CONCESSIONARY BUS FARES IN SCOTLAND: IS THE SCOTTISH GOVERNMENT PAYING TOO MUCH?

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ABSTRACT

Governments in the three constituent countries in Britain – Scotland, Wales and England – have recently introduced much more generous concessionary fares on buses for people of 60 and above, in order to increase "social inclusion" (see DfT, 2006) – i.e., to make it easier for people of limited means to access the activities that they want. To this end, in Wales and Scotland, passholders can now travel anywhere at zero fare, whilst in England, there is a free concession within a more limited area. As the majority of bus services in Britain outside London are operated commercially in a deregulated environment, these operators must be reimbursed for the cost of carrying at least some of the concessionary passengers. The main objective of this paper is to understand how much the concession costs, and whether or not it is a subsidy to operators (public funding that underwrites their costs).

The paper draws on research carried out in Wales, for the Welsh Assembly and in Scotland, for the Scottish Executive, to achieve these objectives. It concludes that there are grounds for arguing that these countries' concession schemes are subsidising operators; that there is some limited evidence that the new concessions are promoting social inclusion; but there are still many elderly people for whom the concession is of very limited use since they face barriers to bus use other than cost.

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INTRODUCTION

The concession and who receives it

A concessionary fare (hereafter referred to as a "concession") is offered to defined groups of people to travel at a reduced fare on public transport. This paper discusses concessions that are arranged by the government for social policy reasons, and the groups that are eligible include retired or older people, and disabled people. Such concessions are required of public transport operators by government and in the UK operators are reimbursed for revenue lost as a result of carrying such passengers. This paper does not discuss

commercially provided concessions (e.g. student reductions) offered by operators of their own volition to increase their revenue.

Since the election of a Labour government in the UK in 1997, there has been a trend towards the provision of more generous and also consistent concessions across the constituent countries of the UK, such that the situation is now as follows:

- People of 60 and above, and all disabled people in England now enjoy a statutory minimum free fare concession for travel by bus within their local authority area, though (groups of) local authorities are free to enhance this concession, should they wish to pay to do so. This concession improves the statutory half-fare concession that was introduced 1 June 2001.
- In Wales people of retirement age and above, and disabled people, enjoy free travel by bus throughout the principality (country) (introduced 1 April 2002). Previously, the level of the concession varied depending on home location and was available only within a Council (municipality) area, or area covered by a group of Councils operating their concession in partnership.
- The same group in Scotland has been eligible for a concession providing free travel by bus after 0930 weekdays and all day at weekends within their concessionary scheme area since 30 September 2002, but this national scheme was extended to grant free travel throughout Scotland on registered local bus services in April 2006. Previously, as in Wales, the concession varied depending on home location and was available only within a Council (municipality) area, or area covered by a group of Councils operating their concession in partnership. Typically the concession was a flat fare of £0.25-£0.45 in urban areas such as the Glasgow and Edinburgh conurbations, and half fare in the more rural areas, although two Councils (Fife, largely urban, and Dumfries and Galloway, largely rural) operated completely free schemes.
- People over 65 in Northern Ireland may travel free by bus throughout the Province (introduced 1 October 2001).

The cost of concessionary fares

Concessionary fares are a public policy initiative and in Britain the public sector pays for this policy by reimbursing bus operators for carrying concessionary passengers. In Wales and Scotland, when concessions varied at a local level, reimbursement was negotiated locally between bus operator(s) and the local council, and the council was able to change the concession as its politicians desired (e.g. to raise the flat fare charged to concession holders by £0.05 to cover a budget deficit, or to supply specialist transport services for those unable to use conventional buses). Reimbursement formulae varied from area to area depending on the characteristics of that area as well as the history of local negotiations over the years. Now in Wales and Scotland reimbursement is calculated according to a single national formula and, in Scotland, is a matter for national government working with bus operators – there is no longer any local involvement in this matter.

Considerable sums of money are being spent on reimbursing public transport operators for these new concessions – the 2007/08 budget in Wales, for example, is likely to be about £40 million, up from £14 million in 2000/2001 (Caerphilly Borough Council, personal communication, 2002; www.wales.gov.uk, 2006; all costs in cash terms). The additional cost in England of a more limited concession was estimated to be around £350 million in financial year 2006/07 and £367.5m in the following year (figures in cash terms from DfT, 2007). The introduction of free travel right across Scotland has increased the number of riders and the concessionary fares bill to the public sector as follows:

Table 1 – Concessionary trips and reimbursement, Scotland (cash terms, from Scottish Executive, 2005)

Year	Concessionary bus trips	Reimbursement
2001/02	102m	£39m
2002/03	114m	£65m
2003/04	140m	£91m
2004/05	145m	£90m

Prior to 2001/02 spending was falling slightly in line with concessionary patronage, which had been reducing at about 2% per year for several years. (All figures from Scottish Executive, 2005; costs in £ outturn figures). The cost has increased beyond that shown in the table with the extension, in April 2006, of the free concession to all-Scotland travel on local and long-distance bus services at any time; that said, the Scottish government has agreed with bus operators to cap the amount of reimbursement at "at £159m [$317m, €234m] in 2006-07 and £163m [$325m, €240m] in 2007-08; the cap for 2008-09 onwards will be calculated by an agreed cost escalator" (Scottish Executive, 2004a).

