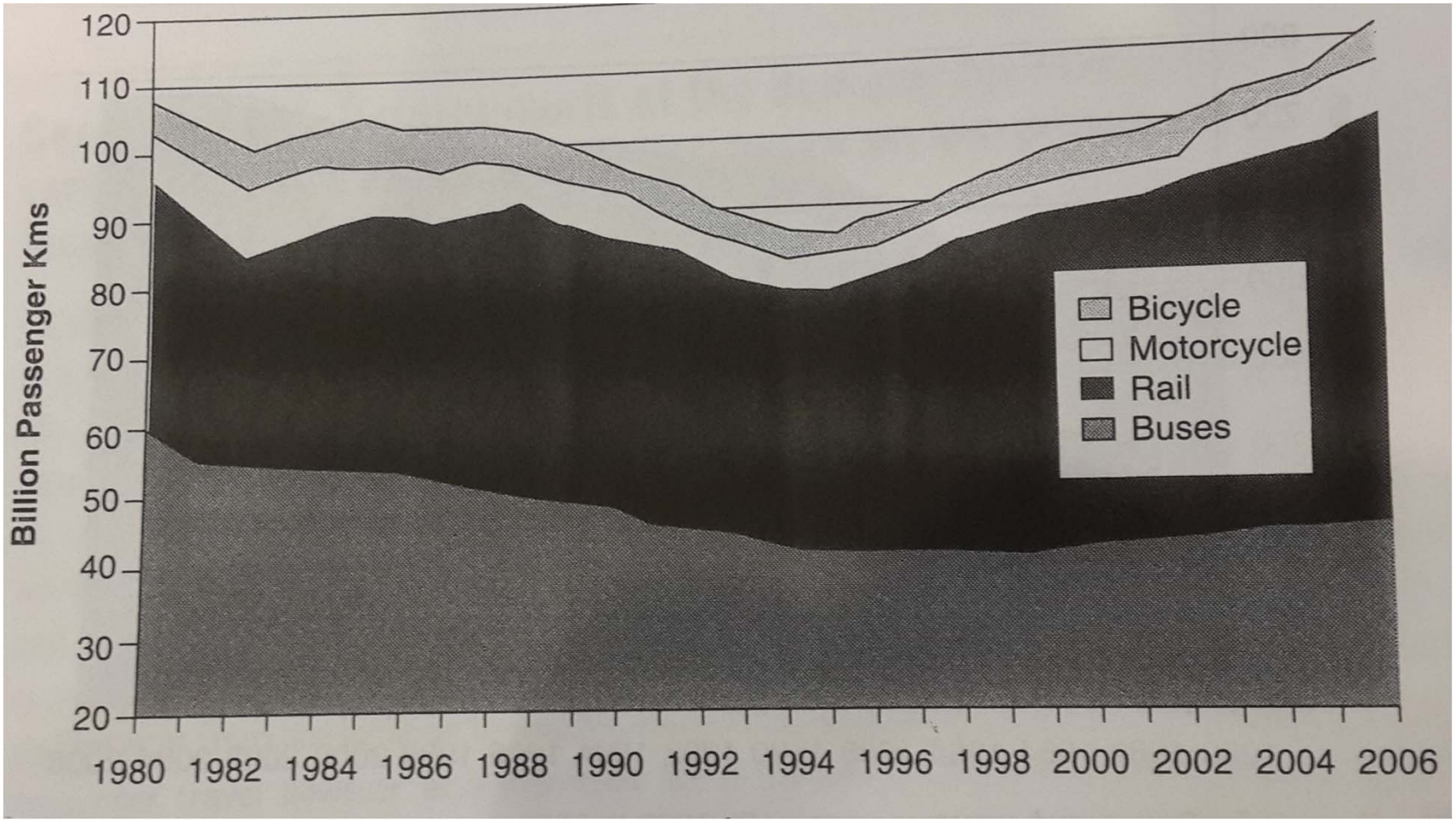
GDP and passenger kilometers, 1980 to 2006



