

Transport subsidy

Learning Outcomes:

On reading this chapter, you will learn about:

- The economic rationale behind the payment of subsidy to transport operators
- Supply side and demand side subsidy measures
- The drawbacks of paying a subsidy
- The issues surrounding the cross subsidisation of transport services
- The different ways and forms in which subsidy can be paid to the operators of transport services.

INTRODUCTION

Subsidy plays a vital role in the operation of transport markets, possibly more so than in any other industry. This is because transport markets are made up of a combination of market forces and the actions of transport planning authorities, with subsidy playing the pivotal role in reconciling these two 'forces' in the actual market place. An understanding of the uses of subsidy in transport industries, and perhaps more importantly the issues that surround the payment of it, is therefore vital to any analyst of transport markets.

Nevertheless, the payment of subsidy is closely related to aspects of regulation in transport markets. With the general move away from transport provision through traditional forms of public ownership towards far more private sector involvement, many argue that it is no longer a 'subsidy' but rather a payment for the performance of a contract for providing a service. In other words, like university lecturers, doctors and nurses and policemen and women, they are simply providing a service for the state. Irrespective of that argument, in return for the payment of the contract these operators are 'regulated', i.e. required to provide a certain level of transport provision. Thus in many areas the regulation and subsidisation of transport services are very closely linked. Furthermore, with greater private sector participation more regulation is required as direct control between the authority and the operator is lost with the loss of public ownership. Regulatory issues have been examined in the previous chapter, and this chapter takes aspects of that topic forward

and deals specifically with the matters surrounding the actual transfer of funds between the state and the operator.

At first sight, the payment of subsidy may appear to be a fairly straightforward process. For example, if a transport authority wants a service provided that cannot be run at a profit, it would appear to be a simple case of paying an operator to provide the service. The subsidy paid would be the net difference between the cost of the service and the revenue gained from passengers. However, that raises many issues and questions, such as how much subsidy should actually be paid to the operator to run the service? What is the best way to pay that subsidy, i.e. simply hand over the cash, or is there a better way? Should the operator that provides the service be publicly owned to increase 'accountability' or would that require more subsidy than a private operator? What is the likely impact of the subsidy payment on what the authority is trying to achieve, i.e. what are the side effects of paying subsidy on the standard of service provided and the efficiency of the operator providing it?

None of these questions are easily resolved. Taking the first point, how much subsidy should be paid for a particular transport facility, this would be dependent upon a number of factors. Firstly, how much it is decided that it is 'fair' to charge direct users of the facility and thus how much should be paid by the state. That in turn will be dependent upon the costs of actually providing that facility and the level of non-monetary benefits and costs associated with it. Finally, in the case where a private operator is to be contracted, then is it right that they should earn a profit from its operation, and if so, just how much profit should they earn? This raises the issue of what would be a 'reasonable' level of profit for the operator and to what extent should that be dependent upon performance?

The issue is further complicated as the payment of subsidy is not a straightforward economic issue, but also has a very strong political dimension, both in terms of the levels of subsidy paid and how it is to be paid. Some governments or authorities for example may continue to operate certain transport services irrespective of the costs involved and thus go way beyond any rationale economic argument. For example, it could be argued that the provision of night sleeper rail services from Fort William to London falls into such a category as its continued operation has little to do with the economic realities of the costs and benefits of the service.

As can be seen from this brief introduction, there are far more issues surrounding the payment of subsidy than actual subsidy itself. Nevertheless, without it the transport system of any country would come to a grinding halt. It is the essential cog in the wheel that keeps the whole system moving and is usually used to guide transport behaviour towards more land use efficient modes of transport or to underpin, in whatever form, economic development of a particular region or locality.

In this chapter we explore these issues and hopefully provide some insights into the points raised above. We begin by outlining the economic argument for the payment of subsidy to transport operations and this should dispel any thoughts that subsidies are used simply because transport services, particularly the train, are unprofitable because they are run inefficiently. We then consider what are known as demand and supply side measures and the main drawbacks of paying subsidy, before finally looking at the actual forms that subsidy payment can take and how this contrasts with the idea of cross subsidisation. In reading this chapter, however, you should also see that within the economics of transport it is very difficult to look at a single issue in isolation. For example transport services are often subsidised because the service that is provided is seen to be of a high 'external' value (e.g. provides a socially necessary service) but cannot be operated profitably by private companies. The inevitable consequence therefore is that when subsidised

there will only be a single operator, i.e. a monopoly, and this in turn raises the problems associated with such market structures highlighted previously in Chapter 7, particularly the strong position of the operator. Part of the system used to pay subsidy therefore is to ensure such drawbacks are minimised.

THE RATIONALE FOR PUBLIC SUBSIDY

In most market-based economies, if a firm or industry cannot make a profit from selling its goods or services then it simply goes out of business. This in a nutshell is what is known as the efficiency of the market. Basically insufficient numbers valued the goods and services that were being produced at the prevailing market prices, hence the continued employment of resources in the production of those goods and services could no longer be supported. By going out of business, the resources previously used are now 'freed' to be put to other purposes more in line with society's wants and needs. Why, therefore, should transport be any different? In order to address this issue, we need to first introduce the basic idea of an externality using non transport examples before applying this to the transport context. This is because the arguments that surround the payment of subsidy for transport services are equally applicable to any other good or service, transport is no different or no 'special case' with regard to this issue.

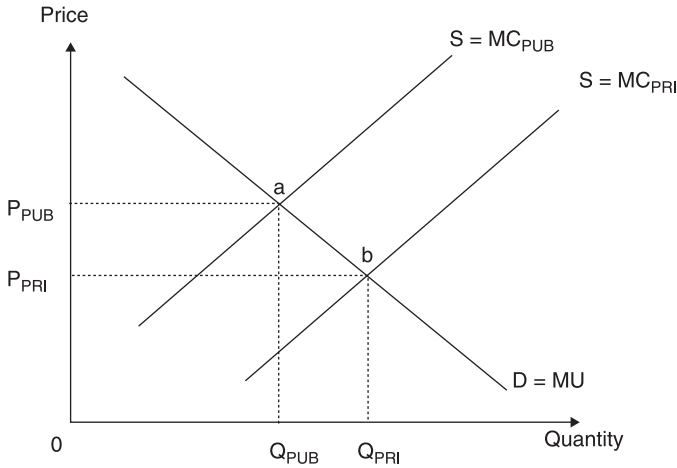
Externalities

We have come across externalities several times before in this text; however, it is one of the main reasons for paying transport a subsidy. To quickly recap, externalities are often called 'spill-overs' and occur when the costs of producing a good or service fall not only on the producer of that good or service but also on others that are not involved in the activity in any capacity. The full cost of an activity therefore can be divided into two categories. Firstly, private costs, which are those that fall on the producers or users of that product, and secondly public costs, which are those costs that fall on others who are not involved in the activity and consequently do not benefit from it. The full cost, i.e. private and public costs, is normally referred to as the social cost.

External costs and over production

The main implication of externalities is that they are not taken into account when individuals make private production and consumption decisions, as only the private costs of that decision are considered. In terms of an external cost, this leads to over-production of a given good or service, as illustrated in Figure 11.1.

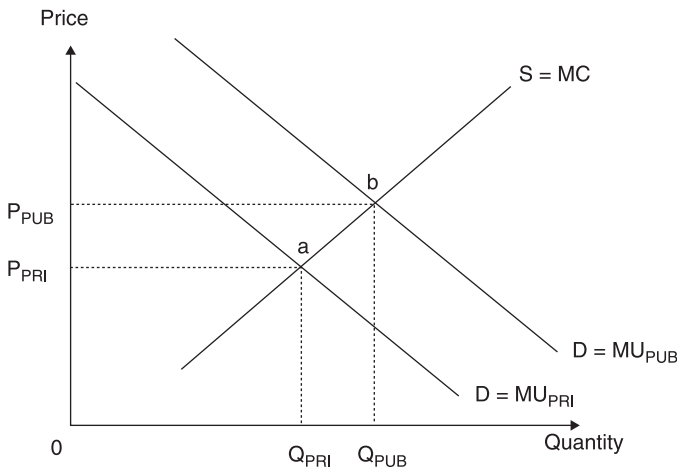
As only private decisions are taken into account in this market, the market would be in equilibrium at point b with a market price of P_{PRI} and quantity traded given by Q_{PRI} . When externalities are brought into the analysis, however, in this case an external cost, the effect would be that the supply curve should be further to the left,¹ as now all costs are brought into the analysis. Hence the market should be in equilibrium at point a, with a higher market price (P_{PUB}) and lower quantity traded (Q_{PUB}). This is a case of over-production, as not all of the costs associated with this good or service are taken into account in the production/consumption decision.



■ *Figure 11.1 Over production due to an external cost*

External benefits and under consumption

Externalities however not only work in relation to costs, but there may also be benefits that are not registered in the market place. For example, if an individual chooses to undertake a programme of physical fitness and also changes to a healthy diet, then a number of benefits will arise. Most of these will accrue directly to the individual concerned, but others in society will also benefit from the individual's new healthy lifestyle. Firstly because of their actions they will probably be less of a drain on health resources and consequently less of a drain on the tax resources used to pay for those health services. Secondly, the individual's employer will benefit in the form of less days off sick and a more 'wide awake' employee. These 'additional' benefits are shown graphically in Figure 11.2.