The scale of these payments is a significant injection of public funds into the public transport service, but it cannot influence how the service is provided, since it is paid per passenger carried, irrespective of where they go. The argument as to whether these payments are a subsidy, or simply reimbursement for revenue that would have been paid by passengers directly in the absence of a scheme, is the key topic of this paper. It is important to understand this issue because, if operators are being wrongly reimbursed then they or the government may be losing out, and the scheme(s) are not in keeping with the spirit of the law. If the government is losing out, there is an opportunity cost associated with the over reimbursement, and the payment represents a subsidy to operators. If operators are losing out, they will have to reduce services or put up fares for other passengers. Neither scenario is optimal.

STRUCTURE AND METHODOLOGY

After outlining the methodology and sources of information used, the paper provides a very brief review of the relevant literature. It then considers how reimbursement of concessionary fares on a "no better, no worse off" basis should work in theory. It goes on to examine the bases for the use of a single reimbursement formula in Wales and Scotland, and to critique these. It then takes a first principles approach to the (re-) calculation of reimbursement in Scotland, using data derived from national statistical sources, and shows how changes in assumptions vary significantly the reimbursement due. Finally, it draws a number of conclusions and makes policy recommendations in relation to these questions.

The paper uses publicly-available data from the National Travel Survey for Great Britain, Transport Statistics for Great Britain, Scottish Bus Statistics and Transport Statistics Scotland. The paper also draws on and critiques the evaluation of the Welsh free concessionary fares scheme carried out in 2003 by MVA for the All-Wales Concessionary Fares Working Group, and in so doing uses previous work by the authors (Rye and Scotney, 2004). The published academic literature on concessionary fares and elasticity of demand is also referenced.

RELEVANT LITERATURE

The paper now moves to a brief review of the literature. Robbins (1990) discussed some of the work about the factors that affect concessionary ridership. The independent variables that affect concessionary ridership, and the effect that they can be anticipated to have, are as follows (based on Robbins, 1990, amongst others):

- The most important factor is the effective absolute discount provided by the concession in relation to alternatives such as train, walk and car. A more generous concession will, all other things being equal, lead to a higher number of concessionary trips per person per year and (in the longer term), possibly suppress the increase in car ownership amongst the eligible population. Other factors listed below follow on from this relationship.
- The area – bus service and congestion characteristics – within which the concessionary passenger resides. Higher bus service levels and higher levels of congestion and central area parking charges would both tend to be associated with a higher demand for bus travel amongst the group who are eligible for a concession.
- The number of elderly people – which can be obtained from demographic projections. This has to be divided into young (< 80) and old (> 80) elderly due to the different travel characteristics of these two groups. As the number of young elderly increases, so concessionary ridership should also increase. National Travel Survey data show a very clear cut off at around age 80, after which the number of journeys that people make by all modes falls off sharply (Noble, 2000). Thus increasing numbers of "old" elderly would not have the same effect.
- Car ownership amongst elderly people. As the number of car owning elderly increases, so concessionary ridership should decrease, exhibiting the same trend as seen in the population as a whole (White, 2001).

Generally the elderly will not acquire a car but, as their age increases, they will continue to have a car which they acquired at a younger age (the 'baby boomer' generation will join the elderly fully equipped!). This appears to be a major influence on the number of concessionary trips made.

- Concessionary pass ownership – that is, the number of eligible people who actually take up the concession for which they are eligible - may rise slightly as bus fares rise. Concessionary pass take up (as opposed to use) declines only slightly up to the age of 80 but thereafter declines sharply. However, even at age 85, 75% of people take up their concession. It has also been shown that concessionary pass take-up varies according to the generosity of the concession and whether a charge was made for the pass (a practice which, for the statutory minimum concessions, is now not permitted – these passes are now free), (DETR, 1998:14).
- The physical ability of those people who are eligible for the concession to actually use the bus. Particularly amongst the over 85s, this ability declines markedly. There is a steady decline in overall travel from the age of 60 upwards, so that by the age of 85 people are only making 35% of the trips they were making when they were 60.

These factors are important because, if generation differs from place to place, then the argument for using a reimbursement formula at a national level is then undermined. In addition, the physical ability of people to use buses obviously influences the usefulness to them of the concession and its impact on their level of social inclusion – a topic which is discussed in another paper by the same authors (Rye and Mykura, 2006).

Costs and reimbursement of concessionary fares

As noted above, the costs of concessionary fares reimbursement are now considerable. Due to the principles on which reimbursement is based, these costs are also difficult to limit since they are dependent on the number of trips made by concessionary passholders whose entitlement allows them to make as many trips as they want; in addition, operators in the UK outside London are free to increase non-concessionary fares as they see fit and a reimbursement scheme that does not take account of reduced non-concessionary demand as a result of rising fares will also increase reimbursement costs when fares go up.

Because UK operators outside London are almost all privately owned, and because all run their services in a deregulated market where blanket subsidy is not permitted, government reimbursement to the operators for carrying concessionary passengers is derived by means of a complex calculation that, in theory, is supposed to leave operators "no better and no worse off" than if there had been no concessionary scheme at all. Operators should *not*, in theory, be reimbursed for carrying passengers who have decided to make the trip only because they have a concession, since they do not represent a loss of revenue. (Operators are, however, permitted to claim for the costs of providing additional capacity to carry these passengers, who are known in concessionary fares parlance as "generated trips").