Passenger kilometres modal split, 1980 to 2006



Modal split, non car modes of transport, 1980 to 2006



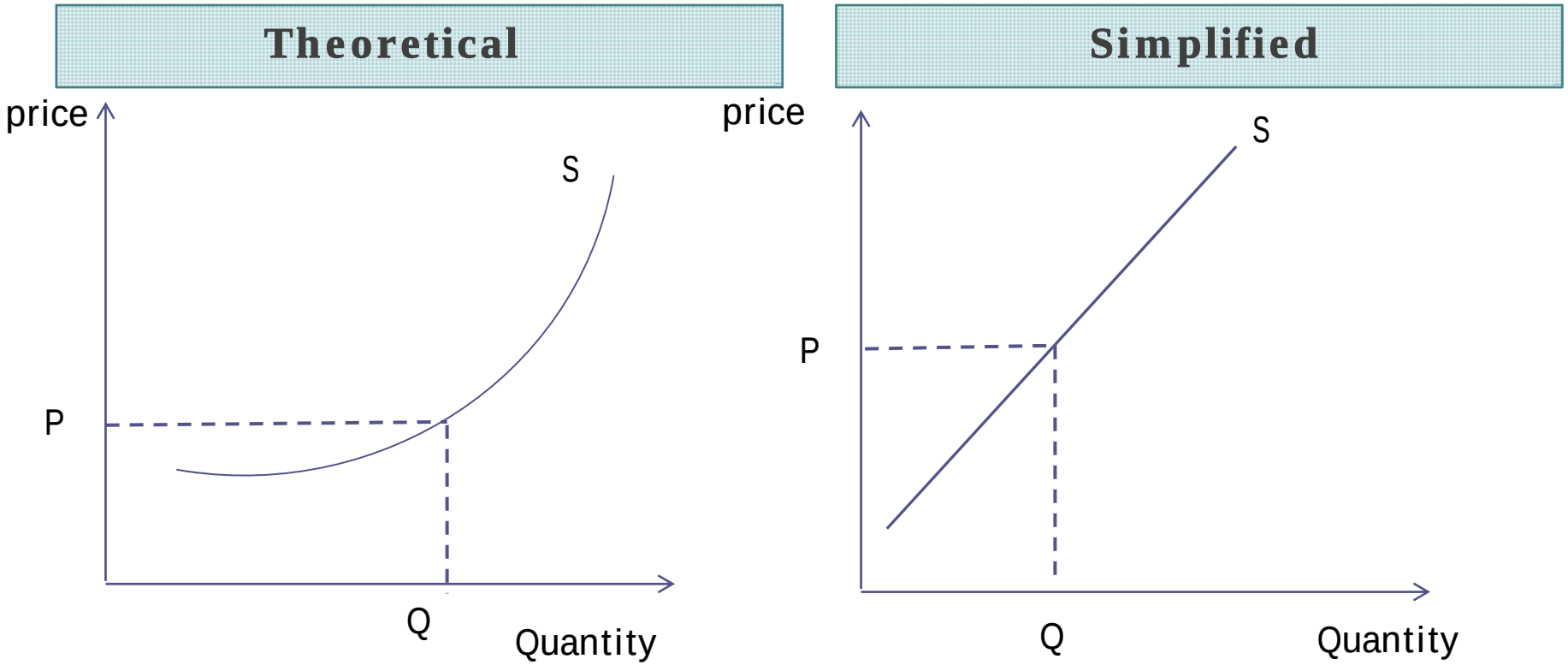
The supply for transport

The Theory of Supply

- As the price rises the quantity supplied to the market will increase

- The underlying assumption used to explain producers' behavior is that they seek to maximize profits
  - If prices are (relatively) low within a given market, few (if any) producers will be able to make a profit in that market as revenues may not cover costs
  - As the price rises, however, this represents better profit opportunities for producers and the quantity supplied would increase
  - At higher prices the profits to be made in a given industry are higher than the next best alternative, the opportunity cost

Basic relationship between the price and the quantity supplied for transport services

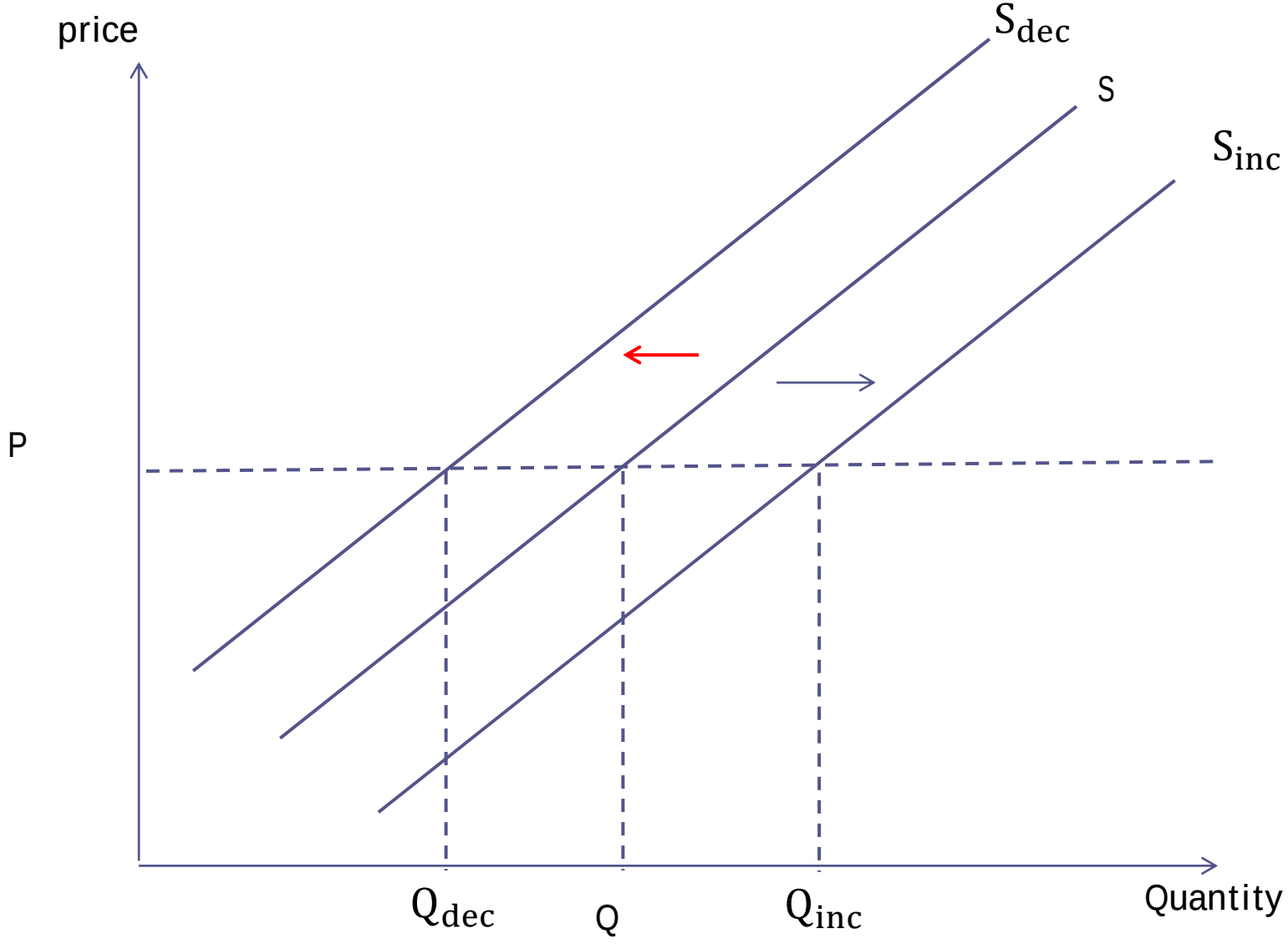


The cost of production

- Cost is a large determinant of the supply of transport services
- Production costs are one half of the profit equation (profit = revenue – cost)
- A change in the cost of transport operations will impact upon profits and thus the supply of services to the market