■ *Figure 11.2 Under-consumption due to an external benefit*

As above, if only private decisions are taken into account in this market, the market (in this case for exercise and healthy diets) would be in equilibrium at point a, with a market price at P_{PRI} and quantity traded given by Q_{PRI} . When externalities are introduced into the analysis, however, because in this example these are benefits that are not taken into account by the individual, this would have the effect of increasing demand at each and every price. This is because there is a higher level of common utility (benefit) than is being registered in the market place by private individuals. Once these are taken into account, the market demand curve should be further to the right. Hence when all benefits, both private and public, are taken into account the market price should be higher (P_{PUB}) and the quantity traded higher (Q_{PUB}). This is therefore a case of under consumption, as not all of the benefits associated with this good or service are taken into account in the production/consumption decision.

Both over production and under consumption are cases of market failure, as the presence of externalities breaches one of the conditions of perfect competition. Thus the market does not find the 'right' answer in terms of production and consumption decisions. Hence in the first case more is produced than is optimal and in the second less is consumed than should be (note however that over production equates to over consumption and vice-versa). Also note however that virtually all goods and services to a greater or lesser extent have an externality associated with them. For example, even a simple chocolate bar may provide a benefit to the person eating it but not to the person sitting next to them who is on a diet! The presence of externalities on their own therefore are not sufficient to justify the subsidisation of transport services; however, the issue is the extent and far reaching consequences of such spill over effects.

The economic rationale for the subsidisation of transport services

Outlined below are the main economic criteria that support the idea of payment of a subsidy for transport services. All however are related to the idea of market failure, where the market as such is either providing too much (over production) or too little (under consumption). Correction of such market failures is the strongest rationale for the payment of subsidy, and as highlighted in Chapter 10 this is primarily on the basis that two 'wrongs' make one right. More precisely, where a second breach of the conditions of perfect competition in the form of government intervention is 'justified' in order to compensate for the effects of a first breach in the form of the presence of externalities. The following economic criteria should also move away from the idea that subsidy is paid simply because transport firms are inefficient or ineffective. Such views are still a hangover from the 1970s where industrial problems were widespread and many key industries and employers effectively bailed out by government due to financial difficulties. This led to a general perception that subsidy equated to inefficient operations. Supporting inefficient operations however is not one of the criteria for the payment of subsidy, the four main ones being:

In support of land use efficient modes of transport

Some forms of transport are far more land use efficient than others. The private car for example is said to take up some 30 metres of land space per vehicle. Whilst in many occasions this may not be a major issue, there are certain areas and certain times where such inefficient use of land does create major problems, commonly known as traffic congestion. Where such instances arise,

authorities have basically two choices. Firstly, they could penalise users of the land inefficient modes of transport through some form of tax. That however may have certain political drawbacks. Alternatively, they could attempt to make the alternative land efficient modes of transport more attractive to car users. This could either be in the form of directly reducing the fares charged, hence directly subsidising the services, or through increasing the quality of the service provided. This may be either through increased frequencies, hence again a direct subsidy on services, or alternatively through the quality of the vehicles or the reliability of the infrastructure on which it runs, hence subsidy would be used to encourage investment. Subsidies therefore can come in the form of supporting the service or in providing financial support in investment in the service, commonly known as capital grants.

To lessen the impact of environmentally unfriendly modes of transport

Not only are certain modes of transport less space efficient, but as illustrated in Chapter 9 some have a far larger impact on the environment than others per passenger journey or tonne of freight hauled. This is one of the major externalities associated with the use of the private car and road haulage in the carriage of freight. As regards the solutions, these are almost identical to those outlined above for land use purposes, hence in simple terms either tax the more environmentally unfriendly forms of transport and/or subsidise the less environmentally harmful modes.

Both points one and two can be reinforced and explored further by the use of an example. Rail travel is known to possess an external benefit, or to be more exact, both an external benefit and avoidance of additional external costs. Those using rail services are not using private transport, therefore road users directly benefit through reduced congestion, faster and less stressful journeys and a reduced number of accidents on the roads. These are the direct external benefits of rail travel and all relate to the land use issue. However, the train also reduces the overall impact of movement, and more exactly private transport, on non road users for the simple reason that many who need to travel are using the train and not the car. Thus the external costs of private motoring on non users, such as noise, pollution, intrusion etc, are reduced because people are using the train to travel. The train, as such, would therefore be a case of under-consumption, as it is valued only by those that directly use the service, not by those that also benefit but whose benefits are not registered in the market place.

To support economic development or regeneration of an area

As outlined in Chapter 2, transport can be viewed as the vital component in promoting and sustaining economic growth. This relates to both enhancing the quality of the transport network and also maintaining existing services at a desirable level. Whether a demand-led or supply-led view is taken of the relationship between transport and economic development, economic development is normally associated with improved or upgraded transport links and services. There may be a political responsibility to take such projects forward; however, there are other reasons as to why this provides an economic rationale for the subsidisation of transport services. These mainly surround the idea of what are known as public goods, which we examined in Chapter 1. In this example, no single individual or firm is ever going to finance the upgrade of transport services into a particular area on economic development grounds. This is because (a) it probably could not afford to do so entirely on its own and (b) once the services were upgraded it would not be the

only firm to benefit from the improvements because of the free rider problem associated with public goods. In this particular case, therefore, the payment of subsidy may be justified on economic rationale grounds on the basis that such an upgrade of services and/or transport infrastructure will boost the local economy. All individuals in the area will therefore benefit from this improved wealth and the aggregated level of 'benefit' will be greater than the level of subsidy paid. This is a topic which is developed further in Chapter 14 on Transport Appraisal.

To support socially necessary services

Grouped under this heading are a range of social considerations which can be commonly regarded as issues concerning equity. Not everyone in the country either owns or has access to (as a driver or as a passenger) private transport, i.e. the car. The 2004 National Travel Survey (DfT, 2004) for example showed that 20 per cent of individuals that were 17 or over lived in a household with no car. Car availability was found to be strongly related to income, with 47 per cent of those on the lowest quintile living in a household with no car compared to a mere 8 per cent in the highest quintile. Furthermore, 50 per cent of single-parent families did not have access to private transport. Even these figures tend to underestimate the scale of the problem because an individual may live in a household that does have a car, but it may be in constant use by other household members and hence access may still be a major issue. This may be a particular issue in rural areas.

In today's modern society, Barr (2004) views transport as a 'participative requirement', i.e. it is required in order to fully participate within society. Education is a similar need, where a lack of education will not kill you but it may make it difficult to 'get on' in the world. Contrast this with an 'absolute requirement', which relates to food, shelter and health services. These are the basic necessities required to sustain life, without access to which you simply could not survive. With a participative requirement, however, the basic assumption is that some kind of minimum standard is required. In other words, not everyone requires an Oxbridge education and a Ferrari but rather requires access to some minimum level of provision. With regards to transport needs, public transport fulfils this role. Many instances exist however where the very nature of these transport operations means that they cannot be operated on a commercial basis. This would therefore be termed a 'socially necessary' service and provides the rationale for the payment of subsidy, i.e. to provide some minimum standard of living.

Some may question however whether the provision of a socially necessary service should be listed under an economic rationale for the payment of subsidy, as essentially this may be viewed as a purely political decision, and one based on maintaining the social fabric within society. Thus for example it could be argued that within a civilised society all its members should have access to a reasonable level of transport provision to enable them in turn to access their work, shops, recreation and various other activities considered as essentials. That in essence would be the political argument and furthermore that ultimately, it is politicians and not economists who decide which transport services should be provided and which should not. The economic argument however would surround the issue of equity (not to be confused with equality), and in particular the equity of opportunity. Wealth-creation opportunities, such as employment, should be open to all and thus those best qualified are those that benefit the most. Furthermore, if the best qualified attain such positions, this will also have wider economic benefits. Transport deprivation should not debar such a process from taking place.

As regards specific services that relate to ‘socially necessary’, this normally refers to the provision of public transport in socially and economically deprived and/or rural areas. As seen in Chapter 2, there is a very high level of correlation between the level of GDP and the level of passenger transport. Whilst that relationship related to the whole of Great Britain, it also exists at a regional, local and district level. Hence within economically deprived areas, the demand for transport services tends to be far lower than in more prosperous ones. If left to the market, therefore, very few transport services would be provided. The perceived danger is that the lack of transport will only worsen the problems facing the area. Whilst extreme, this could almost be termed the ‘ghetto’ syndrome. Transport services therefore need to be subsidised to assist in the development of such areas and prevent a massive imbalance appearing between the ‘haves’ and the ‘have nots’ within society.

With regard to the rural transport problem, most services are provided on the basis of socially necessary services where transport is supplied on the grounds of basic accessibility. It thus gives those that do not have access to private transport a minimum level of transport provision. This is even more acute in rural areas that are particularly remote. Thus for example the island communities off the west coasts of Scotland and Norway simply could not be sustained at their present population levels if ferry services were not subsidised. Faced with the full cost of transport to the island, many important economic sectors, particularly tourism, would be severely affected and the cost of living would also increase significantly as goods and services brought over from the mainland paid the full transport cost. This would almost certainly lead to a massive depopulation of the islands, especially of those on medium and lower incomes. This is a classic example of a ‘socially necessary service’, where without the service the local society would simply disintegrate.

INTERVENTION IN THE MARKET

In order to pay subsidy to correct for the market failures outlined above, subsidies from transport authorities can either be ‘injected’ into the supply side of the market or the demand side, known conveniently as supply side and demand side measures.

