CHAPTER 2

The Importance of Transport in the UK and Europe

2.1 Statistical importance

2.1.1 The overall importance of transport

Statistically, the transport sector is an important part of the UK and European economies, accounting for a substantial proportion of private spending, employment and government expenditure. Changes within the sector potentially have serious and widespread effects on welfare, and so it is important that the economic understanding of the sector is comprehensive. It is only with a sound base of understanding that policy-makers can most effectively develop the sector and pre-empt, and minimise, the effects of any adverse changes that (inevitably) occur. Establishing this understanding is the role of the transport economist.

Figure 2.1 illustrates that in 2005, UK households spent 159.08 billion euros on transport. The majority of this, 75 per cent, was directed towards the purchase and operation of personal transport equipment, the remaining 24.9 per cent towards transport services. Figure 2.2 illustrates that all of this accounted for 15 per cent of total UK household expenditure: the single largest proportion of all of their spending. A similar description can be made of the EU25. In 2005, private households spent 847.99 billion euros, or roughly 13.8 per cent of their total expenditure, on transport. Households in the UK devote a greater proportion of their spending to transport than do their European counterparts, but both are substantial.

In 2005, the first 15 member countries of the European Union collectively contributed 809.71 billion euros to the total household expenditure on transport of the EU25. This accounted for the vast majority of household transport expenditure in the European Union, and an average of 13.91 per cent of their national private expenditures.

The impact of these statistics goes further than at first it may appear. As households are devoting considerable proportions of their expenditure towards private

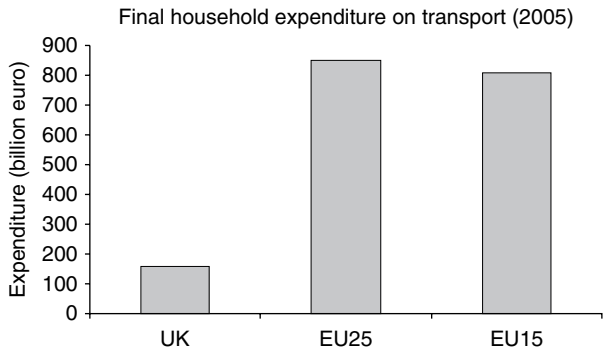

Figure 2.1 Household expenditure
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2006*

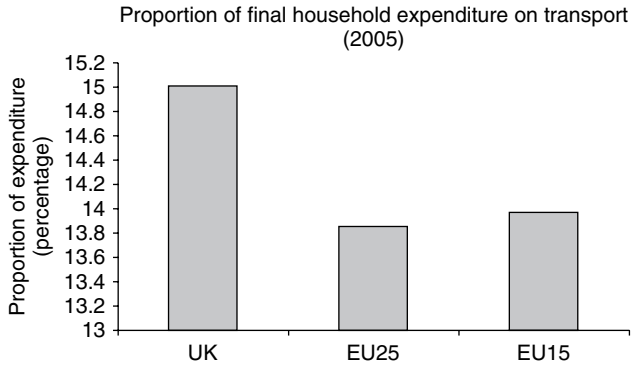

Figure 2.2 Transport's share of total household consumption
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2006*

transport, changes in the private transport sector can have significant effects on consumer confidence and, therefore, on wider spending. Consumers get locked into routines with their methods of transportation which are slow to change. One reason for this is ease of habit: it is easier to continue travelling the way that one is used to rather than trying something new. A second is the large initial capital investments involved in transport. As these capital outlays are significant, consumers are less likely to change their method of transportation quickly. For example, if we had recently purchased a relatively expensive new car, we are probably going to be reluctant to let it simply sit unused on our driveway. These two reasons mean that the demand for private transport is likely to be *price inelastic* (see Section 3.4); or in other words, unresponsive to a change in the price of it. If the price of private transport rises, consumers will continue to purchase it and so will reduce their expenditure in other areas of the economy. Similarly, if consumers expect that the price of private transport will rise in the near future, they are likely to increase their short-term saving and so cut back on consumption in order to

