THE CASE FOR THE URBAN BUS

THE ECONOMIC AND SOCIAL VALUE OF BUS NETWORKS IN THE METROPOLITAN AREAS

pteg
the voice of urban transport

REPORT
FEBRUARY
2013

Report authors: Pedro Abrantes, Rebecca Fuller and Jonathan Bray

Acknowledgements
The authors would like to thank: Steve Cosby (TfGM), Nick Hallett (TfGM), and Ben Francis (TfGM) for their detailed comments on the analysis in the report; Andrew Last (Minnerva) and Tim Larner (STRATA Consultants) for their long-standing contribution to ***pteg***'s work on concessionary travel issues; the members of ***pteg*** Concessionary Travel, Bus Operations and Bus Strategy groups for a number of the data sets used in the report; Meera Rambissoon (Greener Journeys) for her support in identifying relevant case studies; Centre for Cities for supplying Figure 3; Claire Haigh (Greener Journeys), Stephen Joseph (Campaign for Better Transport), Rishi Mandavia (DfT), Fiammetta Gordon (DfT), Shafiq Pandor (DfT) and Anthony Ferguson (DfT) for comments on earlier drafts of the report; and Saila Acton (***pteg*** Support Unit) for her editorial work.

The views expressed in the report remain solely those of the authors.

About *pteg*
pteg represents the six Passenger Transport Executives (PTEs) which between them serve more than eleven million people in Greater Manchester (Transport for Greater Manchester), Merseyside (Merseytravel), South Yorkshire (SYPTE), Tyne and Wear (Nexus), the West Midlands (Centro) and West Yorkshire (Metro). ***pteg*** is also a wider professional network for Britain's largest urban transport authorities.

To find out more about the work and priorities of ***pteg***, visit **www.pteg.net**

Contents

Executive Summary

Buses matter

Bus networks carry 4.7 billion passenger trips a year in England, around three times the total number of trips made on national rail. In PTE areas alone, over one billion bus trips are made every year.

Buses are the backbone of public transport in our regional cities – however they are largely ignored by the national policy debate, focused as it is on London and on more eye-catching infrastructure investment. This report is intended to redress the balance in profile and analysis of the urban bus; to provide a consistent and comprehensive assessment of the range of benefits generated by urban bus networks; and to make the case for continued public investment in the bus.

The bus provides exceptional value for money in generating economic benefits for urban areas

In PTE areas, bus networks are estimated to generate over £2.5bn in economic benefits against public funding of £0.5bn - around £1.3bn reflect user benefits from access to jobs, training, shopping and leisure opportunities. The remaining benefits accrue to other transport users and society at large, through decongestion, reduced pollution, lower accident rates, improved productivity and the stand-by value of bus networks.

The bus industry has a turnover in excess of £5bn nationally. Much of this is ploughed back into regional and local economies through the supply chain and consumption expenditure by staff. Public expenditure on bus networks is therefore likely to have a significant and direct supply-side impact on regional economic output.

The bus is a unique and effective tool of social policy

Vulnerable and socially disadvantaged groups in society are most reliant on bus networks, this includes low income households; young people in education, or trying to enter the job market; older people; disabled people; jobseekers; and women.

Bus services are key to providing access to opportunity including providing the jobless with access to work; young people to education and training; and providing a way out of social isolation for older and disabled people.

The economic benefits of the key forms of support for bus services

Unlike for most other forms of government funding for measures which have a social dimension, public support for buses generates a significant proportion of benefits which accrue to other road users and society at large, rather than just the users themselves. Buses

also have low marginal costs and are disproportionately used by the most vulnerable groups in society. These form the core of the argument for public funding of bus networks.

The **national travel concession** for older and disabled people generates £1.5 of benefits for every £1 of public money spent. A proportion of these benefits accrue to other transport users and society at large rather than to those who benefit from the concession.

The **Bus Service Operators Grant** (fuel duty rebate) generates in excess of £2.8 of benefits for every £1 of public money spent. Over a quarter of these benefits accrue to other road users through decongestion.

Local government expenditure to support non-commercial bus services can generate benefits in excess of £3 for every £1 of public money spent. Most of these benefits accrue to bus users who would have otherwise not been able to access opportunities or who would have seen a steep increase in their transport expenditure.

The multiple, extensive and overlapping benefits of public investment in bus services

Public support for urban bus services generates multiple benefits. In particular it supports local economies, reduces overall road congestion and benefits the disadvantaged. As such it provides exceptional value for money in terms of the return on public investment and support.

Whilst there is currently a great deal of focus on major transport infrastructure schemes as a way of generating growth, this report shows that the urban bus deserves far greater attention and acknowledgement from policy makers across government, given the way in which expenditure on bus generates extensive and multiple overlapping benefits for every pound spent. Public funding for the bus needs to be properly recognised in decisions on future government spending priorities for its contribution to economic as well as social objectives stretching across government, and particularly for being a highly effective distributional policy, which targets those most in need of support.

1. Introduction

1.1. Bus networks are the backbone of the local public transport provision which allows our towns and cities to function. Ask a bus commuter what they would do without their regular bus service and many would say they would need to make some more or less fundamental changes to how they travel – some would have to give up their jobs altogether.

1.2. Yet, buses can often go unnoticed in the wider transport policy debate – which is often conducted from London where public transport provision is very different from the rest of the country. Buses also lack some of the glamour and prestige that attaches itself to other areas of transport policy – such as aviation, cars and rail. They are less dependent too on eye-catching infrastructure. This strength can also be a weakness when it comes to allocating money between competing uses.

1.3. However a passenger travelling to work on a crowded bus must place a high value on this service or otherwise would have chosen to do something else. Car drivers may not see much of bus passengers but this is itself a statement of the value bus networks bring to non-users through decongestion.

1.4. Despite this (and unlike for some other forms of transport provision) there has been a lack of a consistent and comprehensive assessment of the range of benefits generated by urban bus networks. This report addresses the need for such an assessment at a time when bus networks are under pressure, as so much of the public support provided to bus services is in the form of revenue expenditure rather than capital investment.

1.5. This report aims to capture the benefits of public support for bus services in a number of complementary ways. These include:

- the direct and indirect economic benefits to local economies, including through road decongestion, increased agglomeration and other mechanisms
- the direct economic contribution that the bus sector makes via its workforce and supply chain
- social and health benefits (such as public health, access to jobs and education, tackling social isolation)
- the economic benefits and value for money of the key public funding flows for bus services (BSOG, concessionary travel, local government supported services)

1.6. Overall we believe that this report is the most comprehensive and robust assessment of the multiple and overlapping benefits of public support for urban bus services that has been carried out in recent times. It also builds on and complements the research on ‘Buses and Economic Growth’ that has recently been carried out by the University of Leeds.

1.7. Finally, by setting out the case for investing in the urban bus we are not suggesting that rural bus services don’t also deserve support. Many PTE areas contain substantial rural hinterlands and we know just how important the rural buses we support are for keeping rural communities connected, for the rural tourism economy, and to tackle major problems of social exclusion in rural areas. However, in this report we concentrate on the urban case because a good bus network is so important to urban areas that it deserves this detailed analysis of the specific benefits that urban bus services bring.

Structure of the report

1.8. **Chapter Two** covers the policy context within which bus networks operate in England, and provides a summary of key high level trends, facts and figures.

1.9. **Chapter Three** sets out the economic contribution made by metropolitan bus networks.

1.10. **Chapter Four** sets out the social contribution made by bus networks and **Chapter Five** highlights related health and well-being benefits.

1.11. **Chapter Six** assesses the economic impact of three bus policy initiatives: free concessionary travel for older and disabled people, fuel duty rebate (BSOG) and support for tendered services.

1.12. **Chapter Seven** provides a summary of the key results from the report and sets out our policy recommendations.

2. Context

- Bus networks carry 4.7 billion passenger trips a year in England, around three times the total number of trips made on national rail. In PTE areas alone, around one billion bus trips are made every year.
- In metropolitan areas, buses are of vital importance to access job opportunities. In some wards, as many as a third of all commuters rely on the bus to get to work.
- In comparison with car travel, bus trips are more likely to be for commuting and education purposes. Buses also carry a greater proportion of shopping trips than cars.
- In 2011/12, bus operators in metropolitan areas received 42% of their £1.3bn revenue from public sources, with 23% coming in the form of concessionary reimbursement from local authorities, 10% through subsidy for tendered services and 8.5% from central government as a fuel duty rebate (BSOG).

Policy context and background

2.1. Since 1986, bus services outside London have been privately operated under a deregulated framework. In practice, this means that local transport authorities[1] have no direct control over commercial services, which currently comprise almost 80% of total bus mileage. Instead, any private company which is able to satisfy minimum safety and operating standards[2] can operate the services that they see fit. With the exception of some concessionary entitlements, bus fares are set at the discretion of individual operators. Local authorities are only allowed to procure the operation of those services which no private operator is willing to run commercially (these are known as *tendered services*) [3].

2.2. In contrast with the rest of Great Britain, in London the Mayor is in full control of the entire local bus network. Services are still provided by private operators as in the rest of the country but it is Transport for London (TfL) which plans the network, sets the fares and controls ticketing and information. Private operators can compete for the exclusive right to operate individual routes or sets of routes, typically for a period of 5 years, following a competitive tendering exercise (this is similar to the process followed for tendered services elsewhere).

2.3. Although there are hundreds of smaller independent operators, a handful of municipally owned companies and some larger new entrants, in 2009 almost two thirds of market turnover were in the hands of the subsidiaries of one of the five largest transport holding groups: First, Stagecoach, Arriva (now owned by DB AG), National Express and Go-Ahead[4]. In 2011, the Competition Commission concluded an investigation into the competitiveness of

[1] In metropolitan areas, this role is played by Passenger Transport Executives (PTEs). PTEs are accountable to Integrated Transport Authorities (ITAs), which are political bodies composed of councillors from constituent district councils. In Greater Manchester, responsibility for transport powers resides with the Combined Authority which has more wide-reaching powers than an ITA.
[2] Regulatory responsibility lies with the Traffic Commissioners.
[3] In 2011/12. tendered bus mileage, as a proportion of the total network, was 16% in PTE areas and 24% elsewhere in England outside London, DfT Bus Statistics Table BUS0205
[4] TAS (2010), Competition Commission Local Bus Market Investigation. Submission of Evidence by the TAS Partnership.

the local bus market and the Department for Transport has since been implementing a number of its recommendations, including greater availability of multi-operator tickets[5].

2.4. Although transport authorities have no direct control over commercial services, they play a leading role in the development of Local Transport Plans, which set out the overall transport strategy and identify future public spending priorities. They have direct responsibility over transport infrastructure, including bus stops, bus priority facilities and, typically, bus stations. Transport authorities also have a general duty to promote integrated transport and provide impartial public transport information. PTEs, in particular, have been at the forefront in promoting integrated, multi-modal ticketing, the introduction of smartcards and real time information systems.

2.5. There are a number of additional policy tools at the disposal of local and central government, which can have an important bearing on the quality and level of provision of local bus networks:

- *Concessionary travel*. Since 2008, eligible older and disabled residents in England have been entitled to free off-peak bus travel anywhere in the country. Local transport authorities can also introduce additional local concessionary entitlements, for example, requiring bus operators to carry children and young people at a discounted fare. Bus operators must be reimbursed by local transport authorities for the revenue loss and additional costs resulting from any concessionary entitlements.
- *Fuel Subsidy (Bus Service Operators Grant - BSOG, formerly known as Fuel Duty Rebate)*. Bus operators are entitled to claim back some of their fuel costs from the Department for Transport (DfT). In April 2012, the payment rate for diesel was cut from 43.2 p/litre to 34.6 p/litre. Since 2009, low carbon emission buses have been entitled to an additional payment of 6p per kilometre. Since 2010, operators also receive an 8% uplift in their BSOG payment rate for buses with operational ITSO smartcard readers, and an additional 2% for buses with Automatic Vehicle Location (AVL) Equipment. The DfT is currently developing plans to devolve a proportion of BSOG to local transport authorities who could in the future decide locally to allocate the money in different ways.
- *Quality Partnerships*. Local transport authorities can introduce binding schemes (Statutory Quality Partnerships – SQPs) setting minimum standards covering vehicle quality, service performance, frequencies, timings and maximum fares. In return, the local authority must improve the infrastructure on relevant bus routes. Operators who choose not to enter into an SQP are excluded from making use of such infrastructure. More generally, local authorities and operators can enter into voluntary partnerships which set non-binding commitments on either party potentially covering a wide range of issues from punctuality to marketing.
- *Quality Contracts*. Under certain conditions[6], local transport authorities are allowed to move towards a full competitive tendering system broadly similar to that currently in place in London, known as a Quality Contract. A number of PTEs and other authorities are currently exploring this possibility.
- *Capital funding*. The current government recently introduced a ring-fenced competitive funding stream known as Better Bus Areas fund, largely aimed at capital spending on

[5] The DfT is expected to publish its Multi-operator Ticketing Guidance during 2013.
[6] SDG (2004), Bus Planning Performance and Regulation – Implementing a Quality Contract. http://www.pteg.net/Publications/Reports.htm

local bus networks. In the first round of the competition, £70m were awarded. This complements other more general funding streams such as the Integrated Transport Block and Major Scheme funding, which can be used to fund bus improvements amongst other things.

Facts and figures

Patronage

2.6. For most people in Great Britain, the bus *is* public transport. Around 4.7 billion passenger journeys are made in England each year, over three times the number of annual rail trips. Metropolitan areas alone account for 1 billion of these.

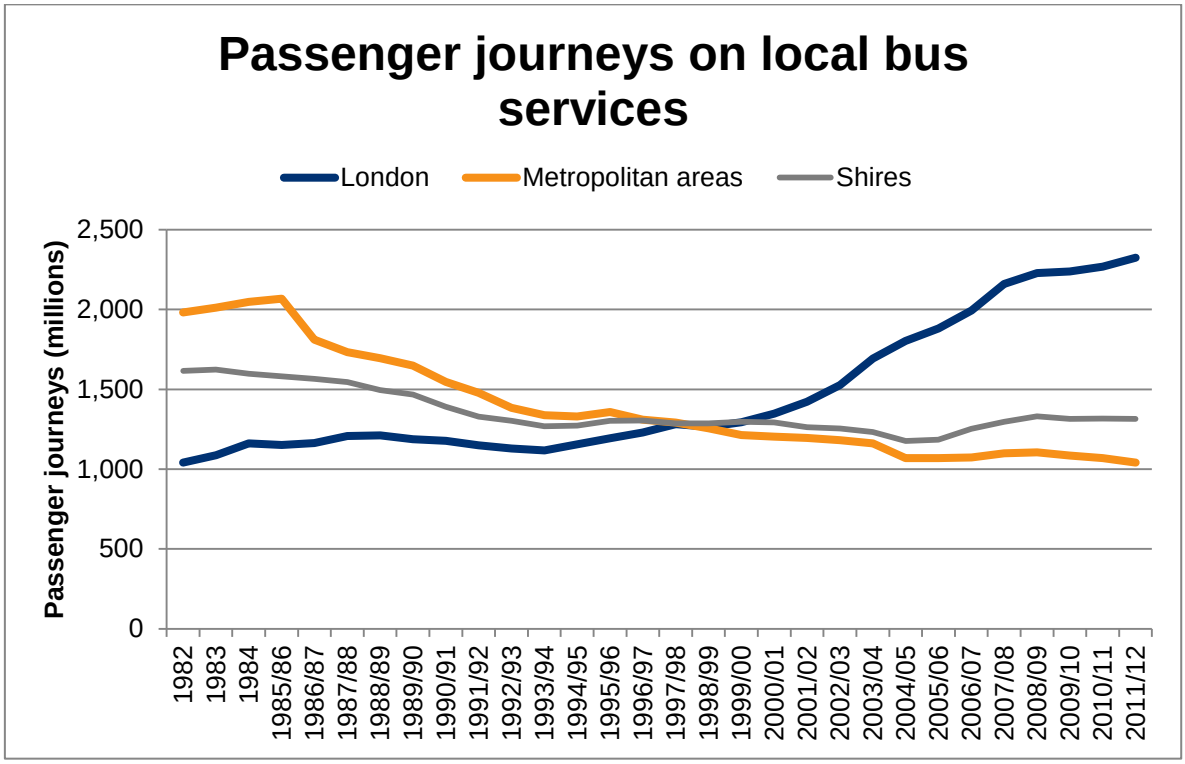
2.7. One important reason for the scale of bus travel is that buses are much more accessible than most forms of public transport. In PTE areas, there are over 67,000 bus stops, compared to just 524 rail and light rail stops and stations. It is therefore no surprise that some 98% of households in metropolitan built-up areas, and in London, live within thirteen minutes' walk of a bus stop with at least an hourly service[7].

2.8. Buses can go right to people's doorsteps and will reach where rail services cannot, at a fraction of the cost. And indeed, around 10% of journeys where rail is the main mode rely on the bus for part of the way. In the metropolitan areas, more than twice as many trips are made by local bus as by all other public transport modes including rail and taxi[8].

2.9. But despite, the comprehensive nature of bus networks, and the sheer volume of bus travel, the number of journeys in metropolitan areas has been in decline for several decades, in particular since bus deregulation in 1986. The same is true in the Shires (although the decline has been less steep here). In contrast, bus patronage in London, where the bus network is planned and controlled by Transport for London, has steadily increased over time, in particular since 1999, as the chart below illustrates.

2.10. Although overall passenger numbers seem to have stabilised since 2005, this is largely due to the introduction of free concessionary travel for older and disabled people. Our analysis suggests that the reduction in fare paying passengers over this period has actually reached double-digits in the metropolitan areas.

[7] DfT National Travel Survey Table NTS9916 2009/10
[8] DfT National Travel Survey Table NTS9903 2009/10

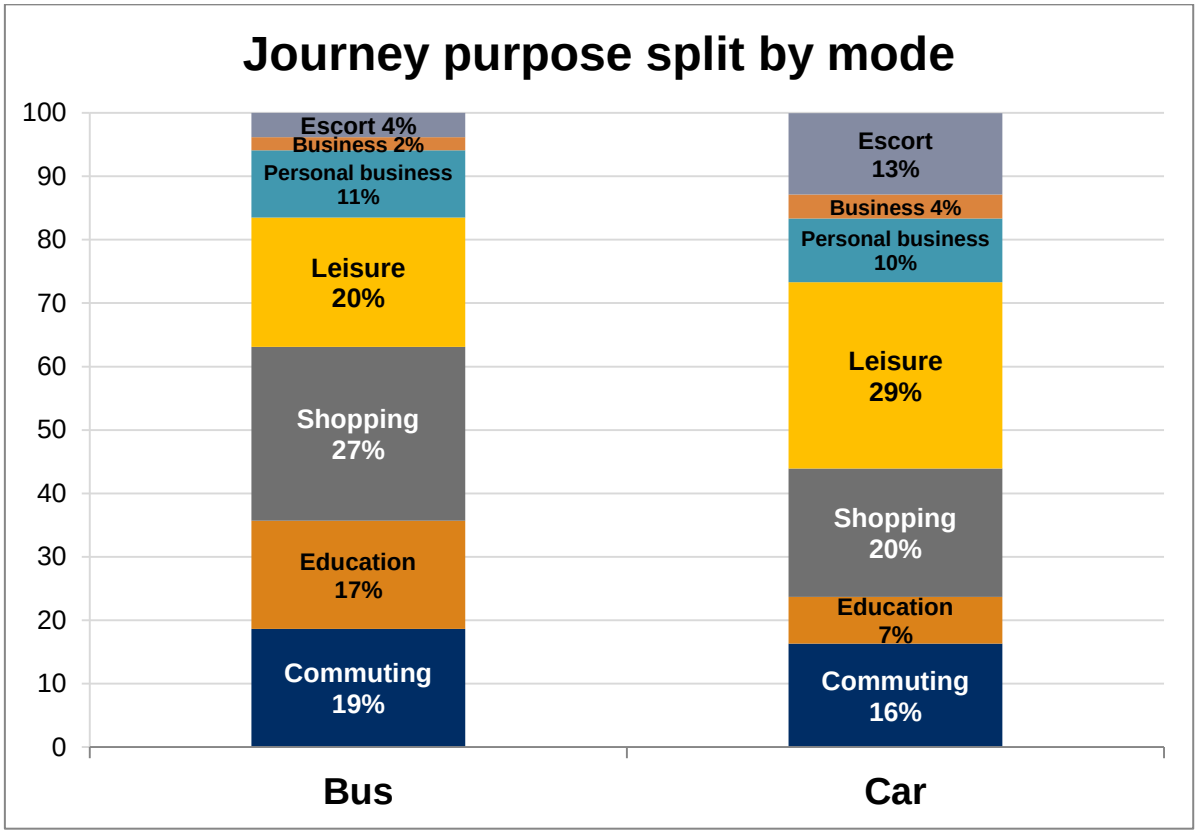


Source: DfT Bus Statistics Table BUS0103

Who travels on the bus?

2.11. Bus services are used by a wide range of people in order to reach many different types of activity. The figure below compares the journey purpose split for car and bus travel[9]. It shows that a greater proportion of bus trips are linked to the most economically productive activities. For example, **38% of bus trips are for work[10] or education purposes, whereas the equivalent figure for car trips is only 27%**. Perhaps contrary to popular belief, buses also carry a greater proportion of trips for shopping purposes than cars, which highlights the important role bus networks play in supporting local retail, in particular in town and city centres.

[9] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[10] Including business travel and commuting.



Source: DfT National Travel Survey Table NTS0409

2.12. The English National Concessionary Travel Scheme (ENCTS), which entitles older and disabled people to free off-peak bus travel has been a major success, and the Table one below shows that some 29% of all passenger journeys in the metropolitan areas are now made by ENCTS pass-holders[11], accounting for 304 million trips in 2011/12[12]. This number has been on the rise since the introduction of free local bus travel in 2006 (subsequently extended to cover cross-boundary travel in 2008) and explains in part why buses cater for such a large proportion of shopping and leisure trips. For the working age population, the importance of bus networks for commuting purposes is likely to be much greater than the figure above suggests.

[11] Covering statutory and discretionary older and disabled concessions.
[12] DfT Bus Statistics Table BUS0105

Table 1. Bus patronage and bus mileage (2011/12)

	Total trips (million)	Older & disabled concessionary trips [13](million)	Older & disabled concessionary passes (million)	Total bus network (million bus-miles)	Tendered bus network[14] (million bus-miles)
PTEs	1,041	304	2,233	351	55[15]
London	2,324	305	1,217	302	N/A
Shire and unitary areas (England)	1,314	456	6,305	656	160
TOTAL	4,679	1,065	9,755	1,309	215

Source: DfT Bus Statistics TablesBUS0103, BUS0820, BUS0821, BUS0203, BUS0205

2.13. Figure one shows the proportion of workers who rely on the bus to get to work, at ward level. It suggests that the buses play a bigger role in urban areas, especially in the dense core of the largest English cities.

2.14. In some wards of Birmingham, Manchester, Leeds, Liverpool, Newcastle and Sheffield, over a third of commuters rely on the bus to get to work on a daily basis. These are congested areas where owning and running a car is likely to be particularly expensive. A large proportion of local residents will no doubt be employed in nearby city centres, where the cost of parking will make driving to work even less affordable.

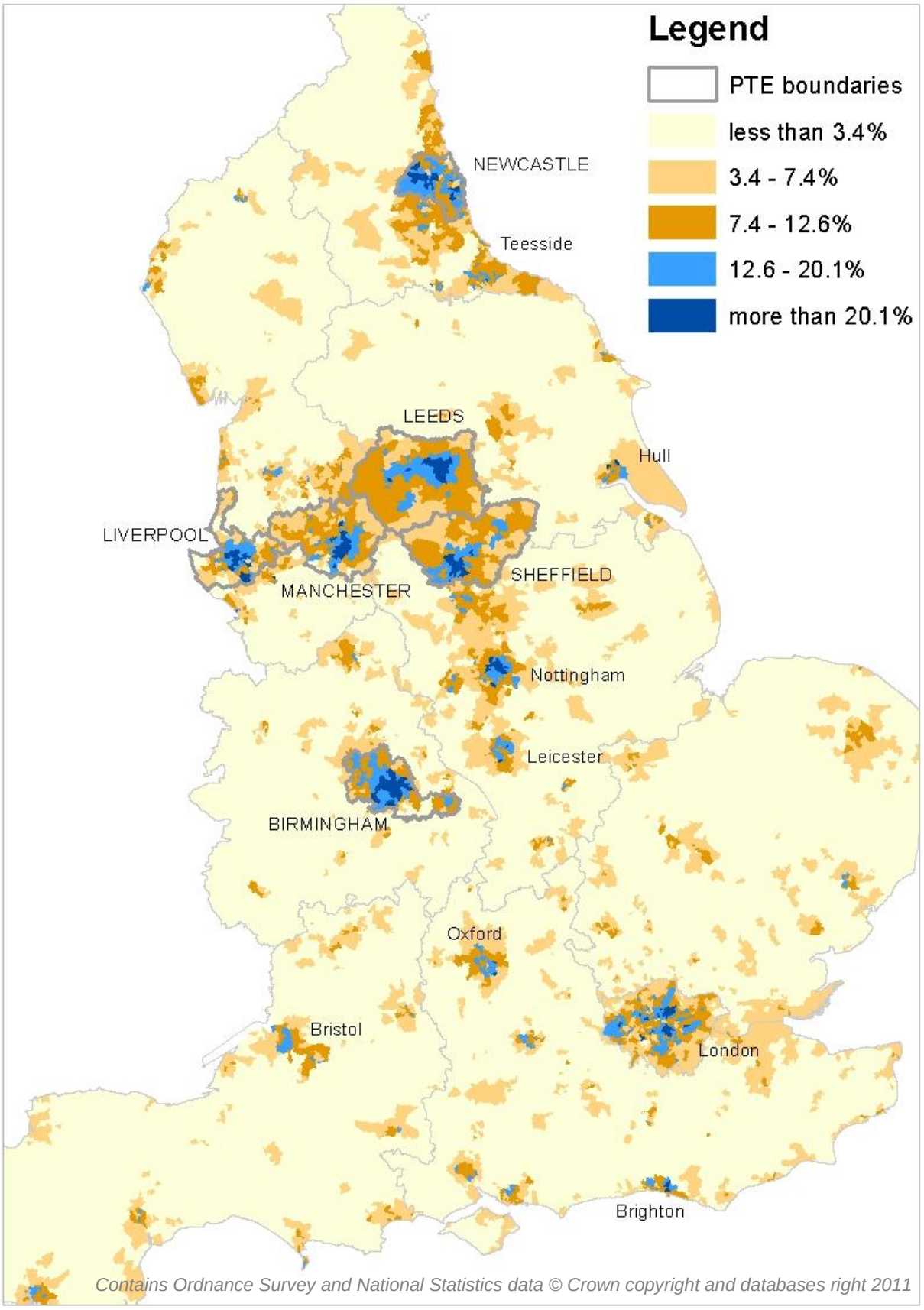
2.15. Despite the vital contribution bus networks make to urban areas, this figure also shows that the bus plays an important role for the local labour market of many smaller cities, market towns and surrounding hinterlands.

2.16. Analysis of the National Travel Survey by Mackie et al (2012)[16] found, in addition, that:

- 30% of people are frequent bus users[17] - a quarter of men and a third of women. Half of all men, and two thirds of all women, rely on the bus at least at some point during the year;
- Over half of all 16-19 year olds, and over a third of 20-29 year olds, are frequent bus users;
- Around 20% of full time employees, and 30% of part time employees, are frequent bus users;
- 70% of those with no car available use the bus frequently, compared with 20% of those with a car available.

[13] These include all trips made by older and disabled pass-holders whether on the ENCTS or on local bus discretionary schemes. In PTE areas, our analysis suggests that the proportion of trips made on such discretions is negligible.
[14] Excluding school services
[15] We estimate that 71% of which relate to conventional tendered services and the remaining to accessible transport and dedicated school services
[16] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[17] Frequent bus use is defined as at least once a week and never as less than once a year.

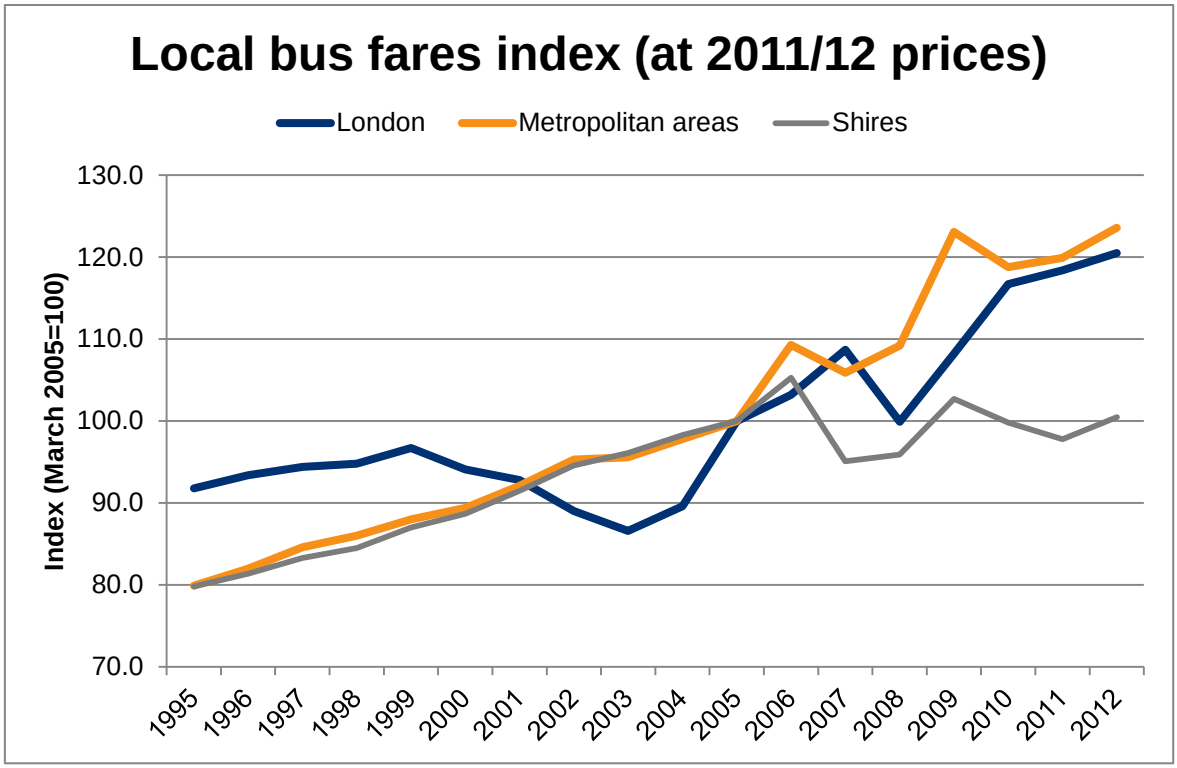
Figure 1 Proportion of workers commuting by bus (data presented at ward level)



*Source: **pteg** analysis based on the ONS's 2001 Census Travel to work matrix*

Bus fares

2.17. Bus fares in the metropolitan areas have followed an upward trend in real terms since deregulation in 1986. The evolution of the DfT bus fares index, represented in the chart below, shows that since 2005, this trend has accelerated slightly with bus fares in metropolitan areas increasing at more than twice the rate of inflation (RPI+3%) – that means fares are now 22% higher in real terms than in 2005. This goes some way towards explaining the reduction in fare paying passengers over the same period, which we refer to earlier.