Supply side measures

A supply side measure is where the subsidy is paid directly to the operator, not the consumer. This then enables the operator to supply a level of service that it would otherwise not have been able to in the absence of the subsidy. Services that are provided as a consequence of supply side measures are open to all potential users and not specifically targeted at or restricted to certain groups within society. The direct effect of a supply side measure is to increase the supply of that service to the market. This is illustrated in Figure 11.3, which is an extension of Figure 11.2 outlined earlier. You may also notice that this is basically one of the answers to Exercise 3.1 in Chapter 3.

In Figure 11.3, prior to the payment of a subsidy then as in Figure 11.2 the market is in equilibrium at point a with a market price of P_{PRI} and a quantity of Q_{PRI} . As illustrated, however, due to an external benefit the ‘true’ market value, i.e. when all costs and benefits are taken into account, would be at point b with a quantity traded of Q_{PUB} . In order to correct for this market failure, one option for the transport authority is to increase the level of supply so that the market

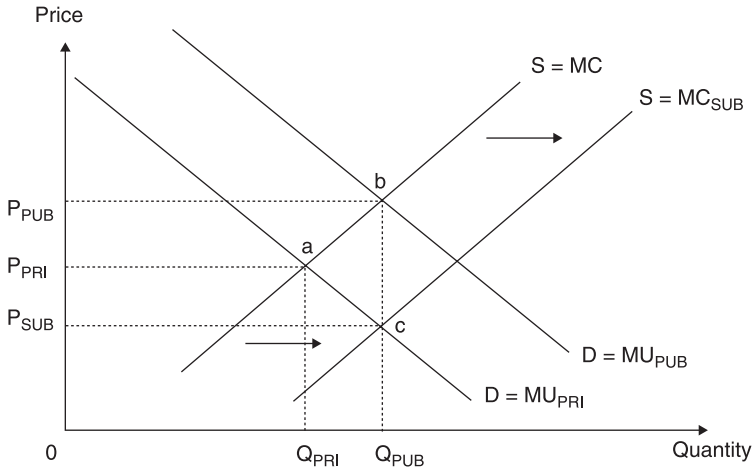


Figure 11.3 Subsidy to operators to correct for under-consumption

will be in equilibrium with a quantity Q_{PUB} . Using a supply side measure, this it does through the payment of a subsidy to transport operators, hence producing a shift in the supply curve from $S = MC$ to $S = MC_{SUB}$. The market would therefore be in equilibrium at point c, with a quantity traded of Q_{PUB} . The difference in the prices between P_{PUB} and P_{SUB} is the effect of the subsidy, with the state effectively paying the operators the value of the external benefit. Note also that the extent to which subsidy impacts upon either reducing fares or increasing the level supplied will be dependent upon the elasticity of demand. Where demand is inelastic, the effect will be to mainly reduce the price with little impact upon the quantity traded. In markets with elastic demand on the other hand, most of the impact will be on quantity with little effect on price. This has major implications on transport markets, where as seen in Chapter 4 demand for most transport services tends to be inelastic. This is one of the reasons why it is very difficult in general for authorities to produce a modal shift from the car to public transport services using subsidies alone, as the biggest impact is on the price and not on quantity demanded.

Note finally in this example, although an external benefit was identified as a demand side problem (under consumption), the easiest ‘solution’ in most cases is a supply side measure (pay a subsidy to operators).

Demand side measures

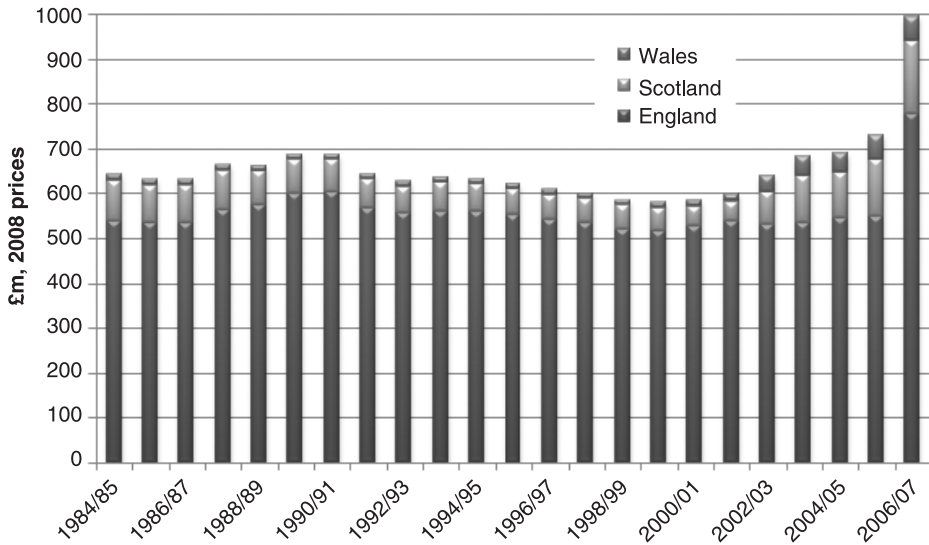
In theory these are far more straightforward, as a demand side measure is used to correct for a demand side market failure and exists where specific groups or individuals are ‘targeted’ to receive the subsidy. Unlike supply side measures, therefore, these are not open to all. In effect the individual is given a ‘concession’ (a reduced fare) to use a transport service, either public or private, but in reality most if not all concern some concession on the use of public transport. This usually requires some proof of entitlement to the reduction and should not be confused with commercial initiatives taken by operators such as the Young Persons Railcard. These are a form of price discrimination and are offered purely for commercial purposes to fill spare capacity. Concessionary fares are given to individuals that the state has decided should receive some

form of discount on their travel needs. These are normally taken on social inclusion grounds and are specified at the minimum level. Whilst in theory the ideas behind concessionary fares are straightforward, the practice of actually bringing such schemes into operation are far from straightforward and the situation in Britain is considered further in Case study 11.1 below.

Case study 11.1 Issues surrounding concessionary fare reimbursement

Perhaps the most common form of demand side measure found in transport markets are concessionary fare schemes. Within the UK, this type of subsidy has seen considerable reform over recent years, which partly reflects the devolved nature of government in the UK. The original Transport Act 1985 allowed for voluntary concessionary fare schemes to be operated for the elderly and registered disabled, thereby leaving it entirely up to local authorities to specify their own schemes for these two groups, including the option of not having one. Local authorities would then allocate a budget that was available to run the scheme. This led to considerable variations between different local authority areas regarding the level of actual fare concessions given, with Scottish local authorities tending to be more generous than their English and Welsh counterparts. Most schemes consisted of either the purchase or the free issue of a pass that entitled the holder to some form of discount on bus travel, but not on train services – as highlighted in the main text, any rail schemes that did exist were entirely on commercial grounds. The actual concession was either set at a straight flat fare irrespective of distance travelled or some form of percentage discount on the full fare. Hence in the Glasgow area, those entitled to the scheme applied for a free bus pass and then paid a flat fare of 25p on all bus services, whilst in West Berkshire a free bus pass entitled the holder to a 50 per cent discount. A final example was in Darlington, where entitlement holders could pay an annual flat charge for the pass, £80, which then entitled them to free travel in the Darlington area and half fare in the outlying rural districts. These arrangements remained in place until the devolution of political power to a Welsh Assembly and a Scottish Parliament, with transport being one of the devolved powers. Wales was the first to introduce an area-wide free concessionary fare scheme in April 2002, covering essentially all of Wales. Scotland followed with first a free travel scheme within local authority boundaries and then a nationwide free concessionary fare scheme that allowed the crossing of local authority boundaries. England followed suit in 2006 with a free local travel concession and then a national scheme in 2008. As can be seen from Figure 11.4, the move to free travel concessions has led to a significant increase in the level of subsidy paid through these initiatives.

Until the last few years shown, there had been a fairly constant pattern in concessionary fare reimbursement. The general trend in the early part of the period shown was upwards, but a squeeze on local authority finances in the early 1990s led to a decrease, although differences are relatively small and the figure hovered around £600m in 2008 prices. The sharp increase in the later years is entirely due to the introduction and expansion of free concessionary fare schemes throughout Britain, firstly in Wales (in 2002), then Scotland (2003 and 2005) and England (2006). In Wales the annual subsidy rose from £14m in 2001/2 to £38m by 2004/5, and in Scotland from £39m in 2001/2 to £92m by 2004/5. The final year shown is the



■ **Figure 11.4** Concessionary fare reimbursement, 1984/85 to 2006/07, at 2008 prices

Source: Compiled from DfT Statistics

impact of the free local travel English scheme, which led to a 42 per cent increase in the level of concessionary fare reimbursement.

How these schemes are administered is a confusing and far from straightforward matter, but in many ways tie in closely with the economics of bus operation. There are a number of ways such schemes could be operated:

- a) As an entirely demand side based scheme where the concession holder pays the full fare to the operator. The traveller would then reclaim all fares at a later date from the authority. The problems with such an arrangement however are considerable and would almost certainly render such a system unworkable.
- b) A voucher or token system could be used, where tokens are issued to entitlement holders, who would then use these instead of paying the fare. Prior to 2006, this was an option in the Cumbria concessionary fare scheme and a number of other English counties. Operators would then reclaim the loss of fares from the authority on production of the vouchers received. Such a system however would be open to exploitation, and thus would also require some form of identification confirming that the user of the tokens was entitled to the concession.
- c) The third option is a pass system, where the entitlement holder shows a pass on boarding and the operator records the number of concessionary passengers. The operator is then reimbursed for every recorded concessionary passenger carried.