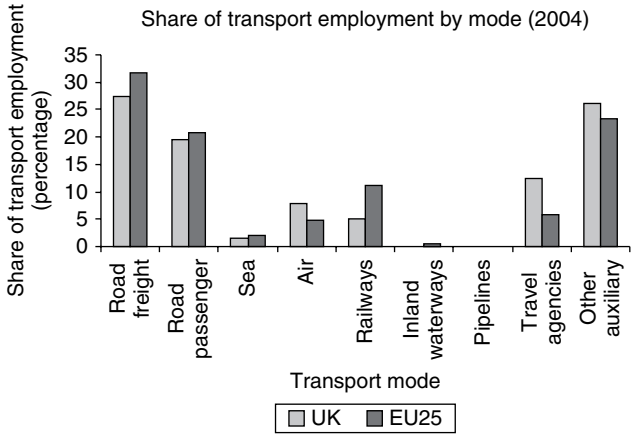

Figure 2.3 Employment in transport
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2005*

finance it. Changes in the transport sector, and especially private transport, clearly have wide-reaching effects across economies.

The transport sector also accounts for a substantial proportion of employment. In 2004, there were 1.1 and 8.2 million workers employed in the transport sectors of the UK and the EU25 respectively. The division of these is illustrated in Figure 2.3. Road transport accounted for 47 per cent of this in the UK and 53 per cent in the EU25; in both instances, road freight accounting for a greater proportion than road passenger transport. In the UK, the further categories of land transport had the following composition: 5 per cent in the railways, and effectively 0 per cent in both the inland waterway and the pipeline industries. After road transport, the second largest employing industry in the transport sectors of both the UK and the EU25, in 2004, was that of supporting and auxiliary transport, accounting for 26 and 23 per cent respectively. This category includes activities such as cargo handling, storage and warehousing. Travel agencies and tour operators accounted for 12 and 6 per cent of employment in transport in the UK and the EU25 respectively. The remainder was employed in the sea and air industries.

Not only does the transport sector have potentially wider implications because of the amount of household expenditure that it attracts, it also has the potential to affect consumer confidence and spending through its employment effects. If these workers fear that they are facing wage reductions or unemployment, their spending may again be contracted, causing effects to ripple throughout the economy.

A final indication of the statistical importance of the transport sector is the amount of government finance devoted to it. Figure 2.4 shows the central and local government expenditure on transport in the UK in the financial year 2002/2003. The total expenditure on transport in this year amounted to £13,241 million, which was an increase of £2217 million from the previous year, which in turn had been an increase of £2437 million from the year before. As Figure 2.4 illustrates,

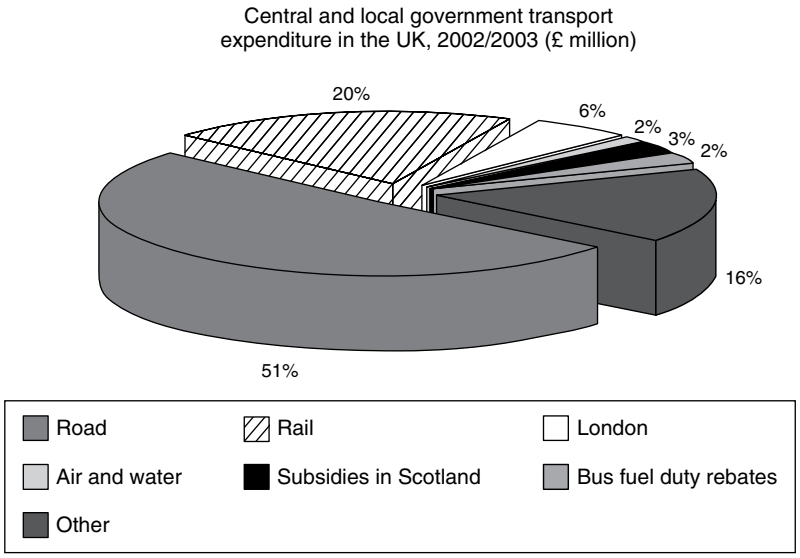

Figure 2.4 Government expenditure on transport
Data Source: Office of National Statistics, *Transport Statistics, 2004*

the largest proportion of this expenditure in 2002/2003, some 51 per cent, was directed towards road transport. The largest expenditure captured in the *other* category was non-specific spending on public transport and concessionary fares (which amounted to £2064 million).