The proportion of total concessionary passengers that is generated is the key to calculating reimbursement, and is known as the generation factor. The generation factor is the proportionate increase in demand resulting from the introduction of a concession and thus is fundamentally linked to the price elasticity of demand for bus fares in the short and longer term. Unfortunately, since many schemes were already in existence in 1985 (before which, a different reimbursement system applied), empirical measurement of the number of trips in the absence of a concession (and therefore empirical derivation of elasticity and thus the generation factor) was impossible, prompting considerable other, work.

The most comprehensive study of concessionary generation was one undertaken by the Transport Research Laboratory and published in October 1998. In this study three approaches were adopted:

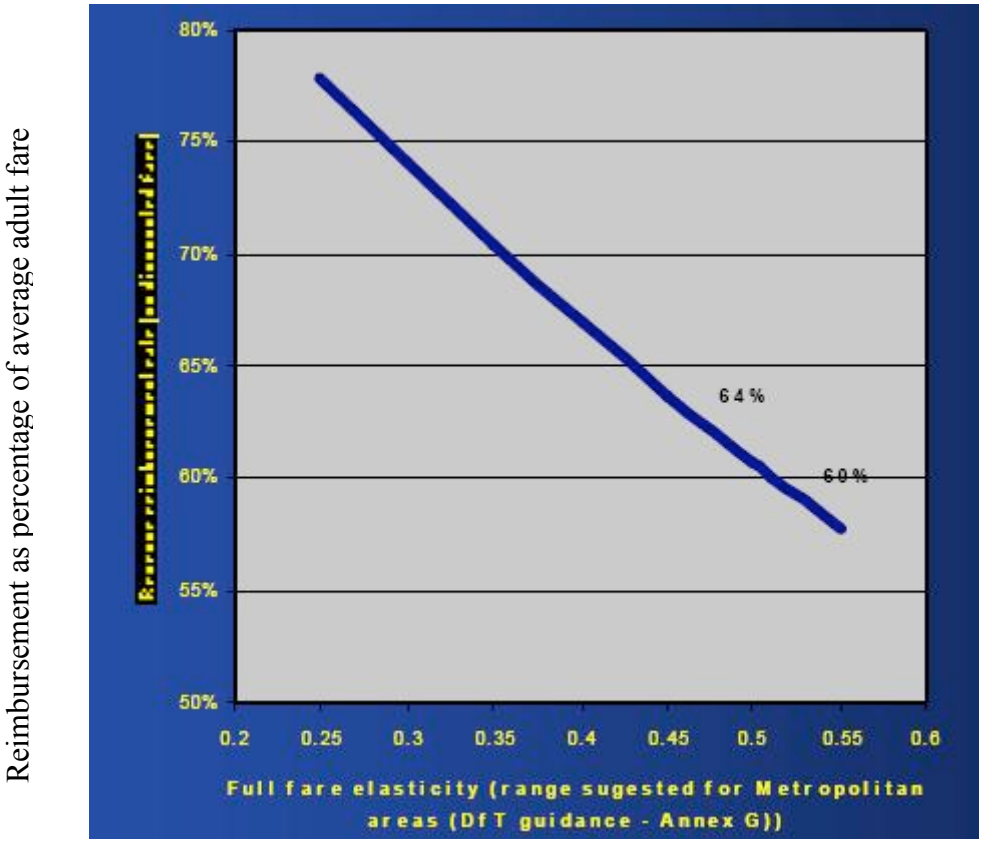
- Comparison of bus use by elderly people in matched pairs of areas with different concessionary fare schemes.
- Examination of data from the latest National Travel Survey (NTS) involving comparisons of bus trip rates by people living in areas with different types of concessions and different levels of bus service.
- Systematic examination of changes over time in concessionary travel in eight major urban areas where significant changes in concessionary fare schemes had occurred in recent years.

The average generation factors derived from NTS data were 1.6 for free-are schemes, 1.35 for flat-fare schemes and 1.32 for half-fare schemes. These are lower than those derived from the local studies, possibly because the NTS sample included non-bus users and different types of environments e.g. rural areas and small towns.

The studies of urban areas indicated generation factors in the range 1.5 to 2.2 for free schemes, 1.2 to 1.9 for flat-fare schemes and 1.2 to 1.5 for half-fare schemes. These figures tend to be greater than for the NTS results and the authors were not sure which of the two approaches is likely to be more reliable. A possible explanation for the difference between the generation factors derived from NTS and those derived from the urban area studies could be that there are car ownership and service elasticity effects in the urban figures that are less pronounced in the national data; it may also result from undercounting of trips in the NTS.

It should be noted that the generation factor is a simplification of a complex relationship between demand for bus travel at the concession fare and at the adult non-concessionary fare. This is a simplification that functioned relatively well for many schemes when they charged some level of concessionary fare, although a more sophisticated demand curve driven model would have been preferable. In addition, the extent to which it was a simplification was not always understood by those who used a single generation factor (MVA, personal communication, 2007). The relationship between reimbursement factors and elasticity of demand is shown in Figure 1, below.