As highlighted above, within Britain a pass system is used. However, how operators are then compensated by the authority raises many issues. What complicates the process is that the underlying principle is that the operator should be no better and no worse off as a result of the scheme. In other words, company profits (or losses!) should be unaffected by the running of the concessionary fare scheme. At first therefore the easy solution would appear to be simply

to reimburse the operator for each concessionary fare passenger carried. For example, say a 50 per cent concession is introduced, and there is a hypothetical bus company that charges a flat fare of £1, consequently those entitled to the concession only pay 50p. For each concessionary fare carried, therefore, should the operator receive 50p as compensation for the loss in revenue? The not so simple answer is no, due to the concept of 'generated traffic'. The following examples illustrate the idea of generated traffic and the process of operator reimbursement firstly where a reduced fare is imposed and then where a completely free concession is introduced. Figure 11.5 therefore shows the demand for bus services specifically from the sector of the market entitled to the concession.

Beginning with the diagram on the left of Figure 11.5, this is the situation prior to the introduction of the concession. The operator charges the full fare, P_M , and at that fare the quantity demanded for this sub group is Q_M . All revenue accrues directly to the operator. Once the concession is introduced, however, the fare falls to P_{CF} in this market sector, i.e. 50 per cent, and sector demand increases to Q_{CF} . $Q_{CF} - Q_M$ therefore represents the additional travellers who did not travel before and this is known as the 'generated traffic'. These individuals are now paying the operator the concessionary fare, in this case 50p. These extra 50ps therefore are fares the operator had not received before and are due to the increase in bus use, or generated traffic, brought about by the introduction of the concession. This represents a net gain to the operator's revenue and needs to be taken into account in any fare reimbursement. The loss in revenue on the other hand, i.e. those concessionary travellers who would have travelled at the full fare, is shown by the area mapped out by P_{CF} , P_M , a, c. It should be clear now that the amount of compensation due to the operator would be the loss in revenue minus the revenue gain from the generated traffic, i.e. area P_{CF} , P_M , a, c minus area Q_M , c, b, Q_{CF} . There is however a further complication. This would still not leave the operator no better or no worse off as there is an additional cost connected with carrying more passengers. This will generally slow down boarding times and hence more buses may be required to maintain route frequency. The operator therefore also needs to be compensated the extra costs incurred as a result of carrying the generated traffic and this is shown in Figure 11.6.

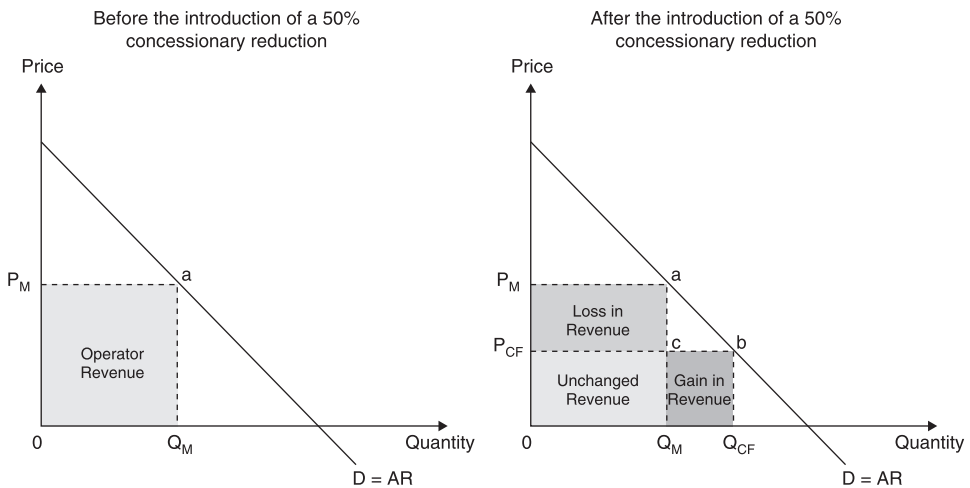
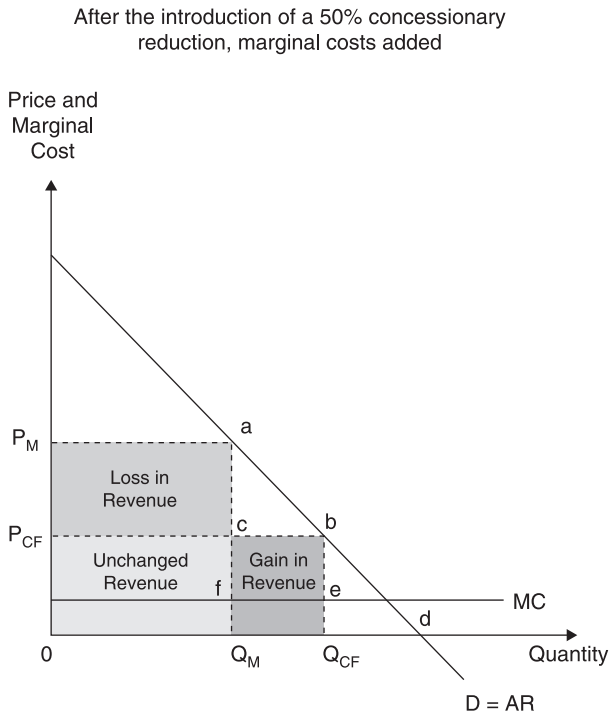


Figure 11.5 Generated traffic



■ **Figure 11.6** *Generated traffic with marginal costs added*

Figure 11.6 shows the marginal cost, and these are shown by adding the line labelled 'MC' which for simplification assumes constant non varying economies of scale. Thus the operator also needs to be compensated by the area Q_M, f, e, Q_{CF} in order to cover these added costs in order to be no better or no worse off as a consequence of the concessionary fare scheme.

In practice operator reimbursement has caused much confusion and resentment amongst operators as to what the actual level of 'generated' traffic should be, as may be imagined this is difficult to determine and even more so with the passing of time. Furthermore as most of these reduced fare schemes were only valid at off peak times, the expectation was that concessionary travellers would only use spare capacity and thus marginal costs would be minimal. This would still be the case however where no such time restrictions applied.

Even under a free concessionary fare scheme, the issue is still not straightforward as to how much the operator should be reimbursed. In Figure 11.6, demand for the concessionary group would now increase to point d and whilst the level of generated traffic will be significant, the level of generated (operator) revenue will be zero. DfT guidelines (DfT, 2008) on the introduction of the English national scheme gives the following measures that should be taken into account in the process of operator reimbursement:

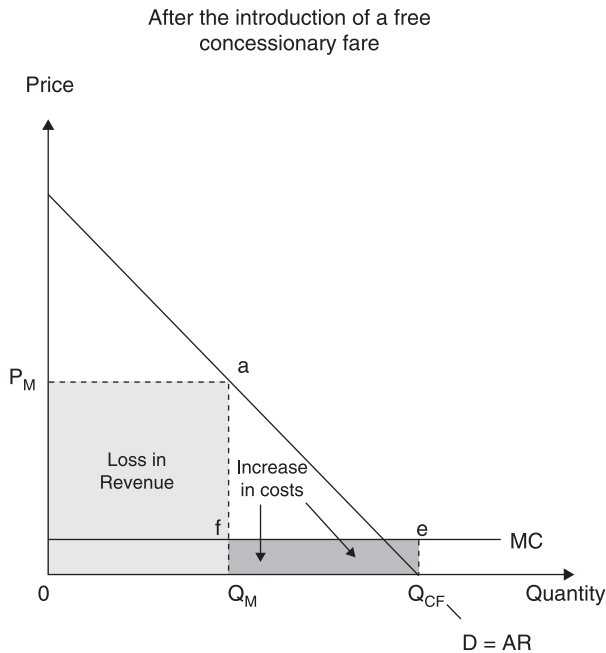
- The average number of pass holders
- The average bus fare for the concession group, or where this is not available, the average bus fare charged
- The expected fare reimbursement revenue

- The expected number of concessionary fare trips
- The expected additional costs.

In order to determine the actual amount of compensation due, the critical elements of those listed above are the average bus fare, the expected number of concessionary fare trips and the expected additional costs, and this is illustrated in Figure 11.7.

After Figure 11.6, Figure 11.7 should be a lot more straightforward, as under a free scheme there is no revenue accruing to the operator from the concessionary passengers. Hence in order for the operator to be left no better or worse off than if the scheme did not operate, they should be reimbursed the loss in revenue and the additional cost of the generated traffic, which is simply given by area 0, P_M , a, Q_M , f, e, Q_{CF} . Nevertheless, the whole process of concessionary fare reimbursement is still a messy area, as how the level of generated traffic is estimated is by the use of elasticities of demand. Hence if we have the level of demand at a zero price, Q_{CF} , which is simply the total number of concessionary trips, we still need to estimate the level of demand at the market price, Q_M . This would be done by applying an appropriate elasticity of demand value which then gives the level of generated traffic from which the additional costs could be calculated.