2.1.2 The importance of the separate modes of transport

The historical narrative of the opening chapter is one of transport expanding greatly, but with the roads and the skies becoming increasingly important at the expense of the canals and the railways. These trends have continued in more recent years, as illustrated by Figures 2.5 and 2.6. Overall, freight transport within the EU25 increased by around 2.8 per cent per annum between 1995 and 2005; and passenger transport by around 1.8 per cent per annum between 1995 and 2004.

It is estimated that in 2004, some 3903 billion tonne-kilometres of freight were transported within the EU25. Of this total, 44.2 per cent was transported by road haulage, 39.1 per cent by sea, 10 per cent by rail, 3.3 per cent by the inland waterways, 3.4 per cent by pipeline, and the remaining 0.1 per cent by air.

As Figure 2.5 shows, road haulage has continued to increase in importance from 1250 billion tonne-kilometres (42.1 per cent of total freight transport) in 1995 to 1724 billion tonne-kilometres in 2005. Maritime transport has also expanded, from 1133 billion tonne-kilometres in 1995 to 1525 billion tonne-kilometres in 2005. This translates to an increase of 0.9 per cent in its proportion of the total cargo since 1995. Rail transport has experienced an absolute increase in usage, from 358 to 392 billion tonne-kilometres over the period, but has contracted in relative terms from 12.1 per cent. Similarly, the inland waterways have expanded in absolute terms, from 117 to 129 billion tonne-kilometres, but have also experienced a slight reduction in their proportion of the total cargo transported. The proportions transported by the pipelines and the air

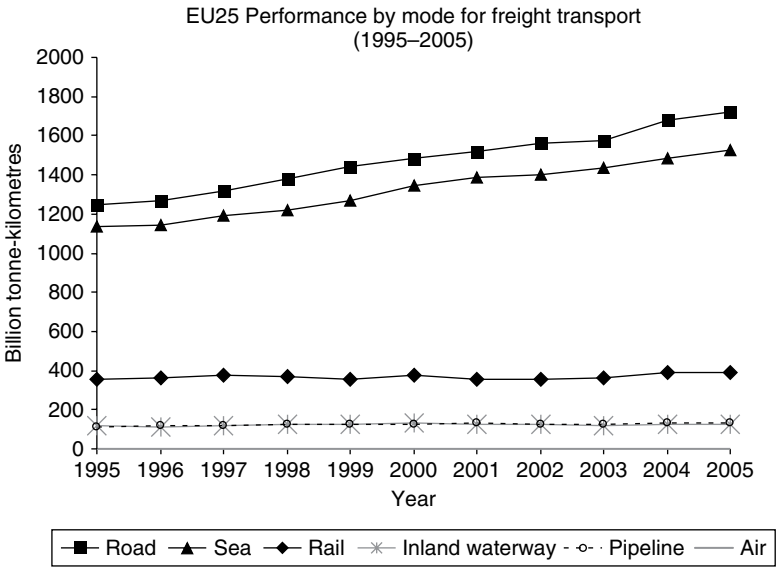

Figure 2.5 Modes of freight transport
Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2006*

have remained fairly constant and so both have expanded in absolute terms: 112 to 131 billion tonne-kilometres and 1.9 to 2.5 billion tonne-kilometres respectively.

In terms of passenger transport, there were an estimated 5061 billion passenger-kilometres travelled within the EU25 in 2004. Cars and powered two-wheelers accounted for 75.9 per cent of this distance; buses and coaches 8.3 per cent; railways 5.8 per cent; and tram and metro services 1.2 per cent. Europeans each travelled an average of 10,225 kilometres in that year by these modes of land transport. Of the remaining 8.7 per cent of the total distance travelled, air and sea accounted for 7.9 per cent and 0.8 per cent respectively.

As Figure 2.6 illustrates, the most notable growth has been that of the use of cars and motorbikes, which has been a continuation of the trend stretching back to the middle of the twentieth century. The usage of these vehicles increased from 3907 billion passenger-kilometres in 1995 to 4601 billion passenger-kilometres in 2004. This represents an increase in the proportion of total passenger transport that these vehicles accounted for in the EU25 over this period of 0.4 per cent. Bus and coach usage expanded in absolute terms, from 474 to 502 billion passenger-kilometres over the period, but contracted in terms of their proportion of the total by 0.94 per cent. The railways, trams and metros experienced a similar trend, growing in absolute terms from 389 to 427 billion passenger-kilometres, but contracting proportionately by 0.50 per cent. Passenger transport by sea fell in both absolute and relative terms over the period; from 55 to 49 billion passenger-kilometres, a reduction of 0.26 per cent. That by the airlines increased from 324 to 482 billion passenger-kilometres, representing an increased proportion of the total of 1.66 per cent.