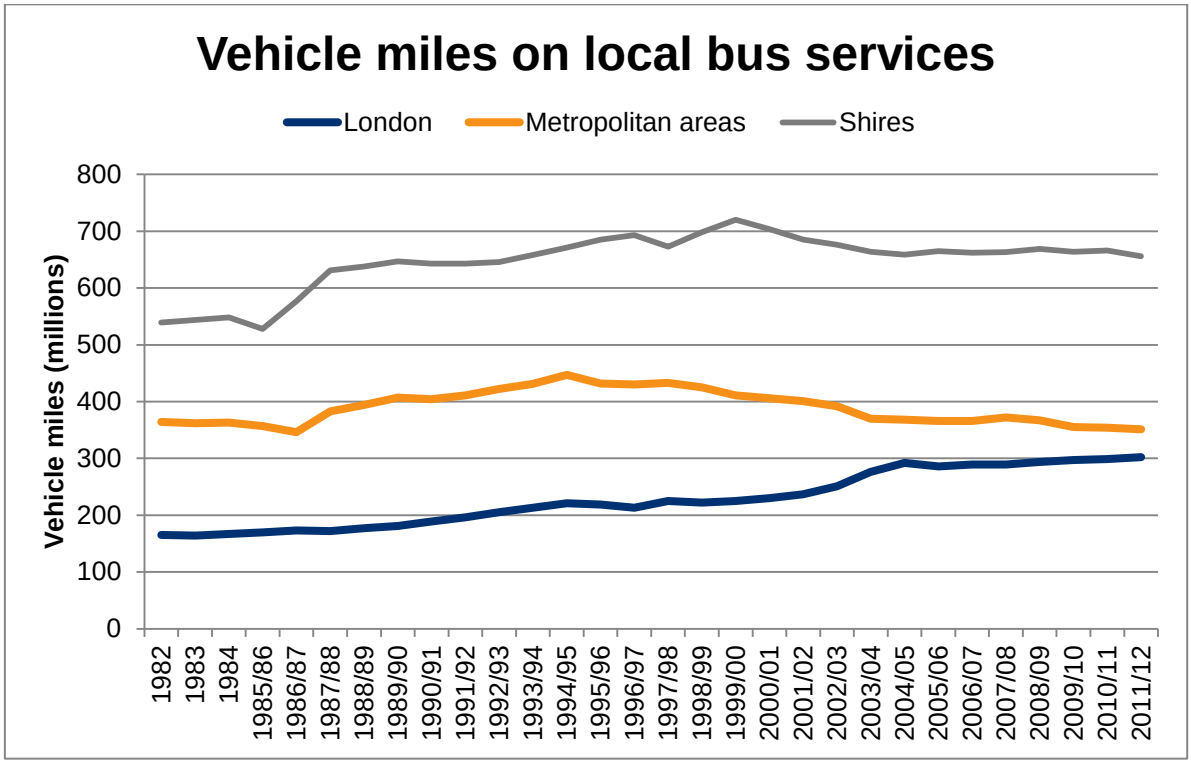
Source: DfT Bus Statistics Table BUS0405B

Bus mileage

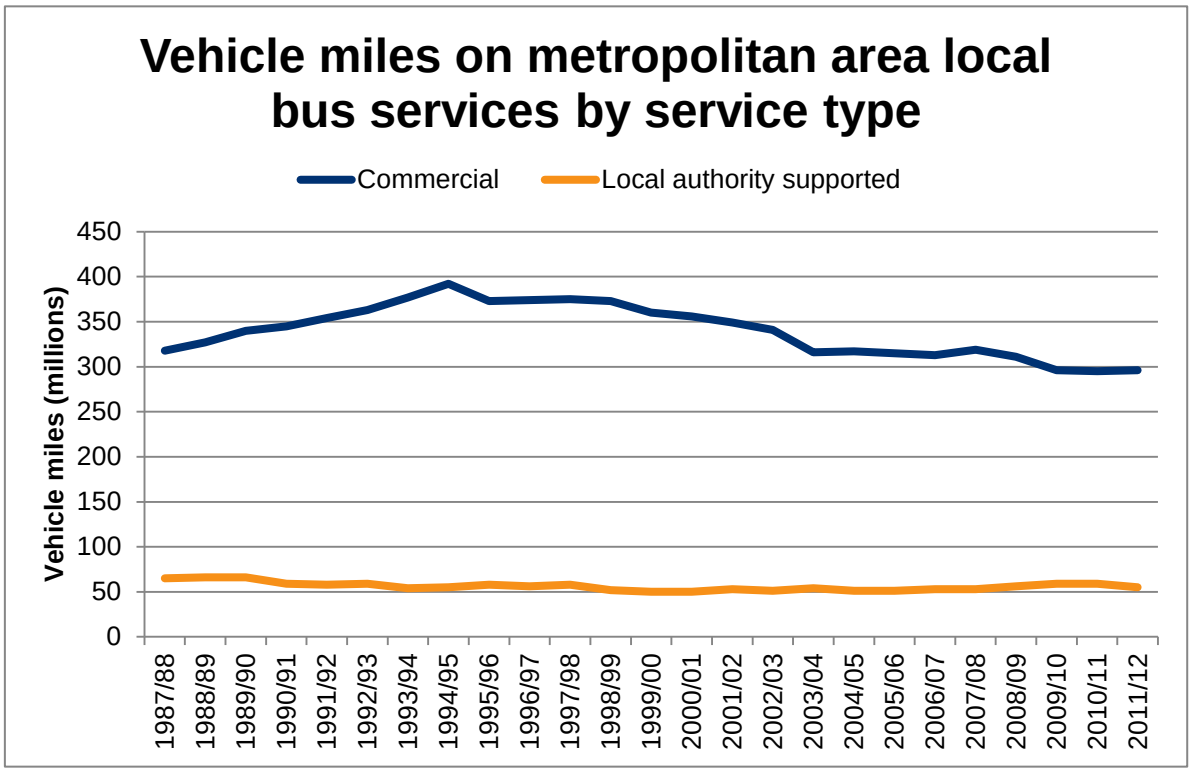
2.18. Public service buses currently travel 351 million miles each year in metropolitan areas, accounting for over a quarter of total bus vehicle mileage in England[18]. Bus mileage has declined by around 22%, from its peak in 1995. This decline has been much less severe in other parts of England, where mileage has declined by only 8% since its peak in 2000 and remains higher than at deregulation. In London, the local bus network has gone from strength to strength, having grown by almost 50% since 1995.

2.19. Tendered bus mileage in metropolitan areas has remained broadly constant over time at just over 50 million miles, currently 14% of the total. However, this proportion has gradually increased since 1995, when tendered services made up only 11% of total mileage.

[18] DfT Bus Statistics Table BUS0203a



Source: DfT Bus Statistics Table BUS0203a



Source: DfT Bus Statistics BUS0205a

Farebox revenue and government support

2.20. Operating revenue on local bus services in the metropolitan areas was £1.3 billion in 2011/12, almost a quarter of the total for England. Farebox revenue made up 58% of the total, with 23% coming in the form of concessionary reimbursement from local authorities, 10% through subsidy for tendered services, and 8.5% from central government through BSOG. The level of BSOG funding is set to decline in the current year, given recent changes by central government. Overall, central and local government contributed £542m to local bus networks, more than half of which went towards concessionary reimbursement.

Table 2. Bus industry revenue (£m per annum, 2011/12 figures)

	Farebox revenue (£m)	Concessionary reimbursement	Of which ENCTS[19]	BSOG	Tendered Network Support[20]	TOTAL
PTEs	763	302[21]	[254]	111	129[22]	1,306
London	1,117	210	[210]	111	519	1,956
Shire and unitary areas (England)	1,125	483	[445]	208	346	2,163
TOTAL	3,005	995	[909]	430	994	5,425

Source: DfT Bus Statistics Tables BUS0501a, BUS0810 and BUS0811

2.21. Looking at revenue and subsidy per trip (Table three), an average non-ENCTS bus journey in the metropolitan areas cost passengers on average £1.04[23], almost twice the London figure (55p). This reflects the lower average cost of bus fares in general as well as the fact that, for those in education, bus travel is free in London up to the age of 18. On the other hand, farebox revenue per vehicle mile was £2.17 in the metropolitan areas, compared to £3.70 in London, which reflects the much higher average load factors achieved in the capital.

2.22. The average subsidy per passenger trip in the metropolitan areas in 2011/12 was 52p (although it is more than twice this figure for older and disabled concessionary trips). **In comparison, the estimated subsidy figure was 36p in London and 79p in other parts of England**.

[19] Calculated from DfT Bus Statistics Tables BUS0810 and BUS0811
[20] Excluding school services
[21] We estimate that, of this, 16% is spent on child concessions and the remaining on ENCTS. Source: ***pteg*** analysis of PTE accounts
[22] We estimate that of this, 65% is spent on standard tendered services and the rest on accessible/community transport (21%) and dedicated school services (14%). Source: ***pteg*** analysis of PTE accounts
[23] This figure excludes any bus trips made using an older or disabled concessionary pass.

Table 3. Revenue and subsidy per trip, 2011/12 (£)

	Farebox revenue per non-older & disabled concessionary trip	Farebox revenue per bus-mile	Reimbursement per older & disabled concessionary trip	BSOG per trip	Tendered support per trip	Average subsidy per trip
PTEs	1.04	2.17	0.84	0.11	0.12	0.52
London	0.55	3.70	0.69	0.05	0.22	0.36
Shire and unitary areas (England)	1.31	1.72	0.98	0.16	0.26	0.79
TOTAL	0.83	2.30	0.85	0.09	0.21	0.52

Source: DfT Bus Statistics Tables BUS0501, BUS0502b, BUS0503b, BUS0103, BUS0810, BUS0811, BUS0821

3. Economic contribution

- PTE bus networks are estimated to generate over £2.5bn in economic benefits - around £1.3bn reflect user benefits from access to jobs, training, shopping and leisure opportunities.
- The remaining £1.2bn of benefits accrue to other transport users and society at large, through decongestion, reduced pollution, lower accident rates, improved productivity and the stand-by value of bus networks.
- The majority of non-user benefits arise in peak periods, when congestion is most severe. We estimate each peak bus trip generates decongestion benefits of around £2.70.
- Overall economic benefits are around five times higher than the amount of public funding going towards PTE bus networks.
- The bus industry has a turnover in excess of £5bn. Much of this is ploughed back into regional economies through the supply chain and consumption expenditure by staff. Public expenditure on bus networks is therefore likely to have a large and direct impact on regional economic output.

3.1. Around 4.7 billion bus trips are made in England every year, around three times the total number of trips on national rail. Bus passengers generate £3bn in fare-box revenues to the bus industry (equivalent to around half the fare-box revenue from rail travel), which is complemented by £2.4bn from central and local government.

3.2. So while the scale of bus use suggests that bus networks have a high value, it's not immediately clear how much exactly they're worth to the economy and society at large – or, just as importantly, what that value stems from. Public authorities need to demonstrate, now more than ever, that these economic and social benefits justify the scale of public funding flowing towards bus passengers and operators. This chapter aims to articulate and quantify the wide range of benefits generated by bus networks from an economic perspective. Chapter Six then assesses the cost effectiveness of specific bus funding streams.

3.3. In this chapter, we demonstrate that in PTE areas:

- Bus users alone receive an economic benefit from bus networks that is greater than total industry revenue;
- Non-users receive the same scale of economic benefits again through reduced congestion, accidents, pollution, option values and higher productivity;
- Overall, bus networks generate net economic benefits estimated to be nearly five times the level of public funding received.

3.4. Moreover, the bus industry also makes a direct contribution to economic output. It directly employs 124,000 people across Great Britain, which is more than 2.5 times the total number of staff working on the railways. 79% of these jobs represent frontline staff which, by their very nature, must be filled by local residents, therefore having a very strong and direct impact on local job levels and economic activity[24]. Bus industry employees are estimated to spend £2.1bn in local economies, and to contribute £0.67bn to the Exchequer in income tax and national insurance. The bus industry also spends an additional £2.5bn across its supply chain.

3.5. Based on these figures we conclude that the bus industry itself produces more than £2 of economic output and 30p of income tax and national insurance for every £1 of public funding it receives[25].

3.6. We begin the rest of this chapter by looking at the mechanism through which bus networks generate economic benefits. We then go on to set out our estimates of user benefits, non-user benefits and externalities from metropolitan bus networks. Finally, we highlight the macroeconomic contribution of the bus industry and bus users to the UK economy. We conclude the chapter by summarising our economic assessment of the economic impact of metropolitan bus networks.

How bus networks generate economic benefits

3.7. The value of bus services to existing passengers is relatively easy to understand. Research has shown that if buses weren't available then 1 in 10 bus commuters might be forced into a less productive job or move out of work altogether[26]. That could amount to tens of thousands of people across PTE areas alone. Most other bus users would be likely to see a steep increase in their transport expenditure or the amount of time spent travelling. In a recent survey of businesses, over 50% considered the bus to have a role in employee recruitment and retention[27].

Case study: npower, Sunderland

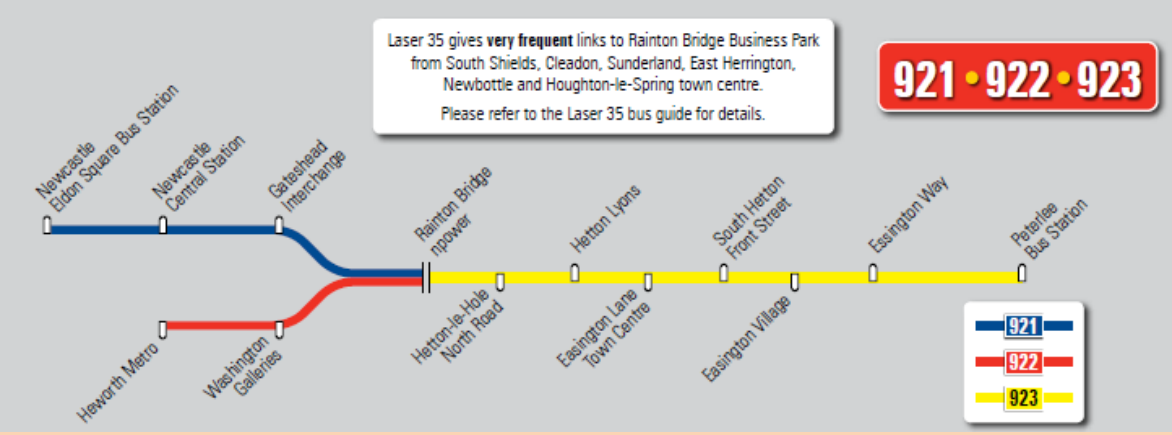
When energy company npower relocated over 1,800 workers to new, but difficult-to-reach offices in a former coal mining area between Sunderland and Durham in 2010, one of the major issues to be addressed was how staff would get to work.

In response, the company worked with Go North East to create four new bus routes for existing staff and new recruits, tailored to match shift working hours. The services were initially funded entirely by npower, but one of the routes has been so successful that it has since opened up commercially. Go North East has also invested £1.26 million in a fleet of new buses offering free Wi-Fi and automated announcements.

There are now more than 15,000 journeys per month on the services and nearly 20% of the people who work at the business park now travel by bus. One employee comments:

[24] BUS0701b: local bus (i.e.: exc. Coach) employs 124,000 people GB-wide (2010/11); 21% of these are head office or maintenance staff – all others work directly in bus operations; based on bus-kms (table BUS0203a), we estimate that bus operators directly employ 27,000 people in PTE areas.
[25] TAS (2010a) The value of buses to the economy.
[26] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[27] Ibid.

"With the use of the 35 service npower and Go North East have made it a lot easier and more efficient to get to work from Sunderland. I now have a direct bus which saves waiting around for connections and conveniently drops me off outside of work."



Source: Greener Journeys, http://www.greenerjourneys.com/2012/06/buses-boosting-businesses/

3.8. But buses do much more than just linking households to jobs and education opportunities, they provide vital links to shopping and leisure opportunities. Bus users in Great Britain make 1.4 billion shopping trips per year, spending an average of £30 for every return trip. This gives a total estimated retail spend of £21 billion[28]. The same research found that bus users also make 471 million leisure trips, spending an average of £26 per trip giving a total estimated spend of £6.2 billion[29]. Together, retail and leisure spend by bus users is £27.2 billion of which the majority (£21.5 billion) is spent in town and city centres[30].

3.9. By enabling these activities to take place, buses support the wider functioning of the economy. The economic value of bus services to users can therefore be seen as a share of the wider economic and social activity that it enables, and the benefits that this activity gives rise to. Leisure activities, such as visiting family and friends, though not necessarily resulting in financial gain, will still hold an economic and social value - otherwise, individuals would choose to do something else with their time.

3.10. Although regular users are the most obvious beneficiaries of bus networks, we know that non users and infrequent users (i.e.: society at large) can actually receive a very significant proportion of the total benefits generated. These benefits come in three main forms:

- decongestion and other externalities (such as reduced accidents, noise and pollution)
- wider economic impacts (agglomeration benefits)
- option and non-use values

[28] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[29] Ibid.
[30] Ibid.

3.11. Although often overlooked, decongestion benefits can be very significant. In most large cities, buses carry more than a quarter of all motorised trips into city centres[31]. In several cases, this is equivalent to the proportion of people who choose the private car. If all, or even half, those bus trips were made by car instead then city centres would literally grind to a halt. In practice, there is little spare capacity left at peak times, which means that future growth in highly productive city centre jobs would be severely compromised.

3.12. The cost of moving goods around would also increase, in particular for retail, which would have an impact on the final price paid by consumers. Conversely, if bus networks were able to attract just a quarter of commuters driving into metropolitan city centres then peak car speeds would increase by more than 50%[32]. For a typical LGV making regular deliveries within an urban area this could lead to a dramatic reduction in staff and fleet costs as fewer drivers and vehicles would be required to make the same number of deliveries.

3.13. Bus networks (and public transport more generally) are effectively one of the key enablers for high density urban areas to develop and remain sustainable in the longer term, especially if personal income and car ownership continue to increase in the longer term. For the service sector in particular, density is in itself a key driver of productivity[33]. For example, for a 1% increase in the effective density of producer services within a given area there is likely to be a 0.08% increase in output per worker[34]. This means that the decongestion benefits attributable to bus services give rise, in turn, to wider economic benefits (WEBs) due to lower business costs and higher productivity. Research[35] has shown that, for bus improvements, these wider economic benefits can amount to around a quarter of decongestion and user benefits.

3.14. An important point to take from this is that some of the most important benefits generated by bus networks actually accrue to those transport users and sections of the economy which are least likely to travel by bus, including taxis, goods vehicles and high income car users. This is one reason why public intervention in this policy area is necessary and justified.

[31] Source: PTE area traffic count data.
[32] Estimate based on speed flow curves in the FORGE model (DfT, 2005), for inner conurbation A-roads. Assuming current speeds of around 18km/h (Manchester, CGN0203 table), this would imply flows of 630pcus per lane. A 25% reduction in traffic would take flows below 504pcus, which is the point at which speeds are assumed to reach 30km/h, a 67% increase. Taking into account differences in speed across PTE areas, a 50% increase is a conservative assumption.
[33] Transport Works (2012), Making the case for city region transport investment
[34] DfT (2012a), Transport Analysis Guidance Unit 3.5.14: The Wider Impacts Sub-Objective
[35] Feldman et al (2007), Transport investments, the wider welfare benefits and the GDP effects of transport schemes.

Buses, cities, jobs and economic growth

Cities concentrate 58% of all jobs in Great Britain - the ten largest cities across PTE areas alone contain four million jobs between them.

The vast majority of jobs in the largest cities tend to be in the private sector. Many of these jobs also tend to be in the most productive and fast growing sectors of the economy. For example, in Leeds, the proportion of private sector jobs is 75% and the proportion of knowledge intensive jobs is 19%. By comparison, in London the figures are 78% and 23%.

Buses are critical to ensure city centres (where these most productive jobs tend to cluster) remain accessible and are able to grow. Buses carry more than a quarter of all motorised trips into the largest city centres[36]; if half of these trips transferred to the private car, city centres would literally grind to a halt.

Source: Smith, R. (2012), City Employment: an overview from the Business Register and Employment Survey (BRES), Centre for Cities briefing paper

3.15. Non-users and infrequent users can also derive significant additional benefits in the form of option and non-use values, which we discuss later in the report. An appreciation of option and non-use values can be important in justifying public funding of lightly loaded services which may nevertheless hold a high stand-by value. They also help in understanding the importance of bus networks to car owning households who are often assumed not to depend on public transport

3.16. Finally, it's often easy to forget that by supporting the bus industry users and government are actually contributing directly to job creation and economic growth. Unlike many other parts of the economy, the bus industry is largely local in nature. Drivers and maintenance staff tend to live near their place of work and their jobs cannot be easily moved to a different region, let alone a different country. The UK has also developed considerable expertise in bus manufacturing and there are several companies with a strong international reputation, such as Optare and WrightBus. It can also be argued that experience in the bus industry equips workers with key transferable skills in engineering, management, marketing, customer service and economics, which can be valuable in other sectors.

3.17. Overall, the bus industry directly contributes £2.86bn to UK output through the farebox. With a total turnover in excess of £5bn, almost all of this gets further recycled into the economy through employee spending and the supply chain[37].

3.18. When it comes to manufacturing, buses offer a very different proposition to either investment in rail or car travel. Buses need to be replaced every 10-15 years which means that the current UK bus fleet is likely to generate a steady stream of orders of around three to five thousand new buses every year[38]. Assuming two thirds of new buses are manufactured in the UK, then bus manufacturing is likely to employ around 2000 people[39]. A 10% increase in bus-kms, for example, could be expected to create 200 new full time jobs in manufacturing alone.

[36] Source: ***pteg*** analysis of PTE traffic count data
[37] TAS (2010a) The value of buses to the economy
[38] DfT Bus Statistics Table BUS0602
[39] Ekosgen (2010), Employment in Sustainable Transport.

User benefits - supporting individual mobility and access to opportunities

3.19. Bus networks serve many different markets. In understanding and quantifying user benefits we have therefore segmented the bus market into homogeneous groups, which we expect to behave in similar ways and derive the same types of benefit. The other objective in developing this segmentation is to try to identify parts of the network or user groups which benefit from significantly different levels of public funding. This is important in order to be able to tease out the value for money of different funding streams, which we tackle in Chapter Six.

3.20. Table four shows the segmentation employed in this study and the proportion of bus trips by segment.

Table 4. Bus market demand segmentation (PTE areas)

		Share of demand	Annual bus trips (million)
	Concessionary (older and disabled)	29%	304
	Children (<16)	13%	131
Adult	Commuter/business/education/peak	20%	203
	Leisure/personal/shopping/off-peak	30%	310
	Early morning (6-7am)	2%	17
	Late evening/night (7pm-6am)	4%	43
	Sunday	3%	32
	TOTAL		1,041

*Source: **pteg** estimates. The proportion of concessionary travel and total number of bus trips are based on DfT Bus Statistics - the remaining figures are based on analysis of NTS 2008-2010*

3.21. The fact that an individual chooses to travel by bus to get to work, the shops or education indicates that this option has a greater value than the next best alternative (for example, staying at home or travelling by another mode). It's also reasonable to assume that, because it makes this activity possible, the bus trip must have some intrinsic value of its own.

3.22. To assess the value of bus trips currently being made it is necessary to understand what value each passenger puts on the bus service, over and above the fare actually paid[40]. Some passengers would have been willing to pay substantially more, for example if they were making a particularly valuable trip and had limited affordable alternatives available: others, on the other hand, would pay no more than the current fare, for example, if they had good cheap alternatives. To represent how willingness to pay varies across existing and potential users, economists often use a market **demand function**. This expresses a relationship between the fare level and the number of bus trips made and can be seen as representing the willingness to pay of different users. In the appendix we set out in more detail how we have derived demand functions for each market segment.

[40] If every passenger derived a benefit exactly equivalent to the fare level then the total farebox revenue would give us an accurate indication of the benefits derived by passengers. In reality, each passenger will derive a different amount of benefit from the bus trip. For a small proportion of passengers, this will be very close to the fare level but for the vast majority of passengers this will be considerably higher.

3.23. We have then used these demand functions to estimate the total benefits derived by each of our market segments over and above the average fare paid (which we refer to as **Net** Consumer Surplus, to emphasise this is over and above the fare paid). We have also estimated the average net benefit per trip and the maximum willingness to pay (WTP) implicit in our demand functions. This allows us to draw some interesting conclusions.

3.24. Firstly, it's clear that concessionary passengers receive the greatest proportion of net user benefits, around a third of the total, slightly higher than their overall share of bus travel. This is essentially due to the fact that concessionary passengers travel for free, which means that the proportion of their WTP which would have gone towards covering the fare is converted into Consumer Surplus.

3.25. On the other hand, concessionary passengers have the lowest average WTP of any market segment. Again, this is largely due to the fact that free travel generates a high proportion of lower value trips which would not have been made in the absence of the concession. In Chapter Six, we explain why, nonetheless, these generated trips still represent good value for money for the public purse as they can generate significant non-user benefits, as well as health and social inclusion benefits, which are unlikely to be reflected in individual-level WTP.

3.26. Looking at the next largest market segments - daytime peak and off-peak adult non-concessionary travel - they are estimated to generate equivalent proportions of user benefits. However, note that average and maximum WTP per trip are higher for peak travel, which reflects the implicit value of the activities undertaken as the result of those trips (work and education). Interestingly, early morning and late evening travel have higher WTP than peak daytime trips. This is likely to result from the higher proportion of commuting and business trips (which is close to 100% in the early morning) as well as scheduling constraints that those trips may be subject to (for example, in the case of shift workers) and the lack of affordable and convenient alternatives at those times.

3.27. Not surprisingly, Sunday trips show the lowest WTP, reflecting the higher proportion of discretionary trips.

3.28. Turning to the maximum WTP, our figures show that some commuters would continue to use the bus even if the average fare was close to £8 per trip. This would most likely represent non car owning individuals, travelling infrequently, for whom the only alternative would be a journey by taxi – for example, low income part-time or contract workers.

3.29. The maximum WTP is important when making decisions about significant reductions in service levels, which could leave such individuals without a viable bus service. Effectively, this could amount to a significant redistribution of income away from these users, even if they were still able to undertake the same trip by other means. To the extent that such individuals are likely to be on the lowest income brackets (see Chapter Four) and potentially even moving out of unemployment, this type of policy is likely to be highly regressive and potentially counterproductive in terms of welfare budgets.

Table 5. User benefits from bus travel (PTE areas)

	Net CS[41] (£m)	Net CS/trip (£)	Gross CS/trip[42] (£)	WTP at 1% of D0 (£)
Concessionary (older and disabled)	463	1.5	1.5	7.0
Children (<16)	144	1.1	1.6	5.7
Peak (Commuter/business/education)	301	1.5	2.6	7.8
Off-peak (Leisure/personal/shopping)	296	1.0	2.1	5.7
Early morning (6-7am)	32	1.9	3.0	9.5
Late evening/night (7pm-6am)	67	1.6	2.7	8.2
Sunday	14	0.4	1.6	3.1
Total/Average	**1,317**	**1.27**	**2.00**	-

N.B.: Net Consumer Surplus (CS) figures net of average fare level.

User benefits and the national economy

3.30. We have so far implicitly taken user benefits to represent a net gain to society. But how do user benefits impact on the wider economy, in particular in terms of aggregate output or Gross Value Added (GVA)?

3.31. National economic output is effectively the aggregation of all economic benefits accruing to individuals. So, for example, when somebody is able to access a higher paid job by using the bus network they reap a direct financial benefit, but this also appears in national accounts. When an individual benefits from a shorter bus journey, they can use that time saving, for example, to work more, undertake training or carry out a leisure activity which, in turn, could improve their health and productivity. Additional work hours appear directly in national accounts as will eventually, the increased output from improved productivity.

3.32. Improved health may also result in reduced government expenditure, which can then be put to more productive uses. In some cases, such as trips to attend training or education, individual willingness to pay may reflect the expectation of higher future earnings rather than short term gains.

3.33. So, in summary, the higher the economic benefits derived by bus network users the greater the contribution bus services are making towards the economic well-being of society as a whole. Assuming users have full information and behave rationally, the aggregate estimate of WTP is likely to closely match the overall contribution bus networks make to the economy through user benefits. In the longer term, this economic contribution can make a place cheaper or more attractive to do business in.

[41] We refer to **net** consumer surplus as the value of bus travel over and above the fare paid by users.
[42] This is equivalent to the average willingness to pay (WTP).

Flexible labour markets

Bus networks help the functioning of the economy by contributing towards more flexible labour markets, for example, in the following ways:

- **By increasing the number and range of jobs accessible to workers**. This can be especially critical for low income or less skilled workers. Such individuals are less likely to have access to a car (only 51% of households on the lowest income quintile have access to a car or van[43]) and may also qualify for a narrower range of jobs, which are more likely to be scattered across a large area (see Figure 3).
- **By improving the match between workers and jobs, thereby raising productivity**. Recent work[44] shows that around 1 in 10 bus commuters would be in a less productive occupation, or out of work altogether, if their regular bus service was not available.
- **By making work pay**. Transport costs can absorb much of low income workers' wages, thereby reducing the financial reward from being in employment. This can be particularly critical for part time workers, for whom the high fixed costs of car ownership make public transport the only option but who are unable to benefit from the most heavily discounted period tickets available to regular commuters. The availability of policies which reduce the cost of travel can have a significant impact on the incentives faced by these workers.
- **By providing a key link to education and training**. The majority of young people do not have access to a car and therefore depend on bus services to reach specialist education facilities. They often also depend on the bus to access part-time work opportunities while in education. As many as 17% of bus trips are for education purposes, more than twice the equivalent proportion for travel by car[45].
- **By providing employers with access to a wider and more varied labour pool**. This is recognised by many employers who factor in public transport accessibility into their wider location decisions[46].