Figure 1 – Relationship between reimbursement factor and elasticity of demand (from Larner, 2007)



Generation factors used in local and national schemes in Scotland and Wales

As explained above, in Wales and Scotland, reimbursement has moved from a situation where, prior to 2001/2002, locally negotiated and varied formulae have been replaced by a single national scheme based on a simple formula that makes no direct reference to elasticity of demand. In this section we compare the two situations and in particular the generation factors that prevailed previously in a number of local free (i.e. no fare) schemes, and that are used to today in Scotland and Wales.

For simplicity, many concessionary fares schemes have normally used one generation factor. The generation factor can be defined as T_c/T_f where T_c is trips made with the scheme, and T_f is trips made in the absence of a scheme. This value will always be at least 1. Sometimes it is defined as $(T_c/T_f) - 1$, in which case the value is normally, although not always, greater than 1. In this paper the first definition is used.

A higher generation factor leads to lower operator reimbursement, and vice versa. A generation factor of, for example, 1.5 means that 33% of concessionary trips would *not* have been made if there had been no scheme.

To take a simple worked example, with an average adult fare £1, and a generation factor of 1.5, the operator gets £1/(1.5) = £0.66 per trip; but if it is 1.3, reimbursement is equal to £0.77 per trip (TAS partnership, 2007). More sophisticated schemes, especially in large metropolitan areas where reimbursement to operators is the responsibility of regional public transport organisations called PTEs, also take into account the effect on generation of the difference between the adult and the concession fare.

The current Scottish scheme uses a generation factor of approximately 1.37 (as does the scheme in Wales). This equates to an elasticity at full fare of around 0.35 and means that operators receive 73% of the average non-concessionary fare for every concessionary trip – irrespective of the area in which the trip is made. This generation factor was chosen as a result of negotiations between operators and a consortium of local authorities (in Wales), and between operators and the Scottish government. It is supposed also to take into account the additional services that operators may have to run in order to carry generated passengers: that is, there was a decision not to calculate on a case by case basis these "additional costs" but, rather, to reimburse all operators in proportion to the number of concessionary passengers that they carry. Thus some operators receive reimbursement for additional costs for carrying generated passengers when in fact they incur no such costs; others may not receive enough payment to cover their actual additional costs. (It should be noted that, prior to 2001/2002, when additional costs payments had to be proven by operators on a case by case basis, there were fewer than ten schemes in the UK where additional costs were actually paid). As shown below, this generation factor is low in comparison to those used in previous local zero fare concessionary schemes (note that these are a simplification since they represent generation at a given adult fare – they varied depending on the precise adult fare obtaining at the time when reimbursement was calculated, normally every year):

- London 1.43
- Nottingham 1.63
- West Midlands 1.36
- Fife 1.61
- Dumfries and Galloway 1.46

With a generation factor of 1.45, the Scottish and Welsh schemes would cost 5.5% less per year to run. This use of these single national reimbursement formulae in Scotland and Wales rests upon the following assumptions:

- That the level of generated passengers does not vary by area and type of service.
- That the number of trips made in the absence of a scheme would not be affected by changes over time in the real level of the fares charged for adult passengers.
- That there is no long term elasticity effect of a concession.
- That much of the new concessionary patronage that appeared in Wales immediately after the introduction of the free concession was from

people who were eligible for the previous half fare concession but for whatever reason had not taken it up, although it is assumed that they had made considerable numbers of bus trips when they had no pass. This assumption is contained in an important report (MVA 2003), which reviewed the validity of the then interim reimbursement formula in Wales.

- That additional costs account (in Wales) for around 3.5% of total scheme costs.

The use of the single reimbursement formulae for free schemes in these two countries is also important for the situation in England, where free local travel was introduced in April 2006. In that year, some 18 operators appealed against the local reimbursement arrangements proposed by local authorities in England (where reimbursement remains a local matter). Although these appeals remain confidential at the present time, it is possible that they are citing the Scottish and Welsh schemes as precedents. The way in which these schemes operate, therefore, has relevance to the much larger concessionary fares market in England, and so the robustness of the assumptions on which the two schemes are based is crucial. Therefore, the paper now goes on to consider how robust these assumptions are.

Generation according to type of area (rural, urban etc)

There appears to be a relationship between pass take up since the free concession was introduced, and area type: pass ownership has grown more rapidly but from a lower base in rural areas. However, this does not necessarily mean that concessionary bus use has grown faster in these areas, since ownership of a pass does not necessarily lead to its use. That said, MVA (2003, Table 2.6) found from surveys that in rural areas of Wales, those who acquired a pass only after the introduction of the new concession made around 75 bus trips per year once they had a pass, compared to around 100 for their new pass-holding counterparts in urban areas. Since Table 2.9 of the same report shows that almost half of the 144,000 people who acquired a pass after the free concession was introduced came from rural areas, it follows that a significant proportion of the increase in concessionary trip making in Wales is accounted for by this group. The proportion of these new trips that might be generated – as opposed to having been made as an adult fare payer prior to the free scheme's introduction – is dealt with in a later section of the paper.