- An increase in costs will reduce the level supplied
- As all operators are assumed to be profit maximizers, an increase in costs reduces profits and hence some, but not all, operators will leave the market to seek better profit opportunities elsewhere
- Others will be driven out of business as revenues fail to cover costs
- A reduction in costs will bring about an increase in supply
- Existing suppliers/ operators will supply more to the market (as all else being equal this will increase profits) and new entrants will enter the market as profit opportunities are now higher than before

Change in the conditions of supply for transport services shown by a shift in the supply curve



Government Policy

- Governments intervene in transport markets to ‘guide’ the market to meeting its policy objectives

- Government policy as such, particularly in public transport markets, has a very large impact on the supply of transport services – For instance, without state intervention the provision of rail services throughout Europe would be considerably diminished

Basic level government policy can be implemented through one of three general policy tools

- Direct provision – state takes on the full responsibility for providing transport services through public ownership of the means of production

- Private sector companies –however the state ‘steers’ the market to its desired objectives through the imposition of taxes and the provision of state subsidies

- Regulatory/ legislative measures- the state directly commands or prevents by law certain actions in order to achieve policy aims

Example

- An increase in a tax on a good or service will decrease supply, as the cost of providing such services would rise
  - An increase in fuel duty would decrease the supply of road haulage as this will directly increase the overall cost of haulage operations

- A payment or increase in subsidy on the other hand would result in an increase in the supply of that good or service
  - The payment of a subsidy to rail freight operators would result in the increase in the supply of rail freight services

The price of other goods and services that can be produced using the same factors of production

- Given that producers are assumed to profit maximize, then if the price of any good or service that could be produced using the same factors of production was to rise, producers are likely to switch production to that particular market – this would cause a reduction in the level of supply at each and every price for the current good or service

- A rise in the price of scheduled air fares may cause a decrease in the supply of chartered services

The price of goods in joint supply

Example – Aviation

- The last twenty years or so have seen a massive increase in the level of air freight services- The reasons for this is due to the increase in passenger level, as most air freight, around 60 %, goes via the cargo hold of passenger aircraft

- Hence rising passenger demand has been met by large increases in the supply of passenger planes, and with that increase has come more cargo holds within which freight can be carried

- Consequently, the increase in the available supply of passenger aircraft has automatically resulted in the increase of air freight capacity as these two products are goods in joint supply

Natural shocks

- Disaster such as the weather, floor, drought, pests etc
- War, Fire, political events etc.
- The oil crisis in the mid-1970s- when the price of oil quadrupled in the space of six months, was originally sparked off by the Egyptian war that affected world suppliers of crude oil