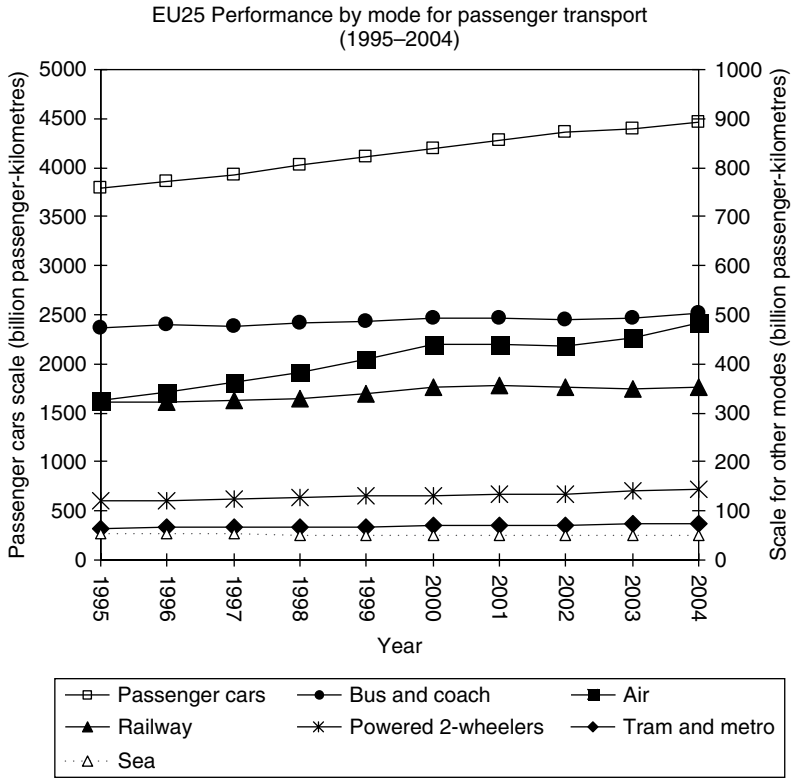

Figure 2.6 Modes of passenger transport
Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2006*

2.1.2.1 Composite units

Throughout the section above, the volume of passenger transport has been measured in *passenger-kilometres* and that of freight transport in *tonne-kilometres*. These are known as *composite units* as they are composed of two separate units. It is important to use these when analysing transport because one is not simply interested in the volume of the cargo or the distance travelled. A huge number of passengers and a huge volume of freight may be transported but if it is only over a short distance the overall importance of the service may be minimal. Similarly, a huge distance may be covered but if it is only for a small amount of passengers or freight the overall importance may again be minimal. As such, it is crucial that *both* the volume and the distance are incorporated, which is the purpose of such composite units.

2.1.3 International comparisons

Transport has been important to human communities throughout history, but the particular modes of transport used have varied considerably across time and space.

The possible reasons for this variability are perhaps just as varied themselves: topography, natural resource endowments, wealth and anthropology, to name just a few.

Two useful comparisons with the EU25 today are those of the USA and Japan, as they are both at similar stages in their economic development. In Figures 2.7 and 2.8 it is clear that there is more overall transport, of both passengers and freight, in the USA than in either the EU25 or Japan. All three populations travel far more kilometres using the passenger car than any of the other modes of transport but this is most noticeable in the USA, where the railways are hardly used for