One might expect generation to be higher in urban areas due to the better service available – where there is a bus every few minutes a generated trip is rather easier to make than where a bus comes only a few times per day. This is borne out by trip rates measured by MVA in surveys in Wales (MVA 2003) where the highest trip rates by concessionary passengers are in areas with higher levels of bus service (see e.g. Table 2.6 of this report). This is also shown by Scotland's SHS, where there is a significant difference in bus trip making amongst those with a concessionary pass that is related to the frequency of their nearest bus service – lower frequency equates to lower usage.

Amongst the population more generally, there is clear evidence that people in rural areas use buses less than their urban counterparts, even when controlling for factors such as income and car ownership. This is likely to relate to fares and service frequencies. Scottish Executive (2005) notes that:

"Usage of local bus services also varies between "urban" and "rural" areas. In 2003, 56% of households in large urban areas had used a local bus in the previous month, with 5% using one every day, and a further 12% almost every day, whereas only 16-22% of those in rural areas or "remote" small towns had used a bus, and just 1-3% used one every day or almost every day." (p 21)

"Just 4% of journeys by people living in "remote" small towns were made by bus and 3-4% of journeys made by people living in rural areas." (p 27)

Fares per km are higher on rural bus services, which may influence generated travel compared to urban areas. Whilst specific data on fares are difficult to obtain, the SHS shows that significantly fewer people living in smaller towns and rural areas believe that bus fares are good value than those living in large urban areas – 60-64% in the former and 75% in the latter agree that "fares are good value". In Edinburgh a one way adult fare is £1 which can take a passenger up to 20km; a similar length of trip in the nearby, but rural, Borders costs around £3.

In MVA's (2003) work in Wales, a generalised cost model is constructed based on the assumption of a £1 average adult fare across the country, reflecting the lack of data on the true average fare at the time. This has the effect that the fares reduction represented by the introduction of a free concession is around 50p, or 12½% of the total generalised cost (journey and waiting time as well as fare) of a trip previously made with a half fare concession. For trips in rural areas, if average adult fares are higher, then the move from a half fare to a free concession will account for a rather greater proportionate reduction in generalised cost than in MVA's all Wales model, and could thus bring about a higher level of generation in rural areas than that predicted by the basic model.

In conclusion to this section, it seems that there are grounds to doubt the robustness of the use of a single reimbursement factor (and the generation factor and elasticity that it implies) for the national concessionary fares schemes in Wales and Scotland, due to variation in elasticity and therefore generation factors across urban and rural areas. However, in the absence of more detailed data, it is difficult to conclude whether the level of generation resulting from the new free scheme is higher or lower in rural compared to urban areas.

How fare-paying demand varies by fare charged

Bus fares are similar to other normal goods in that quantity demanded reduces as fares increase. Real bus fares in Britain increased by 16% between 1993/94 and 2003/04 (Scottish Executive, 2005b), whilst bus travel (passenger boardings) outside London fell by 13% over the same period.

This relationship is absolutely fundamental in concessionary fares reimbursement for calculating the number of trips that would be made in the absence of the scheme. The Scottish and Welsh national reimbursement factor simply takes the number of concessionary trips recorded, then multiplies this by 73.6% in Scotland and 76.1% in Wales to derive the number of passengers who would notionally have travelled in the absence of the scheme, and then multiplies this figure by the average adult fare. The proportion of concessionary passengers assumed to travel in the absence of a scheme does not vary with adult (non-concessionary) fare levels. Previous local schemes, such as those in Lothian and Strathclyde, did take into account this effect, as does reimbursement from the London Boroughs to Transport for London for carrying concessionary passengers on its bus services. In general, generation would be expected to increase as real adult fares increase.

Long term elasticity effects

Earlier work (e.g. Dargay and Hanly 1999, 2002, 2003) demonstrates that it takes a number of years for the full effects of a more generous concession to be felt because people take some time to react to it. This is a long-term elasticity effect and it is widely recognised that elasticities in the long run are higher than in the short run, meaning that concessionary demand per passholder is likely to continue to increase for some years. It could be argued that this increased number of concessionary trips per passholder would be reflected in a similar proportionate increase in trips that they would make, were there no scheme, but only if fares in the absence of the scheme were held constant in real terms. However, bus fares in Britain have in fact been increasing in real terms for many years and continue to do so (National Transport Statistics GB, 2005).

The current reimbursement formula in the Scottish and Welsh national schemes fails to take account of long term elasticity effects. Therefore, as concessionary trips per passholder increase due to long term elasticity, the assumed number of trips in the absence of the scheme will also continue to increase. Unless the current cap on reimbursement is retained in Scotland, then in the future there is likely to be reimbursement paid for trips generated due to this long term elasticity effect in both Scotland and Wales.

Trip making by those eligible for a concession but who have taken it up only since the free scheme was introduced

In 2003 the transport consultancy MVA were commissioned to review the available evidence supporting the use of the interim reimbursement factor of 76.1% that had been adopted by a consortium of Welsh local authorities and operators when the free concession scheme was first introduced. MVA's work surveyed concessionary passholders in Wales before and after the introduction of the new scheme. It found that 39% of these (138,004) had taken up a pass only since the free concession was introduced. These new passholders made 23% of the concessionary trips measured in survey work, after the new scheme was introduced; but how many bus trips they made

previously was not known for sure (since they could not be identified in the "before" survey), but was key to estimating total elasticity, and thus the generation and reimbursement factors.