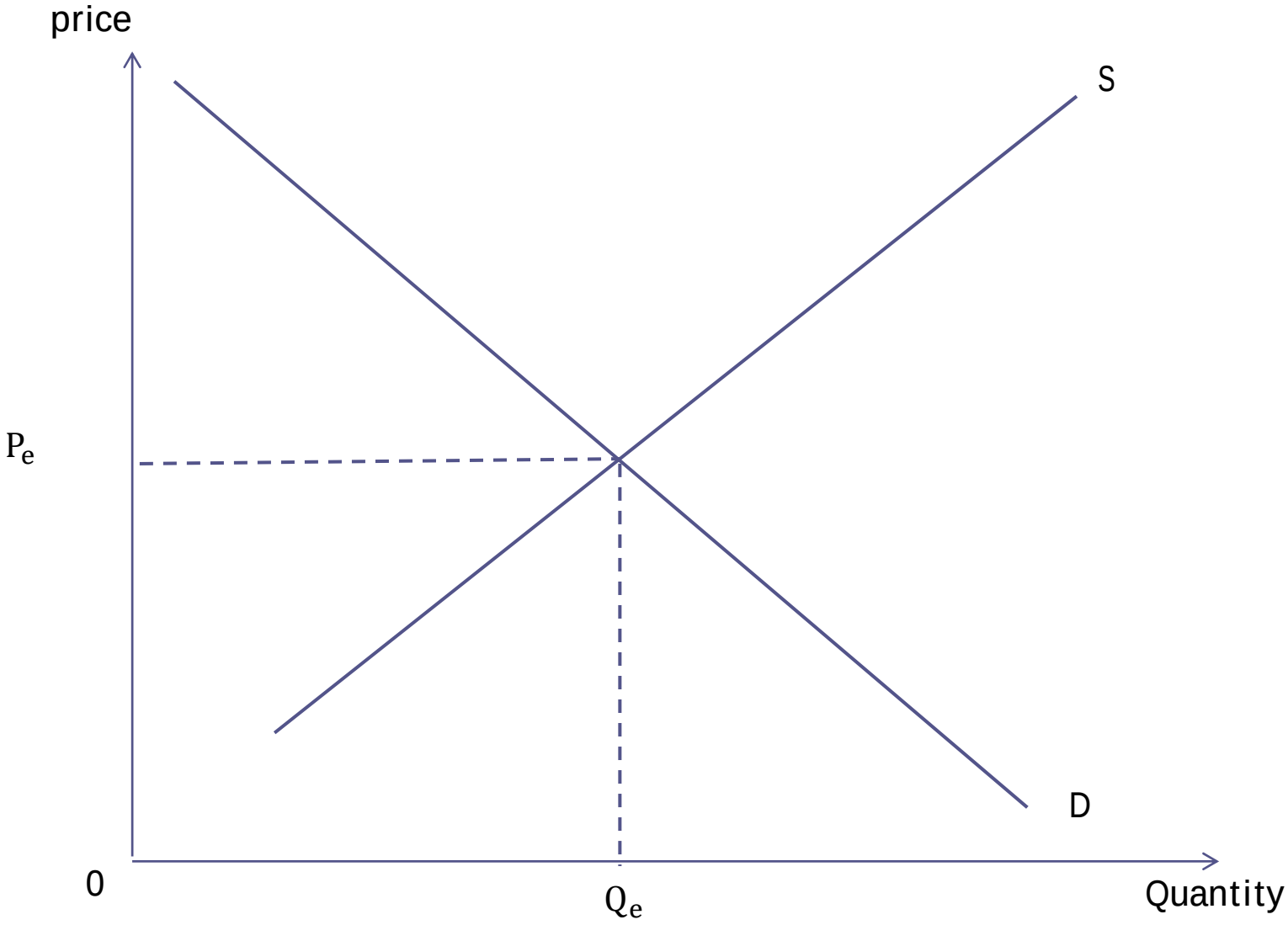
Aims of the producer

- A switch in the emphasis of the aims of producers may result in a change in the level of supply to the market
  - Example a bus operator decided that in order to maximize profits in the long run it needed to expand its market share in the present, this would almost certainly lead to an increase in supply at each and every price

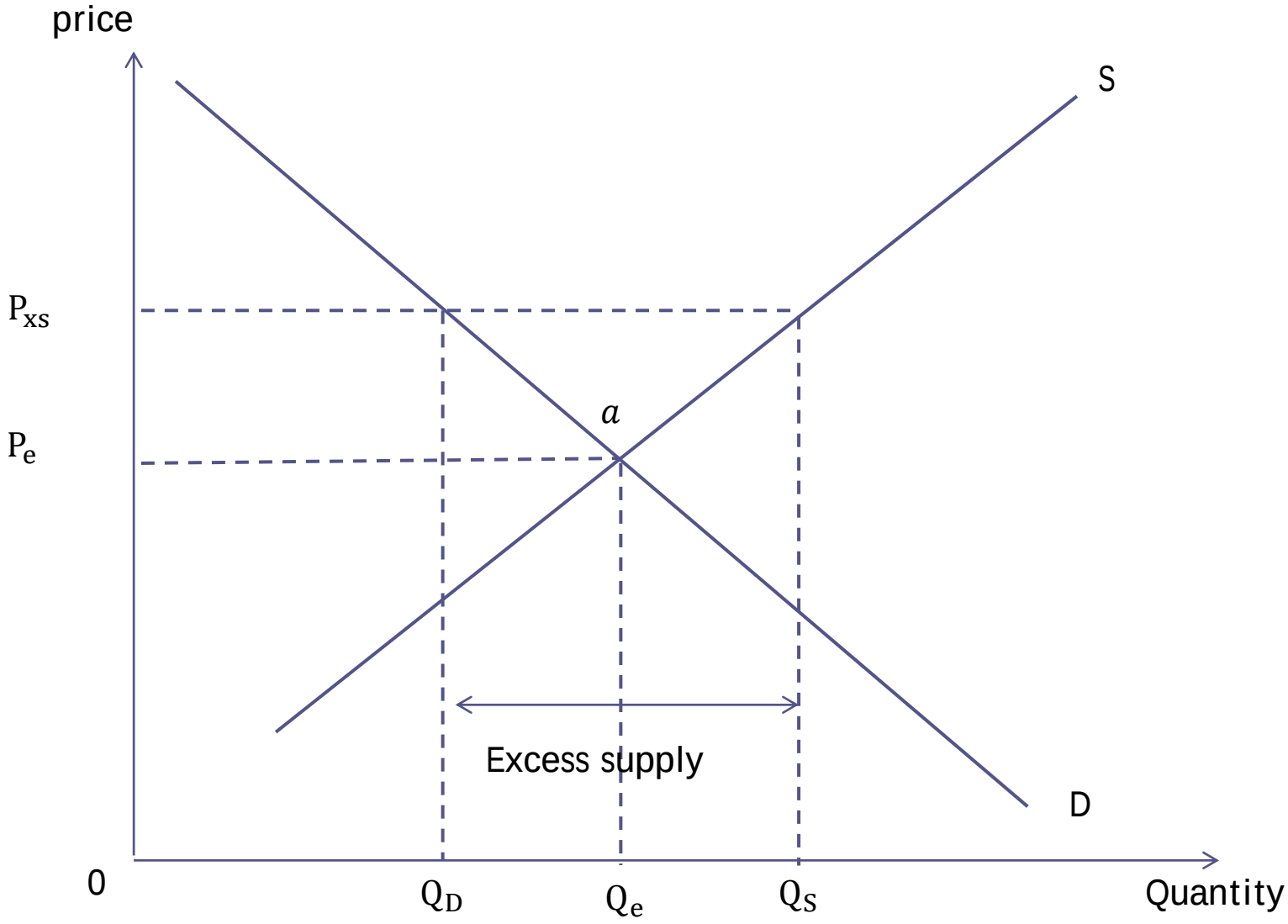
- Aim of sales maximization is entirely consistent with the aim of profit maximization
  - The aim of train operator is to attempt to fill the available capacity with revenue paying customers, and hence if priced correctly this should result in full trains and maximized profits