Another major issue with such schemes only briefly touched upon above is the question of whether it is 'right' that the reimbursement does not include some form of normal profit for the operator? By using the average fare in the compensation, this means that it will include operator profit, but only on the lost revenue, thus leaving the operator 'no better or worse off' as a result of the scheme. Many bus operators argue that the full fare should be compensated on all passengers carried, as in effect they are providing a service to the government in putting such



■ *Figure 11.7 Concessionary fare reimbursement, free concessions*

schemes into operation. For example, in the case of socially necessary services, services are operated on behalf of the government where operators will bid on the tender that will include a profit element, as in simple terms they will not do it for nothing. Why therefore should concessionary fare schemes be any different? The problem with full fare reimbursement however is that operators could increase profits by simply increasing the average fare, hence the level of reimbursement would automatically increase. This would be a particular danger where there is inelastic demand and a high number of concessionary passengers. The compromise solution would be to agree some rate, and this indeed is the case in Scotland and Wales, where all operators receive a flat rate of 73 per cent of the average full fare for each concessionary passenger carried. Rye and Carreno (2008) argue however that this is over-generous and thus provides an indirect form of subsidy to bus operators, and furthermore that such negotiations should be far more localised to reflect local bus market conditions. Nevertheless, regardless of the form of compensation arrangements in place, concessionary fare schemes are critical to the economics of the local bus market – Rye and Scotney (2004) estimated that the revenue from this market segment accounted for around 20 per cent of bus operators' revenue, and that at a time prior to the widespread introduction of free concessionary schemes.

All of the grey areas outlined in this case study are the main reason why such schemes tend to be limited in scope and there is far more reliance on supply side measures. The actual costs of administrating such schemes tend to be very high and thus should only be implemented where a true 'need' exists. It also highlights the problems when involving the private sector in public transport (i.e. a follow on from Chapter 10), as in the days of public ownership bus operators could simply have been ordered to carry concessionary travellers and the whole reimbursement process included in a single budget. Furthermore, given the criteria of 'no better or no worse off', the success of such schemes in meeting the targeted group are very much dependent upon market forces. If there are insufficient numbers of full paying passenger to support a bus service, then it will be cut, even if it is carrying a high level of concessionary travellers as they in theory do not contribute to operator revenue. In a deregulated transport market, this is always going to be the case with demand side measures, as those targeted can only use the services that are available, which in this case are in the main only those that can be sustained commercially. The fallback position of course is that if cut, the service could then be subsidised by the local authority by being deemed to be a socially necessary service. This clearly shows the areas of cross over between demand-side and supply-side measures in the support of transport services. That is, target specific groups through demand-side measures, and then ensure that a satisfactory level of transport provision is available to such groups through supply-side measures.

Drawbacks of paying subsidy

As highlighted in the introduction, there are many more issues that surround the actual payment of subsidy than subsidy itself. Most, if not all, agree it is a 'good thing'; however, most if not all recognise that there are many issues that need to be considered first before supporting transport services in such a manner. There are thus several potential shortcomings from an economic perspective when subsidy is paid. In this short section the four main drawbacks of paying subsidy are outlined, although there are many more.

It is always a second best solution

As we saw with regulation in the previous chapter, the payment of subsidy to a transport operator to provide a service is what is known as a second best solution. The best solution is always provision of the service by the market under the conditions of perfect competition. When subsidy is introduced into the market, however, this will usually be accompanied by some form of regulation in order to specify the conditions under which the subsidy is paid. With regulation comes the associated added costs of the additional bureaucracy needed to measure and monitor performance. The payment of a subsidy also interferes with the market signals generated by the forces of demand and supply. In a free market situation (and again assuming perfect competition), the market will ensure that the 'right' services are provided in the 'right' quantities. If consumers desire more of one type of service over another, then demand for the former will rise and for the latter fall. This will be signalled to producers through the price mechanism and they will ensure that more of the former is provided. When subsidy is paid however this interferes with that process and it becomes dependent upon accurate forecasting and planning in order to ensure that subsidy is used where it is most needed. This procedure will never be as efficient as the market, although note that it should be more effective.

Can lead to inefficient operations

In many ways, this is the most often cited case against paying a subsidy. The basic idea is that because the organisation is not working to strict market principles (i.e. primarily survival of the fittest), then costs are not as low as they should be. This is the x-inefficiency argument again. As a result, public subsidy is used to support inefficient operations rather than providing the service for which it was intended. Those more astute readers will realise that it is very difficult to isolate the subsidy component in such an argument, as in most if not all cases such subsidises will be provided in a monopoly type situation. In other words, if one operator cannot make a normal profit out of such operations then it makes little sense subsidising two!! Hence it is very difficult to split inefficient operations as a result of paying a subsidy or as a result of being the monopoly provider of services, and as highlighted, the two are invariably linked.

Whilst the general perception is that paying an operator a subsidy will lead to inefficiencies, is there any evidence to support that general view? Most research on the topic has indeed found that operators with higher levels of subsidy tend to be less efficient, although one problem in this research area is that some transport operations by their very nature are technically inefficient to provide, hence require subsidy. A classic example would be a rural railway, where frequencies will be low but the necessary inputs, particularly the infrastructure, relatively high. There is thus a problem of the direction of causation, where in many cases it is the inherent inefficient nature of operations that requires higher subsidy in order to sustain the service, i.e. inefficient operations, rather than higher subsidy sustaining inefficient management. Whilst most research has found an inverse relationship between subsidy and productive efficiency, several other factors have been found to impact upon that basic underlying relationship. For example, research on US public transit operators (Pucher *et al.*, 1983) suggested the source of the subsidy was an important factor in this relationship: federal subsidies had a large adverse effect on productivity whilst state subsidies had a small positive effect. This suggests that the nearer the transport authority is spatially

located to the operator then the better targeted the subsidy can be on the use for which it was intended. It is thus less likely to result in productive inefficiencies. Other US research (Karlaftis and McCarthy, 1998) also found that the size of the firm was an important determinant. Larger firms were more vulnerable to the effects of higher subsidy levels on efficiency than smaller firms, with the source of the inefficiency being specifically x-inefficiency. Further studies (Sakano *et al.*, 1997) have also suggested that the source of the inefficiency is related to over-staffing, with those firms with higher subsidy payments tending to employ unnecessary staff.

Understanding these basic underlying factors is important in ensuring that subsidy is used for the purpose for which it was intended, rather than resulting in productive inefficiencies. This whole area of research, however, whilst considerable, still has some way to go before this relationship is fully understood, particularly in identifying the conditions under which paying a subsidy will not have a detrimental effect on efficiency.

The winner's curse syndrome

The idea of the winner's curse is used in auction theory to explain why winning bids may be based upon judgmental failures where the auction is ultimately won by the most optimistic valuation of the auction's item (Alexandersson and Hultén, 2006). Adnett (1998) further argues that winner's curse is more prevalent in tendering situations where the number of bidders is low and inexperienced in the first round of tendering. In terms of the payment of transport subsidy, the idea of the winner's curse is highly relevant, particularly with the general movement towards competitive tender. In these situations, the transport operator would bid for potential transport contracts based upon market information, and this information would tend to be optimistic in its forecasts of the potential market. The winner of the contract therefore would be that operator with the most optimistic revenue figures, hence, all else being equal, requiring the lowest subsidy to operate the service. The net result would be that when successful, the winning bidder would find out the optimism of their forecast and encounter losses on the service (hence the idea of a winning curse). For the transport authority, this would at first appear to be a beneficial situation, as basically they have secured the service at a lower price than would have otherwise been the case. The problem however is that such an argument completely overlooks the very the strong position of the incumbent operator. In a worst case scenario the operator would go out of business due to the losses being incurred, at best look for an early termination of the contract or finally they would provide the required services to the very minimum of standards with a danger of defaulting on the contract. Experience has shown that all of these scenarios are entirely unsatisfactory. In all instances the authority would either be faced with or potentially be faced with refranchising the service. The refranchising process would not only incur an added cost but would also undoubtedly end with the authority paying a higher price for the contract. What usually happens therefore is that the contract is re-negotiated with the existing operator being paid higher levels of subsidy, as that is the lower cost option. There is strong evidence that this was the case with many of the British passenger train operating companies (Cowie, 2009), which resulted in significant increases in subsidy at the time of contract extensions. The real problem with the winner's curse is that it is not the 'best' or most efficient operator that wins the contract, but rather the one with the most optimistic bid, but that it is the authority that ultimately has to address this problem. In simple terms, even as a second best solution this is not market efficient in any sense of the word.

Subsidise a service that doesn't actually need a subsidy

This drawback in some ways is a bit unclear, as many proponents of public transport would be of the view that all public transport services should be subsidised, even where a financial profit could be made. Such a view would be based on the premise of market failure caused by externalities (particularly public benefits) resulting in such services being undervalued by the market (see Figure 11.2). Therefore, accepting a political view that only loss-making services should be subsidised, the fourth and final drawback in paying a subsidy is that it may lead to the subsidisation of a service that on strictly financial criteria grounds does not actually need a subsidy to operate profitably. Hence rather than being used to provide an essential service, the subsidy is being used to bolster the operator's profit and increase the shareholder's dividend at the end of the financial year. The opportunity cost of these increased dividends therefore is the necessary service that is not being provided, and hence such measures are highly regressive. Undoubtedly having a two-tier system, where some services are subsidised and some are not, will affect operators' behaviour in transport markets. There is for example some circumstantial evidence of operators in Britain withdrawing a marginal service in the knowledge that the local authority would have to re-instate that service with the incentive of paying a subsidy. This in many ways is a consequence of a second best solution, because under a highly competitive market such an occurrence simply would not arise as the market would regulate itself.

As with point 2 above, there is far more to this argument than the simple provision of a single service and whether or not it requires subsidy. One factor such an argument overlooks is the systematic nature of public transport networks, and the extent to which one service 'supports' the whole system (note, not to be confused with cross-subsidisation – see below). This is best illustrated in the case of the Beeching closures on the British rail network of the 1960s. It has been argued by Henshaw (1995) that closure of branch lines led to a reduction in patronage on the lines to which they fed into, and thus those lines then became vulnerable and eventually closed. Public transport networks should therefore be viewed as complete systems and the contribution to overall revenues not based purely on whether each individual service covers its full costs or not. A further complication arises as many transport services have shared costs, such as maintenance and administrative overheads, hence how these are apportioned between the various services will determine the extent to which services are profitable or not.