Case study: Cobalt Business Park, North Tyneside[47]

Cobalt Business Park in North Tyneside is the UK's largest office park, including businesses such as Orange, Proctor and Gamble, Balfour Beatty and Formica. The park has a recruitment catchment of over 1.1 million people. Some 600 bus services come through the park daily, connecting to over 40 residential destinations and helping to open up the local labour pool.

"*The bus services in and around Cobalt Business Park have helped retain our staff as well as helped with staff recruitment. Without the services many of our employees wouldn't be able to get to work, they are crucial to Formica in this respect and they have helped transform accessibility to the Park*".

Richard Pollington, European President at Formica Ltd

"*I think it would be very difficult to create a business park of this size without having a bus provision - it's part of the package of sustainable transport*"

Lynne Cramman, Travel Coordinator for Cobalt Business Park

[43] DfT National Travel Survey NTS0703
[44] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[45] DfT National Travel Survey Table NTS0409
[46] See, for example, GVA Grimley (2006), How does transport influence business investment in the city regions?
[47] Source: Greener Journeys (2012) 'Bus Policy: a five-point plan for growth'

Non-user benefits and externalities

3.34. The previous section demonstrated that bus networks hold a high value for existing users. We have also set out the mechanisms by which this user value translates into improved productivity of businesses and individuals, higher economic output and lower government expenditure. But a key characteristic of public transport networks, compared to most other consumer products, is that changes in demand can also have a large impact on non-users through reduced congestion. Society at large also benefits through reduced pollution, noise, accidents and greenhouse gas emissions.

3.35. In addition, there is good evidence to suggest that even those people who choose not to travel by bus on a regular basis place a stand-by, or option, value on the availability of bus services. But many others who do not use the bus at all value the fact that their family, friends and employees are able to rely on bus networks. Spread over a large number of infrequent and non-users, these benefits can add up to a large number.

3.36. As we will show, bus networks also make a critical, if understated, contribution to the growth, efficiency and productivity of city centres and dense urban areas.

3.37. In PTE areas, these benefits together exceed those accruing directly to bus users. This forms the cornerstone argument for public financial support of bus networks.

Decongestion benefits, accidents and environmental externalities

3.38. Decongestion is, by far, the largest non-user benefit that bus networks give rise to and its mechanics are easy to grasp. If a large proportion of peak bus trips were to transfer onto cars, then roads would become significantly more congested, therefore resulting in millions of pounds of lost productive and leisure time. This provides a compelling case for why public authorities (who represent both bus and other transport users) should ensure that bus networks provide as attractive and affordable a service as possible, in particular at peak times. This also helps understand why public authorities may decide to subsidise bus services or bus users directly. Not only should bus users be compensated by the benefits they provide to other road users but this behaviour should also be encouraged, in the pursuit of the common good.

3.39. In order to estimate the value of decongestion benefits, we start by calculating the number of trips which we believe would transfer to the private car in the absence of bus networks. Some trips would no longer be made as the additional cost and inconvenience, or lack of suitable alternatives (for example, for those without access to a car), would outweigh the benefits derived from the activities at the destination end. The majority of trips, however, would continue to take place, either by another form of public transport, by walking and cycling, by taxi or by private car[48].

[48] On average, we have assumed the proportion of trips which would transfer to the private car to be 31%, which is consistent with the average figure suggested in TRL (2004, table 9.9). However, this varies by market segment and our assumptions are documented in more detail in the appendix.

3.40. In some case, individuals would continue to travel but might change their destination to reflect the relative accessibility provided by different modes. This may have an additional detrimental effect on city centres, which we ignore in this section but attempt to estimate at a later stage[49].

3.41. Once we have an estimate of the number of additional car trips that would be made we follow the relatively well-established methodology set out in the DfT's Transport Analysis Guidance (WebTAG) to estimate and value decongestion and externality impact. Our detailed methodology is set out in the appendix.

3.42. Table six and Figure two summarise the results from this analysis. We estimate that in the absence of bus networks there would be an additional 209 million car trips on PTE networks every year, an estimated 3% increase in overall traffic levels and a **21% increase in city centre car traffic at peak times**[50]. We estimate that this amounts to **over £600 million in decongestion and other externality benefits**, even after accounting for the impact of bus traffic. This is equivalent to around half of the level of user benefits estimated earlier. To accommodate this additional traffic in a city the size of Manchester or Birmingham would require a two new dual carriageway roads to be built right through the heart of those cities.

Table 6: Externality benefits from bus travel by market segment

		Decongestion		Other externalities (including accidents)	
		pence/bus trip	£m p.a.	pence/bus trip	£m p.a.
	Concessionary	24	72	4	13
	Children (<16)	56	73	5	6
Adults	Peak (commuter/business/education)	270	549	14	29
	Off-peak (leisure/personal/shopping)	39	120	6	18
	Early morning (6-7am)	49	8	13	2
	Evening/night (7pm-6am)	52	22	6	2
	Sunday	15	5	4	1
	Sub-Total		**850**		**72**
	Bus network externalities[51]		-229		-24
	TOTAL		**621**		**48**

[49] More generally, it is likely that the complete withdrawal of bus networks would have deep and severe consequences which are difficult to capture through this relatively simplistic approach. In practice, this could give rise to the need for much more radical changes in land use, infrastructure requirements, individual behaviour and business models, which would have much greater costs in urban areas than we are assuming in this analysis. It is therefore likely that our work under-estimates the true non-user benefits of bus networks

[50] This was estimated by dividing the proportion of new car trips relative to existing bus trips (50% for peak/commuting/business/education) by the market share ratio between bus and car (20%/40% for the main town and city centres).

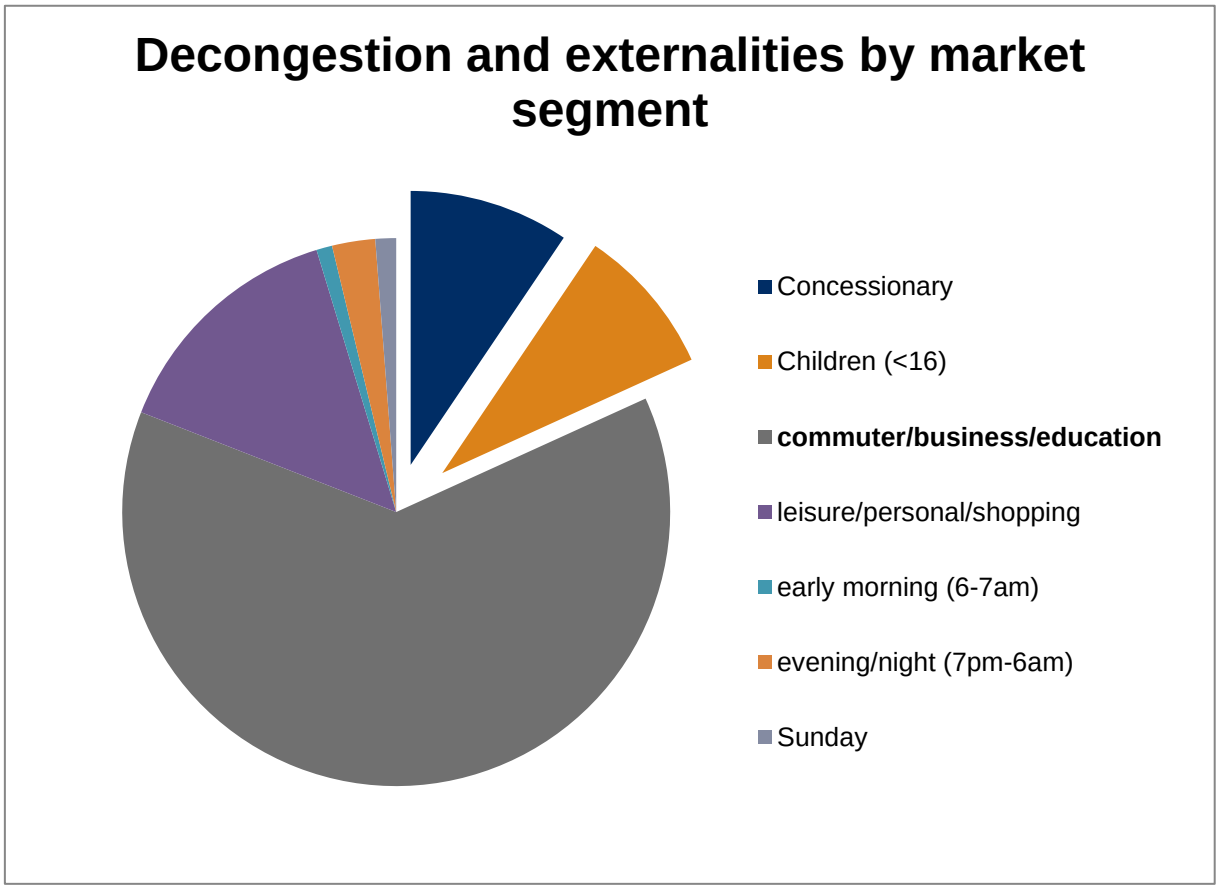
[51] This refers to the additional congestion, accidents and pollution caused by bus vehicular traffic. We have not been able to apportion these effects by market segment due to lack of detailed information on bus mileage by time period.

3.43. It is interesting to note that although peak bus trips represent less than a fifth of total patronage, they account for more than half of all externality benefits generated by bus networks. This is equivalent to a **total benefit to other road users and society at large in excess of £2.84 for every peak bus journey**[52].

To put these figures into context:

- The amount of **peak benefits alone is around five times the total amount of BSOG** paid out to bus operators in PTE areas.
- The amount of **external benefits per peak bus trip is around twice the net consumer surplus accrued by bus users themselves** – a prima facie case for public subsidy.

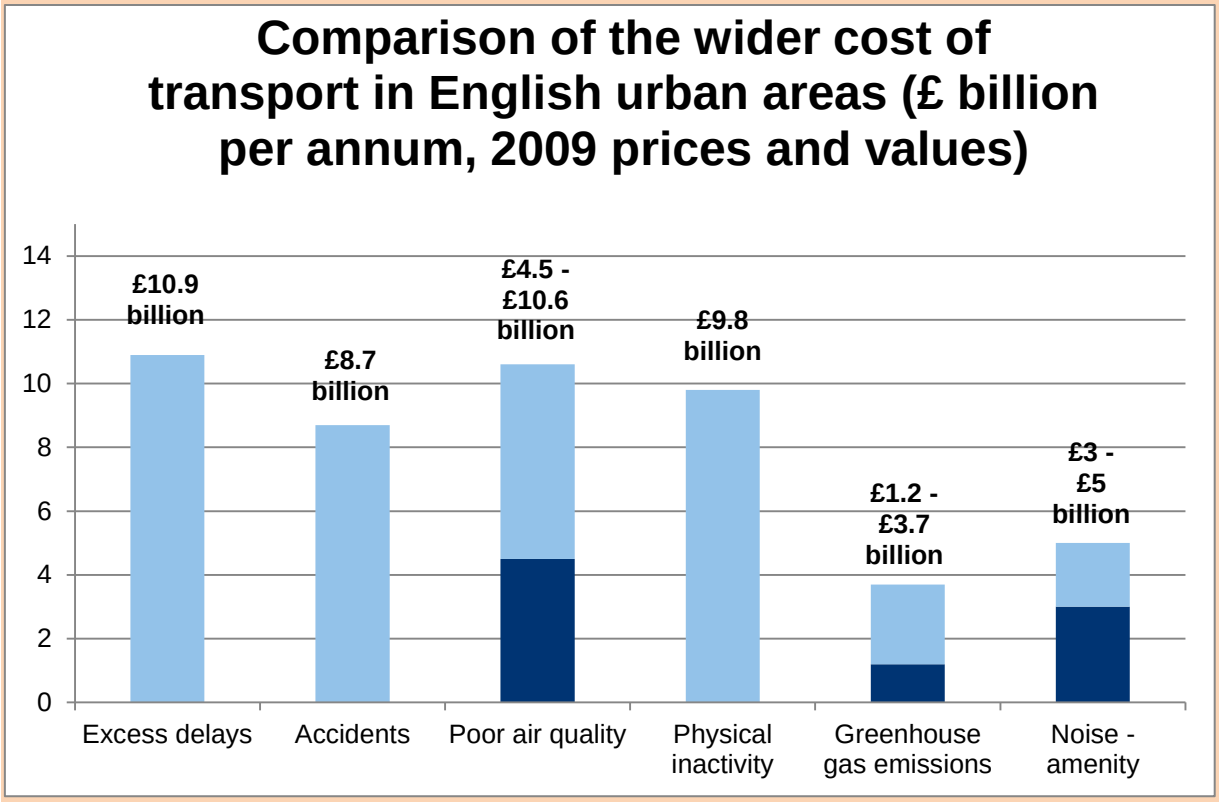
Figure 2



[52] This figure excludes the impact of bus congestion and pollution, which we have not been able to allocate by market segment.

The cost of road congestion

Road congestion in urban areas has been estimated by the Cabinet Office to cost the UK economy around £11bn a year. The delays and unreliability caused by congestion add to the end cost of consumer products, reduce the productivity of businesses and employees more generally, and therefore stymie the ability to innovate and access new markets and resources. Moreover, road transport in urban areas is estimated to generate negative externalities (such as accidents and pollution) valued between £27bn and £38bn per year.



Source: Cabinet Office (2009), The wider costs of transport in urban areas

A survey of businesses by the British Chambers of Commerce (BCC) put the cost of congestion at around £17k per business per year. The same survey found congestion to be a problem for around 90% of businesses, with around 45% viewing it as a significant problem. The congestion problem is set to continuously worsen over time, especially in urban areas and the Eddington Transport Study suggested that its cost to the economy would double over the following 2 decades.

Buses were singled out in the Eddington Transport Study as offering '*a very cost-effective way to reduce congestion and support productive urban labour markets*'. Buses are flexible, can deliver extra capacity very quickly, take up less space on the road and, when combined with priority measures such as bus lanes, can reduce delays and improve journey time reliability. The Eddington Study gave the example of Leeds city centre where bus priority measures had cut journey times on some routes by between 10 and 30%.

Sources: Cabinet Office (2009)The wider costs of transport in urban areas; BCC (2008)The Congestion Question: A Business Transport Survey; Eddington (2006) The Eddington Transport Study; www.transportworks.org

Option and non-use value

3.44. Non-users and infrequent users can also derive significant additional benefits in the form of option and non-use values.

3.45. **Option value** stems from the fact that bus networks are the default stand-by option for many infrequent users when their main mode of travel isn't available, for example when the car is in the garage or when the weather makes walking and cycling less attractive. Research has shown that, on average, regular bus users would be willing to pay up to £60 per year, and infrequent users £38 per year, in order to ensure that a bus service remained available[53]. This work has estimated the option value of bus networks at £700m for the whole of England, equivalent to 30p per bus-km and almost twice the cost of BSOG. Taking option values to be proportional to the number of bus trips, we estimate the total option value of PTE bus networks to be around £188m per year.

3.46. **Non-use value** refers to the benefits accruing to individuals who are unlikely to use bus networks themselves. This could include, for example, the benefits to parents when children no longer need to be escorted or where the bus network enables visits by family and friends. Non-use values tend to be much lower than option values (GJ/ITS Leeds estimated a figure of £1.20 per person) but can be of great importance to specific segments of the population, such as license holding members of larger one car households.

Denser and more productive urban economies (wider economic impacts)

3.47. As we demonstrate earlier, bus networks make a critical, if understated, contribution towards the free flow of people and goods in urban areas. This has a direct impact on business costs and individual quality of life, which translates into additional economic output.

3.48. However, decongestion benefits simply measure the direct impacts in terms of reduced journey times. For certain industries, an efficient urban transport network, providing high accessibility to town and city centres, can generate additional second order productivity impacts. While there are several reasons for this[54] we would argue the two following factors are key:

- urban centres offer the opportunity for significant agglomeration economies, by allowing close proximity and greater interaction with competitors, clients and suppliers;
- a highly accessible central location maximises provides access to a wide and more specialised labour pool.

3.49. For producer and consumer services in particular, these second order productivity impacts can give businesses an important competitive edge and make a substantial contribution towards aggregate economic output. In this section we attempt to quantify the contribution bus networks make to this type of benefit. We look at this issue from two different perspectives:

- by assessing the constraints that the absence of bus networks would place on city centre employment density;

[53] Mackie, P., Laird, J. and Johnson, D. (2012) Buses and Economic Growth
[54] See www.transportworks.org for a detailed explanation of the range of evidence demonstrating the link between productivity and improved transport networks.

- by following the DfT's wider impacts methodology, which is based on the empirical relationship between effective density (and implicitly the degree of congestion) and business productivity. This approach requires a number of detailed assumptions to be made around the distribution of employment and decongestion benefits from bus networks across PTE areas.

3.50. Starting by looking at infrastructure constraints, we earlier estimated that for PTE city centre peak trips, **there would be a 21% increase in peak car travel in the absence of bus networks**. Assuming the radial road network serving metropolitan city centres are close to full capacity and could not accommodate additional traffic, this would equate to a 8.4% loss in city centre jobs[55], which needs to be added to the number of commuting trips[56], currently made by bus, which would no longer take place (implying associated jobs would be lost). This would equate to a loss of over one hundred thousand jobs across all PTE areas, or over £4.6bn in GDP[57].

3.51. But even if we were to assume no jobs were lost due to transport infrastructure constraints, those businesses located in congested areas would become less productive due to increasing difficulty in accessing a wide labour market and interacting with other businesses. The Department for Transport has developed a methodology for estimating these types of effect, known as Wider Economic Impacts[58]. In this report we concentrate on estimating agglomeration benefits[59], the largest of these impacts, which are defined as the increased productivity that results from a greater effective density[60] of jobs in a given area.

3.52. Based on some broad assumptions[61], we have estimated that, in the absence of bus networks, **there would be an overall loss of productivity in PTE areas equivalent to £427m of GDP**, around 90% of which would occur in town and city centres. This is around half of the decongestion benefits, which we have previously calculated. Note, however, that this figure is likely to be an under-estimate of overall wider impacts as there were some types of benefit which we were not able to quantify[62].

3.53. In conclusion, there are significant productivity benefits in the form of agglomeration economies as the result of the greater proximity between workers/businesses due to lower congestion. Based on our broad assumptions, bus networks in metropolitan areas generate

[55] Assuming car trips make up 40% of city centre commuting/peak traffic.
[56] Assuming bus trips make up 20% of city centre commuting/peak traffic and a degeneration factor of 20%, this would equate to 4% of jobs.
[57] This takes employment and earnings figures from WebTAG Unit 3.5.14, and assumes half of all producer and consumer service jobs are located in town and city centres.
[58] DfT (2012a), Transport Analysis Guidance Unit 3.5.14: The Wider Impacts Sub-Objective
[59] These are known as WI1
[60] Effective density is based on the travel cost and time required to reach neighbouring businesses in a given area.
[61] Summary of key assumptions: half of all jobs in producer and consumer services based in city centre areas; all other jobs located in suburban areas; GDP per job assumed spatially uniform within each business sector; current average car generalised cost taken as £3.90 per trip based on NTS/DfT data; impact of bus service withdrawal assumed to lead to an increase in GC of 92p/trip for city centre businesses and 4p/trip for suburban businesses (based on estimate of decongestion benefits); Job and GDP figures by local authority taken from WebTAG Unit 3.5.14
[62] We have excluded from our analysis labour market impacts (WI4) and the increased output in imperfectly competitive markets. We have also assumed GDP per job not to vary by location. In practice, within a given sector, city centre jobs are likely to generate a greater economic output per worker.

in excess of £400m per year in agglomeration benefits, the vast majority of which is concentrated around city centres.

Why are firms and workers attracted to town and city centres?

There are two key mechanisms through which transport investment can produce wider economic benefits beyond those that would arise under perfect competition conditions: agglomeration economies and labour market effects. These are critical in explaining why people and businesses are so attracted to urban areas.

Agglomeration economies occur where lower transport costs bring firms closer together, resulting in lower unit costs and higher productivity. Urbanisation economies (a form of agglomeration economies typical in large cities) arise where firms from a range of industries are able to benefit from the concentration of shared resources, competitors and clients. Shared resources can include physical infrastructure, centres of knowledge and research, labour pools as well as shared intangible goods such as information, knowledge, business culture and technological innovation, all of which can have a cumulative effect on productivity.

"Interaction between activities produces agglomeration forces which preserve the local concentration of activities"[63]

Lower transport costs can also have a significant impact on **labour markets** by promoting the relocation of jobs to more accessible, higher productivity areas, by widening labour search areas and by encouraging more people into work through reduced commuting costs. These effects can have a positive impact on taxation revenues and total economic output[64].

Empirical evidence of agglomeration effects and their impact on productivity

There is a growing consensus that transport infrastructure can have a significant impact on productivity. A comprehensive literature review[65] suggested that a doubling of city size would increase productivity by somewhere between 3-8%, implying an elasticity of productivity with respect to city size in the range 0.04-0.11.

A more recent UK study[66] estimated average elasticities of 0.04 for manufacturing and 0.12 for service industries as a whole. The impact of economic density on productivity is shown to be highest for financial and business services, with a weighted elasticity of 0.2. The impact of economic density on productivity is even higher for specific sub-sectors such as business and management consultancy.

This growing body of research was reflected in the findings of the Eddington report, which recognised that transport investment has the potential to grow GDP, productivity and employment at a faster rate than is typically assumed in standard transport analysis. The Department for Transport has since published TAG Unit 2.8 on Wider Impacts and Regeneration, which provides guidance on how to quantify wider economic benefits from transport.

[63] Vickerman, R. (2007), Recent Evolution of Research into the Wider Economic Benefits of Transport Infrastructure Investments
[64] Venables, A. (2004), Productivity effects of urban transport improvements
[65] Rosenthal, S.S. and Strange, W.C. (2004), Evidence on the nature and sources of agglomeration economies
[66] Graham, D. (2006), Wider Economic Benefits of Transport Improvements

"It seems clear that transport networks will continue to play an increasingly crucial role in supporting the success of these urban agglomerations: enabling commuting journeys to support deep labour markets; facilitating rapid business to business contacts; and providing international connections to support the export of high productivity services"[67]

Macroeconomic contribution of the bus industry and bus users (economic impact)

3.54. Previous sections in this chapter have attempted to quantify the **net economic benefits** generated by bus networks. This analysis largely discounts any benefits that may arise on the supply side, for example, in terms of increased bus sector employment. This is based on the assumption (which comes as standard in welfare economics) that the economy is operating at full capacity, which means that any increase in bus sector employment would actually be at the expense of a reduction in employment elsewhere, hence having a neutral effect on aggregate output.

3.55. However, national economies are seldom operating at full capacity, and this is particularly true in the wake of the recent economic crisis. Hence, all things being equal, there is a case for directing spending towards those policy areas with the greatest spending multiplier, i.e. those that generate the greatest amount of economic activity from a similar amount of public funding. The purpose of this section is to set out the supply-side economic impact of bus networks.

3.56. Bus companies need to employ drivers, depot and office staff, acquire and maintain buses, purchase fuel and buy, rent or build depot and office space. Employees and suppliers then use the money earned to acquire goods and services from other parts of the economy. This sequence of events generates economic activity, which is taxed by government, and eventually reflected in national accounts.

3.57. The UK bus industry has a turnover of **£5.2 billion per year**, £2.8bn from the farebox, £2bn from local government through contracted services and concessionary travel, and £0.4bn from central government through BSOG[68]. In PTE areas, we estimate total turnover to be in excess of £1.2bn, with farebox revenue representing around 58%.

3.58. A significant proportion of this revenue then goes towards staff costs (36%), including tax and NI, investment in new vehicles (21%), maintenance (24%) and the rest of the supply chain, getting further distributed through the economy[69]. TAS has estimated that £4.6bn (87%) of industry turnover is spent by bus operators and employees elsewhere in the economy.

3.59. Based on these figures we conclude that **the bus industry itself produces more than £2 of economic output and 30p of income tax and national insurance for every £1 of public funding it receives**[70].

[67] Eddington, R. (2006), Eddington Transport Study
[68] DfT Bus Statistics Tables BUS0501 and BUS0701b
[69] ***pteg*** estimates based on Metropolitan Bus Model.
[70] TAS (2010a) The value of buses to the economy

Staff

3.60. In its 2010 report, TAS estimated that the UK bus industry directly employs around 123,000 people, who are estimated to spend £2.1bn in other sectors of the economy. This equates to more than 2.5 times the total number of staff working on the railways.

3.61. Unlike many other parts of the economy, the bus industry is largely local in nature - 79% of all industry jobs represent frontline staff which, by their very nature, must be filled by local residents[71]. Added to the fact that bus usage is highest in areas of high deprivation this suggests that an additional pound spend on bus networks is not only going to create jobs in the areas that most need them but that these jobs are also unlikely to leak out of these areas.

3.62. Overall, bus industry employees are estimated to spend £2.1bn in local economies and to contribute £0.67bn to the Exchequer in income tax and national insurance alone.

Vehicle manufacturing

3.63. There are over 46,000 public service buses in Great Britain, more than 10,000 of which are in metropolitan areas alone (which is more than London's entire bus fleet). If we assume an average lifespan of ten years for a typical bus, then the industry will need to replace over 4000 vehicles every year. Assuming an average unit cost of £150k per new bus this would result in annual bus orders worth £600m[72].

3.64. A report for ***pteg***[73] has estimated that two people[74]are employed for every bus produced. Assuming three quarters of all public services buses in circulation are manufactured in the UK, bus manufacturing is likely to employ more than 6,000 people across the country.

3.65. If metropolitan bus networks were to go grow back to their pre-deregulation scale, this could generate well over 1,000 new UK manufacturing jobs. Although industrial policy tends to focus on direct, short term support for individual industries or companies, often focusing on capital investment, our analysis shows how public transport expenditure could generate sustainable and more competitive manufacturing jobs, on top of substantial economic and social benefits.

3.66. It is also worth highlighting that the UK has developed considerable expertise in bus manufacturing and that there are now several companies with a strong international reputation. This is therefore one area where the UK could develop its exporting potential – the global bus market is estimated to exceed 400,000 vehicles per annum worth close to £60bn[i]. It can also be argued that experience in the bus industry equips workers with key transferable skills in engineering, management, marketing, customer service and economics, which can be valuable in other sectors.

[71] DfT Bus Statistics Table BUS0701b: local bus (i.e.: exc. coach) employs 124,000 people GB-wide (2010/11); 21% of these are head office or maintenance staff – all others work directly in bus operations; based on bus-kms (table BUS0203a), we estimate that bus operators directly employ 27,000 people in PTE areas.
[72] DfT Bus Statistics Table BUS0602; N.B.: financing costs and incidental expenses would bring this figure in line with the 21% of industry costs indicated above
[73] Ekosgen (2010), Employment in Sustainable Transport
[74] 24 man months.

Buses – a UK manufacturing success story

Wrightbus and the New Bus for London

Two British companies - Heatherwick Studio in London and Wrightbus in Ballymena, Northern Ireland – were selected to design and manufacture the replacement for the iconic London Routemaster bus. The result is a powerful showcase for British design and low carbon technology.

Heatherwick Studio's design is packed with attractive and innovative features from the rounded edges and corners that minimise the perceived size of the vehicle to the front window angled towards the pavement, enabling the driver to see small children standing next to the bus[ii]. Inside, a welcoming colour scheme, low energy LED lighting, climate control and audio-visual next stop announcements help to enhance the passenger experience[iii].

The New Bus for London(c) Transport for London

Manufactured by Wrightbus in Northern Ireland, the vehicles are fully accessible and produce less than half the harmful emissions of conventional diesel buses, as well as being twice as fuel efficient[iv].

The first bus entered service in February 2012 and a further 600 were ordered from Wrightbus in September 2012 – the largest order of hybrid buses ever placed in Europe[v]. In the same year, Wrightbus won a three year £41m contract to supply 550 double decker buses to Singapore[vi]. The company has a varied portfolio of products, sold across the world including the StreetCar RTV, designed to operate in the tough environment of the Nevada desert[vii].

Back in the UK, every fourth bus sold on a PSV chassis is made in Wrightbus's Ballymena plant[viii]. The company is family owned and managed, and employs more than 1400 people[ix]. It has a turnover of £130m and was ranked among Northern Ireland's top 40 companies in 2012[x].

Optare

Formed in 1985, 2012 saw Yorkshire-based bus company Optare reach the milestone of manufacturing its 10,000th bus[xi]. Meanwhile, export sales reached a record £10.5m in the six months to September 2012[xii]. The company employs around 500 people and its parent company, Ashok Leyland, is ranked among the top five global bus manufacturers[xiii]. Optare has a turnover of £72 million and recently invested £2.2m in a new purpose built manufacturing facility in Sherburn-in-Elmet, Yorkshire[xiv].

Optare's innovative fast-charging electric bus won the prestigious Society of Motor Manufacturers and Traders Award for Automotive Innovation in 2012. Optare is the only producer of full-size, commercially viable, battery powered buses in the UK[xv].

Alexander Dennis

Based in Falkirk, with additional manufacturing bases in Guildford and Scarborough[xvi], Alexander Dennis more than doubled its turnover between 2007 and 2011, from £170m to

£360m[xvii]. Sales are expected to increase by a further 20% in 2012 and a target has been set for turnover of £500m by 2015[xviii]. The company employs around 2,000 people in the UK, continental Asia and North America[xix].

The company won nearly half of the UK bus market in 2011 and also has a growing international presence, with nearly 40% of sales going overseas including Hong Kong, New Zealand and North America[xx]. Europe is also a significant market. According to Transport Resources International, Alexander Dennis registered more city buses last year in Western Europe than either Volvo or Scania[xxi].

In November 2012, Alexander Dennis announced that it had won orders for almost 1,000 vehicles, worth £220 million, all of which will be delivered in the next 18 months, including an order of 530 vehicles from bus operators in Hong Kong[xxii].

Sources: see endnotes

Value of bus networks – an economic balance sheet

3.67. Table seven summarises the results from our analysis. Overall we estimate that **PTE bus networks generate in excess of £2.5bn in economic benefits per year**. Just over half accrue to users, in particular to concessionary passengers. Around a quarter accrue mainly to other road users and society at large through decongestion, reduced pollution and lower numbers of accidents. Almost a fifth accrues largely to businesses and consumers through improved productivity. In the longer term, all these different benefits result in greater quality of life and a more successful economy.