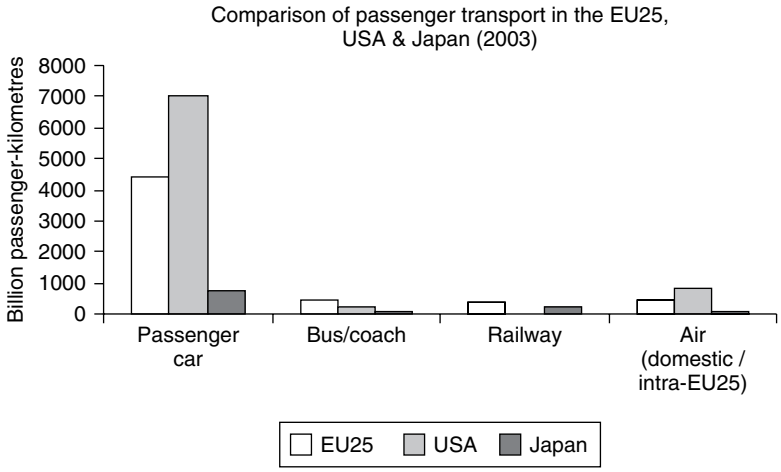

Figure 2.7 International comparisons of passenger transport
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2005*. *Note:* the data for Japan are for 2002

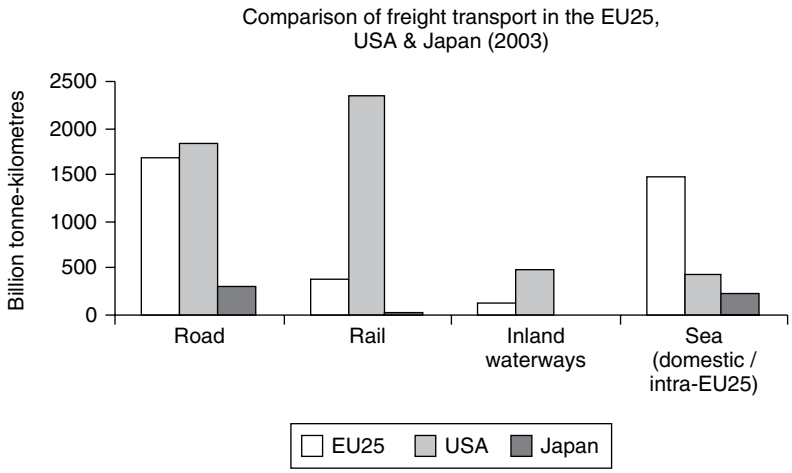

Figure 2.8 International comparisons of freight transport
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2005*. *Note:* the data for Japan are for 2002

passenger transportation at all. In Japan, on the other hand, the railways account for a much greater proportion of passenger transport. Figure 2.8 also illustrates that more freight is transported on the railways in the USA than by any of the other modes, whereas in the EU25 and Japan it is the roads that account for the largest proportions of freight transport.

One could assume from these statistics that the railway network in the USA would account for a much larger proportion of the transport infrastructure than in the EU25 or in Japan. However, Figure 2.9 demonstrates that the opposite is actually the case. Roads stretch for more kilometres in each of these three areas than do the railways or the navigable waterways, but it is in the USA that the largest proportion of the transport infrastructure is accounted for by roads.

This reliance on motor vehicles is further illustrated by Figure 2.10, which shows the degree of *motorisation*, measured by the number of motor vehicles per thousand people, in these three areas. In the EU25 and Japan there are between four and five cars for every ten people, with the lowest figure being in Japan. In the USA there are nearly eight cars for every ten people. This is to be expected as Figures 2.7 and 2.8 show that road transport accounts for a much smaller proportion of all transport in Japan and that it accounts for a much larger proportion of passenger transportation in the USA.

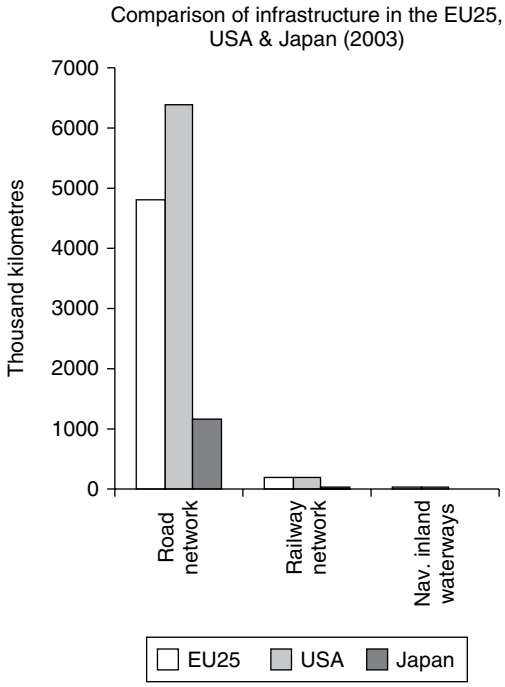

Figure 2.9 International comparisons of infrastructure
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2005*