OTHER ISSUES SURROUNDING TRANSPORT SUBSIDY

We end the chapter with a look at some other issues surrounding the payment of transport subsidy. The second, actual methods of payments, outlines the methods open to the authority for the payment of transport subsidy; however, the first issue considered, cross-subsidisation, also relates to how subsidy is paid. In simple terms should it be paid for a group of services which in total fail to make an economic return or should they be subsidised individually?

Cross-subsidisation

Cross-subsidisation occurs where the profits of one route or service are used to pay for the losses on another route or service. Why this idea is covered here under subsidy is that cross-subsidisation

has often been used in the past as an alternative to a transport authority paying an operator a subsidy, or has been used to at least reduce the level of subsidy to be paid. This is particularly true of local authority owned and run bus companies, where the profits from high-density well-defined bus routes were used to recover some of the losses from little used low-density routes, hence reducing the overall reliance on subsidy.

In some ways, and to the general public at large, cross-subsidisation appears to be a 'good' thing. This is because there seems to be some balance in such a system where profits from one part of the operation are used to cover losses in another. As such, the system would appear to be self-contained, and where wholly cross-subsidised, the system entirely self-funded with no reliance on public subsidy, i.e. tax payers' money. Furthermore, in a regulated transport market where an operator may be protected from competition through the regulatory system, then it may seem only 'fair' that in return for this regulatory protection the operator sacrifices a part of their profit to provide some unprofitable routes for the authority.

The biggest argument against cross-subsidisation, however, particularly from an economist's point of view, is that it hides the true costs of providing a particular service. If profitable services are used to support loss-making routes, then the true costs of providing these services is completely hidden. In turn, if the true costs are not known then there is no way to judge if those routes are worth supporting or if the money could be better spent on other transport services. Direct accountability is therefore lost, which can lead to bad decision-making due to incomplete and aggregated data.

A second argument against cross-subsidisation is that rather than the operator being 'penalised' by using potential profits to fund loss-making routes, it is the users of the profitable routes that are being 'penalised' as they are paying for the users of the poorly used routes. This may well be a regressive measure, particularly given that some of the high-density routes may serve less prosperous areas, nevertheless the fares facing those individuals will be higher than they would otherwise be. As a result, the market as such is not as efficient as it should be. More may well use profitable services if fares were reduced to reflect their true market value, and hence it is also those potential users that are also paying for unprofitable routes. In many ways, therefore, cross-subsidisation is again in the realm of second best solutions, in which market signals are distorted by such measures. Importantly, however, in this case the best solution (i.e. the market) is an option that is available but simply not taken.

A final argument against cross-subsidising transport services is that there are other and better measures and policy instruments available to ensure that necessary services are provided to those that need them. Why should, for example, the users of profitable bus routes pay for the users of non-profitable bus routes whilst car drivers make absolutely no contribution? Or put the other way around, why should those dependent upon loss-making routes be reliant upon users of profitable bus routes for their bus service? What happens if bus patronage falls and the number of loss-making routes increases, are the number of bus routes cut? If a transport service is deemed to be a social necessity but is a loss maker, it should be the whole society that pays for the provision of that service, not just those existing users on profitable routes. This relates to the argument that transport should be provided on the basis of need rather than financial means. The 'best' mechanism for doing this is through the tax system, as this takes a far wider view than simply concentrating on the users of the system.

Other instances arise which may be confused with cross-subsidisation, where a loss-making

route is continued but it can be justified on purely economic grounds. This can occur where there are short and long run factors or network effects present. In the first case, a route may be covering its short run costs but is returning losses as it is not covering the capital costs. In such instances, it makes economic sense to continue the service in the short run but when it comes to replacing the capital stock to then withdraw it. This is because in the short run the route will be returning a profit; however, the future return could never justify the investment required to continue operating the service. The second instance may be where an individual route is making a loss; however, in total it is adding to profits through network effects. This is because the service is making a positive contribution to the network as passengers brought in are then using other services in the network, hence if the route was cut these passengers would not use the service. Neither of these instances however should be confused with cross-subsidisation.

Methods of payment of subsidy

Today transport subsidies increasingly come in the form of a contractual payment for a service and may be applied to a specific route or a batch of routes or network. Where these are paid to a private sector operator, this would normally be in the expectation that the operator could provide the service at a lower cost than a publicly owned firm and that cost savings would more than offset the operator's profit from providing the service. Consequently, the total cost (i.e. subsidy) to be paid by the transport authority would be reduced; however, practice has shown that this has not always been the case. Moreover, such methods of subsidy payment are not the only ones open to transport authorities and outlined below are the five main methods used to pay subsidy to transport operators, irrespective of if the operator is publicly or privately owned. These virtually all concern supply side measures used to provide a service where one would not exist under free market conditions.

Deficit subsidy

This is the simplest form of subsidy and as suggested by the name, this is where the authority pays the difference between the revenue received from the service and the cost of providing that service. In the past these have been in the form of open-ended subsidies, where the authority covers the size of the deficit irrespective of how large that subsidy is. Increasingly, however, authorities have moved to a form of an allocated or negotiated budget. In many respects these forms of subsidy are consistent with the traditional view of the nationalised operator where the operator is allocated a budget, usually on an annual basis, to provide public transport services. Being publicly owned, the operator would be expected to provide the service in the public interest rather than for profit and hence break even (after the payment of subsidy) at the end of the year. This could be paid either through a straight allocation, as happened in the pre 1985 Transport Act with local authority bus operators/departments, or alternatively through negotiation. Many, if not most, of the Swiss independent railways operate along similar principles, where the standard of services to be provided is agreed and an annual budgeted figure negotiated.

The modern day equivalent of the deficit subsidy is what is known as a management contract. In simple terms, this is where a transport operator will run the service for a transport authority and then invoice the authority for the cost of running that service. This will consist of the difference between passenger revenue and operating costs in addition to a management fee. This will be

subject to a negotiated budget beforehand and may be put out to tender. Such contracts may be used where there is a high degree of uncertainty involved, both in terms of future demand and future production requirements, and hence no operator willing to take on the business risk.

Net cost contract

Under such agreements, the operator in effect acts as a sub-contractor to government to provide transport services within a given area. This also reduces cross-subsidisation and produces greater visibility as to the actual cost of providing a given service/batch of services. Such contracts are normally for a set period of time, after which point the contract is then re-tendered. This basically is the idea of the contestable market outlined in Chapter 7 and it is over the last point highlighted, the length of the contract, that much debate exists. This is because the length of the contract ultimately determines the extent to which the market is actually contestable. In order to increase contestability, contracts should be for relatively short periods, because a short contract length puts added pressure on the incumbent to provide the best service. Under such a scenario, if they fail to perform then they can be replaced in a relatively short period of time or alternatively strong performance will increase the likelihood of success in any imminent re-bidding. However, there are several problems with short contracts. Firstly, the cost of having to re-bid the contract on a regular basis becomes a financial drain on the money available to actually spend on the service. Secondly, constant changes of operator may become disruptive in the provision of the service and hence not represent 'best value'. Thirdly, the longer the contract then the more likelihood that the operator will invest in new vehicle stock and a general organisational investment in the whole operation which may lead to a better understanding of users' needs and improvements in the service provided. The length of the contract therefore is a question of finding the optimum time period that maintains the contestability of the market but does not discourage investment in the service being provided. Due to the heavier investment requirements in the rail industry, this has tended to lead to longer contracts in the provision of rail services than for bus services. In Britain standard rail franchise lengths are seven years, whilst as seen in Case study 10.2 in Sweden it is five. For bus services, however, experience from around Europe shows that local transport authorities offer bus contracts in most instances for two to three years.

Full cost contract

Under a full cost contract the operator's bid for subsidy is based on the full cost of running the service or network specified by the transport authority. This is what was referred to as an operational contract in Case study 10.2. Under such a contract, the fares charged are specified by the authority but collected by the operator who then returns the revenue to the authority. The net subsidy paid under such a contract by the authority is therefore the cost of the operator's contract less the revenue received from passengers. All revenue risk therefore rests with the authority and none with the operator. The operator thus knows exactly how much they will receive whilst the authority's revenue is dependent upon patronage levels. As with a net cost contract outlined above, such contracts will normally be for a set period of time, with the same issues over short versus long contracts. Several of the British passenger rail franchises operate under full cost contracts, Merseyside for example, whilst again as seen in Case study 10.2 both

Transport for London and the Helsinki Transport Authority operate a system of full cost contracts for the provision of bus services.