Table 7. Economic benefits of PTE bus networks – summary table (£m, 2010 prices)

	User benefits	Option value	Decongestion	Other Externalities	Wider Economic impacts
Concessionary (older and disabled)	463		72	13	
Children (<16)	144		73	6	
Peak (Commuter/business/education)	301		549	29	
Off-peak (Leisure/personal/ shopping)	296		120	18	
Early morning (6-7am)	32		8	2	
Late evening/night (7pm-6am)	67		22	2	
Sunday	14		5	1	
Sub-Total	**1,317**	**188**	**850**	**72**	**427**
Bus externalities			-229	-24	
Indirect taxation[75]			-90		
Sub-Total	**1,317**	**188**	**531**	**48**	**427**
TOTAL			**£2,511**		

[75] This refers to the loss of fuel duty and VAT revenue to government as the result of the reduction in road traffic and congestion. Although this is effectively a cost to government, DfT appraisal currently treats this as a negative benefit.

3.68. In addition to these benefits, which can be thought of as added value, PTE bus networks also have a direct supply-side effect on economic output, with an estimated contribution to regional economic output of around £2bn[76].

3.69. All these benefits and impacts are achieved from public funding amounting to £542m, more than half of which goes towards concessionary travel reimbursement. Decongestion benefits alone exceed this figure and overall economic benefits are almost five times greater than public expenditure in this area, which are likely to make it one of the most effective areas of public expenditure. In Chapter Six, we attempt to estimate the value for money of individual funding streams.

Bus Lane in Leeds - Metro

[76] £1.2bn turnover, around 90% of which is non-fuel; we have then assumed 87% of the total gets further recycled elsewhere in the economy.

4. Social contribution

- Vulnerable and socially disadvantaged groups in society are most reliant on bus networks - this includes low income households; part-time workers; young people in education, or trying to enter the job market; older people; disabled people; jobseekers and women.
- For example, households in the lowest income quintile use buses almost twice as often as those on an average income, and four times as often as those on the highest income quintile.
- The long term unemployed make three times more bus trips than those on managerial and professional occupations.
- Bus services are key to providing access to opportunity, including providing the jobless with access to jobs; young people to education and training; and providing a way out of social isolation for older and disabled people.

4.1. The previous chapter articulated the scale of the economic benefits that accrue to society as a whole from the existence of bus networks. We have shown that these benefits far outweigh the amount of public funding and farebox revenue received by the industry, itself a strong argument for government support.

4.2. But another important feature of bus networks is that they tend to be of greatest service to the most vulnerable groups in society, be it those on low incomes, those trying to find work, young people, older people or disabled people. The increased access to opportunities which bus networks provide to these groups, and in some cases related health benefits, can make a powerful contribution to greater social inclusion, social mobility and reduced government expenditure on health, social care and welfare payments.

4.3. So it is important, not only to quantify the total amount of benefits which bus networks generate, but also to understand how these benefits are distributed between different individuals. As we will show, the highly progressive nature of bus services provides a further powerful rationale for public spending in this area.

4.4. We believe that this chapter can also help us understand how the economic benefits which we have previously identified are realised in practice, for example when a low income worker can reach a more productive job a bus commute away, and can still make it home to her family in the evening.

4.5. We begin the rest of this chapter by defining social inclusion and how bus networks can help tackle this issue. We then look at how bus services support different groups in society, focusing on each group in turn.

Social inclusion

What is social inclusion?

Social inclusion is perhaps best explained in terms of its opposite – social exclusion. To be socially excluded is to be unable to access the opportunities in life that most of UK society takes for granted. These opportunities include access to employment, education, leisure, key services (such as healthcare), shops and social networks.

This issue can also be considered in terms of social mobility. Social mobility describes the movement, or opportunities for movement, between different social groups and the advantages and disadvantages that go with this in terms of income, security of employment, opportunities for advancement and so on[77].

4.6. We look at the distributional impact of bus networks through the prism of social inclusion, as it provides a helpful framework to identify those groups of individuals for whom public transport, or the lack thereof, is an important constraint on the contribution that they can make to society.

4.7. Of course, provision of transport alone cannot solve the complex pattern of circumstances that lead to social exclusion; however, it is a vital tool in ensuring people have the means to stay connected to the wider world and the opportunities it has to offer.

4.8. To successfully connect people to opportunities, public transport services must be available, accessible, affordable and acceptable. A lack of public transport which fulfils these four criteria can leave people stranded and cut off.

4.9. This section focuses on the value of bus for groups of people who are particularly vulnerable to being excluded in this way:

- **Young people** for whom public transport is a prime means of getting around independently, particularly where the journey is not suitable for walking or cycling. Young people are amongst the biggest users of bus services.
- **Low income households** – over half of households on the lowest real income quintile do not have access to a car[78] and are therefore more likely to rely on public transport. Bus use rises as income falls[79].
- **Older people** who may no longer be fit, or feel able, to drive or be able to afford to run a car. Bus use declines after the age of around 20 but increases again when people enter their 60s[80].
- **Disabled people** who are less likely to have access to a car, and more likely to use bus services than non-disabled people[81].
- **Jobseekers** – 64% of whom either have no access to a vehicle or cannot drive[82]. People who have never worked or are long-term unemployed make significantly more bus trips and travel further by bus than those in employment[83].

[77] HM Government (2009) New opportunities – Fair chances for the future.
[78] DfT National Travel Survey NTS0703 - 2010
[79] DfT National Travel Survey NTS0705 - 2011
[80] DfT National Travel Survey (2010) table NTS0601.
[81] DfT (2008) Travel behaviour, experiences and aspirations of disabled people
[82] Woodland, Mandy and Miller (2003) 'Easing the transition into work (Part 2 – client survey)', p. 146
[83] DfT National Travel Survey NTS0708

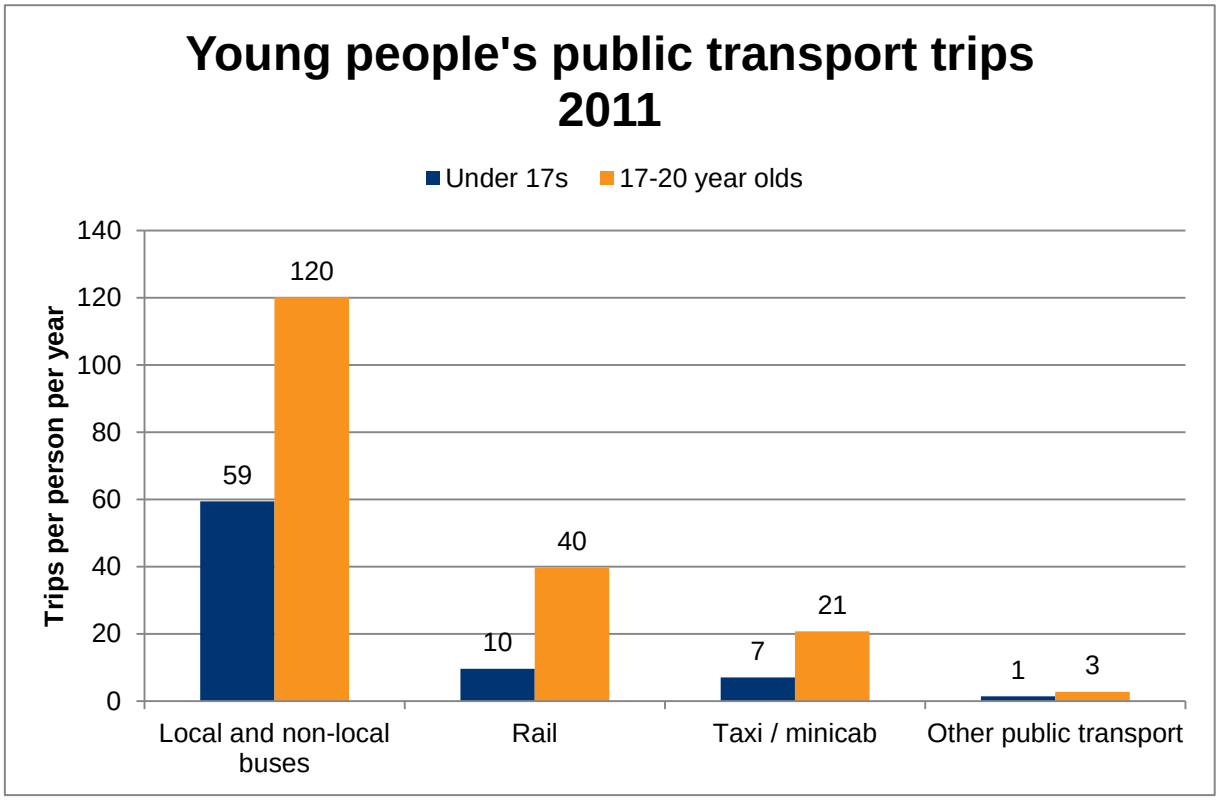
- **Women** who are less likely to have access to a car, and more likely to use the bus than men[84].

Young people

4.10. Public transport, and bus services in particular, are very important to the lives of children and young people, particularly as they begin to travel independently. A nationwide poll of young people, followed by a vote among members of the UK Youth Parliament, decided that 'Public Transport: Cheaper, Better, Accessible' should be the organisation's priority campaign for 2012[85]. A repeat polling in 2012 again saw public transport emerge as a top priority for young people[86].

4.11. Meanwhile, the Youth Select Committee (made up entirely of young people) chose public transport as their first topic for inquiry, issuing a call for written evidence and holding oral evidence sessions over two days in parliament[87].

4.12. It is clear, therefore, that young people themselves value public transport. For most young people, the bus *is* public transport, as the chart below illustrates.



Source: DfT National Travel Survey, table NTS0601

[84] DfT National Travel Survey (NTS0206 and NTS0601)
[85] For more on the campaign see: http://www.ukyouthparliament.org.uk/campaign/public-transport-cheaper-accessible/
[86] 'A massive 250,000 young people took part in UKYP's 'Make your Mark' ballot – find out what they said!' UKYP news release, 22/10/12 available from: http://www.ukyouthparliament.org.uk/2012/news/ukyp-announce-top-campaigns-2013-record-mark-turnout/
[87] For more on the Youth Select Committee see http://www.byc.org.uk/uk-work/youth-select-committee.aspx

4.13. As can be seen from the chart, the bus is by far the dominant mode of public transport for young people and assumes particular importance for 'older' young people. Indeed, at 120 bus trips per year, 17-20 year olds make considerably more bus journeys than the average person in Great Britain, who makes 64 bus trips per year.

4.14. These averages are likely to mask a great deal of variation between the journey patterns of young people of different ages. 11 to 16 year olds, for example, are likely to make more than 64 bus trips a year, as they grow in independence and are likely to need to travel further to education.

4.15. Research by DfT[88] found that young people identify the lack of available bus services, especially in the evenings and weekends, as a key barrier to participating in education, employment and leisure activities.

4.16. This section will now look in more detail at the social contribution of urban bus services for under 17 year olds and for 17-20 year olds.

Under 17s

4.17. Analysis of the National Travel Survey[89] indicates that, for under-17s, the bus is likely to be most important in enabling access to education. Some 20% of trips to and from school by 5-16 year olds are made by bus, rising to 23% in metropolitan areas[90]. Again, the proportion of trips to school made by bus is likely to be much higher than this among 11-16 year olds who are more likely to need to travel further to reach education.


School bus passengers - Centro

4.18. Local councils must provide free home to school transport for young people aged 5 to 16 who are attending their nearest suitable school which is further than walking distance away. In addition to this, available and affordable bus services allow children and their families - particularly those on lower incomes - a broader choice of schools and provide those schools with a more diverse intake. In Consett, County Durham, the council took the decision to stop providing free transport for pupils from the area to a secondary school in nearby Lanchester. The head teacher of the school said at the time:

"Poorer families won't be able to afford to come, I don't want to become a middle-class school. We want a school for the whole community; we want to be able to look after the most vulnerable children."

Head teacher, St Bede's Catholic Secondary School[91]

[88] DfT (2006) Young People and Transport: Their needs and requirements.
[89] DfT National Travel Survey table NTS0611 - 2011
[90] DfT National Travel Survey NTS9908 – 2009/10
[91] 'Local authority cuts: one year on', The Guardian 18/10/11

4.19. Travelling by bus independently can also be a valuable educational experience in itself, offering the opportunity to develop important life skills such as planning a journey, understanding timetables and handling money. Furthermore, independent travel builds confidence, brings young people into contact with a wide range of people, helps in the development of social skills and expands horizons. The latter is important in preventing the territoriality that can see some young people in later years reluctant to travel far beyond their immediate neighbourhood[92], something that can place unnecessary limits on education, employment and social opportunities.

4.20. Bus services are also important in enabling young people from all backgrounds to access positive activities before and after school, such as breakfast clubs, football practice, drama clubs, homework clubs and volunteering.

"My eldest would like to do after-school netball, but there aren't any buses that come near our house at the time she would be leaving, so she can't do it."

Cath, parent of two children[93]

4.21. Such activities are key in building the self-esteem, skills, interests and contacts necessary for social mobility. A report by the All Party Parliamentary Group on Social Mobility found that participation in out of school activities was a key factor in breaking the cycle of social immobility.[94] It recommended that policy makers should explore ways of levelling the playing field on access to, and participation in, out of school activities.

4.22. Available and affordable urban bus services have the potential to help equalise access to these positive activities. Evidence suggests that high bus fares, or even simply a lack of available bus services can prevent parents from allowing their children to participate in such activities.

"For the local sports centre near me…we've got to get a bus to get to it. So my brothers do that, and my mum takes my sister because they have like that little baby club thing there. So if a bus, the price went up, my mum wouldn't take my sister to the little clubs where she can meet other little kids. And my brothers probably wouldn't go to the gym at all."

Young person, 15-16 years old[95]*, London*

[92] JRF (2008) 'Young people and territoriality in British Cities.'
[93] Social Exclusion Unit (2003) 'Making the Connections: Final Report on Transport and Social Exclusion'.
[94] All Party Parliamentary Group on Social Mobility (2012) 'Seven key truths about social mobility'
[95] Jones, A., Steinbach, R., Roberts, H., Goodman, A. and Green, J. (2012) 'Rethinking passive transport: Bus fare exemptions and young people's health.'

4.23. Seemingly small hikes in bus fares can make a big difference to low income families. When child fares had to rise by 20p in Greater Manchester to cover the cost of free travel for older and disabled people, research among parents found that, as a result, they were restricting the journeys that their children made, particularly for those activities falling outside of school[96] as the quotes below illustrate:

"It's reduced the activities she can participate in over weekends and evenings after school."

"I've had to refuse some activities because I just can't afford the cost and also pay for travel to school."

"Pocket money no longer stretches as far, limiting some activities."

Quotes from parents in Greater Manchester[97]

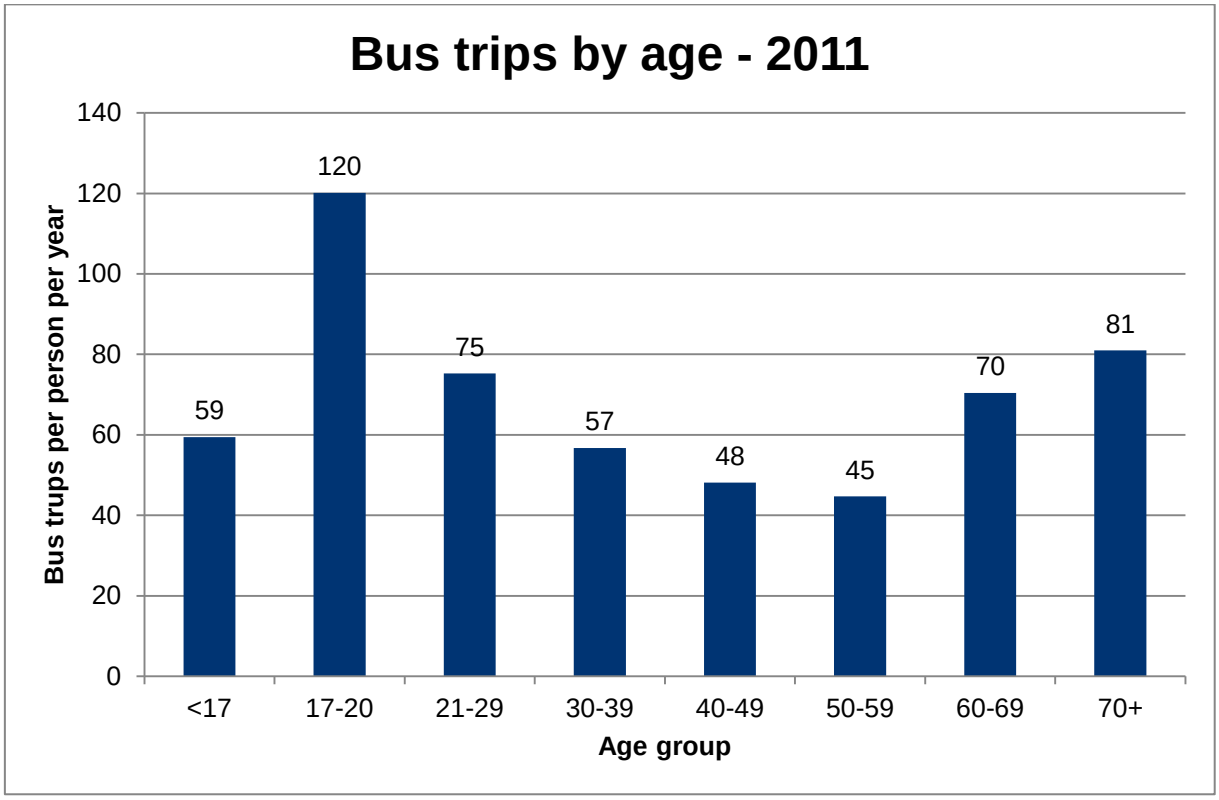
4.24. One way to prevent parents from having to 'ration' the bus journeys that their children make is to introduce capped daily fares. The decision by Tyne and Wear ITA to introduce simplified, flat fares for under 16s travelling on bus and Metro in the area led to a 15% increase in journeys by this group between 2008 and 2012. The fare of £1.10 for an all-day ticket (allowing unlimited journeys) or 60p for a single represents a significant saving compared to commercial fares which can be as much as 90p per single journey. The capped, affordable fare gives young people the freedom to make more journeys to the places they want to go.

17-20 year olds

4.25. From the age of 17, driving a car becomes an option for young people. However, just 31% of 17-20 year olds hold a full driving licence compared to 72% of all people in Great Britain aged 17 or over[98]. This means that many young people of this age will be dependent on lifts or on public transport.

4.26. As the chart (at 4.12) shows, when it comes to public transport, 17-20 year olds make considerably more trips by bus than by any other public transport mode. Indeed, 17-20 year olds are amongst the biggest users of buses, making more trips than any other age group (see chart below).

[96] Greater Manchester Transport Research Unit (2008) Food or education – the impact of the rise in the concessionary bus fare in Greater Manchester.
[97] Ibid.
[98] DfT National Travel Survey, Table NTS0201 - 2011



Source: DfT National Travel Survey table NTS0601

4.27. Analysis of the National Travel Survey shows that the bus is likely to be particularly important in enabling 17-20 year olds to socialise and visit friends as well as to commute to work[99]. As with under-17s, education trips are also important.

4.28. For this group of young people, many of whom have yet to pass their driving test or cannot afford to drive, the bus offers an independent means to access college, university, work, friends and social life.

Access to education

4.29. Affordable and available bus services means that students have more choice about where to study and can base their decision primarily on the courses available, and the quality of the establishment, rather than the costs of getting there. As more and more colleges opt to specialise in particular subjects, rather than offering a broad range of courses, it is likely that students will have to travel further to pursue their chosen educational path.

4.30. Colleges surveyed by the Association of Colleges (AoC)[100] estimate that some 72% of students take the bus to college and that nine miles is the average distance travelled. Students can find the costs of these journeys difficult to meet, especially as, in many areas, young people have to pay the full adult fare after the age of 16.

4.31. In the past, students were able to access the Education Maintenance Allowance (EMA) to help with travel, and other practical costs of attending college. This has since been replaced by the 16-19 Bursary Fund. The move saw funding cut from £560m a year to £180m and eligibility greatly curtailed.

[99] DfT National Travel Survey Table NTS0611 - 2011
[100] Association of Colleges (2011) AoC EMA Transport Survey January 2011

4.32. A survey of AoC members[101] revealed that 94% of colleges felt that the abolition of the EMA will affect student's ability to travel to and from college. The AoC note that the poorest students and those with the lowest skill levels are particularly likely not to enrol, with practical barriers such as the cost of bus fares being enough to deter them[102].

4.33. According to a study by the National Foundation for Educational Research (NfER)[103], a third of young people not in education, employment or training or in a job without training post 16 think they would have chosen to participate in education or training if they had received more money to cover the costs of transport.

4.34. Accessibility is likely to be a key determinant of whether the poorest young people choose to continue in education and go on to university. According to figures from the Higher Education Statistics Agency, over a quarter of Merseyside residents who go on to Higher Education choose to remain in the local area.

4.35. The fact that one of NUS's key current campaigns is 'Get on the bus'[104], focusing on opposing cuts to financial support for travel costs and to bus service provision highlights the importance of this mode for many young people attempting to access education.

Providing access to work and training

4.36. From the age of 16 onwards, the bus becomes an important tool in enabling young people to access employment and training.

Case study: Cobalt Business Park, North Tyneside[105]

Cobalt Business Park in North Tyneside is the largest office park in the UK. Some 600 bus services come through the park daily, services that have proven to be particularly beneficial for younger employees at the site.

"A lot of the younger workforce who don't have any current employment close to where they live have to travel out of their area and the only way they can do that is by bus."

Lynn Cramman, Travel Coordinator for Cobalt Business Park

"It's hard to find your own transport when you're young – especially if it's your first job as you're not going to have any money, you're not going to be able to fund getting a car here or getting a taxi every day, so a bus service is the most direct, best way."

Cobalt Business Park employee

4.37. The ACEVO Commission on Youth Unemployment found that:

'for a great many young people, the costs of transport remain a major barrier to engaging in education or work.'[106]

[101] Association of Colleges (2011) Association of Colleges Education Maintenance Allowance Transport Survey January 2011
[102] Association of Colleges (2011) Association of Colleges Education Maintenance Allowance Transport Survey January 2011
[103] NfER (2008) Barriers to Participation in Education and Training
[104] See http://www.nus.org.uk/en/Campaigns/Welfare-and-Student-Rights/Can-you-afford-to-Get-on-the-Bus-/
[105] Greener Journeys (2012) 'Bus Policy: a five-point plan for growth'

It suggested that:

'high transport costs can eat significant chunks out of the earnings of a young person on the minimum wage, and be a major disincentive to staying in training for a prolonged period, or to undertaking unpaid work experience.' [107]

4.38. A quarter of young people aged 16-25 say they have not applied for a particular job in the last 12 months because of transport problems[108].

4.39. Many of the jobs young people take up are likely to be part-time, low paid and involve evening and weekend working to fit around study and training commitments. Affordable off-peak and weekend bus services therefore have a key role to play in ensuring young people can reach these opportunities.

Providing access to a social life

4.40. The bus as an enabler to a social life is very important to this group. Some 39% of young people aged 16-24 years old think that better public transport would improve their social lives compared to 33% of the general population.[109]

4.41. The quote below, from a young person living in Marchwood on the outskirts of Southampton - an area where bus services have been cut - helps to illustrate how important buses can be to young people's sociability:

"There's been quite a few times where my friends have said do you want to go to the cinema and I can't get there and back so I can't go. It doesn't sound like a big deal but if all your friends are going, you want to go especially when you're 17/18 – you want to go out and do things.

We don't really do as much as we used to. I don't drive so I can't just drive over and see them but if there was a bus it would be so much easier to just get on the bus.

I feel very annoyed. I think it's something that a lot of young people in Marchwood feel quite strongly about as we want to be able to go out and do things but if we don't have the buses we just don't really do anything. You just end up walking round Marchwood and then people get this idea that we're yobs but we're not really we just don't really have anywhere else to go."

Anna, 17 years old[110]

4.42. Research into the impact of free bus travel in London found that even the bus journey itself can be important in enabling young people to maintain social relationships[111]. Research has found that people with poor social networks tend to have poorer health outcomes[112].

[106] ACEVO Commission on Youth Unemployment (2012) 'Youth unemployment: the crisis we cannot afford.' http://vitalregeneration.org/userfiles/ACEVO%20Youth%20Unemplyment_lo_res.pdf (p.62)
[107] ACEVO Commission on Youth Unemployment (2012) 'Youth unemployment: the crisis we cannot afford.' http://vitalregeneration.org/userfiles/ACEVO%20Youth%20Unemplyment_lo_res.pdf (p.62).
[108] DfT (2002) 'Accessibility of local services and facilities'.
[109] Commission for Integrated Transport (2001) 'Public Attitudes to Transport in England'.
[110] Ecorys UK (2012) 'The Social Inclusion Value of Buses – Marchwood'

Low income households

4.43. Low income households are less likely to have access to a car or van, as the statistics below illustrate.

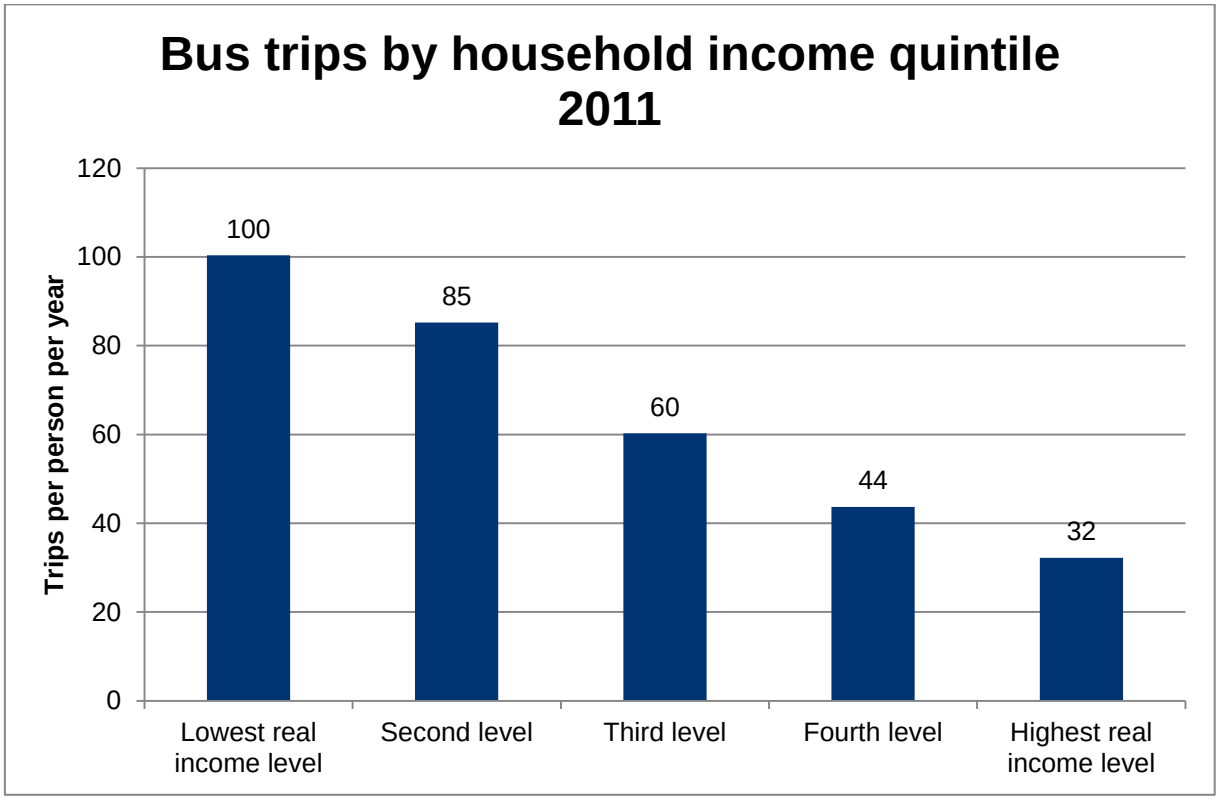
Percentage of people with access to a car or van

75%	51%	36%	27%
All households[113]	**Households on the lowest real income quintile[114]**	**People in receipt of welfare benefits[115]**	**People in receipt of Income Support[116]**

4.44. Levels of car availability may be lower still as those households with access to a car may have to share it, meaning it is not available for all the trips a family may want to take. Research by DfT found that where people shared access to household cars, journeys to work tended to take priority[117]. For single car households, the family vehicle may be exclusively available to the main commuter during the working day and is therefore unavailable for other work, education, leisure, health or social trips.

4.45. The bus is the form of public transport most used by families on the lowest incomes. The average number of bus trips made by households of all income levels is 64[118] per year. As can be seen in the chart below, the average number of bus trips made by households in the lowest income quintile is 100. Bus trips fall as income rises, with people in the lowest income bracket making one and a half times as many bus trips as those on an average income and over three times more trips than those in the highest bracket.

[111] Jones, A., Steinbach, R., Roberts, H., Goodman, A. and Green, J. (2012) 'Rethinking passive transport: Bus fare exemptions and young people's health.'
[112] Morton, B. (2001) 'Evidence of the impact on transport on health'.
[113] DfT National Travel Survey NTS0703 - 2010
[114] Ibid.
[115] Woodland, Mandy and Miller (2003) 'Easing the transition into work (Part 2 – client survey)', p. 146
[116] Ibid.
[117] DfT (2008) The travel choices and needs of low income households: the role of the car.'
[118] DfT National Travel Survey NTS0705 – 2010.



Source: DfT National Travel Survey table NTS0705

4.46. Perhaps not surprisingly, Duffy (2000)[119] found, based on results from the nationwide People's Panel survey, that bus services were more important to respondents in deprived areas, compared with those in non-deprived areas, and that improving bus services was seen as a relatively greater priority in deprived areas.

4.47. Where bus services are poor, people on low incomes may be forced into car ownership which they can ill afford. Barker and Connelly (2005)[120] note that, in Scotland, households on a low income (less than £10,000) showed lower levels of car ownership (37%) if they had access to a frequent bus service (one at least every 10 minutes) compared to low income households who had to wait more than an hour between buses (93% car ownership).

4.48. Further evidence of the potential impact on low income families of poor bus services comes from the Joseph Rowntree Foundation (JRF). In 2008, it developed a minimum income standard (MIS) for Britain based on what members of the public thought people needed in order to achieve an acceptable minimum standard of living[121]. Different MISs were developed for different family types, with people from the particular category under discussion deciding the MIS for that group – e.g. lone parents decide what the MIS should be for lone parent families.