The report uses a generalised cost elasticity model to estimate trips made by "new" passholders prior to the introduction of the free scheme. People who had a half fare pass were surveyed before the free scheme was introduced, and again afterwards, and elasticity of demand for this group could be measured. This elasticity was then applied to the trips made by "new" passholders in the free scheme to estimate their trip making in the before situation, when they had no pass. On this basis the report estimated that 70% of the 68 trips per year that these people were observed to make by bus after the introduction of a free scheme had been made as full adult fare paying passengers one year previously – although many of these people were eligible for a concession at that time.

There are some grounds on which to question this estimate. For example, surveys such as that presented by Ling (2007) show that most people who use public transport and who are eligible for a concession will take it up (although such surveys, when carried out on-vehicle, oversample the most frequent travellers). In contrast, MVA's estimate implies that a significant proportion (15-20%) of eligible travellers on buses in Wales prior to the introduction of the free concession would not have bothered to obtain a half fare pass.

Furthermore, when we consider UK National Travel Survey (NTS) data on this matter, it becomes apparent that this survey shows major differences in levels of bus trip making by those eligible for a concession between those who take up a pass and those who do not. In 2005, people aged 60 and over who had no concessionary pass made 18 public transport (bus and rail) trips per person per year, whilst those with a pass made 128. (This difference is even more marked in small urban areas and less marked in large urban areas and London, due probably to higher rail use in the non-passholding group in those more urban areas where there is a better rail network). The great bulk of the sample for NTS comes from England where the free concession was introduced in 2006, so these figures are unlikely to be affected significantly by the higher pass take-up amongst car-owning pensioners that has been apparent after the earlier introduction of free concessions in Wales and Scotland (Scottish Executive, 2004b; MVA, 2003; Ling, 2007). Thus it there are strong grounds to argue that bus trips made by those who were eligible for a concession, but chose not to take it up when the concession was only half fare, could have been much closer to the figure of 18 per person per year from the NTS than the 68 calculated from the generalised cost model in MVA's 2003 report. On the other hand, there are also grounds to argue that a large part of this group of "new" passholders are those at the margin between the frequent bus users who had a (half-fare) pass already, and the average non-passholder whose trip making is reflected in very low numbers reflected by the NTS data. In addition, it is possible that the NTS under-surveys trips made due to respondent bias, although a review of the National Travel Survey by

DETR (2001) did not highlight that this was a major issue, particularly with regard to households made up of retired people.

MVA's method reduces the proportion of total free concessionary trips that are believed to be generated, from 41% to 29%, and increases the reimbursement factor from 59% to 71%, when compared to the same calculation based on the NTS non-passholder trip rate. Even doubling the NTS trip rate for eligible non-passholders to 36 trips per year increases the reimbursement factor only from 59% to 63%.

TRL (Balcombe *et al,* 1998) in its seminal study of concessionary fares found that car owners who were eligible for a concessionary pass were more sensitive to bus fares than their retired counterparts with no car, which gives grounds to argue that a higher proportion of those taking up the concession since it became free are car owners attracted by the free fare. Scottish Executive (2004) and Ling (2007) in surveys in Scotland and Greater Manchester respectively each observe that those who have acquired a pass only since the introduction of the free scheme show higher rates of car ownership than those who had a pass when the scheme was half-fare or similar. MVA's report shows, from survey data, that new pass owners have (at least initially) a much lower rate of bus usage under the free scheme than those who had a pass in the before situation (1.9 as opposed to 4.1 trips per week), an observation that would be consistent with higher car ownership in the former group – however, this socio-economic characteristic was not measured in the surveys. If the "new" passholders do indeed have higher car ownership than the "old" passholders then this would add further weight to the argument that this group had a "before" bus trip rate rather lower than the 68 per year estimated by MVA.

In conclusion to this section, MVA's estimates on these various figures are thus clearly critically important to ensuring that operators are reimbursed on a "no-better and no worse off" basis. Assuming a high figure for bus trips made before the free scheme by people who acquired a pass only when the scheme became free will lead to significant over-reimbursement. The MVA methodology for Wales is doubly important because, the author understands, it formed the basis of negotiations on the national reimbursement mechanism in Scotland (Transport Scotland, personal communication, 2007).

Additional costs as proportion of total scheme costs

Additional costs may be incurred by operators if they have to provide additional capacity to carry passengers whose trips are generated by the concession. The move to national schemes in Wales and Scotland has led to a situation where a proportion of reimbursement for all trips in all locations is notionally intended to cover additional costs. In Wales, this is about 3.6% of total scheme costs.

Prior to the introduction of national schemes in Wales and Scotland, only one operator in the latter country successfully claimed for additional costs. They were paid £240,000 in 2001/02, in comparison to fares reimbursement of £9

million – 2.6%. One of the authors previously worked on additional costs on the London scheme, where they accounted – in 1993/94 – for just over 2% of the total bus reimbursement costs. Thus the proportion of total scheme costs now paid in Wales and Scotland to cover additional costs appears high in relation to previous local schemes, and it is also somewhat anachronistic that every single operator in all parts of each country receives some allowance for these costs – even if they never incur any.