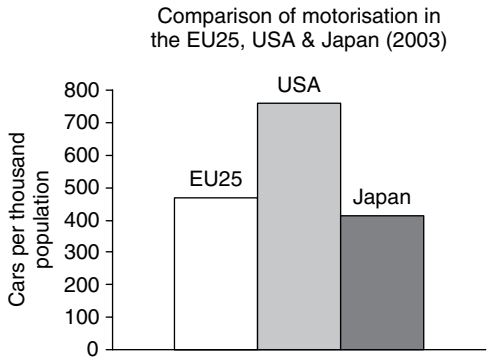

Figure 2.10 International comparisons of motorisation
Data Source: European Commission, Directorate-General for Energy and Transport in Co-operation with Eurostat, *Energy and Transport in Figures, 2005*

It is clear from these international comparisons that transport in the EU25 is not unique, although in the USA there is a much greater use of the railway network for freight and in Japan there is much less transport overall. What is noticeable is that there is a significant reliance on road transport for both passengers and freight in all three of these countries: an apparently inevitable consequence of economic development?

2.2 Theoretical importance

2.2.1 Pareto efficiency

An outcome that economists desire of markets is that of *Pareto efficiency*. This is where the outcome of a market is such that it is not possible for someone to be made better off without making someone else worse off, even after any possible compensation has been made. In this way, total welfare or satisfaction in the market is maximised.

For example, let us assume very simply that there are two consumers in a particular market and that there are four units of a particular product that can be allocated between them. Each of these consumers enjoys 10 units of satisfaction (which shall be termed *utiles* for clarity) from receiving a single unit of the product; 7.5 utiles from a second unit of the product; 5 utiles from a third unit of the product; and 2.5 utiles from a fourth unit of the product. This incorporates the concept of *diminishing marginal utility*: the extra satisfaction (or *utility*) that a consumer derives from additional units of a product decreases as his or her consumption of that product increases.

Returning to the example, if all four units of the product are allocated to consumer A, the total satisfaction in the market is 25 utiles (10 + 7.5 + 5 + 2.5). If one of these units of the product is transferred to consumer B, the satisfaction of consumer A falls by 2.5 utiles but consumer B gains 10 utiles. Consequently,

the total satisfaction in the market has increased to 32.5 utiles (10 + 7.5 + 5 + 10) and consumer B can compensate consumer A so that the satisfaction of the latter rises back to 25. By doing this, consumer B has clearly been made better off (by 7.5 utiles) without making consumer A worse off. This is a *Pareto improvement* in the market. A similar, but weaker, Pareto improvement would be made if a second unit of the product was transferred from consumer A to consumer B as well.

When both consumers each have two units of the product, the satisfaction in the market is maximised at 35 utiles (10 + 7.5 + 10 + 7.5). This is the *Pareto efficient* outcome because it is impossible to make either of the consumers better off without making the other worse off, even with compensation payments.

In order for a market, and a whole economy, to achieve Pareto efficiency it is necessary for it to have two characteristics. The first is that it needs to be *productively efficient*, meaning that the producers within it are producing their output without wasting any of their inputs. In other words, output is being maximised for a given amount of inputs. If it is possible to increase output in the example above to six units, both consumers could be made better off simultaneously and so the market could not possibly be at Pareto efficiency without so doing.

The second is that it needs to be *allocatively efficient*, meaning that resources in the market or the economy are being used to produce the products that generate the most satisfaction and that these products are then distributed to consumers in the way that will maximise that satisfaction. The latter of these aspects of allocative efficiency is demonstrated in the example above and the first is clear if the effect of there being a different type of product that would generate greater satisfaction for the consumers is considered. If there is such a product, then there would be a Pareto improvement by producing this alternative product and so the market could not be at Pareto efficiency without so doing.

The transport sector is necessary if both productive and allocative efficiency, and thus Pareto efficiency, are to be achieved. If by improving the transport system production costs could be reduced, the market could be made more productively efficient as average costs could be forced down and a greater output could be produced using the available resources. This would lead to a Pareto improvement.