The Market for Transport Services

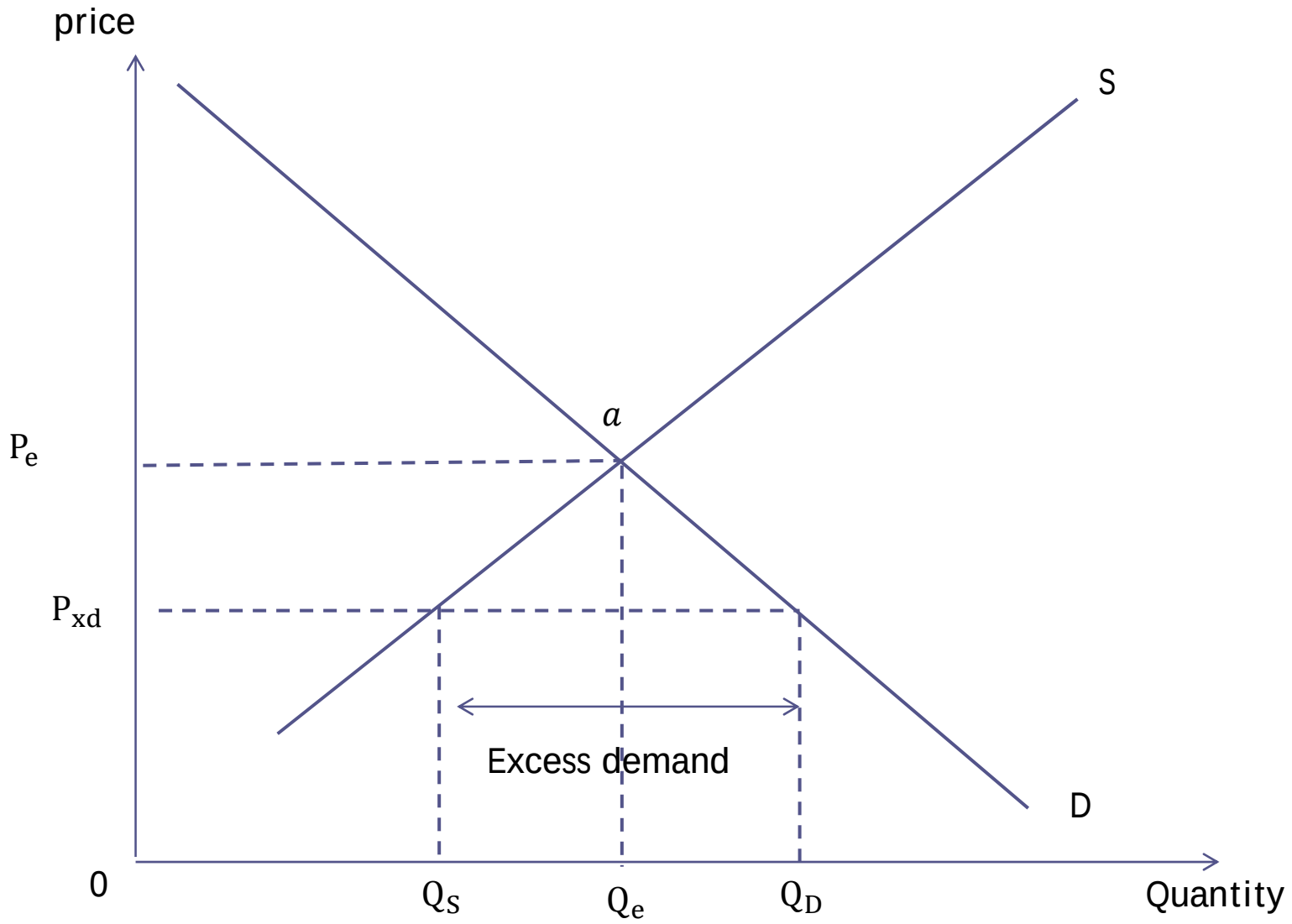
The Market for Transport Services



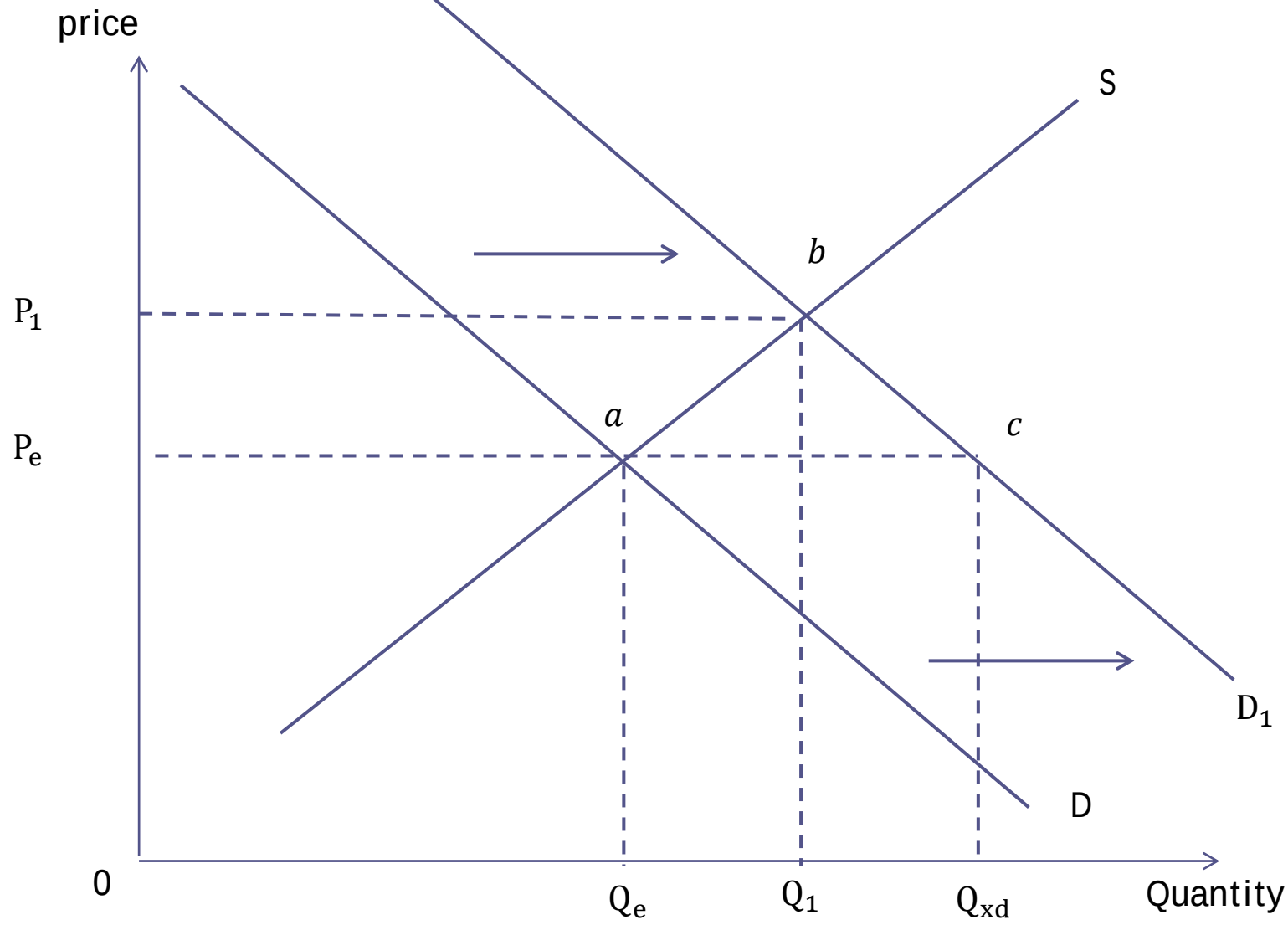
Excess supply in the market



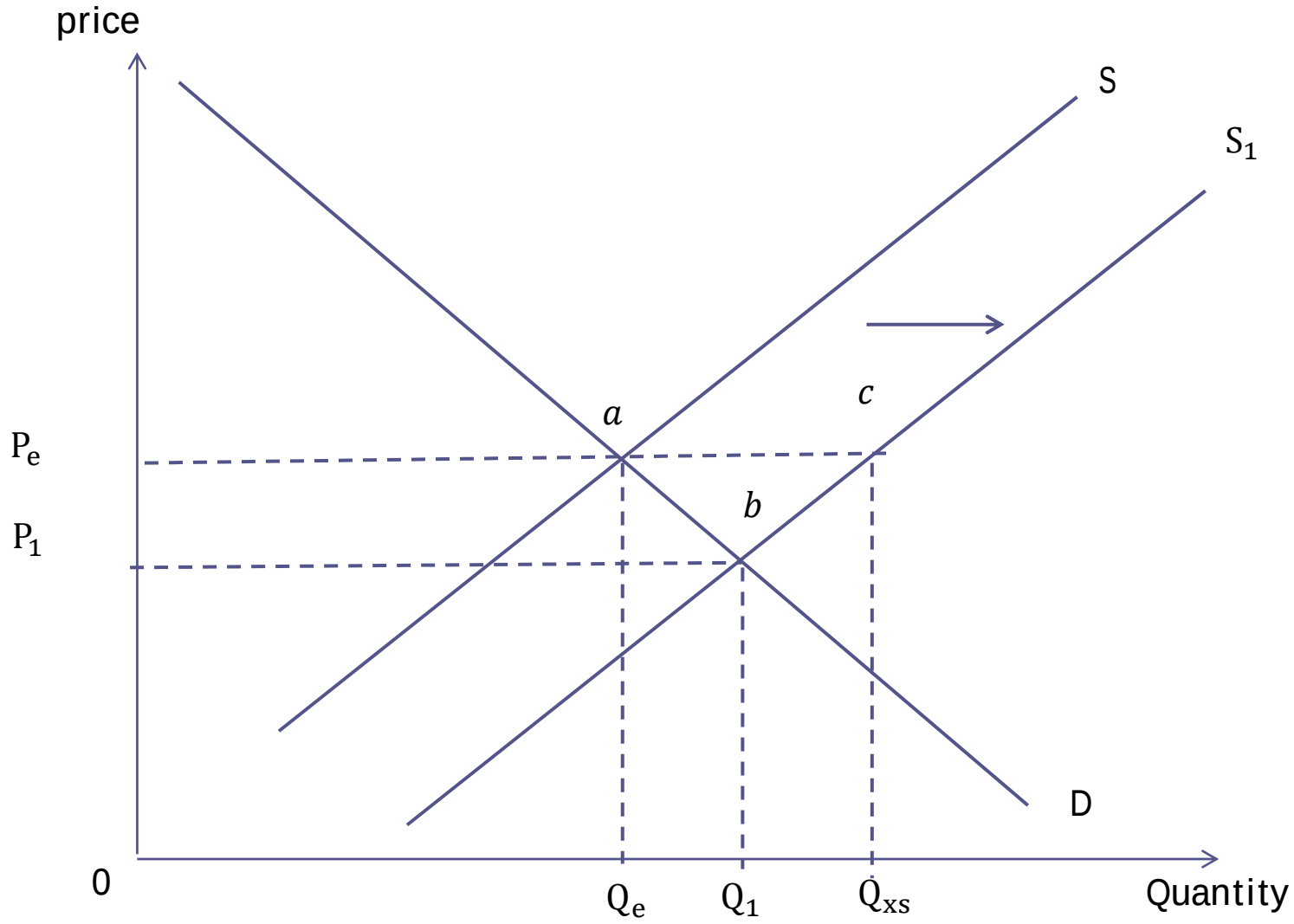
Excess demand in the market



Effect of an increase in the price of rail services on the market for bus services



Effect of an increase in the level of subsidy paid to bus operators on the market price and quantity traded of bus services