Differences between elasticities of demand in England, Wales and Scotland

As noted previously, the reimbursement formula in Scotland and Wales equates to a point elasticity at full fare of around -0.35. In its guidance on concessionary fares to local authorities in England, DfT (2007, p 23) recommends point elasticities (central estimates) of -0.40 for metropolitan areas, -0.45 for other urban areas, and -0.60 for rural areas. Thus in England there is a national recommendation to use lower reimbursement factors in less urban areas; and that these should all be lower than those in use in Scotland and Wales.

Conclusion to critique of assumptions underlying single reimbursement formulae in Scotland and Wales

The previous sections have critiqued key estimates and assumptions on which the reimbursement of operators in the national concessionary schemes in Wales and Scotland are based. On several counts, these estimates are found to be open to debate, in some cases seriously so. Before concluding, the paper now moves on to a "first principles" analysis of concessionary reimbursement in Scotland, based on published data sources.

FIRST PRINCIPLES ANALYSIS

Published national data from Scotland allow the derivation of many of the key variables for an analysis of concessionary reimbursement. The following data have been derived:

- Number of concessionary and adult fare paying bus trips.
- Average adult fare (passenger receipts divided by adult fare paying bus trips).
- Number of concessionary passholders (from Scottish Household Survey).
- Reimbursement paid to operators each year.

In addition to these, the key variable that is required to calculate concessionary reimbursement from first principles is the number of trips that would have been made in the absence of a scheme. The authors have used National Travel Survey data in this case. In 2004 the bus trip rates per head per year by age were as follows: people aged 70+ made 73 trips; those aged

60-69 made 60 trips and those aged 50-59 made 45 trips (NTS 2005). In Scotland, bus trip rates per head were 13% higher than those in England in 2003/04 (Scottish Executive, 2005). Uplifting these data by 13% and then averaging them gives a bus trip rate of 67 per person per year – likely to be a very generous estimate of travel in the absence of a scheme, given that the data from the NTS include many people in eligible groups who were passholders in at least half fare schemes. (There is a strong argument for using the trip rate for the 50-59 age cohort and uplifting it for Scottish conditions and to take account of lower car ownership and income amongst those over 60.)

Disabled passholders must be taken into account as they make up about a third of the total passholders and their trip making cannot, in reimbursement claims, be distinguished from that of the over 60s, at least for the time being. It is known (Scottish Executive, 2006) that disabled people make about two thirds of the total number of trips as non-disabled people, regardless of other factors. This gives a trip rate in relation to the over 60s of 45. Weighting the two trip rates according to the number of passholders in each category leads to a combined trip rate of 60 per passholder. Multiplying this through by the number of passholders and the adult average fare results in a level of revenue foregone that for most of the years 2001/02 to 2004/05 is significantly less than the actual reimbursement that was paid. This is shown in Table 2, overleaf.

The first two columns of the table show concessionary passenger numbers and reimbursement as shown in Scottish Executive (2005b). The third column shows reimbursement minus a notional 6% to cover additional costs (except in 2001/02, when this did not figure at a national level). The fourth column shows the revenue received from concessionary passengers on-bus – obviously this only exceeded zero when the concession was less generous than it now is. The average adult fare, in the next column, is derived from Scottish Executive (2005c) by taking total non-concessionary revenue for local bus services, and dividing by the total number of adult bus trips. The column "Trips made in absence of scheme implied by reimbursement" is calculated by taking the total sum for reimbursement (less additional costs), and dividing it by average adult fare.

Clearly there is some variance between this number and the actual number of concessionary trips recorded. The number of concessionary passholders is shown in the next column, and then the number of bus trips per head per year that these passholders might be expected to make if they had no concession, based on NTS data, as explained earlier in the paper (this includes disabled passholders and their trips). On this basis, total trips made in the absence of a scheme can easily be derived by multiplying the previous two columns together. The column "Revenue foregone - NTS method" takes the NTS trips per head and multiplies this by passholder numbers and adult fare, less any on-bus revenue. The final column shows the difference between the two methods of calculating revenue foregone, in percentage and in actual terms. Interestingly enough, whilst the discrepancy is significant in all cases, it appears to have been greatest under the non-national scheme.

Table 2 – Comparison of actual reimbursement (reimb) with that based on NTS trip data

Year	Conc. pax (m)	Actual reimb (£m)	Reimb minus 6% add costs £m	Conc. revenue on bus* £m	Ave adult fare (from Scot Bus Stats)	Trips made in absence of scheme implied by reimb	Number of passholders (Scottish Bus Stats)	Bus trips per head per year in absence of scheme (NTS)	Trips made in absence of scheme – NTS trip rate times passholder numbers	Revenue foregone NTS method	Difference as % of actual reimb	Difference in revenue foregone (£m) between two methods
2001/02	102	£39	£39	£31.4	£0.77	90,037,194	990,600	60	59,372,184	£14,581,132	-63%	£24.42
2002/03	114	£65	£61.1	£18.5	£0.81	129,821,277	1,320,800	60	79,162,912	£45,616,262	-30%	£19.38
2003/04	140	£91	£85.5	0	£0.79	143,024,930	1,320,800	60	79,162,912	£62,534,016	-31%	£28.47
2004/05	145	£90	£84.6	0	£0.87	128,251,042	1,320,800	60	79,162,912	£68,971,280	-23%	£21.03

* In old scheme average concessionary fare was about 40% of adult fare so revenue on bus is 40% of adult fare multiplied by concessionary passenger numbers; 2002/03 includes 6 months of old scheme, 6 months new; Actual reimbursement and average adult fare in cash terms

Given the sensitivity of these results to the NTS figures on trips per head per year, Table 3, overleaf, provides a sensitivity analysis, varying this key input. It can be seen that only when the NTS non-concession trip rate is raised to 80 bus trips per person per year do the actual and “NTS-method” reimbursement costs converge.