Design, Build, Operate and Maintain (DBOM)

DBOM contracts usually surround a major infrastructure project, such as the construction of a light-rail network such as the Nottingham Tram or a new (relief) motorway, such as the M6 Toll around Birmingham. Under these contracts, tenders will be based upon the price required to design, build, operate and maintain the infrastructure over a set period of time. Due to the high level of investment required, in most cases these will tend to be long-term contracts. The actual price bid in most cases is the difference between the revenue received from the operation of the service over the contract period minus the cost of designing, building and maintaining the system during that time. Therefore, once the lump sum is paid, the operator will be expected to make a profit out of the operation of the service (i.e. cover its short run costs). The revenue risk in this case therefore is with the operator of the service. Once the contract is completed the ownership of the infrastructure will return to the transport authority and then the contract re-tendered based upon either a franchised subsidy contract or a full cost contract. This is how the first phase of the Manchester LRT system (Metrolink) highlighted in the previous chapter was financed, where Serco won a DBOM contract for 15 years' operation. Once that contract expired in 2007, the facility was then re-tendered with Stagecoach winning it under a fixed term management contract (see above). Many other variations of DBOM contracts exist, however, for example in some specifications the revenue risk remains with the authority or others specify only operate and maintain. The distinguishing feature of these types of contracts is that the assets used in the provision of transport services are ultimately owned by the transport authority.

As we have seen, the payment of subsidy to a transport operator has seen considerable reform in the recent past, with several different methods and models of delivery (see Figure 10.4) introduced in the process of reform. Case study 11.2 considers the success in introducing these reforms into the provision of transport services.

Case study 11.2 Success in the payment of subsidy

This case study examines the actual mechanisms used in the payment of subsidy to support public transport services and the evidence of success or otherwise of these different approaches. As will become apparent from the case, in many instances how subsidy is paid can be dependent upon what is 'in vogue' rather than being based on any objective criteria. One problem when examining the different methods that have been used to inject subsidy into transport markets, is that there is a danger it can dissolve into an economic history on the payment of subsidies to transport industries. In this case, some historical background and precedent is useful, as how subsidy was paid in the past in some ways shapes how it is paid in the present. Nevertheless, this case will particularly focus on the movement away from open ended lump sum subsidies to more contract-based approaches.

Subsidies have been around for many years in one form or another, although there has always been differences regarding the extent to which the state should intervene in transport

markets with the support of public finance. Even back in the 19th century many railways around continental Europe were constructed with heavy state backing due to their perceived strategic importance, whilst in Britain all railways were constructed using only private finance (although required state legislative approval). Even within Britain, however, the idea of subsidising transport services was not a completely alien notion. In the 1930s the big 4 'private' railways received substantial payments from government and the 'national' airline, Imperial Airways, was allegedly supported by an annual subsidy of around £1m (a relatively large sum at the time) to support air services that connected the Empire. The subsidisation of transport services however never really became a major issue until the 1960s when the last of the major state railways, Swiss Federal Railways, fell into deficit for the first time in 1969. With the rise of the private car, the financial viability of bus services also became increasingly marginal and ultimately required subsidy to support existing networks. The US experience for example shows that subsidy for public transport from all levels of government (local, state and federal) rose from \$318m in 1970 to \$9.27bn by 1990 (Karlaftis and McCarthy, 1998).

The first form of subsidy payment used was deficit subsidy, where subsidy bridged the gap between passenger revenue and the cost of providing the transport service. This was given legislative backing by the then European Community with the passing of directive 1191/69 in 1969 that introduced the idea of Public Service Obligations (PSO). This recognised that there were certain transport services (mainly bus and rail) for which the then largely state-owned operators were 'forced' to operate but which would never make a viable economic return. The directive required the relevant authorities to re-compensate the operators for such public service obligations in the form of a lump sum payment. When Britain joined the EC in 1973, the PSO was introduced into the railways by the Railways Act 1974, which required that the then state-owned British Rail provide services 'broadly consistent with that provided at the moment'. In subsequent years this was generally interpreted as a level of train kilometres consistent with that run in 1974 (British Railways Board, 1988). The PSO was paid on the basis of a lump sum subsidy for the whole of the British network. In the 1980s, however, under the Organising for Quality initiative, BR was re-organised more along market-focused principles and thus the PSO was split between the three passenger sectors of Regional Railways, Network South East and Intercity, and negotiated annually. By far the largest part of the PSO was taken by Regional Railways, which consisted of all non Intercity routes outside of the south east. The Intercity sector however was set a target of zero subsidy, a position it duly achieved in the years 1986/87 and 1987/88, whilst the Network South East sector (NSE – London commuter routes) hoped to reach a target of zero subsidy by the early 1990s. A major change in the economic climate however brought about a major re-think, in which it was realised that the Lawson Boom of the late 1980s had been the prime driver behind the strong performance of NSE. Consequently it was also realised that NSE would always require subsidy if it was to provide a valuable transport service to the London commuter network.

The first country however to adopt full market principles in the payment of subsidy was not Britain but New Zealand, with full deregulation of bus services in 1983 and railway reform between 1986 and privatisation in 1993. The first large land-based passenger transport market to be deregulated however was the British bus industry. The topic of transport industry reform has been covered in the previous chapter, hence this case study only concentrates on the reforms in the payment of subsidy to operators. The Transport Act 1985 put an end to open ended lump

payment subsidies and all services were expected to make a profitable return, even where provided by a local authority company. The one exception, as noted previously, was that local authorities could specify a service where none was provided by the free market on the basis of a social necessity. This would then be put out to competitive tender, hence creating competition for the market rather than in the market. The impact these reforms had on subsidy payments can be clearly seen in Figure 11.8, which outlines subsidy payments in constant 2008 prices from 1976/77 to 2004/05.

Figure 11.8 shows the total subsidy paid for services for all of Britain up until 1984/85, and then due to availability of the data, splits this between London and outside of London after that period. The rise in the level of subsidy paid throughout the mid 70s and early 80s is very clear, primarily caused not only by falling passenger numbers, but also a suspicion of decreasing efficiency in operations. With the change in the system of subsidy brought in by the 1985 Act, subsidy levels fell considerably, so that by 1990/91 for supported services outside of London the subsidy paid to operators had fallen to almost 40 per cent of its previous level. This should not however be taken as an indication of simply moving from an open-ended-type payment to a contractual payment, as other reformatory principles were also put into effect, principally the requirement that fares could no longer be directly subsidised by local authorities.

The British experience is fairly consistent with that in other countries. Most of the research cited below comes from the Thredbo series of conferences on 'Competition and Ownership in Land Passenger Transport' led by Professor David Hensher of the University of Sydney and held biannually since the first conference in Thredbo, Australia, in 1989. This has been a major forum that draws on a wide range of international experience for the discussion of reforms in the organisation and operation of public transport services, including, of course, the payment of subsidy. For example, Hauge (1999) found considerable savings in the subsidies required to maintain Norwegian ferry links, where the introduction of competitive tendering on a limited number of routes had led to reductions in subsidy, improved efficiency and a better organised

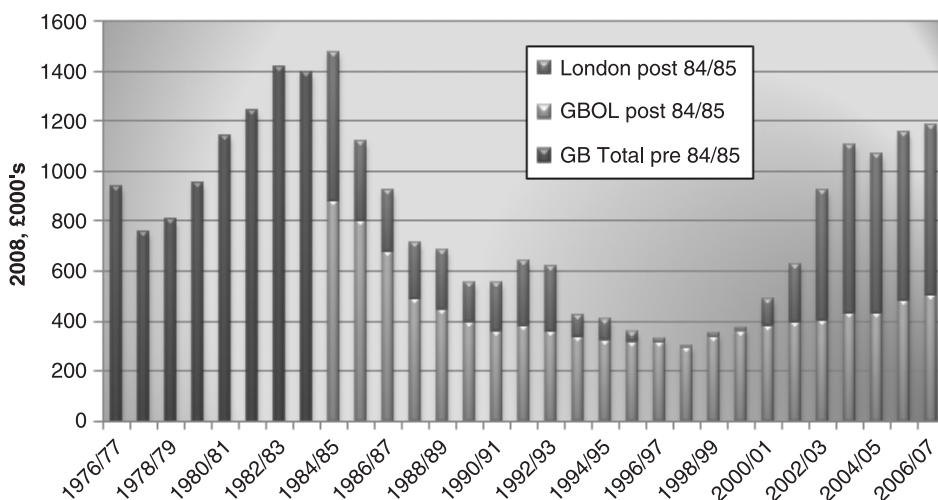


Figure 11.8 Public financial support for services, 1976/77 to 2005/06, 2008 prices

Source: Compiled from DfT Statistics

transport ferry operation. The author also found some evidence however of winner's curse. Johansen (1999), in an examination of the Norwegian bus industry, found that the movement away from net cost contracts, i.e. lump sum subsidies, to contracts based on cost norms and competitive tendering had had a major impact on the bus market in Norway. The main findings were that costs had decreased by around 20 per cent, the reliance on subsidy had fallen from 37 to 24 per cent and finally that the reforms had sparked off major restructuring of the supply side of the industry. This had seen the number of bus operators reduce from 220 to 83 and the emergence of two dominant operators through mergers and acquisitions who held around 40 per cent of the total market. Van de Velde (2003) not only found that the introduction of market reforms had led to considerable supply side consolidations across a number of countries examined, but also strong evidence of the 'internationalisation' of public transport operations. This was no more acute than in Denmark, where two foreign-owned companies held almost two-thirds of the bus market. This had led to an upward trend in contract prices; however, subsidy levels had stabilised at around 10 per cent under pre-reform levels. Finally Preston (2001), in a review of bus and light-rail systems across Europe, estimated that the dependence on subsidy for fully competitive transport markets, at 37 per cent, was considerably lower than for either limited competition markets or fully regulated markets, where the level for both was found to be 53 per cent. Competitive bus markets also had costs per vehicle kilometre some 23 per cent lower than limited competitive markets and 51 per cent lower than regulated markets.