[119] Duffy, Bobby (2000) *Satisfaction and expectations: attitudes to public services in deprived areas*
[120] Barker, L. and Connelly, D. (2005). *Scottish Household Survey Topic Report 2005: Mode Choice*
[121] JRF (2008) 'A minimum income standard for Britain: what people think'

4.49. The MIS is updated regularly. In this year's update[122], for the first time, participants decided that a car has become essential for families with children living in urban areas outside London in order for them to meet an acceptable living standard. This was attributed to cuts to bus service availability, the perceived inflexibility of public transport and high bus fares. The addition of a car as an essential item significantly raised the MIS needed for these households. For example, for a couple with two children, the 2008 transport budget uprated with inflation to 2012 would be £46 a week. The addition of a car costing £60 a week to run, combined with some remaining public transport costs, added £29 a week (net) to the total transport budget for these families[123].

4.50. This suggests that families who cannot afford to purchase a car are likely to find themselves cut off from the activities that their peers perceive are needed to achieve a minimum acceptable standard of living. The bus has the potential to connect these households to opportunities, but only if it runs to the places they want to go and is affordable. Cuts to bus services and bus fare rises mean that this is becoming less likely to be the case. Many of the bus service cuts so far have hit supported services – those which are not profitable for operators to run commercially. These are likely to include buses to isolated housing estates and areas outside of profitable commuter routes.

4.51. Research conducted on the Burbank Estate in Hartlepool[124], at a time when it had lost its only bus service, illustrates the problems that low income communities can face when bus services disappear. Hartlepool was ranked the 24th most deprived local authority in the country in 2012 according to the Indices of Multiple Deprivation. Within Hartlepool, the Stranton ward, which includes Burbank, is ranked the second most deprived ward in the borough and 56th out of the 7,934 wards in England. According to the 2001 Census, 62% of households in the ward had no access to a car (compared to 39% in Hartlepool as a whole).

4.52. In a survey of residents[125], 83% said that the loss of the estate's only bus service had a financial impact on them as they now had to take more taxis. These were expensive and meant that people were not able to get out as much as they wanted to. This was particularly galling for the estate's older residents who had free bus travel but no buses on which to use it. The quotes below from survey respondents illustrate their frustration:

"Can't get out as much as I would like because taxi fares are £3 each way to town"

"It's a big loss in this area. People staying at home more because of cost of taxis"

"Just feel trapped here, what's the point of a bus pass if there are no buses to use it on?"

Burbank residents

[122] JRF (2012) 'A Minimum Income Standard for the UK in 2012'.
[123] JRF (2012) 'A Minimum Income Standard for the UK in 2012'
[124] Ecorys UK (2012) 'The Social Inclusion Value of Buses – Burbank'
[125] Ibid.

Older people

4.53. The World Health Organisation guide to age friendly cities[126] highlights the importance of transport as a gateway to access all the other features that make up an active older age:

'without transportation or adequate means of obtaining information to allow people to meet and connect, other urban facilities and services that could support active ageing are simply inaccessible.'

4.54. It also states:

'Transportation, including accessible and affordable public transport, is a key factor influencing active ageing…In particular, being able to move about the city determines social and civic participation and access to community and health services.'

4.55. The bus is the most important mode of public transport for older people. After 17-29 year olds, people aged 60 and over are the most frequent bus users[127]. Some 40% of those aged 60 and over use the bus at least once a week[128], compared to 29% of the general population[129].

4.56. The high usage of buses amongst older people is in part due to the English National Concessionary Travel Scheme (ENCTS) which entitles them to free, off-peak travel on local buses anywhere in England. An econometric model estimated for the for the DfT suggests that the introduction of the scheme will have had the effect of increasing bus travel by eligible individuals in 2008 by 26% in the metropolitan areas relative to the counterfactual[130]. In 2011/12, there were six million more concessionary passenger journeys in metropolitan areas than in 2007/08, just before the ENCTS was introduced[131].

4.57. Take-up of concessionary passes among eligible pensioners now stands at 79%, with take-up in the metropolitan areas higher still at 86%[132]. In the metropolitan areas, an average of 136 journeys are made per concessionary pass, higher than the England average of 109 journeys per pass[133].

4.58. The most common journey purposes for older people are shopping and visiting friends as well as attending to personal business (including visits to services, such as the hairdressers or the bank and medical appointments)[134]. Bus services are also important in supporting older people to retain their independence.

[126] World Health Organisation (2007) 'Global Age Friendly Cities: A Guide'
[127] DfT National Travel Survey Table NTS0601
[128] DfT National Travel Survey Table NTS0621 - 2010
[129] DfT National Travel Survey Table NTS0313 - 2010
[130] Dargay and Liu (2010), *Concessionary Fares Project - Report 6: Analysis of the National Travel Survey Data*
[131] DfT Bus Statistics Table BUS0105. 'Concessionary passenger journeys' covers statutory and discretionary older people, disabled people and youth schemes.
[132] DfT National Travel Survey Table NTS0619 - 2011
[133] DfT Bus Statistics - Table BUS0821 – 2011/12
[134] DfT National Travel Survey Table NTS0611

"The free bus pass is a godsend to a lot of my older friends. It means they can get out and about without having to pay a fortune in fares. It gives them a better social life and is better than being stuck in the house. Whenever I go on the bus ... it has elderly people on the bus saying it's wonderful to be able to get out and about shopping in nearby towns and visiting relatives that they wouldn't be able to see if they had to pay fares.

Pensioner participating in polling of older people[135].

4.59. In a survey of older concessionary pass holders in Manchester[136], 74% said their passes had enabled them to participate in new activities or visit new places.

4.60. Despite the fact that people increasingly enjoy a sociable, healthy and active older age, it is estimated that overall, around 10% of people aged over 65 in the UK are lonely all or most of the time[137]. Some 12% of older people feel trapped in their own homes and 17% are in contact with family, friends and neighbours less than once a week[138].

4.61. These problems can be exacerbated if the bus services that older people rely on are cut back, curtailing their ability to access key local services and to socialise and maintain vital links with friends and family.

4.62. The story below is from an older resident of the Burbank estate in Hartlepool which lost its only bus service.

Case study: Sheila[139]

Sheila is 62 years old and has trouble walking because of a hip replacement and back problem. Before the bus service was cut, she used to take the bus every day. Now she relies on taxis. Because of the cost, she has to restrict her taxi journeys to the essentials – to get her shopping and attend medical appointments.

Sheila used to go to Bingo twice a week but can no longer afford to do so, because of the cost of taxis. Bingo was an important part of her social life, and Sheila now feels isolated and stuck at home:

"It's just depressing because all you do is sitting in and falling asleep."

4.63. The following quote further highlights how a lack of available bus services can curtail older people's ability to undertake valuable social activities:

[135] Cited in Centre for Social Justice (2010) 'The Forgotten Age: Understanding Poverty and Social Exclusion in Later Life' Interim Report.
[136] Transport Action Group – Manchester (2011) Investigating the impact of concessionary fares on older people's lives.
[137] Oxfordshire Age UK (2012) Loneliness – the state we're in: A report of evidence compiled for the Campaign to End Loneliness.
[138] Oxfordshire Age UK (2012) Loneliness – the state we're in: A report of evidence compiled for the Campaign to End Loneliness.
[139] Ecorys (2012) 'The Social Inclusion Value of Buses – Burbank'.

"I desperately want to join a choir but I can't because there's no way of getting to one – I don't feel like I could justify spending money on taxi journeys to get to choir practice, when there are other, more vital journeys I am having to find money for taxis for, like visiting the doctor. It takes up quite a lot of my pension."

Cy, 68 years old[140]

4.64. Without available bus services, running at suitable times and frequencies, older people can be forced to rely on taxis to get to where they want to go. As the quotes above suggest, the high cost of taxis can mean that older people avoid making all but the most essential journeys. This can mean missing out on the sorts of social activities that are vital to maintaining health and wellbeing as well as to building informal networks of support that can be called upon if needed.

"*It's like a forgotten world. It makes you feel so depressed…we've got bus passes – that's brilliant – I feel like framing mine…But no bus services to use them on. We're on an estate surrounded by main roads. The whole of life is out there but we can't access it."*

Older resident of Burbank estate[141]

4.65. Bus services play a vital role in supporting older people to stay active and independent. The examples above suggest that without such a service, older people can be left feeling isolated and stuck at home. This can lead to people becoming less physically active and more reliant on others for tasks such as shopping, which can affect confidence and self-worth. This has clear implications for health and social care costs as mobility and independence is reduced.

Disabled people

4.66. Disabled people are less likely to drive and more likely to use buses, community transport or lifts from friends and family than the general population[142]. According to research by the Disabled Persons Transport Advisory Committee (DPTAC)[143], 60% of disabled people had no car in the household, compared to 27% of the general population.

4.67. According to the DPTAC research[144], disabled people were most likely to travel as a car passenger (67% had done so in the last month when surveyed), followed by the bus (43%). Among specific impairment groups, local buses were most frequently used by people with visual impairments (57% used the bus at least once a month) and by people with learning disabilities (56%). Wheelchair users travelled on buses much less frequently (11% used the bus at least once a month).

4.68. Responses to the Office for Disability Issues (ODI) Life Opportunities survey reveal that 18% of disabled adults use buses less than they would like and 34% experienced difficulty using

[140] Sustrans (2012) 'Access Denied: Transport poverty in Wales'
[141] Channel 4 News report 'Cuts to bus subsidies leave vulnerable stranded', broadcast 14 August 2011 available from: http://www.channel4.com/news/exclusive-90-of-english-councils-slashing-bus-subsidies
[142] DfT (2008) Travel behaviour, experiences and aspirations of disabled people
[143] DPTAC (2002) Attitudes of disabled people to public transport.
[144] Ibid.

local buses[145]. A lack of accessible public transport services can severely restrict access to opportunity. A survey among disabled people found that[146]:

- 23% of respondents actively seeking employment had to turn down a job offer and a further 23% a job interview, because of inaccessible transport. This is considerably higher than figures found among jobseekers overall where 5% had turned down a job offer in the last year because of transport problems and 12% had turned down interviews[147].
- 48% said that inaccessible transport had restricted their choice of jobs, rising to 62% of wheelchair users and 86% of people with a visual impairment.
- 20% found it difficult or impossible to get the healthcare they needed, because of inaccessible transport.
- 50% of those respondents that did not see their family and friends as often as they would like said that this was a consequence of inaccessible transport, rising to 67% for those without a car. 27% said that inaccessible transport restricted their leisure pursuits, rising to 43% of those without a car.

4.69. Given that the bus is the most commonly used form of public transport among disabled people, it is pivotal in deciding whether or not people can access opportunities for work, education, health and leisure.

> "*public transport makes the difference between my isolation and integration into my local community and beyond. If I can't get to the shops, or to college, not to mention work, how am I expected to be able to live independently?"*
>
> *Local disability campaigner*[148]

4.70. Improvements to bus services have the potential to open up a wealth of opportunities for disabled people. Much progress has been made already[149]. There is now a legal framework for accessibility, free off-peak travel on local buses as well as on-going investment in measures such as low floor buses, training for drivers and accessible information. Examples of investment in accessible transport in the metropolitan areas include:

- **Centro**, in a partnership with Birmingham and Solihull Mental Health NHS Foundation Trust, National Express West Midlands, Community Vibe (a theatre company) and mental health service users, has provided funding for mental health awareness training for bus operators. To date, 1,920 staff (including drivers, inspectors and traffic office staff) at National Express have received training, a figure which is expected to rise to 4,065 by the end of 2013. Mental health service users have reported greater levels of independence as a result of the partnership.
- **Nexus** has developed the Bridge Card as a way of showing public transport staff that the cardholder needs extra help during a journey, whether because of disability, age, illness or a lack of confidence.

[145] Office for Disability Issues (2011) 'Life Opportunities Survey: Wave one results, 2009/11'
[146] Campion, J., Greenhalgh, C. and Knight, J. (2003) 'Mind the Gap: Leonard Cheshire's Social Exclusion Report.'
[147] Social Exclusion Unit (2003) 'Making the Connections: Final Report on Transport and Social Exclusion'.
[148] Webster,L. and Shah, S. (2008) 'Into the Unknown: Disabled People's experiences of public transport'(p. 10)
[149] See ***pteg*** (2010) 'Transport and Social Inclusion: Have we made the connections in our cities?' for a summary of progress towards more accessible public transport services.

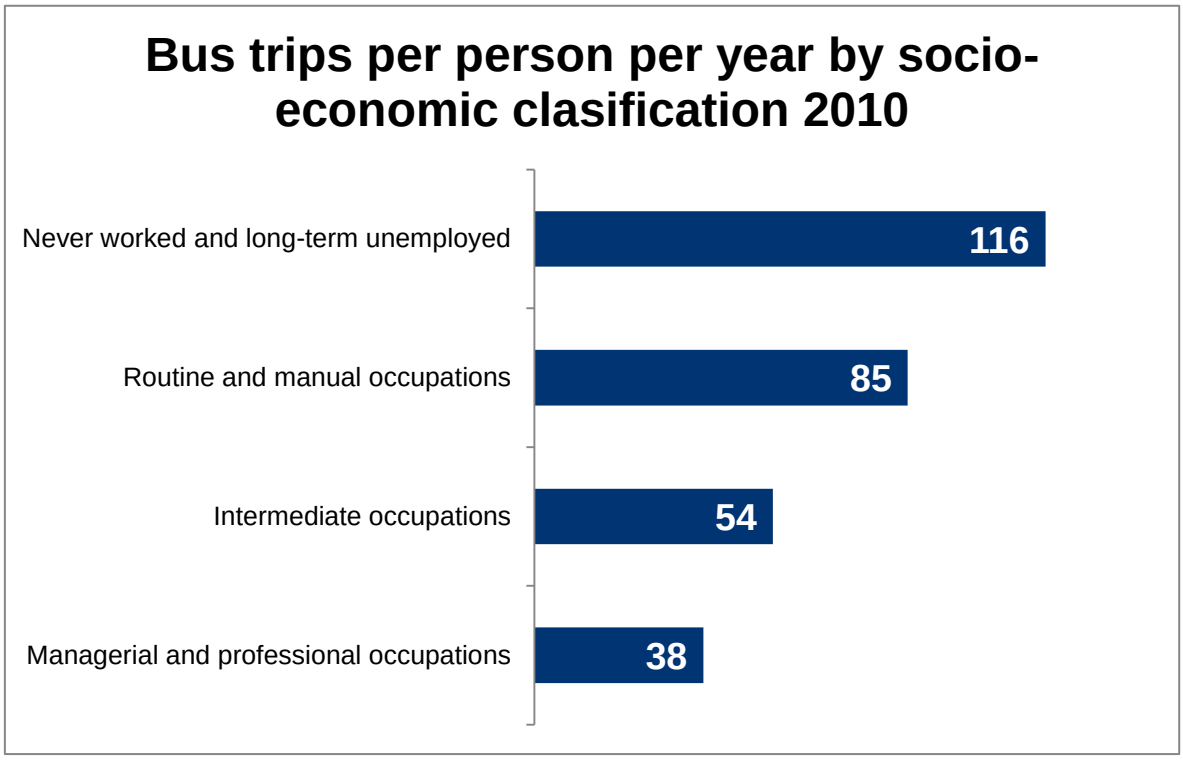
- **Metro** invested £2m in renewing their AccessBus fleet for people who are unable to easily use conventional bus services. All new buses now 'kneel' and have ramps for quick and easy boarding and are narrower and shorter to enable them to get down residential streets to pick up and drop off passengers as near to their door as possible.
- **Centro**, together with RNIB, have produced hand-held tactile plans of a number of their bus stations which are read by touch instead of sight. Customers can use the plans at the bus stations or at home to become familiar with layouts.

4.71. However, we are still a long way from providing a bus network that disabled people can consistently rely on to be accessible. Without continued investment, opportunities for disabled people could be severely curtailed.

Jobseekers

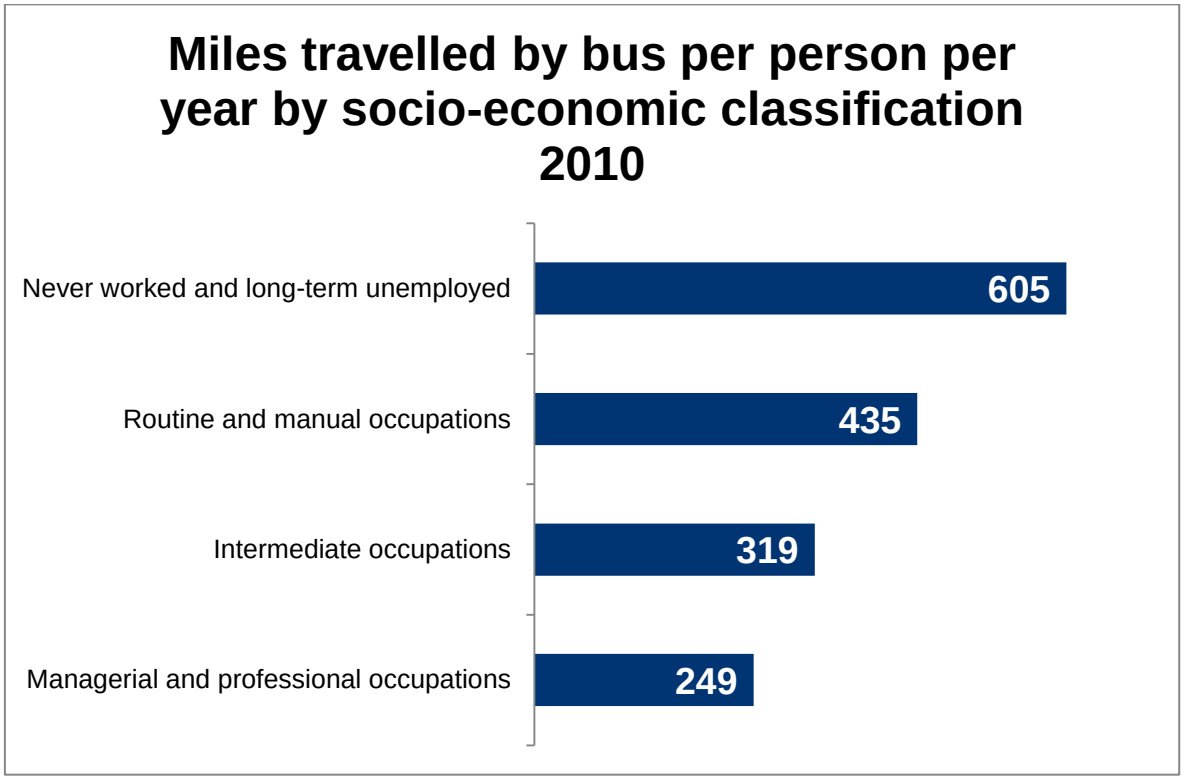
4.72. Employment provides one of the surest routes out of poverty and towards social inclusion. The bus has a major role to play in connecting people to work, given that 64% of jobseekers either have no access to a vehicle or cannot drive[150].

4.73. The charts below provide further evidence of the importance of the bus to people who are out of work. People who have never worked or are long-term unemployed make significantly more bus trips and travel further by bus than those in employment.



Source: DfT National Travel Survey table NTS0708

[150] Woodland, Mandy and Miller (2003) 'Easing the transition into work (Part 2 – client survey)', p. 146



Source: DfT National Travel Survey table NTS0708

4.74. The extent of available and affordable bus services can have a large impact on whether or not someone is able to find, accept and retain employment. Indeed, 38% of jobseekers say that lack of personal transport or poor public transport is a key barrier to getting a job[151].

4.75. A recent study by the Joseph Rowntree Foundation[152], focusing on disadvantaged young jobseekers identified transport as a 'particularly important issue'[153]. The research analysed three contrasting urban local labour markets and potential candidates for low-skilled vacancies. It found that whilst 70 to 90% of unfilled vacancies were easily accessible by car, only 35-55% could be reached within 30 minutes by public transport.

4.76. The following example from South Yorkshire helps to illustrate the difference a bus service can make to people's ability to access employment.

[151] Social Exclusion Unit (2003) Making the Connections: Final Report on Transport and Social Exclusion.
[152] JRF (2012) The Challenges for Disadvantaged young people seeking work
[153] Ibid., p.6.

Case study: Opening up job opportunities at ASOS

ASOS is the largest online fashion store in both the UK and Europe. ASOS partnered with global logistics and fulfilment giant Unipart to manage its European distribution centre when it relocated to South Yorkshire.

ASOS Unipart began recruiting in early 2011, teaming up with Jobcentre Plus they sought to draw candidates from a jobseeker market of largely semi-skilled people aged 19-25 from the local area.

Initial survey data showed that more than 75% of candidates did not drive or have access to vehicles. This made it nearly impossible for them to get to the site, where buses were infrequent and there were no evening or Sunday services. Jobcentre Plus was finding that up to 92 potential candidates per week were unable to accept or apply for a role at ASOS.

In response, SYPTE in partnership with local bus operators altered bus routes stopping at the site and adjusted and expanded timetables to match shift patterns.

Following the alterations, bus patronage on the enhanced services has grown from 108 in the first week of services in late June to 831 per week by September 2011. The bulk of this increase is likely to represent people connected to jobs that they otherwise could not have reached.

4.77. Research by CAB[154] asked JSA claimants to complete the sentence 'It would help me get back to work if…' One of the top two answers was '…I could find work near where I live'.

4.78. A case in point is the former steel making town of Consett, County Durham, where unemployment among 18-24 year olds rose by 13% in the space of a year. There are few jobs available in the area and those that do exist tend to be low-paid and short-term in nature with applicants facing stiff competition. More opportunities are available in the cities of Durham and Newcastle but, at £10 a day, a bus to get there is unaffordable for many jobseekers, forcing them to limit their search to the local area[155].

4.79. More broadly, one in four people say their job search is inhibited by the cost of travel to interviews[156]. Jobseekers are now required to apply for and take up job opportunities that are up to 90 minutes journey away. Given that the majority of jobseekers do not have access to a car, available and affordable bus services will be more important than ever.

4.80. PTE-led WorkWise schemes can assist in this respect. The schemes offer free or discounted travel tickets to interviews and for the first weeks of a new job and personalised journey planning advice to help jobseekers understand where they can get to using public transport. The example below shows how the schemes can help.

[154] Citizens Advice (2010) Fair welfare: Supporting claimants into work'.
[155] Local authority cuts: one year on', The Guardian 18/10/11.
[156] Social Exclusion Unit (2003) Making the Connections: Final Report on Transport and Social Exclusion

Case study: James[157]

James had been looking for work for two years when he was offered a job at Morrisons. He received support from a WorkWise initiative led by Metro in West Yorkshire (known as 'Travel for Work'). The Travel for Work team helped James with journey planning and with the cost of bus tickets. James said:

"I found the travel information really helpful as I work shifts, so I needed to know that I could definitely get home at night. The free MetroCard was great, I catch four buses a day and am paid monthly, so it really helped until the first pay day".

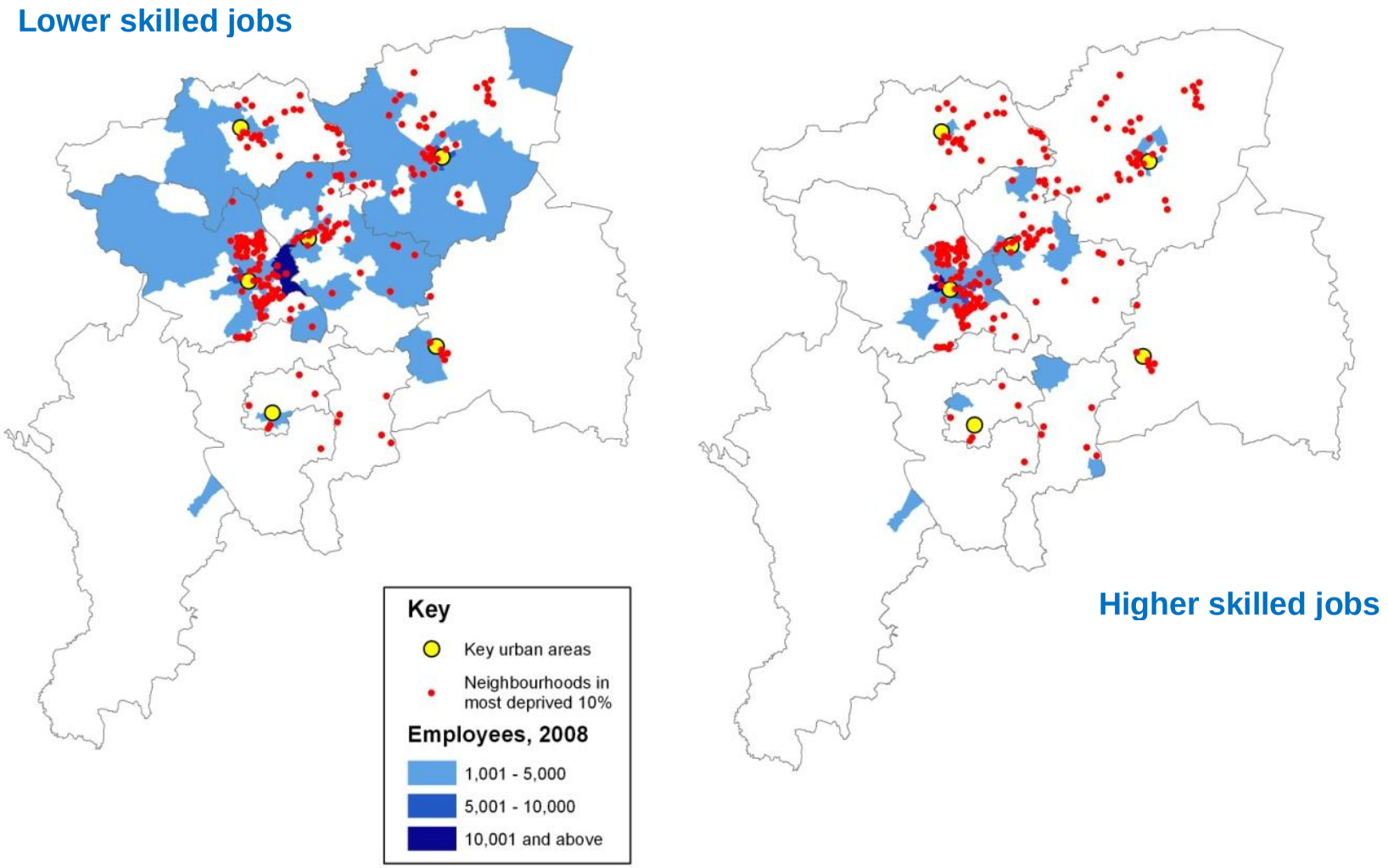
4.81. To date, WorkWise schemes in the West Midlands alone have supported more than 12,500 people into employment, and more than 3,000 people to get to interviews. Evaluation of one such scheme in the area found that more than 80% of customers said that they would have struggled to access employment opportunities without the travel passes provided[158]. In another survey of WorkWise customers, when asked why they valued the monthly pass provided by the scheme, 76% of respondents said it *'Saves me a lot of money/takes away the worry about money.'*[159]

4.82. Buses are also vital for people who have a job, but have low levels of pay. As the charts above show, lower skilled, lower paid workers travel by bus more frequently, and further, than those in intermediate or managerial and professional occupations.

4.83. This could be due in part to the identified mismatches between the places where lower skilled people are likely to live, and where the jobs they seek are located[160]. The maps below (Fig 3) of the Sheffield City Region help to illustrate this issue. The blue areas show where jobs are located – the locations of lower skilled jobs are shown on the left hand map, higher skilled jobs on the right. The red dots show the locations of the most deprived neighbourhoods. The maps show that many of the most deprived neighbourhoods are focused around key urban areas (the yellow dots). However, as the map on the right shows, these areas also tend to contain the largest concentrations of higher skilled jobs. The map on the left shows that lower skilled jobs are more dispersed and are often remote from deprived communities who may wish to access them. Affordable public transport links between these places are vitally important to widen access to employment opportunities.

[157] ***pteg*** (2009) 'WorkWise – a ticket to employment'.
[158] ***pteg*** (2010) 'Transport and Social Inclusion: Have we made the connections in our cities.'
[159] MVA Consultancy (2009) 'Evaluating Performance: Qualitative Study of WorkWise in North Solihull'
[160] Clayton, N., Smith, R. and Tochtermann, L. (2011) 'Access all areas: Linking people to jobs.'

Figure 3. The geography of higher and lower skilled employment in the Sheffield City Region



Source: Clayton, N., Smith, R. and Tochtermann, L. (2011) 'Access all areas: Linking people to jobs

4.84. In addition to dispersed locations, many low-paid jobs involve shift working and unconventional working hours.

Case study: Bus services to support shift working in St Helens[161]

Businesses on the Haydock Industrial Estate in St Helens, Merseyside employ thousands of people, many of whom are shift workers. With no direct bus provision onto the estate, other nearby services did not match workers' needs. Employers on the estate cited this as a major barrier in recruiting new staff and in retaining existing workers.

In a bid to tackle the problem, St Helens Chamber, local businesses, Merseytravel and St Helens Metropolitan Borough Council worked to gather an evidence base to demonstrate the numbers of people that could potentially use a dedicated bus service to the site. The data was taken to Arriva North West and further research was done to cross-reference shift times with postcodes. The research identified demand for bus services around the hours of 6am, 2pm and 10pm seven days a week.

In response, the bus company, with funding from St Helens Chamber, launched the 920 service in 2007 to assist people to get to work at Haydock. The service attracted customers from the day it was launched and is now able to run as a commercial service (with an annual contribution from Merseytravel).

"St Helens has some areas of high unemployment and the people who need work are up to five miles from getting to those jobs. The bus has played a key part in provided much needed jobs for local people and helped staff recruitment and retention for businesses, which in turn enhances productivity."

Sue Waller, Business Advocate for St Helens Chamber

4.85. Cuts to off-peak bus services can have a significant impact on low paid workers and their ability to stay in employment. In Hartlepool (where 60% of people do not have access to a car), all subsidised bus services were cut, leaving just one regular evening service in the whole town. This is likely to leave many people able to get to work in the morning, but unable to get back home in the evening. Reports at the time suggested that this had affected shift workers, with some, for example, faced with a six mile walk home after a shift because of a lack of evening bus services[162].