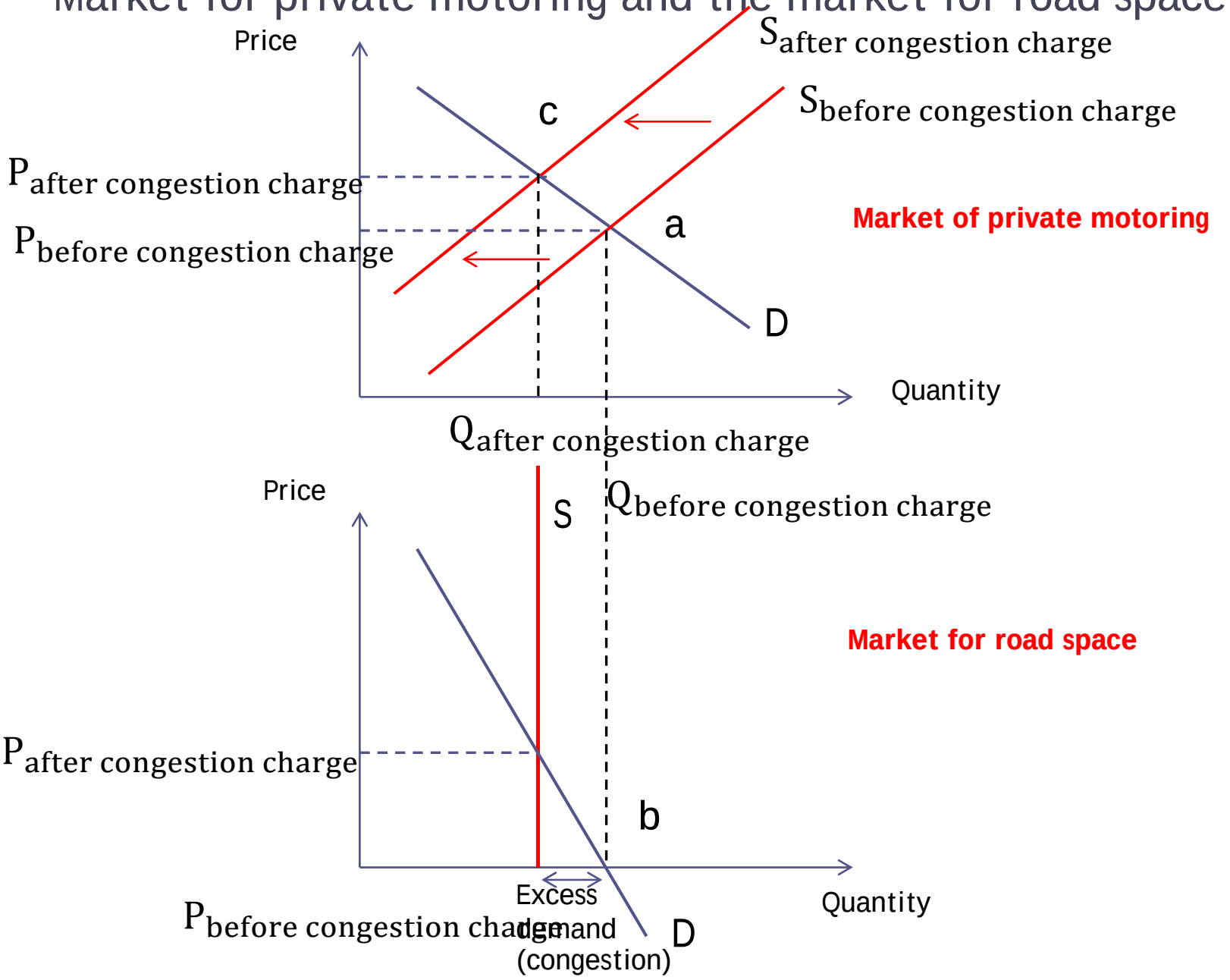
Case study: The market for urban road space

A practical illustration of the working of the market in transport services in the case of London car and bus usage

- The analysis of the market for urban road space
- The demand and supply curves follow normal principles and before imposition of a congestion charge the market is in equilibrium at point a, hence there is no excess demand or supply
- The diagram below represents the market for road space
- This example concerns (London) urban road space; hence no matter what the price the supply of available road space simply cannot be expanded (at least certainly not in the short term)
- Although prior to the imposition of a congestion charge the price to the user (at the point of use) is zero, market principles still operate and the market equilibrium is at point b
- The associated 'price' is actually paid through general taxation and not directly by the user

- By imposing a congestion charge, this has the effect of increasing the cost of motoring
- The supply curve in the market for private motoring shifts to the left
- This causes an increase in the price of motoring and a decrease in the quantity demand and a new equilibrium point at c
- On the market for road space, the effect of this reduction in demand is that now the road network is operating at its optimum level and the user is now directly paying a price for road usage