Whilst the evidence would undeniably support the view that the move away from open ended lump sum payments towards more competitive and public sector contract agreements has considerably reduced subsidy levels, there remains a question mark and debate over how far such reforms can be taken. There is clearly a limit as to how little subsidy can be paid before the low finance levels impact upon the quality of the service provided. Paying low subsidy levels to sustain a poor quality service with little patronage could never be described as 'value for money'. Considered opinion is therefore moving back towards the idea of negotiated contracts, where in the first instance, the transport authority will re-negotiate the contract with the incumbent operator. This overcomes the problems of the transaction costs of having to re-tender the contract as well as what can potentially be a disruptive period as one operator takes over from another. The evidence suggests that where such initiatives have been put into place, then potentially the added advantages are that it can lead to less conservative approaches to the provision of public transport services and contract renewal can be directly linked to key performance indicators and appropriate benchmarks. Hensher and Wallis (2005) clearly see a greater role for negotiated contracts under a particular set of circumstances. Namely, where the incumbent is recognised as an efficient supplier, where a greater focus needs to be placed on innovation to grow patronage and finally where incentives need to be provided to encourage the required investment to support such activities. Around the globe, such circumstances are hardly uncommon. Rather than the authority/operator as a contractor/contractee relationship, this encourages far more of a genuine partnership arrangement between the authority and the operator. Much debate and inconsistencies however remain over this whole issue. The European Union for example require that in certain transport sectors all public service contracts over a given threshold be put out to competitive tender irrespective of the circumstances facing the particular transport mode.

This case has provided a review of the development and changing trends in the payment of

subsidy and would appear to outline a clear evolutionary process in the structure of subsidy payments. Starting from a simple open-ended lump sum payment, regulatory reform has tended to move the operator towards a more market-driven focus and subsidy usually paid on a negotiated or cost norm basis with clear 'targets' set. The next stage would be to introduce competition for the market through competitive tender, where the market for the payment of subsidy is 'opened up' to other operators. Research suggests however that whilst both these regulatory reforms can produce considerable reductions in subsidy, these appear to be one-off effects and are not continued into the medium to longer terms; in fact if anything, such trends are reversed in subsequent rounds. Under such circumstances, therefore, negotiated contracts may produce better results, where the authority negotiates with the incumbent, rather than continue with a system of competitive bidding.

CHAPTER SUMMARY AND REFLECTION

This chapter has directly followed on from the previous chapter on regulation and ownership in transport markets, and examined the issue of where the state directly funds transport operations or investments in a specific location. It has considered the main issues surrounding this topic in the form of the reasons for doing it and the associated drawbacks in doing so. Whilst this has generally been from a 'pro' perspective, i.e. under certain conditions transport services should be subsidised, alternative views do exist. For example Karlaftis and McCarthy (1998: 359) state that while capital subsidies to transport industries can be justified on the grounds of achieving returns to scale, '... there are no economic grounds for providing operating subsidies'. To a certain extent such a view may reflect a far narrower definition of what constitutes 'economic grounds', as 'revitalizing cities' for example is considered as a social objective, but it is nevertheless a statement that few would agree with. What we have seen in the course of this chapter is that the rationale for the payment of subsidy mainly surrounds issues of market failure, thus in a mixed market economy one of the roles of the state is to correct for such market failures. It cannot however correct for all market failures, as the resources at its disposal are limited. It therefore has to ensure that when such action is taken, the financial resources are used in the appropriate manner, i.e. to correct the market failure, and are not wasted in the process due to inefficiencies. It is thus this second point around which most of the issues surrounding subsidy revolve.

CHAPTER EXERCISES

Exercise 11.1 Options in the payment of subsidy

A transport authority seeks to produce a modal shift from the car to public transport services in order to encourage local economic development and reduce traffic congestion. Outline in a variety of diagrams the main options that are open to the authority to achieve this aim and come to a conclusion as to which you believe to be the 'best' approach or combinations of approaches that should be used.

Where subsidy features in your solutions, you should outline the main drawbacks that stand in the way of a successful outcome and what measures you propose to take to minimise the impact of these drawbacks.

Exercise 11.2 Which type of contract to use

As the recently appointed leader of your local transport authority, you are given a blank sheet of paper with which to re-organise urban based public transport services in your local area. Assume that the national legislation allows for any of the models of delivery outlined in Chapter 10 to be used, but nationalisation is out of the question.

Using Figure 10.4, which related to ownership forms in the provision of transport services, consider for each of the following scenarios which 'model' of ownership would be most suitable for the particular situation:

- i A pro public transport council that has a strong policy stance on encouraging more people to use public transport.
- ii A council that is facing possible budget cuts in the medium to longer term and seeks to reduce its budget for public transport services.
- iii A council that is expecting strong economic growth in the medium and long runs and is concerned that the current public transport provision, which is mainly bus based, will limit this economic growth.
- iv Where public transport services have been run directly by the local authority department, however, the last ten years have seen a significant decline in patronage and low investment levels.
- v Public transport services are currently run by private sector companies; however, the overall perception is of poor quality services that have seen significant passenger declines in the last ten years.
- vi A publicly owned and run urban rail metro that is badly in need of refurbishment; however, budget constraints means that the local authority do not have the funds available to undertake the investment required.

Then consider under what type of the following contracts should be used in delivery of these services:

- a) Complete deregulation with contracts only for socially necessary services
- b) Tender all services on a full cost basis
- c) Tender all services on a relative cost basis.

Exercise 11.3 Blue bus company's bid for a local authority contract

This exercise concerns the costing of a bid for a local authority specified bus service contract. The case surrounds a local operator, The Blue Bus Company, that is a very traditional local operator with a reputation acquired over a number of years for providing an excellent service. Blue Bus has won several Local Authority contracts in the past. It has however recently experienced a small dip in its share of the local market.

The Contract

The contract is for a new route of 6 kilometres in length that will operate from 7am in the morning (first service) until 7pm in the evening (last service) from Monday through to Saturday. Total annual revenue is expected to be in the order of £85,000 and you should assume a 50 week operating period.

New buses will have to be purchased if the company is successful in its bid for this contract. These will cost £110,000 each and will be written down to their scrap value of £10,000 using the straight line method over a period of ten years. The company expects that the buses operated on this route will broadly match the company's current average annual mileage per bus.

The specific costing figures for Blue Bus are:

Fixed costs:	£350,000
Variable costs, per kilometre run:	£0.95
Annual vehicle Km:	1,200,000
Number of buses operated:	27
Profit Mark Up:	12%

The variable costs per kilometre run include all the costs associated with the running of the buses, including staff costs, fuel and maintenance and so on. Fixed costs include depreciation, interest payments and fixed depot costs. For the purposes of this exercise, assume that the only fixed costs associated with the new contract will be the depreciation of the vehicles used.

Competition

The company is likely to face competition for this tender from two other bus companies, with some brief details given of these below:

The Go By Red Bus Company

Go by Red is a bit of a pushy company known for its aggressive marketing campaigns and cut-throat competition in the market place. A well-known local operator, the company was acquired by a major UK and international bus company with a similar reputation of aggressive and rough market tactics. Since the take-over, the company has not bid on any Local Authority contracts.

Black and Gold Platinum Bus Services

Part of a major UK bus group, Black and Gold are looking to expand operations and have not previously run bus services in this area, either commercially or under contract to the local authority.

You should price this contract in the first instance based upon the Blue Bus Company's current costs and profit mark-ups. Having done so, you should then consider the competition and whether there are any 'adjustments' that you feel should be made to the contract price before putting in the final tender. Note in making these decisions your figures should still make economic sense, i.e. running the company into the ground to win this contract is not an option!

Exercise 11.4 Concessionary fare reimbursement

Consider the following exercise below which concerns compensation for the implementation of a concessionary fare scheme.

The transport authority wishes to implement a concessionary fare scheme on the basis that the

operator should be 'no worse or no better off' as a result of the scheme. The current demand for bus services from those that would benefit from the scheme is estimated to be in the order 3,500 passengers daily and the flat fare charged by the operator is £1.20. The authority is considering the following options.

Scheme 1: The concessionary fare to be implemented would be a flat 25p charge. This would be expected to increase demand of those entitled to the concession by 10 per cent and the authority agrees to pay 20p to the operator to cover the cost of each additional passenger carried.

Scheme 2: An entirely free concessionary fare scheme which would be expected to increase demand of the entitled group by 25 per cent with again the authority agreeing to pay 20p to the operator for each additional passenger carried

- a) Calculate for both schemes the expected level of compensation that will be due to the operator on an annual basis, where the schemes are assumed to operate for 360 days a year.
- b) Having looked at the figures, which of the two schemes do you think the authority should introduce?
- c) An alternative form of reimbursement is proposed, where the operator receives a straight compensation of 75 per cent of the full fare for each concessionary passenger carried. Rework the levels of reimbursement under this proposed form for both the flat 25p and free concessions.
- d) Using these figures and comparing them to the values given in Figure 11.4 and Case study 11.1 regarding increases in compensation levels in Wales and Scotland (which is on a straight 73 per cent of full fare compensation), what possible reasons can be given for the considerable increases in the levels of reimbursement being paid with the move to a completely free scheme?

Exercise 11.5 Questions for discussion

Discuss the following simple statements, which should help to build on and develop some of the issues discussed in this chapter:

- 'Low subsidy is "good", high subsidy is "bad".'
- 'Transport should only be subsidised on the basis of what can be afforded by the relevant authorities.'
- ' "Public" Transport is a "public" good, therefore should be subsidised.'
- 'Road networks, because they are provided and maintained by the state, are therefore provided free of charge.'