[161] Greener Journeys (2012) Bus Policy: a five-point plan for growth.
[162] Channel 4 News report 'Cuts to bus subsidies leave vulnerable stranded', broadcast 14 August 2011 available from: http://www.channel4.com/news/exclusive-90-of-english-councils-slashing-bus-subsidies

4.86. Another example comes from Marchwood on the outskirts of Southampton.

Case study: Mark[163]

Mark is in his early twenties and lives in a home for people with learning disabilities in Marchwood, where supported Sunday and evening bus services have been cut back. Mark works part-time in the evenings and at weekends as a steward at a venue in Southampton.

Since the cut backs to bus services, Mark has found it very difficult to get to and from his evening shifts. Mark's shift does not end until 10.30pm, leaving him with few options to get home. Mark's employer agreed to pay for a taxi on one occasion but cannot offer this on a regular basis. Mark cannot afford to pay for taxis himself and so is no longer able to work in the evenings:

"They want me to be there but I've told them that as the bus service has cut down completely I can't come to work in the evenings."

Mark also used to work some Sundays, but now that the bus service has ended, he cannot do these shifts either. The only day that Mark can now work is Saturday and he is concerned that he will lose his job as a result. His earnings have already fallen because of the reduced hours he is able to work due to the bus cuts. Mark says:

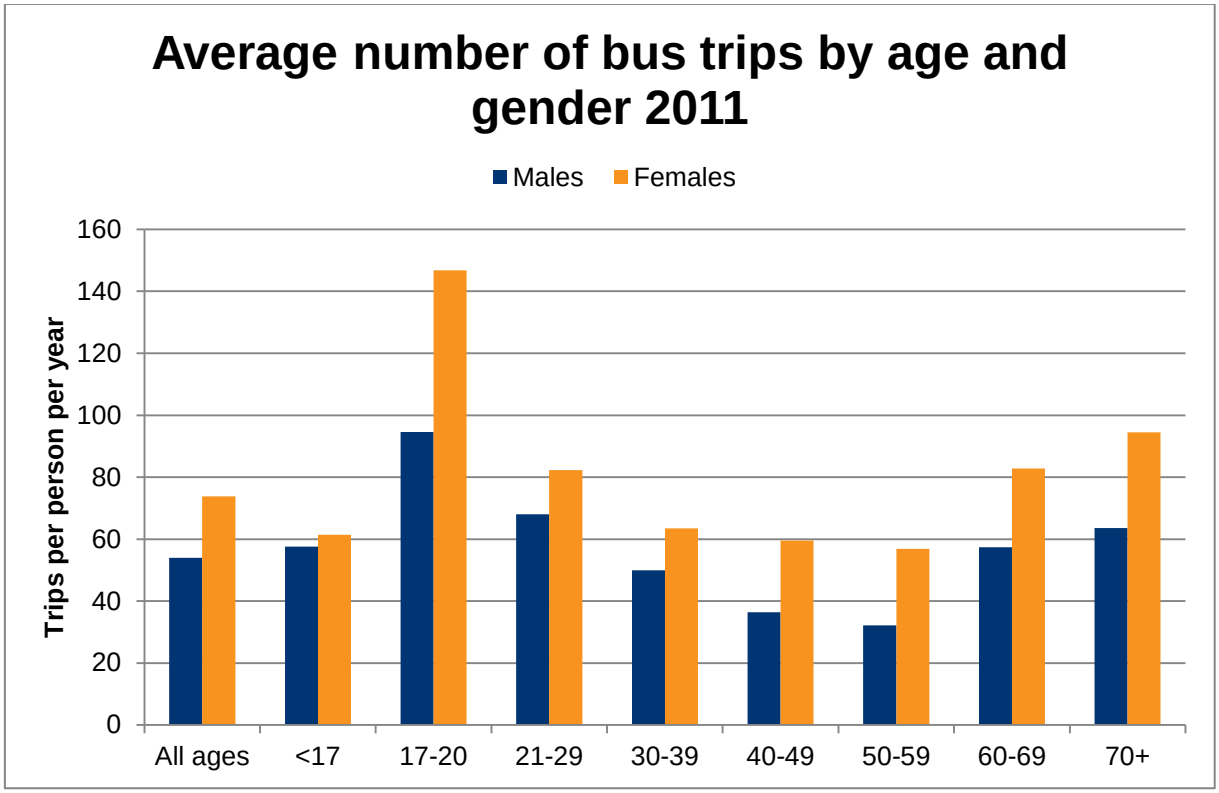
"I don't like being in the house all the time. I like to be independent, going out and enjoying myself."

Women

4.87. Women are more likely to live in a household without a car or van (22% of women compared to 17% men) and, where the household does have a car or van, women are less likely to be the main driver (50% of women are the main driver in their households compared to 62% of men) and more likely to be a non-driver (16% of women compared to 9% of men)[164].

4.88. As the chart below shows, across all age groups, women are more likely than men to use the bus.

[163] Ecorys UK (2012) 'The Social Inclusion Value of Buses – Marchwood'
[164] DfT National Travel Survey NTS0206 - 2010



Source: DfT National Travel Survey NTS0601

4.89. Women tend to travel further on the bus than men, averaging 386 miles per year (compared to 314 for men)[165]. Men aged 21-39 travel further on the bus than women of the same age but for all other age groups, women's mileage exceeds men's[166].

4.90. Women's bus journeys are also likely to contain more stages (where there is a change in the form of transport or where there is a change of vehicle requiring a separate ticket) than men's[167]. This supports previous research suggesting that women are more likely than men to undertake trip-chaining[168]. The bus is therefore likely to be particularly important in enabling women to access opportunities.

4.91. In this chapter, we have sought to illustrate the valuable social contribution made by bus networks. We have shown the bus to be a uniquely effective social policy tool which automatically targets those groups who are most in need of support and enables them to access opportunities. The next chapter describes how bus networks can also make a powerful contribution towards improving people's health and wellbeing.

[165] DfT National Travel Survey table NTS0605 - 2011
[166] Ibid.
[167] DfT National Travel Survey NTS0604 - 2011
[168] European Parliament (2006) 'Women and Transport study'

5. The contribution of bus networks to health and wellbeing

- As mainstream buses do not provide a door-to-door service, journeys involving the bus always include walking trips. Simply walking to a bus stop gets people moving in a way that taking two steps to the car in the drive cannot. The bus can therefore make an important contribution towards meeting daily physical activity targets.
- Buses enable people, particularly those without access to a car, to reach health services and health promoting activities including GP surgeries, sports and shops selling affordable, healthy foods.
- Transport is one of the most important levers for improving wellbeing. Bus travel in particular can contribute to the five 'ways to wellbeing' - opening up opportunities to connect with others, be active, take notice, keep learning and to give.
- Bus travel supports older and disabled people to retain their independence, improving health and wellbeing and reducing the costs of care.

5.1. Transport is among the key issues determining whether or not a person leads a healthy lifestyle. Walking, cycling and public transport offer an alternative to the sedentary lifestyles that cars encourage.

5.2. Furthermore, in reducing road traffic and congestion (each double decker bus can take 75 cars off the road[169]) bus services can help to reduce the risk of injury, poor air quality and community severance caused by road traffic.

5.3. As well as direct impacts on health, bus travel helps to ensure that people can access health services as well as health promoting activities. Bus travel also has the potential to improve wellbeing and promote independent living.

5.4. This section focuses on the role of bus in promoting physical activity, enabling access to health services and health promoting activities, improving wellbeing and promoting independent living.

Promoting physical activity

5.5. Currently, just one in twenty adults achieve the recommended minimum level of physical activity of 30 minutes of moderate activity at least five days a week[170]. This has been estimated to cost the country in excess of £8bn per year[171].

5.6. The 30 minute target can be achieved in short bursts of activity. As mainstream buses do not provide a door-to-door service, journeys involving the bus always include walking trips. Simply walking to a bus stop gets people moving in a way that taking two steps to the car in the drive cannot.

5.7. An American study[172] has found that people who use public transport spend a median of 19 minutes daily walking to and from public transport. It found that 29% of people achieve the

[169] 'Bus travel 'a third less stressful than the car'', Greener Journeys news release, 20 September 2010.
[170] NHS Information Centre (2009) Health Survey for England 2008.
[171] 2002 estimate cited in NHS Information Centre (2009) Health Survey for England 2008.
[172] Besser, L.M. and Dannenberg, A.L (2005) 'Walking to Public Transit: Steps to help meet physical activity recommendations' in American Journal of Preventative Medicine 29 (4) pp.273-280.

required 30 minutes or more daily physical activity solely by walking to and from public transport. People in low income households, minority groups and people in high-density urban areas were particularly likely to spend 30 minutes or more walking to and from public transport. The study concluded that:

'Increased access to public transit may help promote and maintain active lifestyles.'[173]

5.8. In the UK, a study by Mindlab[174] found that walking as part of a return trip by bus provided up to half the recommended daily level of exercise. Participants in the study walked an average of 1.3km (taking around 15 minutes) when taking a return journey by bus, 2.5 times more than when taking the same journey by car.

Active lifestyles - walking

5.9. Concerns have been raised that significant increases in the availability and affordability of bus services (such as free bus travel) could begin to act as a disincentive to walking and cycling. However, there is growing evidence to suggest that this is not the case.

5.10. A study by the Imperial College London, for example, analysing four years of data from the UK National Travel Survey found that people with a bus pass are more likely to walk frequently and take more journeys by 'active travel' – such as walking, cycling or using public transport. Passholders in large urban areas were found to be particularly likely to use active transport[175].

5.11. Another, longitudinal, study[176] of around 9,000 people in England found that free passes for older people had increased their public transport use and that older people who used public transport had reduced odds of being obese compared with those who did not. It found that those who used public transport, or took advantage of free bus travel, were 25% less likely to be obese in 2008 than those who did not.

5.12. Research has also been conducted into the health impacts of free bus travel for young people in London[177]. Researchers found that whilst free bus travel removes any financial incentive to walk (and so displaces some walking trips) it also generates additional trips. It is not yet clear whether the generation of additional trips outweighs the displaced trips, however, the researchers found evidence that bus travel is far from a passive mode of travel.

[173] Bessler, L and Dannenberg, A. (2005) 'Walking to public transit: Steps to help meet physical activity recommendations' (p.273).
[174] 'Why taking the bus is good for your health', Greener Journeys news release, 12th September 2011.
[175] Coronini-Cronberg, S. et al (2012) The impact of free older persons' bus pass on active travel and regular walking in England.
[176] Webb, E., Netuveli, G. and Millett, C. (2011) 'Free bus passes, use of public transport and obesity among older people in England.'
[177] Jones, A., Steinbach, R., Roberts, H., Goodman, A and Green, J. (2012) 'Rethinking passive transport: Bus fare exemptions and young people's wellbeing.'

5.13. The study found evidence that:

- Free bus travel generated extra walking journeys that either would not have been undertaken without the fare exemption, or would have been carried out as a car passenger.
- Journeys might be undertaken less often without free bus travel.
- In suburban areas in particular, free bus travel generated physical activity by encouraging hybrid walking and bus trips, rather than door to door journeys as a car passenger.
- Being able to travel for free meant young people would often take journeys involving multiple buses and interchanges and that these journeys involved walking or running between buses and stops.
- Riding the bus itself did not necessarily mean remaining sedentary – active behaviour included standing; moving between friends or sitting on different parts of the bus; running to or between buses; running off the bus after nearly missing their stop and 'even using metal bars intended to help passengers support themselves as ad hoc exercise frames.'[178] According to Government physical activity guidance, even simply 'standing rather than sitting means that your body is working harder.'[179]

5.14. The bus, therefore, provides far more opportunities to be physically active than sitting in the car. Unlike the bus, the car provides very limited opportunities for movement inside the vehicle (and no opportunity for standing) and tends to transport people from door to door, reducing opportunities for walking.

Enabling access to health services and health promoting activities

5.15. A review by the NHS found that one of the key challenges for improving patient access to health services was an assumption that private transport will normally be available[180], meaning that the need for other transport options is not always taken into account.

5.16. Some 44% of people without access to a car find it difficult to get to the doctors or to hospital[181]. This means public transport, and the bus in particular, has an important role to play in ensuring people are able to access health services.

5.17. Missed outpatient appointments alone cost hospitals £600m a year (£100 in lost revenue per missed appointment)[182]. Research has shown that the likelihood of missing an appointment rises with increasing levels of deprivation and is also more common among the younger and older extremes of the age spectrum[183]. Whilst other factors are likely to be at play, it is surely no coincidence that these are also the groups who are least likely to have access to a car.

5.18. The example below shows the difference a bus service can make in reducing missed appointments.

---

[178] Ibid.
[179] See Change 4 Life website page 'Active travel – get going while you're on the move!' at http://www.nhs.uk/Change4Life/Pages/active-travel-ideas.aspx
[180] Hamer, L. (2004) 'Improving patient access to health services: a national review and case studies of current approaches.'
[181] Defra (2009) 'Sustainable Development Indicators in your Pocket 2009'.
[182] Doctor Foster Health and the NHS Information Centre 'Outpatient appointment no-shows cost hospitals £600m a year' http://www.drfosterhealth.co.uk/features/outpatient-appointment-no-shows.aspx
[183] Ibid.

Case study: The GEM Centre
The GEM Centre is a key centre supporting children with special needs or disabilities in the Wolverhampton area. However, it was built on an isolated site, and families in poorer areas of the city were struggling to access it because of the lack of bus services to get there.

In response, Centro, together with the health authority and a community transport organisation put on a dedicated bus service.

Before the bus service was introduced, the centre had a high proportion of people who were missing their appointments. Following the introduction of the bus service, missed appointments at the clinic dropped by 60%.

5.19. As well as connecting people to health services, buses also play an important role in enabling people to access to shops selling healthy and affordable food. A study by City University London found that local food shops tend to be used by people on a low income who are more likely to have difficulty transporting food than higher income groups[184]. Local convenience stores are likely to be more expensive and more limited in their range of healthy food. Bus services, such as in the example below, can help people to access supermarkets where cheap, healthy food is more readily available.

Case study: Local Link
Transport for Greater Manchester runs a number of 'Local Link' door-to-door bus services. The services provide a vital lifeline for many people. Research into just one of the Local Link services, for example, found that a quarter of passengers would have been unable to make their journey if the service ceased. The bus opens up vital opportunities for this group given that the majority of journeys made using the Local Link were to key health facilities, fresh food shops and employment.

5.20. Bus tickets can be used to incentivise participation in sports and leisure activities to benefit health. The Nottingham Citycard, for example, automatically saves Nottingham residents up to 5% on most activities at city leisure centres and up to 50% for people on certain benefits[185].

Improving wellbeing

5.21. In 2008, nef (the new economics foundation) developed 'Five ways to wellbeing'[186] as part of the then government's Foresight Mental Capital and Wellbeing project. nef describe transport as one of the most important levers for improving wellbeing[187].

[184] Caraher, M., Dixon, P., Lang, T. & Carr-Hill, R. (1998). Access to healthy foods: Part I. Barriers to accessing healthy foods: Differentials by gender, social class, income and mode of transport.
[185] Details of Adult Citycard benefits can be found at: http://www.citycardnottingham.co.uk/AdultEasyriderCitycard.html
[186] **nef** (2008) Five Ways to Well-being available from http://neweconomics.org/projects/five-ways-well-being
[187] **nef** (2010) The role of local government in promoting wellbeing.

5.22. Bus travel can contribute to all five 'ways to wellbeing' identified by nef:

1. **Connect with people around you:** buses connect people to family and friends, whether on the bus itself or at the places buses link people to.

   A recent study of young people's use of buses in London found that *'Buses provide a key site for sociability and public engagement in the city'*[188]. As one young research participant commented:

   "It's one of the main things you do on the bus, if you do go out with someone you sit down and you talk about things."

   The same can be true for other groups. Even simply talking to people at the bus stop or on the bus can make a big difference to people who might otherwise be lonely or isolated. The bus provides an environment for encountering and interacting with a broad range of people, who may not meet under ordinary circumstances.

   Furthermore, by reducing traffic congestion (each double decker bus can take 75 cars off the road[189]) we can create environments where it is easier for people to interact socially and which promote outdoor play[190].

2. **Be active:** walking to and from the bus stop can help meet recommended daily levels of physical activity (see p.58 for more on this topic). Buses can also connect people to sports and leisure facilities.

3. **Take notice:** travelling on the bus allows time to think, look out of the window and notice the world around us.

4. **Keep learning:** the bus can enable people to access school, college, university and other formal and informal learning activities. Time spent on the bus can also be used to read or do work.

5. **Give:** as well as helping people get to volunteering activities, the communal experience of travelling on a bus presents opportunities to do positive things for other people – such as giving up a seat for someone else or helping someone with a buggy get off the bus.

5.23. Research by Mindlab[191] found that taking the bus rather than the car can reduce mental stress by a third. The study measured the heart rate and EDR (Electro-Dermal Response – an indicator of mental stress) of 30 commuters taking similar journeys by car and by bus. In addition to the biophysical data, participants were asked to rank their stress levels for each trip. Despite not being regular bus users, 93% said that they found driving more stressful than the same journey by bus.

[188] Jones, A., Steinbach, R., Roberts, H., Goodman, A and Green, J. (2012) 'Rethinking passive transport: Bus fare exemptions and young people's wellbeing.'
[189] 'Bus travel 'a third less stressful than the car'', Greener Journeys news release, 20 September 2010.
[190] For more on the impact of traffic volumes on quality of life see Hart, J. and Parkhurst, G. (2011) 'Driven to Excess: Impacts of Motor Vehicles on the Quality of Life of Residents of Three Streets in Bristol UK'
[191] 'Bus travel 'a third less stressful than the car'', Greener Journeys news release, 20 September 2010.

Promoting independent living

5.24. Free off-peak bus travel for older and disabled people, accessible bus services and door-to-door or Ring and Ride buses all play a key role in helping people to retain their independence.

5.25. They enable people to independently access shops, services and activities. Furthermore, they mean that vulnerable people can simply get out of the house and see other people, something that can make a big difference to a person's wellbeing and likelihood of keeping healthy. The relationships that are built in this way can also act as a valuable support network.

5.26. Bus drivers (particularly drivers of smaller, door to door bus services) also become familiar with their passengers and can raise the alarm should a person not appear on board the bus when they normally would.

5.27. Just one Ring and Ride service, funded by Centro in the West Midlands, serving 31,000 active registered blind and disabled users is estimated by accountants Grant Thornton to save the health sector between £13.4m and £58.5m. The savings are due to the reduced need for care, home help and meals; reduced use of costly taxi, district, Community or NHS transport; reduced need for escorts; and improved access to employment[192].

5.28. All PTEs support similar Ring and Ride or door-to-door bus services, likely to result in millions of pounds worth of savings for the health and social care sector each year.

5.29. This chapter has sought to illustrate the contribution that bus networks make to health and wellbeing. It has shown how bus networks boost physical activity; improve access to health services and health promoting activities; foster good mental health; and promote independent living. The next chapter sets out a cost benefit analysis of three bus policy initiatives – free concessionary travel for older and disabled people, fuel duty rebate (BSOG) and support for tendered services.

[192] West Midlands Integrated Transport Authority, internal briefing.

6. Value for money of public funding

- Unlike most other goods and services, bus networks generate a significant proportion of benefits which accrue to other road users and society at large, rather than to passengers themselves. Buses also have low marginal costs and are disproportionately used by the most vulnerable groups in society. These form the core of the argument for public funding of bus networks.
- The national travel concession generates £1.50 of benefits for every £1 of public money spent. Around one fifth of these benefits accrue to other transport users and society at large rather than to those who benefit from the concession.
- BSOG generates at least £2.80 of benefits for every £1 of public money spent. Around half the benefits accrue to other road users and society at large through decongestion, reduced accidents/pollution and improved productivity.
- Local government expenditure to support non-commercial bus services can generate benefits in excess of £3 for every £1 of public money spent, at certain times of day. Most of these benefits accrue to bus users who would otherwise have not been able to access opportunities or seen a steep increase in their transport expenditure.

6.1. Previous chapters have set out the overall social and economic benefits generated by bus networks. We have estimated that, in metropolitan areas, this essential service generates over £2.5bn of economic benefits per year. We have also shown that these benefits accrue in greater proportion to the lower income groups in society. These facts are recognised by central and local government agencies, which contribute a significant amount of public funding towards users and operators. Overall, we estimate that bus networks generate economic benefits that are five times greater than the amount of public funding they receive, though this figure says nothing about the proportion of benefits which would still materialise in the absence of public funding.

6.2. In this chapter, we to try to understand the value for money achieved from different public funding streams. The objective is not necessarily to compare the relative merits of different types of expenditure. There are many challenges in disentangling the effect of individual funding streams on specific market segments and services types – our work therefore relies on a number of assumptions and needs to be interpreted accordingly. What we hope this analysis does achieve is to highlight the mechanisms through which different funding streams generate social and economic benefits, so that public funders in particular understand the potential implications of changes in policy and funding.

6.3. The focus of this report is on revenue spending rather than capital schemes, which are typically the subject of detailed appraisal and whose merits will depend on project specific factors and local circumstances. For a detailed discussion of the value for money of bus capital spending, we refer readers to a recent ***pteg*** report on the value of small public transport schemes[193].

[193] Jacobs Consultancy (2011), Value for Money and Appraisal of Small Scale Public Transport Schemes.

6.4. This chapter starts by looking at free concessionary travel for older and disabled people and then goes on to consider fuel subsidy (in the form of the Bus Service Operator Grant) and subsidy for socially necessary services.

Why buses merit public funding

As set out in previous chapters there are a number of reasons why bus networks warrant public funding:

- They generate a significant proportion of **non-user benefits and externalities**, including decongestion, reduced pollution, lower accident rates and improved city centre productivity.
- Bus operations have **low marginal costs**; once a bus is running, it costs relatively little to carry an additional passenger. This is part of the rationale for the national concessionary travel scheme and the reason why most services warrant some level of subsidy.
- They hold a **stand-by, or option, value** even when individuals choose not to use them. Some of this value is closely related to the existence of comprehensive bus networks, available as and when required.
- Socially disadvantaged groups tend to disproportionately rely on bus services. Public funding of bus use by lower income groups therefore contributes to **greater equity and social inclusion**.

Concessionary travel for older and disabled people

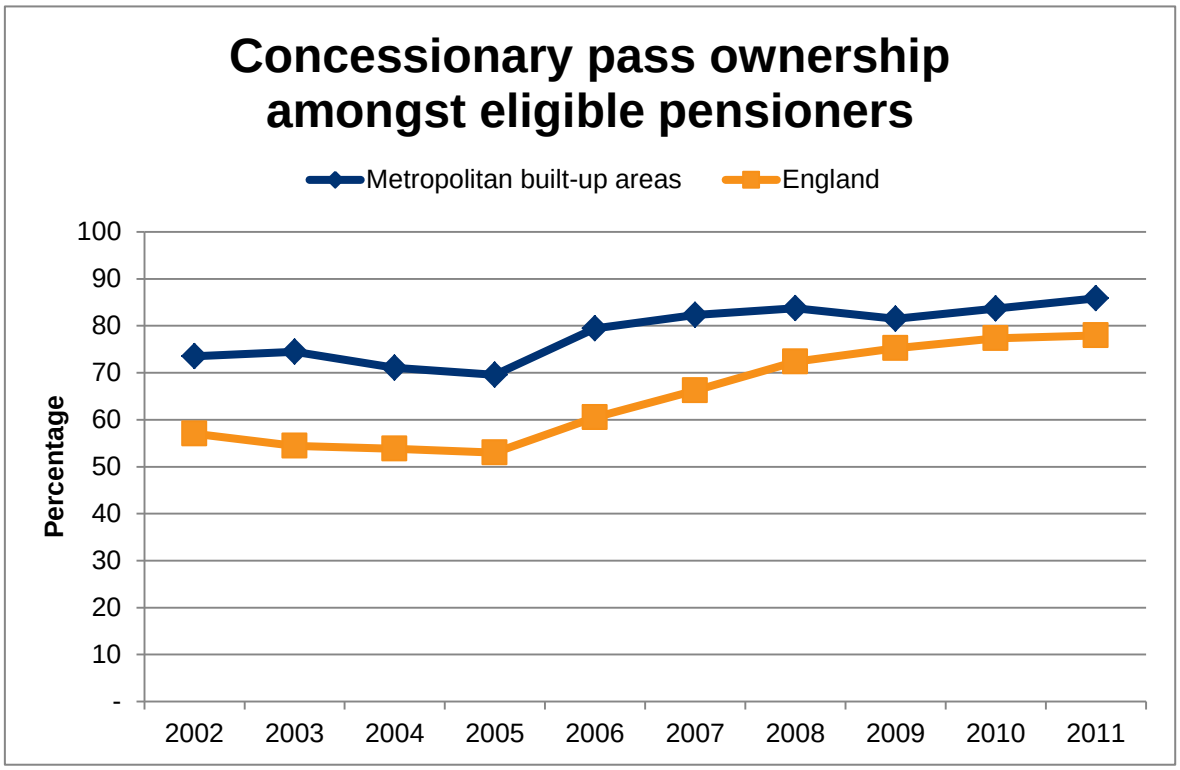
6.5. From April 2008, residents in England, aged 60 and over or with an eligible disability became entitled to free, off-peak travel on local buses, anywhere in England. This extended a previous national concession, introduced in 2006, which allowed for free off-peak bus travel within an eligible individual's local authority area of residence. Equivalent concessions are also provided to residents of Wales, Scotland and Northern Ireland under separate schemes. In London, local eligible residents are entitled to free all day travel on bus, tube, boat and local rail, as well as free bus travel elsewhere in England – this scheme is known as the Freedom Pass and it has been in existence under different guises since the early 70s. There are currently nine million older people's passes and 748,000 disabled passes in circulation in England[194].

6.6. Many PTEs previously had local concessionary schemes for older and disabled people before the introduction of the national concession. In some cases, these already allowed for free local travel prior to the national scheme coming into place. In parallel with the national concession, some PTEs also offer specific local enhancements such as free travel on local tram and rail services or an extension of free travel before 9.30am. Partly because of this, the increase in pass ownership in PTE areas has been less steep than elsewhere in England (see figure on next page).

6.7. From 2010, the age of eligibility for the national scheme has started to increase in line with State Pension Age and will reach 66 by 2020. The Mayor of London has recently announced a so-called 60+ concession, which will guarantee that local free travel will continue to apply to those between 60 and the age of entitlement.

[194] DfT Bus Statistics Table BUS0820

6.8. At over £1bn nationally, the English National Concessionary Travel Scheme (ENCTS) represents the single largest item of bus-related public expenditure. In metropolitan areas, PTEs spend around £250m per year to cover the cost of the scheme, which is almost twice the total expenditure on tendered networks, school services and community transport put together. PTEs and other Travel Concession Authorities (unitary authorities and shire counties) are required to reimburse commercial bus operators for revenue forgone and the additional capacity costs required to carry the additional passengers generated by the concession. Given that bus networks tend to operate with a significant proportion of spare capacity outside the morning peaks and that concessionary travel tends to peak in the middle of the day[195], generated passengers are carried at very low marginal cost (typically 10-15p[196]). The bulk of the cost of the scheme therefore arises as the result of reimbursement for revenue forgone, therefore largely representing a transfer to those groups who made most use of bus networks prior to the introduction of the concession.



Source: DfT National Travel Survey table NTS0619

6.9. The **rationale** underlying public funding of free off-peak travel for older and disabled passengers is essentially based on the following arguments:

- **Equity/income redistribution**. Seen in its simplest form, the concession effectively amounts to a reduction in the cost of travel for those trips which would have been made by bus regardless of the concession being in place. Bus use amongst the older population prior to the concession was highest amongst the lowest income quintiles so it can be argued that this policy is an effective redistributive mechanism.
- **Decongestion and externalities**. Given the degree of spare capacity in bus networks outside of the morning and evening peaks, ENCTS is likely to be a relatively cost effective

[195] See Abrantes and Last (2011) for an empirical analysis of this issue.
[196] ***pteg*** analysis using DfT reimbursement calculator.

way to reduce car travel by eligible individuals. Increase in bus use following the introduction of the concession was highest amongst higher income individuals.

- **Health and wellbeing**. Older people and disabled people are two of the groups in society most at risk of social exclusion, isolation and poor health, all of which can be mutually reinforcing. It is hoped that, by stimulating greater social interaction and a more active life style, free travel can help break this vicious circle. This can improve quality of life but it may also reduce the cost to the taxpayer of health and social care provision.
- **Increased service frequency**. Bus operator reimbursement includes an allowance for additional capacity costs that may be required to accommodate the additional trips being made. This increase in off-peak frequency would in turn lead to an increase in fare paying passengers, and concomitantly in user and non-user benefits.

6.10. Table 8 summarises our assessment of the benefits, costs and overall benefit-cost ratio of the ENCTS. Our assumptions and detailed workings are documented in the appendix. Below, we discuss each of these factors in more detail.

Table 8[197]. Welfare assessment of the national concessionary travel scheme

	Benefits		Costs
Welfare gain to old users (transfer)	£232m	Reimbursement for revenue forgone	£232m
Welfare gain to new users	£69m	Reimbursement for additional capacity costs	£22m
Deadweight welfare loss[198]	-£0.5m		
Decongestion/other externalities[199]	£42m		
Wider Economic Impacts (WI1)	£19m		
Welfare gains to other bus users	£27m		
Health benefits (equally split between users and government/society)	£16m		
Bus externalities	-£20m		
Indirect taxation	-£8m		
Total	£377m		£254m
Benefit:Cost Ratio	**1.5 : 1**		

[197] Source: "t:\Projects\Bus fares and subsidies\the case for bus (2011)\concessionarytravel\welfare_calculations.xlsx"
[198] This is equivalent to the gain in consumer surplus to those passengers who would be unwilling to cover their marginal cost.
[199] Net of indirect taxation

6.11. Not surprisingly, given that the ENTCS is effectively a transfer between taxpayers and eligible individuals, the greatest proportion of benefits from the scheme accrue to users, in particular to those who would have still used the bus in the absence of the concession.

6.12. The equity rationale for the scheme stems from the fact that older users have a higher level of deprivation than the population at large. For example, Dargay and Liu (2010) show that, in metropolitan areas in 2001, of those bus users eligible for the concession, only 28% had access to a car, compared to 54% of other bus users and 80% of the population at large[200].

6.13. Although by 2008 this proportion had gone up to 45%, bus trip rates for individuals from non-car owning households were still five times greater than for those with access to a car (3.7 and 0.8 trips per week respectively). The same authors also show that reliance on the bus increases rapidly with age (16% of all trips by 85+ year olds are by bus compared to 8% for 60-69 year olds) whereas income, mobility and health are all likely to evolve in the opposite direction. The ENCTS can therefore be seen as a relatively effective redistributive mechanism.