Market for private motoring and the market for road space

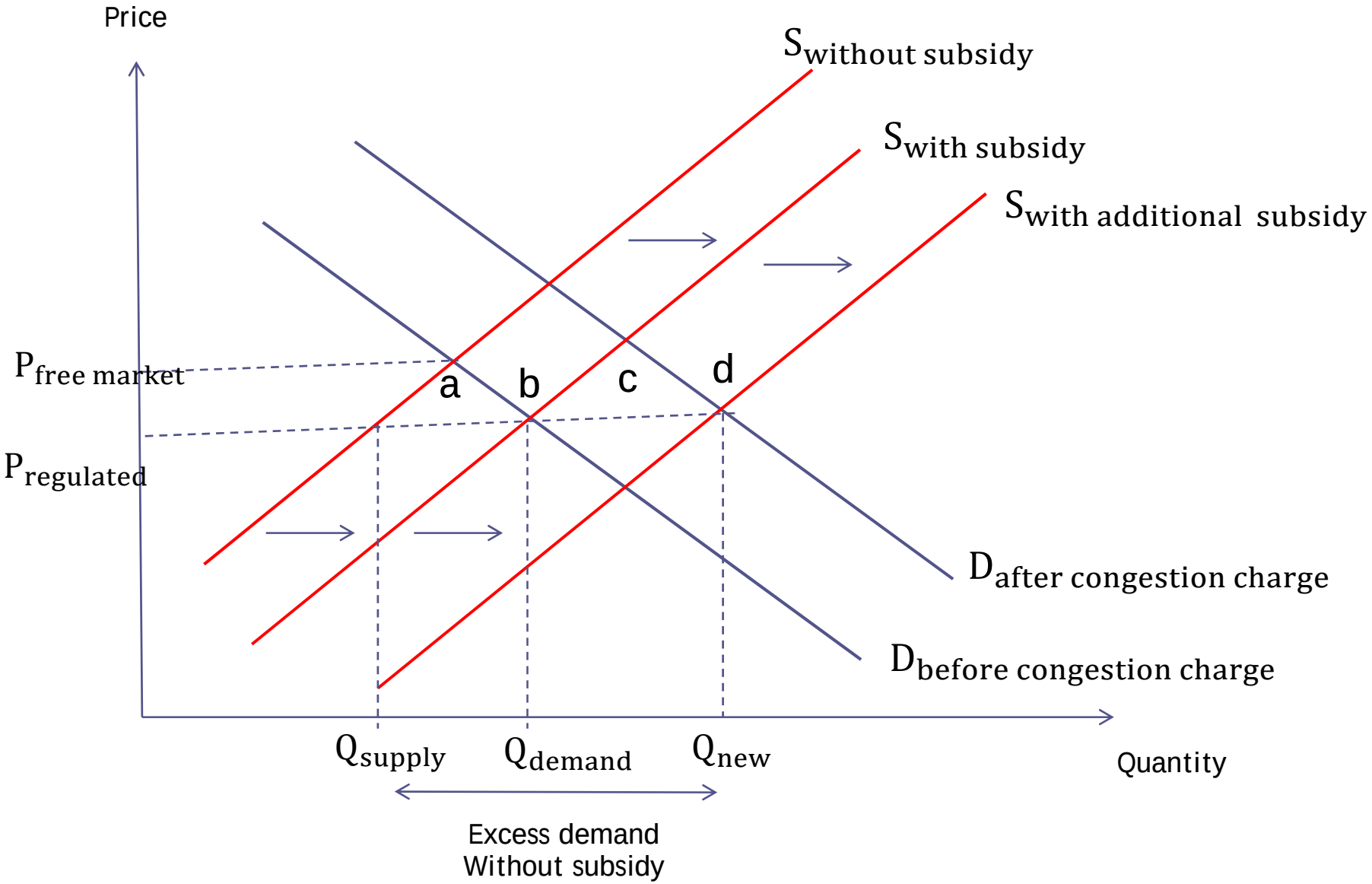


Average daily journeys by mode, 1993-2006, Greater London area

Year	Rail	Underground	Bus	Taxi	Car	Bicycle	Walk	All Modes
1993	1.4	2.0	3.1	0.2	10.5	0.3	5.2	22.9
1994	1.4	2.1	3.1	0.2	10.6	0.3	5.2	23.1
1995	1.5	2.1	3.3	0.2	10.6	0.3	5.2	23.4
1996	1.5	2.1	3.4	0.2	10.7	0.3	5.3	23.7
1997	1.6	2.2	3.5	0.2	10.8	0.3	5.3	24.2
1998	1.7	2.4	3.5	0.2	10.8	0.3	5.3	24.5
1999	1.8	2.5	3.5	0.2	11.1	0.3	5.4	25.1
2000	1.8	2.6	3.7	0.2	11.0	0.3	5.5	25.4
2001	1.8	2.6	3.9	0.2	11.0	0.3	5.5	25.6
2002	1.9	2.6	4.2	0.2	11.1	0.3	5.5	26.1
2003	1.9	2.6	4.6	0.2	11.0	0.3	5.5	26.4
2004	1.9	2.7	5.0	0.2	11.0	0.4	5.6	27.1
2005	2.0	2.6	5.0	0.2	10.9	0.4	5.6	27.0
2006	2.1	2.7	5.2	0.2	10.9	0.5	5.6	27.6

Source: The London Travel Report (2007)

The market for London bus services



- Bus fares and service levels within London are set by the transport authority, Transport for London, and not by the free market. Nevertheless, the sector still follows market principles

- The market supply without subsidy and the market demand before congestion charging, then the equilibrium price where the market would clear is at point a with a price of $P_{free\ market}$

- The regulated price set by the transport authority, however, is set below the market clearing price at $P_{regulated}$

- Despite the price being set by the authority, however, market forces still operate, and without any further measures there would be excess demand

- Long queues and overcrowding on buses

- In order to overcome this problem, the transport authority pays a subsidy to operators. This shits the supply curve to the right from $S_{without\ subsidy}$ to $S_{with\ subsidy}$

- Hence bringing the market back into equilibrium at point b with a price $P_{regulated}$ and Q_{demand}

- With the imposition of a congestion charge, this would cause an increase in the price of private transport, a substitute service to the bus
- This would cause a shift in the demand curve to the right for bus services (an increase in demand)
- Under normal free market principles, this would put upward pressure on the price, and the market would reach a new equilibrium at point c

- Under a regulated market, however, the same market forces would apply; however, in this case the price cannot increase in order to clear the market

- The authority would have to either set a higher regulated price or alternatively increase the level of subsidy paid to operators to allow them to provide more services at the current regulated price

- This produces an apparent contradiction of paying more subsidy with increasing passenger numbers; however, this is exactly what has happened in the London case

Class exercises

You should now consider each of the following scenarios on the price and quantity traded for the market highlighted. This is a series of straightforward exercises in which you should identify what side of the market, demand or supply, is being affected, which particular determinant has changed and you should explain your reasoning at arriving at your answer.

1. A general rise in income on the market for bus services

2. A rise in the demand for passenger air travel on the market for air cargo

3. An increase in fuel duty on the market for road haulage services

4. A fall in the costs of production of bus services on the market for rail services

5. The publication of a government report on the detrimental effects of environmental change on the market for private motoring

6. A weekend ban on lorry movements on the market for rail freight

7. The abolition of what had been strict government controls on the entry of new airline operators on the airline market

8. The announcement of increased grants available for the installation of rail freight facilities (infrastructure) on the actual market for rail freight services

Reference

- Mallard G., and Glaister S. (2008). Transport Economics: Theory, Application and Policy. Palgrave Macmillan.

- Cowie J. (2010). The Economics of Transport. Routledge.