If there are resources in the north of the country that would increase overall satisfaction if used in production in the south, they should be transported south to do so. Similarly, if there are products being allocated to consumers in the south that would lead to a Pareto improvement if allocated to others in the north, they should be transported north to do so. In both of these aspects of allocative efficiency, the transport system clearly plays a vital role.

An economy cannot be productive, allocative and overall Pareto efficient without an effective, well-functioning transport sector.

2.2.2 Agglomerations

Throughout history, humans have found it advantageous to gather into local communities of like-minded people, rather than being dispersed as individuals over wide areas. An *agglomeration* is a centre of economic activity; or in other words, a

geographical location that is dense with production and trade. Since the onset of the industrial revolution in Europe, during the second half of the eighteenth century, there has been a pressure towards the development of such agglomerations. The earliest modern agglomerations were simply the first industrial towns, which generally developed around a particular industry. For example, Manchester and Liverpool were focused on cotton textile manufacturing. More recently developed agglomerations include the area of Eastern England known as *Silicon Fen*, which is dense with modern technology industries. The Italian textile and clothing industries, the largest of their kind in Europe, are also organised into agglomerations. The Varese Province has traditionally concentrated on cotton manufacturing, whilst the neighbouring province of Como on silk production. These are called *clusters* and are organised by entrepreneurs, known as *impannatori*, to include producers at every stage in the chain of production. The *external economies of scale* that these clusters afford the producers within them have contributed to them having lower average costs than their British counterparts, which in turn have helped them to keep the growing Chinese competition at bay, if only in the short term.

Agglomerations bring potentially significant benefits to the producers within them, and the larger they become, the larger the potential benefits are. The sources of these external economies of scale are as follows:

- *Reputation effects*. The first potential benefit is that of the area earning a positive reputation, which all of the individual producers within it can gain from. If a particular location becomes renowned for quality, consumers from an increasingly widespread area will be drawn to trade with the producers within it. The reputation effects associated with an agglomeration are likely to be larger than those with a single producer.
- *Suppliers*. Historically, agglomerations have often developed where supplies already exist, but there is a further dynamic effect: as particular types of producers gather in one location, their suppliers are likely to be drawn to locate in that area as well. The suppliers will want to do this to gain a competitive advantage over rivals through a reduction in transport costs and also through a greater ability to respond to the needs of their consumers, both of which can in turn significantly benefit the producers within the agglomeration.
- *Pooled labour*. For a similar reason as that above, workers with the skills demanded by the gathering producers are likely to seek residence in the area in order to gain employment. The best employees are attracted, improving the pool of labour available to the producers. In addition to this, if the producers face similar needs from employees, they are more likely to enter into joint training schemes, further improving the quality of labour available to all. Local educational institutions may also respond by tailoring their courses to meet the demands of the local producers through a desire to improve employment statistics and perhaps through mutually beneficial partnerships with the producers themselves. The effect of all three of these possibilities is an improvement in the pool of skilled labour available, reducing producers' individual training costs and increasing their productivity.

- *Information transfer*. Producers within an agglomeration have a geographical proximity to one another that facilitates mutually beneficial information transfers that would be much less likely if they were geographically dispersed. By sharing information, all members of the community can experience greater technological advancement, helping them to become more competitive with rivals further afield.
- *Infrastructure*. An agglomeration of similarly orientated producers encourages the development of a common infrastructure that benefits all. The mining communities of the North-East of England benefited from the development of a rail network that transported coal from the mines to the towns, something which would have been less economical and less likely if the industry was more geographically spread. Similar effects can be seen with communication networks as well, and they too lead to lower costs for all of the producers within the agglomeration.

Producers within an agglomeration benefit hugely from the transport networks that are more likely to be developed as a result of the agglomeration, but it goes further than this as the agglomeration is unlikely to develop in the first place without effective transport. The function of a producer can largely be seen as one of processing materials or information in order to add value to them and then selling them onto consumers for a satisfactory return. It has been noted that agglomerations often develop where supplies already exist and that one of the benefits of their development is that they attract further suppliers to locate within them, but it is unlikely that there will be a similar location of consumers. Before the industrial revolution, separate populations largely relied on their own local producers for the products and services that they required, although there was some trade. Agglomerations, on the other hand, often find themselves geographically separated from their consumers and so need an effective transport system for their survival. Without the capacity to move the final products to the consumers, agglomerations cannot possibly exist and so the potential benefits to the producers cannot be realised.