6.14. Another point to note is that the benefits to new users are achieved at a comparatively low cost (£69m of benefits, net of deadweight loss, for a cost to tax-payers of £22m, implying a BCR above 3:1 for this part of the expenditure). This is because the marginal cost to operators of carrying an additional off-peak passenger, once a service is already running, is almost negligible[201] in comparison to the average fare level[202]. This fact means that the concession brings demand and fare levels closer to their welfare maximising optimum.

6.15. Moreover, the increase in bus service frequency that it is estimated would be required to accommodate additional passengers could generate further benefits to non-concessionary bus users of around £27m, taking the partial BCR to 4.3:1.

6.16. Another important characteristic of public transport networks, which makes them a particularly effective way to use public money, is that increases in patronage can generate substantial positive externalities to other transport users and society at large. According to our calculations, the increase in demand as a result of the concession will have led to a reduction in congestion and other private transport externalities, as well as positive wider economic impacts, amounting to £52m per year[203].

6.17. Finally, research by Kelly (2011) has suggested that the move from the local to a national concession led to an increase in the number of walking trips amongst pass-holders of around six per year. Using the NZTA's estimate of the health benefits of walking trips of around £1 per km[204], we have estimated that this will have amounted to an additional £16m in annual economic benefits. Bearing in mind that most bus concessionary trips are within the same local authority area, the overall health benefits of free bus travel could be several times higher.

[200] Dargay and Liu (2010), Concessionary Fares Project - Report 6: Analysis of the National Travel Survey Data (p.49)
[201] According to the DfT's Concessionary Reimbursement Guidance, this figure is close to 7p/trip.
[202] Our calculations take into account the dead-weight loss that results from the difference between free travel and marginal cost pricing, as well as the additional capacity costs required to accommodate generated passengers.
[203] This is net of bus externalities.
[204] New Zealand Transport Agency (2008), Research Report 359 Valuing the health benefits of active modes

6.18. Overall, our analysis suggests that the ENCTS generates an overall benefit cost ratio of at least 1.48:1. The characteristics of public transport (low marginal costs, user and non-user externalities, including health benefits) mean that this benefit-cost ratio is significantly higher than the figure of 1 which a straightforward transfer would typically imply[205] and is likely to make this much more effective than most other similar social policies.

Bus Services Operators Grant (BSOG, formerly known as Fuel Duty Rebate)

6.19. Bus operators are entitled to claim back some of their fuel tax from the Department for Transport (DfT) – this subsidy is known as the Bus Service Operators Grant. The payment rate for diesel is currently 34.6 p/litre (having been cut from 43.2p/litre in April 2012). Since 2010, eligible operators have been receiving an 8% uplift in their BSOG payment rate for buses with operational ITSO smartcard readers, and an additional 2% for buses with Automatic Vehicle Location (AVL) Equipment.

6.20. In this report, we take the view that the impact of BSOG can be analysed as if it were a straightforward transfer between tax-payers and bus users, much in the same way as concessionary travel. Although BSOG is paid out in a way that may create incentives for operators to allocate the subsidy in different proportions to each market segment, our analysis suggests that, given differences in operating speed, vehicle size and occupancy, in PTE areas it effectively amounts to a uniform subsidy per passenger trip.

6.21. It could be argued that operators have discretion over their use of BSOG and that they may prefer to use it, for example, to increase mileage rather than to reduce fares. However, our analysis strongly suggests that at current levels, fare reductions are likely to be much more effective in increasing demand and generating economic benefits. This may, of course, not be the case where fares and services are comparatively lower. We also acknowledge that a small proportion of BSOG is paid out as an environmental incentive. For simplicity, in this report we focus purely on the mileage-based component and assume operators use BSOG entirely to reduce commercial fares.

6.22. If we accept these assumptions, then BSOG would be expected to generate more or less the same types of benefit as concessionary travel: existing user benefits (transfer), new user benefits, decongestion/externality benefits and increased frequency. However, the relative magnitude of each of these benefit types will vary as each market segment will be exposed to different levels of congestion and will have a varying degree of sensitivity to fares. Given the complexity of bus markets, we have made a number of simplifying assumptions to approximate the value for money of BSOG, which are documented in the appendix.

6.23. Table nine below summarises our assessment of the benefits, costs and overall benefit-cost ratio of BSOG in PTE areas.

[205] Before accounting for the shadow cost of public funds.

Table 9. Welfare assessment of the Bus Service Operator Grant (BSOG)

Benefits		Costs	
Welfare gain to existing users (transfer)	£151m (equivalent to 25p average fare reduction)	Revenue forgone	£151m
Welfare gain to existing users (increased frequency)	£16m	Additional operating costs	£72m
Welfare gain to new users	£16m	Generated Revenue	-£124m
		Concessionary reimbursement forgone[206]	£12m
Decongestion/other externalities	£106m		
Wider Economic Impacts (WI1)	£49m[207]		
Bus congestion and externalities	-£14m		
Indirect taxation	-£10m		
Total	£314m		£111m[208]
Benefit:Cost Ratio[199]	**2.8 : 1**		

6.24. As in the case of concessionary travel, the greatest proportion of benefits (just under half) accrues to those passengers who would have used the bus even in the absence of the subsidy. For them, BSOG equates to an average fare reduction of 25p per trip plus a boost in service frequency. As we've previously argued, there is a strong equity argument in support of this transfer.

6.25. In contrast with the free concession, however, the net cost of the BSOG transfer is relatively low since the revenue forgone is almost entirely compensated by the revenue generated from new passengers, who decide to use the bus at the lower resulting fare. It could be argued that this is a welfare enhancing outcome as it brings the average fare closer to the welfare maximising marginal cost. However, the reduction in commercial fares would result in a decrease in concessionary reimbursement which we would expect operators to seek to compensate from the available subsidy.

[206] Our analysis assumes central government and local finances are treated independently and DfT would therefore not stand to gain from the reduction in concessionary reimbursement. As we discuss in the appendix, if all public funding is treated in the same way, the BCR of BSOG becomes greater than 3.
[207] Estimated to be around a third of decongestion and other externality benefits (see Chapter Three).
[208] This was the subsidy paid out to operators in 2011/12, before the reduction in the BSOG rate.

6.26. The welfare benefit to generated passengers is estimated at £16m. However, this results in additional operating costs of £72m and increased bus-induced congestion and externalities worth £14m. The extent to which this would be the case in practice depends on the degree of crowding at the time when the new passengers choose to travel – our calculations are based on relatively conservative assumptions, broadly consistent with those used in the DfT's Concessionary Reimbursement Guidance. However, some would argue that additional capacity requirements would be virtually negligible outside the peak hours[209].

6.27. The good news is that these additional passengers also generate significant benefits for other road users and society at large, largely in the form of decongestion and wider economic impacts amounting to just over £155m. This figure represents a much larger proportion of total benefits than in the case of concessionary travel. This is because commercial passengers tend to travel at the more congested times of day when decongestion benefits of bus travel are greatest.

6.28. Overall, we estimate that the benefit cost ratio of BSOG is 2.8 :1[199]. This figure is relatively sensitive to the underlying assumptions and the work we have presented so far uses a relatively conservative long run market elasticity of -0.68[210] and a frequency elasticity of 0.3. If we were to use the long run fare elasticity derived from Dargay and Hanly (2000) (see appendix) and the frequency elasticity of 0.66 recommended in TRL (2004) then the BCR would easily exceed 4:1.

6.29. This means that the higher the sensitivity of passengers to changes in fares and frequency the more cost effective fare subsidies are likely to be. If we accept that fare elasticities increase with fare levels then the sustained rise in PTE fares over the past couple of decades would suggest that fare subsidies are likely to be highly effective.

6.30. One further caveat is that where new fare paying passengers are transferring from existing subsidised public transport modes, this may result in an increase in subsidy elsewhere. However, we would expect this to be a relatively small effect across metropolitan areas as a whole[211].

6.31. Overall, our analysis suggests that at current fare levels, and based on our understanding of passengers' sensitivity to fares, there is a strong economic rationale for further reducing bus fares, either through a uniform subsidy such as BSOG or, ideally, through more targeted interventions.

[209] See, for example, Abrantes, P and Last, A (2011), Estimating additional capacity requirements due to free bus travel, European Transport Conference.
[210] This is the average between the short run and long run elasticities which we have derived from Dargay and Hanly (2000).
[211] Rail and light rail stops and stations amount to less than 1% of the total number of bus stops and stations in PTE areas. This suggests that the bus is likely to be the only public transport mode available to the vast majority of the population. Although some evidence suggests non-negligible diversion factors from rail to bus (for example, TRL, 2004 suggests a figure of 6%) it is possible (and we would argue, likely) that this will have originated from scheme specific evidence, for example, where a new rail scheme comes into operation in an area previously served by bus only. If we were considering area-wide improvements to bus, which are furthermore likely to focus on areas less well served by rail, we would expect this figure to be much lower.

Tendered networks

6.32. Since 1986, bus services outside London have been privately operated under a deregulated framework. In practice, this means that local transport authorities (PTEs/ITAs in metropolitan areas) have no direct control over commercial services, which are instead operated by private companies, which plan networks and set fares. However, in cases where local authorities consider there to be socially valuable services which are not commercially viable then they can contract (or tender) services out to private operators against a subsidy payment.

6.33. Because tendered services are not commercially viable it is often thought that they can only be justified on social grounds, whereby they are seen as providing vital links to those without alternative forms of transport available. But while it is true that without tendered services many of those working un-sociable hours would find it much harder to access work, we show in this section that many tendered services are also likely to represent very good value for money against more conventional economic criteria.

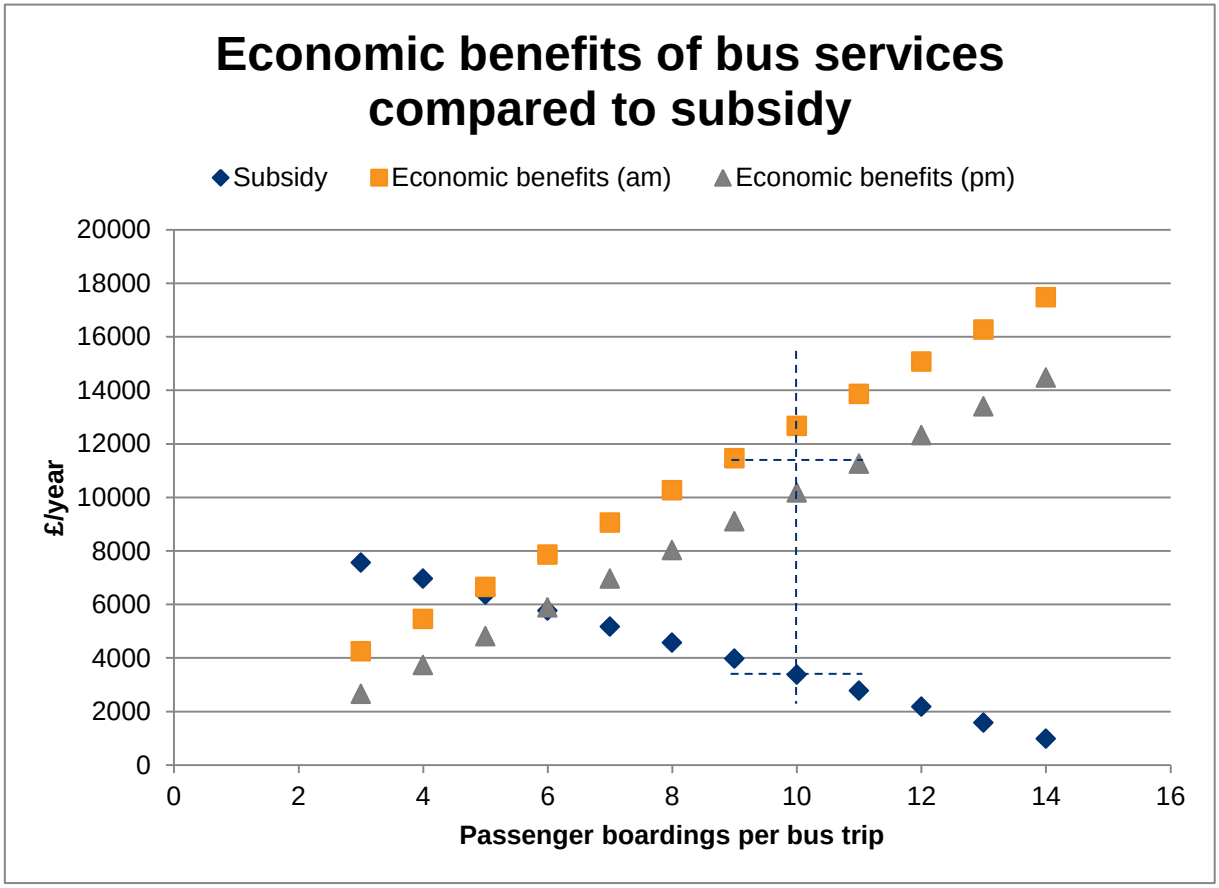
6.34. Let's start by taking the example of a typical PTE bus route, 10km in length and with an average operating cost of £1.80/km[212]. Its total operating cost for a single round bus trip would be £32; if we assume an average commercial fare of £1.15[213] and an average passenger trip length of 6.88km[214], then a bus would need to pick up around 16 adult commercial passengers each way to break even (bearing in mind some would be travelling for free and others would be travelling at a higher fare). This corresponds to an average load factor of around 11 pax-km/bus-km (excluding children and older/disabled concessionary passengers). However, if a weekday evening service was only able to attract, for example, 10 passengers per leg then it would require an annual subsidy of £3,380.

6.35. For early morning and late evening services, we know that the proportion of children and concessionary passengers is negligible and so our preceding analysis is likely to be accurate. At other times of day, the breakeven number of passengers would be higher, probably in excess of 20 passengers per leg. In the rest of our analysis, we concentrate on early morning/late evening services, while acknowledging that the value for money of other types of tendered service would be lower for an equivalent number of passenger boardings.

6.36. Based on our earlier analysis we have estimated net subsidy and economic benefits (user benefits[215], decongestion, externalities, indirect taxation and option values) for typical weekday early morning and evening services. With the exception of option values, which we have assumed to accrue on a uniform basis per bus-km, benefits are proportional to the number of passengers carried so below we illustrate the results as a function of passenger boardings.

[212] DfT Bus Statistics Tables BUS0406 and BUS0203, 2010/11 figures
[213] This is the average farebox revenue divided by the estimated number of adult fare paying passengers (Source: DfT Bus Statistics Tables BUS0401 and BUS0203).
[214] Source: National Travel Survey
[215] The calculation of economic benefits follows the same approach as that used in Chapter Three. One key assumption to note is that we have estimated the loss of net consumer surplus from average demand functions for early morning/late evening services. However, the demand function for an individual bus service may vary significantly from this average depending on the types of trip being made and the specific alternatives available. These figures should therefore not be applied to the appraisal of individual tendered bus services without some knowledge of specific demand patterns.

6.37. Our analysis shows that for a number of boardings above 10 passengers/bus-trip (equivalent to a load factor of 6.9), economic benefits outweigh net subsidy by a factor of at least 3:1. For boardings above 6 passengers/bus-trip (load factor of 4.1), economic benefits continue to outweigh costs. Below that point, subsidy begins to overtake economic benefits. Note, however, that bus services are likely to be a cost effective alternative to taxi services down to at least 4 boardings per bus leg[216], which could be seen as a suitable threshold for supporting tendered services on social grounds.



6.38. Data from the English PTEs shows average boardings per bus-trip on tendered services above 10. This would suggest most PTE tendered services[217] currently represent very good value for money, even if we were to provide an allowance for a proportion of concessionary passengers. More generally, this analysis demonstrates that there are likely to be a large number of bus services[218] which, despite not being commercially viable, can deliver large net economic benefits to users and society at large and therefore warrant pubic funding. Funding cuts to tendered bus networks in PTE areas are therefore likely to hit services with a high net economic value.

[216] Assuming an average taxi occupancy of 2 passengers per trip.
[217] This statement will hold in general for any services which can be said to have a similar demand curve to early morning and late evening services.
[218] Effectively, any early morning/late evening service with an average load factor between 4 and 10 passenger-km/bus-km. Similar analysis could be easily undertaken for other types of service, assuming the respective demand function is known.

7. Conclusions and recommendations

7.1. This report has attempted to articulate the social and economic value of bus networks, while specifically capturing the sizeable benefits which public support for bus services and bus passengers can bring.

7.2. Although buses may lack the visibility of other forms of transport, we have shown that they are a critical link in the infrastructure which sustains Britain's largest urban areas. Without affordable bus services our cities would be more divided, with the poorest, and the most vulnerable, severed and isolated from the opportunities that many take for granted. So much of the talent that dynamic and prosperous cities need would go to waste as training, education and jobs would be unreachable for many families and young people.

7.3. But cities would also have less productive, vibrant and competitive economies, with workers finding themselves more frequently caught up in gridlock, employers finding it harder to recruit the right people at the right price and companies seeing the cost of doing business increase.

7.4. Crucially, this report highlights how the bus is uniquely effective as a tool of both social and economic policy. Not only does support for bus networks bring about considerable social and distributional benefits but it also simultaneously brings clear economic benefits – most pointedly, reductions in congestion for many road users who may feel they do not actually rely on the bus at all.

7.5. Overall, bus networks offer exceptional value for money through a wide range of overlapping social and economic benefits. It therefore needs to be recognised that funding for bus passengers and services is a highly effective form of public spending.

7.6. Below we summarise the key messages and results from the report. We conclude this chapter by setting out our key policy recommendations.

Background facts and figures

7.7. Chapter Two provided an overview of the policy context in which bus networks operate and summarised key trends, facts and figures. It highlighted the sheer volume of bus travel with over 4.7 billion passenger trips being made every year in England, around three times the total number of trips made on national rail. In PTE areas alone, close to one billion trips are made by bus every year.

7.8. Buses provide access to opportunities, creating a vital link especially where other alternatives are not available, affordable or convenient. In London and in metropolitan built-up areas, 98% of households are within a 13 minutes' walk of a bus stop with at least an

hourly service. In PTE areas, the total number of bus stops and stations outweighs rail and light rail stops and stations by a factor of 100 to 1. In fact, 10% of all rail journeys rely on the bus for part of the way. So, despite the fact that rail gets most of the media and policy attention, the bus ***is*** public transport for the majority of people in metropolitan areas.

7.9. Buses are of vital importance to commuters, especially in the densest and largest urban areas – in many wards of Birmingham, Manchester, Leeds, Liverpool, Newcastle and Sheffield, over a third of people rely on the bus to get to work on a daily basis. Recent research has also shown that 1 out of 10 bus users would be out of work or in a less productive job had their service not been available or proved unaffordable.

7.10. In comparison with car travel, bus trips are more likely to be for commuting and education purposes. Buses also carry a greater proportion of shopping trips than cars, which highlights their importance to local retail.

The economic case for urban bus networks

7.11. Chapter Three outlined the overall economic value of the urban bus. It showed that metropolitan bus networks generate over £2.5 billion of economic benefits every year, which is around five times the level of public funding they receive and more than four three times total farebox revenue.

7.12. Just over £1.3bn of total benefits accrue to passengers, who would otherwise have been unable to reach work, education and other opportunities, or would have been faced with a steep increase in travel costs. That equates to a net benefit per passenger trip of £1.27, over and above the commercial fare.

7.13. The remaining £1.2bn of benefits accrue to other road users and society at large, essentially through decongestion, reduced accidents, pollution, the stand-by value of bus networks and increased economic productivity. The majority of non-user benefits arise in peak periods, when congestion is most severe. We estimate that each peak bus trip generates decongestion benefits of £2.70.

7.14. The fact that the economic benefits to society as a whole far outweigh the revenue to bus operators and the private gains to passengers should be taken as a *prima facie* case for public funding of bus networks.

7.15. In addition to economic benefits, the bus industry also generates a considerable amount of economic activity in its own right. Overall, the bus industry has a turnover in excess of £5bn, almost half the size of the rail industry. The majority of its turnover is again ploughed back into local economies through the supply chain and consumption expenditure by staff, which means that public funding in this area is likely to have a high spending multiplier. This means that bus services can be an especially effective fiscal tool during recessionary times, particularly as car ownership and use are likely to be temporarily in decline in favour of more affordable alternatives.

The social contribution of bus networks

7.16. Chapter Four articulated the social contribution of bus networks. We have shown that the bus is a uniquely effective social policy tool because it is targeted at those who are most in need of support without resort to complicated means-testing arrangements.

7.17. For young people, the bus is essential for independent travel. For under 17s the bus enables affordable access to a wider choice of schools - 1 in 5 trips to and from school are made by bus. It also enables access other positive activities, a key factor in breaking the cycle of social immobility. The bus is as critical to those aged 17-20, who make almost twice as many bus trips as the average person in Great Britain. For this group - the majority of whom do not yet hold a full driving licence - the bus provides a gateway to education, work, and training opportunities, as well as to a social life.

7.18. The bus is vital for most low income families – around half of households on the lowest real income quintile do not have access to a car or van. Affordable and available bus services are vital to avoid cutting these households off from opportunity or forcing them into unaffordable car ownership or increased use of costly taxis.

7.19. Bus services are important in maintaining an active and independent old age – some 40% of over 60s use the bus at least once a week, compared to 29% of the general population. The national concessionary travel scheme in particular supports this group to participate in social and civic life, as well as access community and health services.

7.20. For disabled people, car ownership is low and the bus is the most commonly used form of public transport. This makes it pivotal in supporting this group to access opportunities for work, education, health and leisure.

7.21. The bus has a major role to play for jobseekers given that 64% of this group have no access to a vehicle or cannot drive. Many lower skilled vacancies are located on the outskirts of urban areas and are often difficult to access without a car. We have shown how, when bus services are introduced to remote employment sites, the labour pool opens up significantly.

7.22. For women, the bus assumes particular importance given that they are more likely to live in a household without a car or van or, where they do, are less likely to be the main driver or even a licence holder. Across all age groups, women make more bus trips than men and generally travel further by bus.

The contribution of bus networks to health and wellbeing

7.23. Chapter Five illustrated the contribution bus networks make to health and wellbeing. We have highlighted how every bus journey includes walking trips and that simply walking to the bus stop, rather than to the car in the drive, can make an important contribution towards daily physical activity targets.

7.24. The bus can also improve people's access to health services and health promoting activities. Some 44% of people without access to a car find it difficult to get to the doctors or to the hospital. We have shown how, when suitable bus links are added, numbers of missed appointments fall. Buses also connect people to shops selling cheap, healthy food (as opposed to costly corner shops) and can incentivise sports and leisure participation.

7.25. Bus travel and, in particular free off-peak travel for older and disabled people, accessible bus services and door-to-door or Ring and Ride buses, play a key role in helping people to retain their independence while remaining connected to valuable networks of support. We have also shown how such services have the potential to save the health and social care sectors millions of pounds each year.

The value for money of bus subsidy

7.26. Chapter Six set out a cost benefit analysis of three bus policy initiatives: free concessionary travel for older and disabled people; fuel duty rebate (BSOG); and support for tendered services. Our analysis shows that these funding streams not only target public funding at those most in need of support but they also generate considerable economic benefits to society at large.

7.27. We have found that the free concession generates economic benefits of £1.48 for every £1 of public money spent. Our work also shows that the majority of funding and benefits actually flow to those who would have used the bus in the absence of the concession. These people would have come disproportionately from the lowest income groups in society, which makes this a highly effective social policy tool as it does away with the need to resort to complicated means-testing arrangements.

7.28. We have estimated fuel duty rebate (BSOG) to generate £2.80 of economic benefits for every £1 of public money spent. Around half of those benefits accrue to society at large through reduced congestion, accidents, pollution and improved productivity. This means tax-payers will have got their money's worth well before the benefits to bus users are taken into account.

7.29. Our assessment of tendered services has demonstrated that even where services cannot be operated commercially, they may still deliver substantial benefits. Our analysis suggests that, for early morning services in particular, PTE funding is delivering in excess of £3 of benefits for every £1 of public money. Although this figure will vary for different types of service, it shows that increased funding for tendered services is likely to be highly cost-effective, especially when we consider the vital nature of these services for those seeking work or in low paid jobs.

Recommendations

7.30. The wide range of benefits which bus networks generate needs to be better understood and acknowledged across different parts of government, not just by the Department for Transport, but also by HM Treasury; Department for Communities and Local Government; Department for Work and Pensions; Department for Business, Innovation and Skills; Department for Education; Department of Health; and Department of Energy and Climate Change.

7.31. Funding for bus networks and bus users should as a result be properly considered alongside other policy tools as a form of achieving wider government social and economic objectives. In particular, it should be recognised that public funding for bus is a highly effective distributional policy, as it is likely to be targeted on those most in need of support. It therefore needs to be considered alongside other more conventional social policies, which tend to rely on complicated means testing mechanisms and may generate negative side effects.

7.32. Any future decision on bus concessions should be based on a clear understanding of the wider social, distributional and economic consequences that this type of policy can have.

7.33. Public funding for bus can generate very significant economic benefits, in some cases comparable to the best infrastructure projects. Although we accept the importance of capital spending, the government needs to acknowledge that there are other forms of public expenditure which can make an equally strong contribution to wider policy objectives.

7.34. Bus networks make a particularly important, if understated, contribution to the efficient functioning of local labour markets and economies in the UK's largest cities, supporting the free flow of people and goods. It therefore needs to be recognised that denser networks and more affordable bus services have a direct impact on economic growth and employment levels.

7.35. Any future Spending Reviews need to recognise the multiple funding streams which are used to support the bus (in particular, the role of DCLG funding to local authorities) and ensure that any future decisions on the quantum and structure of funding reflects the cost effectiveness of this form of public expenditure.

7.36. Government should recognise the significant supply side effect of bus policies and should consider how public policies could strengthen the UK competitive edge in bus manufacturing and design.

References

Abrantes, P. and Last, A. (2011), *Estimating additional capacity requirements due to free bus travel*, paper presented at the European Transport Conference 2011. Available from: https://etcproceedings.org/paper/estimating-additional-capacity-requirements-due-to-free-bus-travel

ACEVO Commission on Youth Unemployment (2012) *Youth unemployment: the crisis we cannot afford.* Available from: http://vitalregeneration.org/userfiles/ACEVO%20Youth%20Unemplyment_lo_res.pdf

All Party Parliamentary Group on Social Mobility (2012) *Seven key truths about social mobility.* Available from: http://www.appg-socialmobility.org/.

Association of Colleges (2011) *Association of Colleges Education Maintenance Allowance Transport Survey January 2011*

Barker, L. and Connelly, D. (2005). *Scottish Household Survey Topic Report 2005: Mode Choice*. Scottish Government Publications. Summary available from: http://www.scotland.gov.uk/Publications/2005/10/10154807/48080

Bessler, L.M. and Dannenberg, A.L (2005) 'Walking to Public Transit: Steps to help meet physical activity recommendations' in *American Journal of Preventative Medicine* 29 (4) pp.273-280

British Chambers of Commerce (2008), *The Congestion Question: A Business Transport Survey*.

Cabinet Office (2009), The wider costs of transport in urban areas. Available from: http://www.cabinetoffice.gov.uk/strategy/work_areas/urban-transport.aspx

Campion, J., Greenhalgh, C. and Knight, J. (2003) *Mind the Gap: Leonard Cheshire's Social Exclusion Report.* Available from: http://www.lcdisability.org/download.php?id=434

Caraher, M., Dixon, P., Lang, T. & Carr-Hill, R. (1998). 'Access to healthy foods: Part I. Barriers to accessing healthy foods: Differentials by gender, social class, income and mode of transport' *Health Education Journal*, 57(3), 191 - 201

Centre for Social Justice (2010) *The Forgotten Age: Understanding Poverty and Social Exclusion in Later Life, Interim Report.* Available from: http://www.centreforsocialjustice.org.uk/publications/the-forgotten-age

Citizens Advice (2010) *Fair welfare: Supporting claimants into work.* Available from: http://www.citizensadvice.org.uk/pdf-sp-fw-report.pdf

Clayton, N., Smith, R. and Tochtermann, L. (2011) *Access all areas: Linking people to jobs*. Available from: http://www.centreforcities.org.uk/access.html

Commission for Integrated Transport (2001) *Public Attitudes to Transport in England.*

Coronini-Cronberg, S. et al (2012) 'The impact of free older persons' bus pass on active travel and regular walking in England'. *American Journal of Public Health,* November, 102 (11) pp.2141-8.

Dargay, J.M. and Hanly, M. (2002), "The Demand for Local Bus Services in England". *Journal of Transport Economics and Policy*, 36(1), pp.73-91

Dargay and Liu (2010), *Concessionary Fares Project - Report 6: Analysis of the National Travel Survey Data*, report to DfT

Defra (2009) *Sustainable Development Indicators in your Pocket 2009*. Available from: http://www.defra.gov.uk/publications/2011/03/26/sdiyp-2009-pb13265/

HA, SODD, WO, DEfNI and DoT (1996), Design Manual for Roads and Bridges, Volume 12 Traffic Appraisal of Road Schemes, Section 2 Traffic Appraisal Advice. Available from: http://www.dft.gov.uk/ha/standards/dmrb/index.htm

DfT (2002) *Accessibility of local services and facilities*.

DfT (2005), *FORGE: the road capacity and costs model, Full Report*. Available from: http://webarchive.nationalarchives.gov.uk/20110202223628/http:/www.dft.gov.uk/pgr/economics/ntm/

DfT (2006) *Young People and Transport: Their needs and requirements.*

DfT (2008) *The travel choices and needs of low income households: the role of the car.*

DfT (2008) *Travel behaviour, experiences and aspirations of disabled people.*

DfT (2011), *National Travel Survey tables.* Available from: https://www.gov.uk/government/organisations/department-for-transport/series/national-travel-survey-statistics

DfT (2012), *Bus Statistics tables.* Available from: https://www.gov.uk/government/organisations/department-for-transport/series/bus-statistics

DfT (2012a), *Transport Analysis Guidance Unit 3.5.14: The Wider Impacts Sub-Objective*. Available from: http://www.dft.gov.uk/webtag/documents/expert/unit3.5.14.php

DPTAC (2002) *Attitudes of disabled people to public transport.*

Duffy, Bobby (2000) *Satisfaction and expectations: attitudes to public services in deprived areas*. CASE paper 45. Centre for Analysis of Social Exclusion, London School of Economics and Political Science, London, UK. Available from: http://eprints.lse.ac.uk/6441/

Ecorys UK (2012) *The Social Inclusion Value of Buses – Burbank.* Available from: http://www.bettertransport.org.uk/files/social-inclusion-value-of-buses-burbank-report.pdf

Ecorys UK (2012) *The Social Inclusion Value of Buses – Marchwood.* Available from: http://www.bettertransport.org.uk/files/social-inclusion-value-of-buses-marchwood-report.pdf

Eddington, R. (2006), The Eddington Transport Study: Transport's role in sustaining the UK's productivity and competitiveness. Available from: http://webarchive.nationalarchives.gov.uk/20090104005813/http:/www.dft.gov.uk/about/strategy/transportstrategy/eddingtonstudy/

Ekosgen (2010), *Employment in Sustainable Transport – a report for **pteg**, CBT and Sustrans*. Available from: http://www.pteg.net/Publications/Reports.htm.