Table 3: Sensitivity of results to NTS annual over 60s bus trip rate in absence of scheme

		50 trips		67 trips		80 trips	
Year	**Actual reimbursement (£m)**	**Revenue foregone NTS method**	**Difference as % of actual reimbursement**	**Revenue foregone NTS method**	**Difference as % of actual reimbursement**	**Revenue foregone NTS method**	**Difference as % of actual reimbursement**
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2003/04	£91	£52,167,692	-43%	£69,904,708	-23%	£83,468,308	-8%
2004/05	£90	£57,537,844	-36%	£77,100,711	-14%	£92,060,551	2%

Concessions on non-local services

Since 1 April 2006 the Scottish scheme has also allowed free travel on non-local bus services – primarily those operated by Citylink, part of National Express Group, and also travel in the morning peak. Budgeted reimbursement for 2006/07 is £159 million, up from £90 million two years earlier (cash terms). This increase can in part be explained by the adoption since April 2006 of the national reimbursement factor, and the fact that concessionary passholders can now travel free in the weekday morning peak in addition to all other times. However, a first principles calculation of revenue foregone for non-local services is also worthy of inclusion here, as this accounts for part of the increase in reimbursement.

National Express has been, until recently, the only provider of long distance coach services in Britain. In 2006 it carried 16 million passengers who paid revenue totalling £207 million (NEX group website, accessed 15/07/07). This equates to 0.27 trips per person per year in the UK, at an average fare of just under £13. If it is assumed that Scottish concessionary travellers were, prior to the new non-local concession, travelling on National Express services at about the same rate as everyone else. Working this through by the number of passholders gives a calculation of revenue foregone – that which was paid by passholders before the new scheme – as £4.566 million per year, or rather less than the increase in reimbursement between 2004/05 and 2006/07. NTS (personal communication, 2007) shows that people of 60 and over made 1.2 coach trips per person per year in the previous 3 years. The majority of these trips are likely to have been made on organised tours which, as yet, are not eligible for a concession. However, if it is assumed that they were all made on scheduled coach services (where the concession is now valid), this gives an upper bound of revenue foregone of £15.6 million, still much less than the increase in support to operators since free non-local travel was introduced.

Alternatives and additions to the national minimum concession

The research for this paper has not included any consideration of alternatives to the national minimum concession. It has made a case, however, that existing schemes in Scotland and Wales are likely to be over-reimbursing operators – in other words providing them with a subsidy, but one that is paid without influencing how, when and where operators run their services. This subsidy of course represents an opportunity cost – for example, providing more specialized transport for people who cannot, due to disability, use conventional bus services requires additional subsidy which currently may be being paid as part of concessionary reimbursement.

The likelihood that concession reimbursements become a form subsidy could be reduced by reverting back to locally-negotiated reimbursement formulae, more suited to local situations. This could however reduce the economies of scale currently enjoyed in the reimbursement processes at national level in Wales and Scotland. Local authorities could influence how subsidy is used by operators only if they were to pay them for providing services and not on the basis of concessionary passengers carried. These are significant changes to

the current situation of bus subsidy – which include but also go well beyond the issue of carrying concessionary passengers - in Britain that cannot be discussed in detail here but which are currently being studied by government in England (Hansard, 2007). For a fuller discussion of alternatives to the current system see for example Preston (2008, forthcoming); Johnson, Whelan, and Mackie (2006); CfIT (2002); and DfT (2005).

CONCLUSIONS

In conclusion to this paper, there are three reasons for arguing that the current system of concessionary reimbursement in Scotland and Wales is over-reimbursing operators: firstly, the rather low and uniform generation factor across a wide range of bus service areas; secondly, because no account is taken over time of an increase in generation due to long term elasticity effects nor of increases in real adult fares; and, thirdly, because additional costs are paid on a blanket basis. Such over-reimbursement can be argued to be a subsidy, but one that is paid to operators without regard to the services that they run in exchange for it. To take one example from Scotland known to the authors (Inverclyde Council, personal communication, 2006), since the introduction of the free concession an operator has introduced an entirely new service from the southwestern part of the Glasgow conurbation to the nearby national park at Loch Lomond, northwest of Glasgow. Since this direct service did not exist prior to the free concession, it is highly probable that the vast majority of the trips now made are generated. Nonetheless, the operator is reimbursed for 73% of a notional adult fare for every concession passenger carried and without such public funding, the service would not run. It is problematic, to say the least, that in the case of this service the operator that runs it is neither better nor worse off than before the scheme was introduced.

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