European Parliament (2006) *Women and Transport study.*

Feldman, O, Nicoll, J, Simmonds, D, Sinclair, C, and Skinner, A (2007): "Transport investments, the wider welfare benefits and the GDP effects of transport schemes". *Paper presented to the World Conference on Transport Research 2007*, June 24-28, University of California, Berkeley., Available from: http://www.cix.co.uk/~davidsimmonds/main/pdfs/WCTR%20WEB.pdf

Graham, D. (2006), *Wider Economic Benefits of Transport Improvements: Link between city size and productivity.* Available from: http://www.dft.gov.uk/rmd/project.asp?intProjectID=11775

Greater Manchester Transport Research Unit (2008) *Food or education – the impact of the rise in the concessionary bus fare in Greater Manchester.* Available from: http://www.gmcvo.org.uk/sites/gmcvo.org.uk/files/Food%20or%20Education.pdf

Greener Journeys (2012) *Bus Policy: a five-point plan for growth.* Available from: http://www.greenerjourneys.com/2012/09/bus-and-business-leaders-present-five-point-plan-for-growth-at-house-of-commons/

GVA Grimley (2006), *How does transport influence business investment in the city regions?* Available from: http://www.pteg.net/Publications/Reports.htm

HA, SODD, WO, DEfNI and DoT (1996), Design Manual for Roads and Bridges, Volume 12 Traffic Appraisal of Road Schemes, Section 2 Traffic Appraisal Advice. Available from: http://www.dft.gov.uk/ha/standards/dmrb/index.htm

Hamer, L. (2004) *Improving patient access to health services: a national review and case studies of current approaches.* Available from: http://www.nice.org.uk/aboutnice/whoweare/aboutthehda/hdapublications/improving_patient_access_to_health_services.jsp

Hart, J. and Parkhurst, G. (2011) 'Driven to Excess: Impacts of Motor Vehicles on the Quality of Life of Residents of Three Streets in Bristol UK', *World Transport Policy and Practice*, Volume 17.2 June

HM Government (2009) *New opportunities – Fair chances for the future.*

Institute for Transport Studies (2010), *Concessionary Fares Project – Main Report*, report to DfT

Jacobs Consultancy (2011), Value for Money and Appraisal of Small Scale Public Transport Schemes. Report to the Passenger Transport Executive Group. Available from: http://www.pteg.net/Publications/Reports.htm

Jara-Diaz, S.R. and Videla, J.I. (1990), "Welfare implications of the omission of income effect in mode choice models", Journal of Transport Economics and Policy, 24(1)

Jara-Díaz, S. R. and Gschwender, A. (2009), "The effect of financial constraints on the optimal design of public transport services". Transportation 36(1): 65-75.

Jones, A., Steinbach, R., Roberts, H., Goodman, A. and Green, J. (2012) 'Rethinking passive transport: Bus fare exemptions and young people's health.' *Health and place,* May 18 (3) pp. 605-12. Available from: http://researchonline.lshtm.ac.uk/20703/

Joseph Rowntree Foundation (2008) *A minimum income standard for Britain: what people think.* Available from: http://www.jrf.org.uk/publications/minimum-income-standard-britain-what-people-think

Joseph Rowntree Foundation (2008) *Young people and territoriality in British Cities*. Available from: http://www.jrf.org.uk/publications/young-people-and-territoriality-british-cities

Joseph Rowntree Foundation (2012) *A Minimum Income Standard for the UK in 2012*. Available from: http://www.jrf.org.uk/publications/MIS-2012

Joseph Rowntree Foundation (2012) *The Challenges for Disadvantaged young people seeking work.* Available from: http://www.jrf.org.uk/publications/disadvantaged-young-people-work

Mackie, P., Laird, J. and Johnson, D. (2012) *Buses and Economic Growth. Report to Greener Journeys*. Available from: http://www.greenerjourneys.com/2012/07/buses-economic-growth-making-the-link-new-report/

Marshall, A. and Webber, C. (2007), *The case for better transport investment: agglomeration and growth in the Leeds City Region*. Available from: http://www.centreforcities.org/the-case-for-better-transport-investment-agglomeration-and-growth-in-the-leeds-city-region.html

Mohring, H. (1972), "Optimization and scale economics in urban bus transportation", American Economic Review, 62, 591–604.Morton, B. (2001) *Evidence of the impact on transport on health*.

MVA Consultancy (2009*) Evaluating Performance: Qualitative Study of WorkWise in North Solihull.*

nef (2008) Five Ways to Well-being available from http://neweconomics.org/projects/five-ways-well-being

nef (2010) *The role of local government in promoting wellbeing*. Available from: http://www.neweconomics.org/publications/the-role-of-local-government-in-promoting-well-being

Nellthorp, J. and Hyman, G. (2001), Alternatives to the Rule of a Half in Matrix-Based Appraisal, Paper to the European Transport Conference, Cambridge. Available from: http://www.its.leeds.ac.uk/projects/WBToolkit/Note6Annex1.htm

New Zealand Transport Agency (2008), Research Report 359 Valuing the health benefits of active modes. Available from: http://www.nzta.govt.nz/resources/research/reports/359/

NfER (2008) *Barriers to Participation in Education and Training.* Available from: https://www.education.gov.uk/publications/eOrderingDownload/DFE-RR009.pdf

NHS Information Centre (2009) *Health Survey for England 2008*

Office for Disability Issues (2011) *Life Opportunities Survey: Wave one results, 2009/11.*

ONS (2002), Travel to work flows. Available from: http://data.gov.uk/dataset/travel_to_work_flows

Oxfordshire Age UK (2012) *Loneliness – the state we're in: A report of evidence compiled for the Campaign to End Loneliness* available from: http://www.campaigntoendloneliness.org.uk/wp-content/uploads/Loneliness-The-State-Were-In.pdf

Preston (1998), Public transport elasticities: Time for a re-think? UTSG 30th Annual Conference, Dublin, Working Paper 856, Oxford University Transport Studies Unit.

pteg (2009) *WorkWise – a ticket to employment.* Available from: http://www.pteg.net/PolicyCentre/SocialInclusion/Briefings

pteg (2010) *Transport and Social Inclusion: Have we made the connections in our cities?.* Available from: http://www.pteg.net/PolicyCentre/SocialInclusion/Research

Rosenthal, S.S. and Strange, W.C. (2004), "Evidence on the nature and sources of agglomeration economies", in *Handbook of Regional and Urban Economics*, Volume 4

SDG (2004), *Bus Planning Performance and Regulation – Implementing a Quality Contract*. Available from: http://www.pteg.net/Publications/Reports.htm

Smith, R. (2012), *City Employment: and overview from the Business Register and Employment Survey (BRES)*, Centre for Cities briefing paper. Available from: http://www.centreforcities.org/bres2012.html

Social Exclusion Unit (2003) *Making the Connections: Final Report on Transport and Social Exclusion*. Available from: http://webarchive.nationalarchives.gov.uk/+/http://www.cabinetoffice.gov.uk/media/cabinetoffice/social_exclusion_task_force/assets/publications_1997_to_2006/making_transport_2003.pdf

Sustrans (2012) *Access Denied: Transport poverty in Wales.* Available from: http://www.sustrans.org.uk/assets/files/Wales%20Policy%20Docs/Transport%20Poverty%20Briefing%20English.pdf

TAS (2010), *Competition Commission Local Bus Market Investigation. Submission of Evidence by the TAS Partnership*. Available from: http://www.tas.uk.net/content/index.php/video2/53-competition-commission-evidence

TAS (2010a) *The value of buses to the economy*. Report to the Confederation of Passenger Transport. Available from: http://www.cpt-uk.org/index.php?PHPSESSID=46b7r1l7oi564k32nhsf8eqml6&fuseaction=newsevents.details_news&news_id=558

Wheat, P. and Toner, J. (2010), Concessionary Fares Project, Research Report 8, Whole market demand elasticity variation, Report to the Derpartment for Transport, available from: http://assets.dft.gov.uk/publications/research-into-the-reimbursement-of-concessionary-fares/

Transport Action Group – Manchester (2011) *Investigating the impact of concessionary fares on older people's lives*. Available from: http://www.healthandtransportgroup.co.uk/health_transport/Bus-Pass-Use-Qual-of-Life-Final20110707.pdf

Transport Works (2012), Making the case for city region transport investment. Available from: http://www.transportworks.org/

TRL (2004), The demand for public transport: a practical guide, TRL Report TRL593.

Venables (2004) Productivity effects of urban transport improvements, report to the DfT.

Vickerman, R. (2007), *Recent Evolution of Research into the Wider Economic Benefits of Transport Infrastructure Investments*, Discussion Paper 2007-9.

Webb, E., Netuveli, G. and Millett, C. (2011) 'Free bus passes, use of public transport and obesity among older people in England', *Journal of Epidemiology and Community Health*.

Webster,L. and Shah, S. (2008) *Into the Unknown: Disabled People's experiences of public transport*. Available from: http://www.lcdisability.org/download.php?id=1203.

Woodland, Mandy and Miller (2003) *Easing the transition into work (Part 2 – client survey).* Available from: http://research.dwp.gov.uk/asd/asd5/report_abstracts/rr_abstracts/rra_186.asp

World Health Organisation (2007) *Global Age Friendly Cities: A Guide.* Available from: http://www.who.int/ageing/age_friendly_cities_guide/en/

Zenou, Y. (2009), *Urban Labour Economics*, Cambridge University Press.

Technical Appendix

A. Technical appendix

7.37. This appendix sets out the methodological approach, data sources and key assumptions for the economic benefit estimates in Chapters Three and Six of the main report.

Bus market segmentation

7.38. The proportion of travel by older and disabled concessionary pass-holders was taken from the DfT's January 2013 Bus Statistics Tables[219]. The proportional split between the remaining segments was based on ***pteg*** analysis of NTS survey data for the years 2008 to 2010. Our market segments are defined below.

7.39. ***Children*** includes all bus trips made by under 16s at any time of day or day of the week.

7.40. ***Commuter/business/education*** includes all bus trips, made between 7am and 7pm, Monday to Friday, and anytime on Saturday, for any of those purposes, by individuals aged 16 and over, not travelling on an older or disabled concessionary pass.

7.41. ***Leisure/personal /shopping*** includes all bus trips, made between 7am and 7pm, Monday to Friday, and anytime on Saturday, for any of those purposes (where personal represents personal business), by individuals aged 16 and over, not travelling on an older or disabled concessionary pass

7.42. ***Early morning*** includes all bus trips made between 6am and 7pm, Monday to Friday, by individuals aged 16 and over, not travelling on an older or disabled concessionary pass

7.43. ***Late evening*** includes all bus trips made between 6am and 7pm, Monday to Friday, by individuals aged 16 and over, not travelling on an older or disabled concessionary pass.

7.44. ***Sunday includes*** all bus trips made on Sundays by non-concessionary passengers aged 16 and over.

7.45. We have estimated the proportion of trips made on weekdays between 7pm and 7am by children and older/disabled concessionary pass-holders at around 2.5% of the total trips made by those groups. This figure is likely to be much higher on Sundays. As a result, our analysis will very slightly under-estimate total benefits from early morning and late evening networks, while more significantly under-estimating the benefits from the Sunday network.

7.46. The reason for keeping all trips by these two groups within individual demand segments is that their behavioural response to changes in fares is more uniform and better understood than for some of the other groups. They also benefit from relatively systematic fare discounts which makes their average fare much lower than for the other segments. Separating out children and concessionary passengers means we were able to estimate more accurate demand functions for the adult non-concessionary market.

Approach to the estimation of user benefits – Net Consumer Surplus

7.47. User benefits are taken as the net Consumer Surplus estimated from market demand functions. Conceptually, Consumer Surplus represents the summation, over the relevant population of users, of the maximum amount each individual passenger would have been willing pay to use the bus – known as the reserve price. For a large number of users, this is approximately equivalent to the integral of the inverse market demand function from the

[219] *DfT Bus Statistics Tables BUS0820 and BUS0821*

origin to the total number of trips. **Net** Consumer Surplus is equal to the Consumer Surplus minus the amount paid out by passengers in fares[220].

7.48. For a given trip, if the difference between the reserve price and the commercial fare is relatively small, then the trip being undertaken is likely to be of low value or there may be close substitutes available. If the amount is high then this will be a high value trip with few good alternatives. Assuming our estimated demand functions are accurate, this approach implicitly takes into account both the relative underlying value of different activities and the competitive position of the bus relative to alternative modes of travel. Net Consumer Surplus excludes the benefits of bus travel, which are external to users, for example, due to a reduction in road congestion, more efficient and productive urban economies (over and above the benefits that accrue to bus passengers) or savings in welfare payments to the unemployed. These types of benefit are addressed in later sections.

7.49. Market demand functions are assumed to be of a negative exponential form (see following section for a discussion of the estimation of demand curve parameters):

$$D(p) = \alpha . e^{\beta . p}$$

7.50. Where D (for demand) is the number of bus trips, p is the average market bus fare, alpha and beta are constant parameters, and beta<0.

7.51. For a function of this type, the elasticity of demand with respect to price is given by $\beta . p$, which means that elasticity increases linearly with the fare level.

7.52. The inverse demand function is:

$$p(D) = \frac{ln\frac{D}{\alpha}}{\beta}$$

7.53. Consumer Surplus is then given by the integral of the inverse demand function from zero to the current demand level, D_0:

$$CS = \int_0^{D_0} \frac{\ln(\frac{D}{\alpha})}{\beta} dD = \frac{1}{\beta} . D_0 . (ln\frac{D_0}{\alpha} - 1)$$

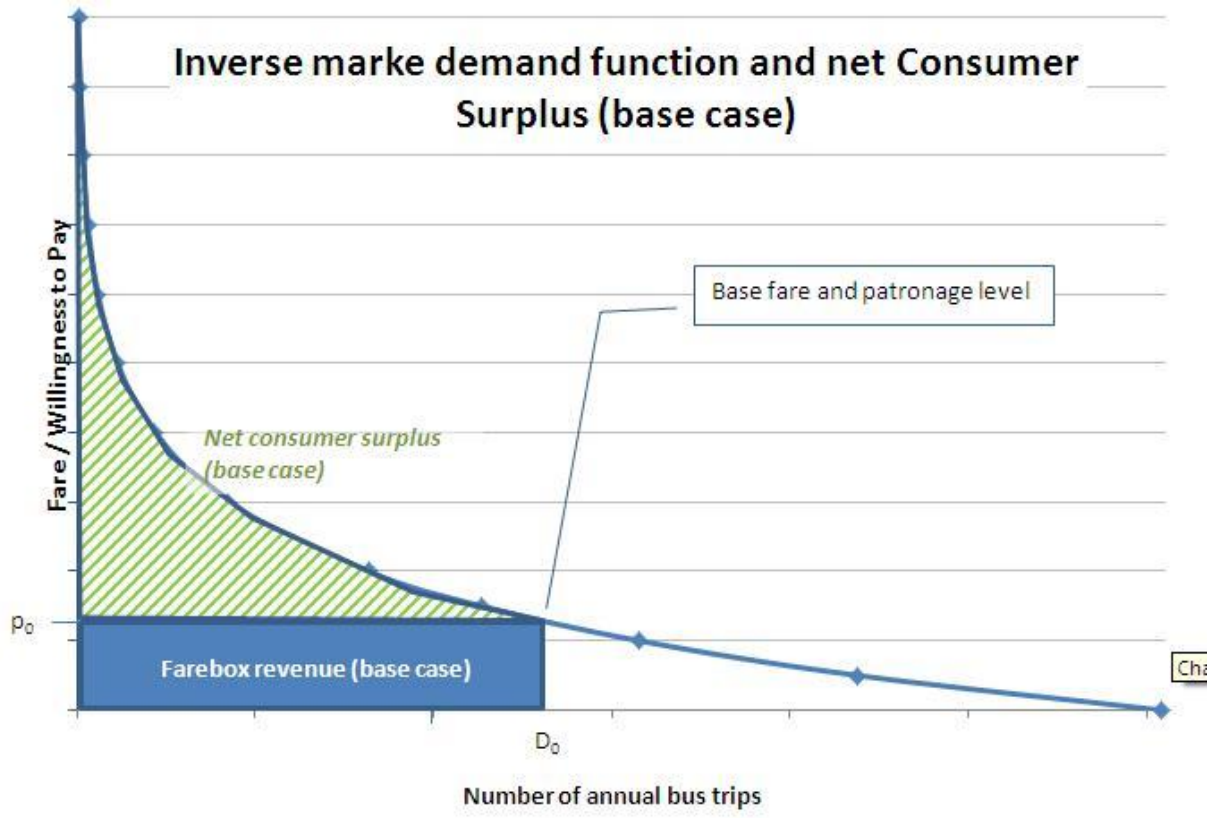
7.54. **Net** Consumer Surplus is given by subtracting farebox revenue, $D_0 . p_0$, from this integral:

$$netCS = \frac{1}{\beta} . D_0 . \left(ln\frac{D_0}{\alpha} - 1 \right) - D_0 . p_0$$

7.55. This is illustrated graphically in figure 1.

[220] This is known as the Marshallian Consumer Surplus and treats the consumption of a given good in isolation from other goods and from income level. Although this is likely to be a reasonable approximation for the market as a whole, the cost of bus fares is likely to represent a significant proportion of total income for some passengers, for example part time low income workers. If we took a 20 year old working 5 hour weekday shifts and earning the minimum wage, their weekly income would total £124. Assuming a one way bus fare of £2, travel costs would amount 16% of total weekly earnings. In this case, a reduction in bus fares could lead to increased consumption of other goods or the decision to work an additional shift and the Marshallian Consumer Surplus may therefore be an under-estimate of user benefits. See, for example, Jara-Diaz et al (1990) for a detailed discussion of this issue.

Figure 1.



Net Consumer Surplus from a change in fares

7.56. The change in net consumer surplus when demand increases from D_0 to D_1 is given by:

$$\Delta netCS = \frac{1}{\beta} . \ D_1 . \ \ ln\frac{D_1}{\alpha} - 1 \ \ - D_0 . \ \ ln\frac{D_0}{\alpha} - 1 \ \ - D_1 . p_1 + D_0 . p_0$$

7.57. This is illustrated graphically in figure 2 in the following page.

Net Consumer Surplus from an increase in frequency (Mohring effect)

7.58. An increase in frequency, all other things being equal, leads to an upward shift in the demand curve (equivalent to an increase in the alpha parameter to α^*) as more passengers become willing to travel by bus at any given fare. Figure 3 illustrates the increased consumer surplus from a fare reduction and simultaneous increase in capacity.

7.59. This can be expressed as:

$$\Delta netCS = \frac{1}{\beta} . \ {D_1}^* . \ \ ln\frac{{D_1}^*}{\alpha^*} - 1 \ \ - D_0 . \ \ ln\frac{D_0}{\alpha^*} - 1 \ \ - \ {D_1}^* - D_0 \ . p_1$$
$$+ \frac{1}{\beta} . \ D_0 . \ \ ln\frac{D_0}{\alpha^*} - 1 \ \ - D_0 . \ \ ln\frac{D_0}{\alpha} - 1 \ \ + D_0 . (p_0 - p_1)$$

Figure 2.

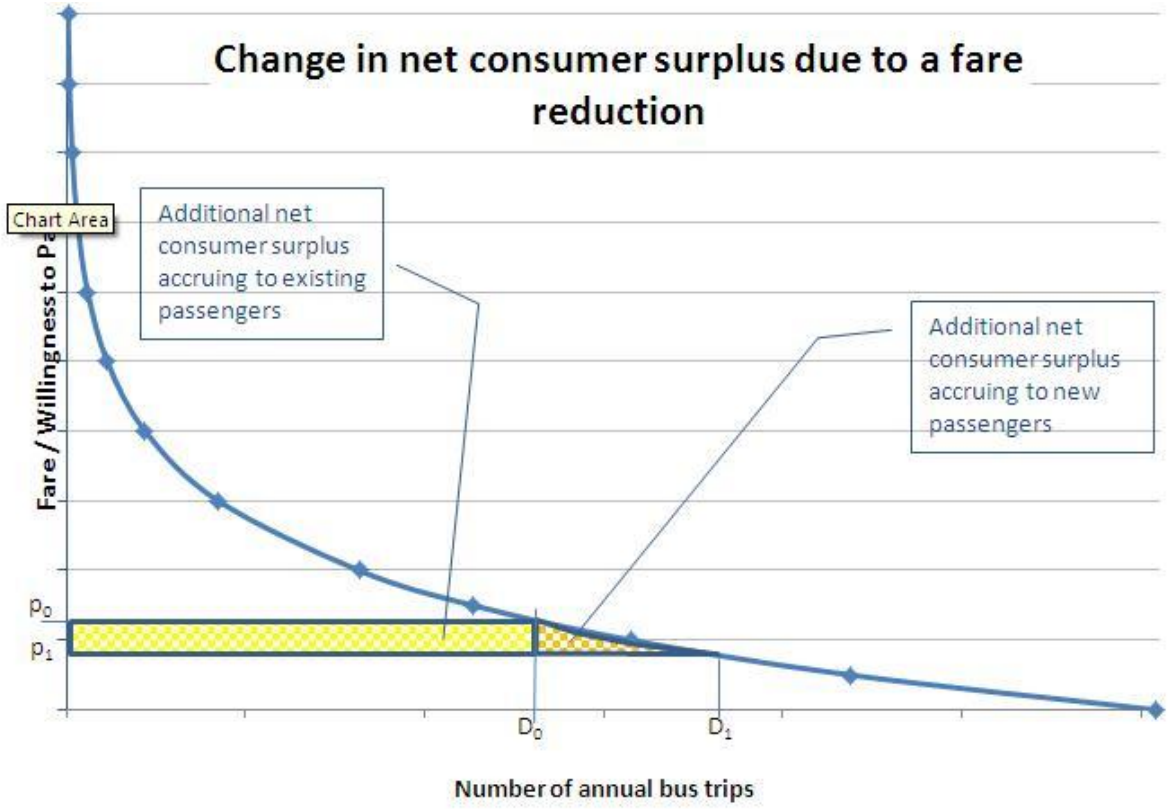
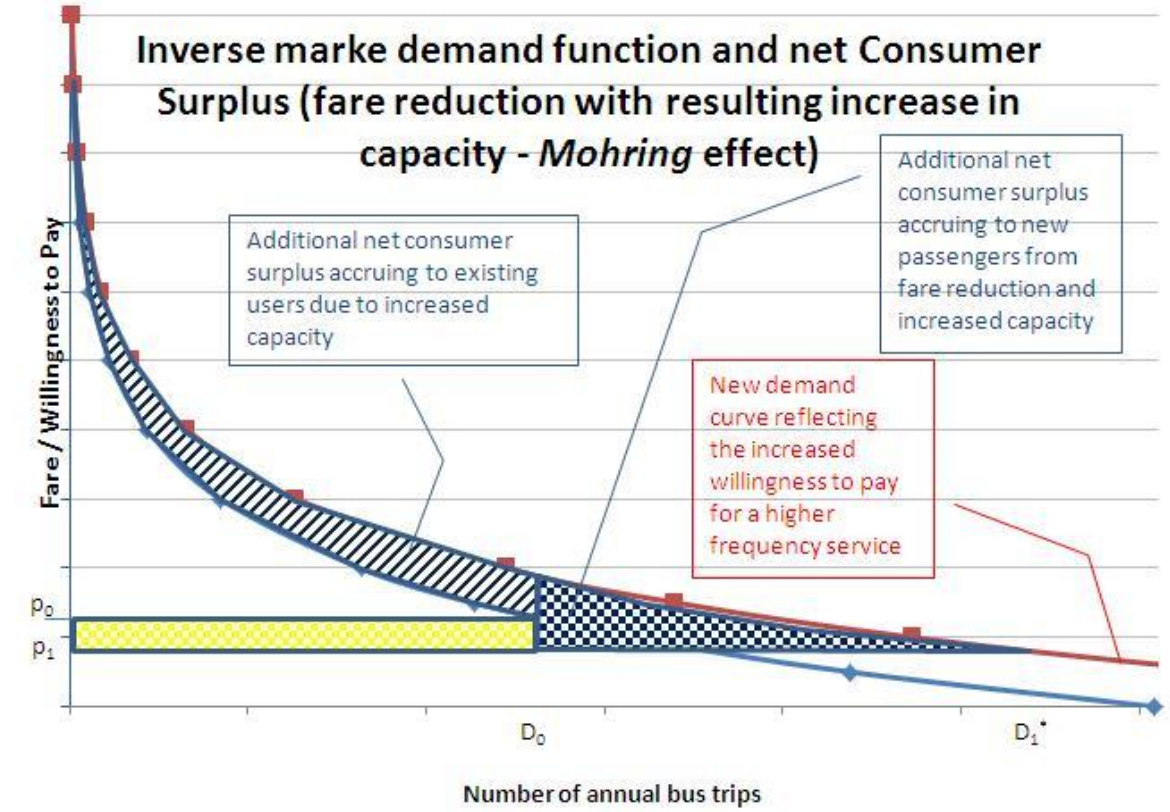


Figure 3.



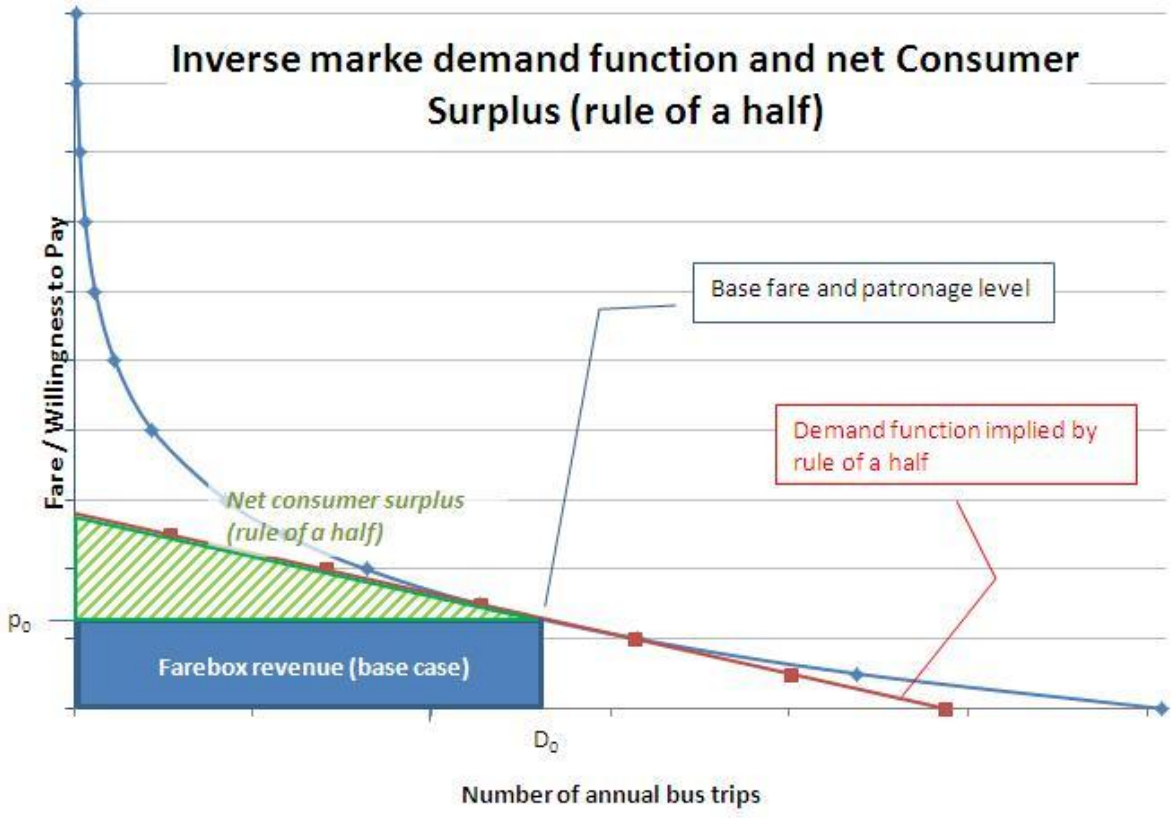
Net Consumer Surplus, the rule of a half (RoH) and alternative measures of user benefits

7.60. The rule of a half is an approximate formula for computing changes in Consumer Surplus, which is employed in the UK's standard appraisal methods. Following our earlier notation, the rule of a half gives a change in Net Consumer Surplus using the following formula:

$$\Delta netCS = \frac{1}{2} . \quad D_0 + D_1 \, . [p_0 - p_1]$$

7.61. This approximation is valid if we assume a linear demand curve or small changes in travel costs from a given base level. However, the formula becomes increasingly inaccurate for non-linear demand curves and larger changes in travel costs. This is illustrated in figure 4 below, which illustrates how the rule of a half would significantly under-estimate the overall economic benefit to users assuming an underlying non-linear demand function.

Figure 4.



7.62. The linear demand curve implies that bus passengers are highly sensitive to changes in fares (much more sensitive than is implied by any evidence we are aware of), suggesting that demand would be virtually wiped out at average fares double their current levels. Given that there are, in fact, many passengers still travelling at fares twice as high as the average this seems highly unlikely. See Nellthorp and Hyman (2001) for a more detailed discussion of this issue.

Choice of functional form

7.63. Our choice of a negative exponential demand curve is based on the following arguments:

- It is an integrable function over its entire domain; this factor precludes the use of a more conventional constant elasticity (or loglinear) model of the form $D(p) = \alpha.p^{\beta}$
- Statistical tests reported by Dargay and Hanly (2002) support a variable elasticity over a constant elasticity hypothesis.
- Over the past two decades, commercial bus fares in metropolitan areas have increased significantly above inflation and at greater pace than motoring costs or average rail fares. A variable elasticity formulation is better able to capture the effect of these changes on the relative competitiveness of bus.
- This was one of the functional forms employed by the Competition Commission to estimate the adverse effect on competition in the context of its recent bus market investigation. Our results are therefore consistent with the Competition Commission's analytical framework.
- The DfT's Concessionary Reimbursement research project estimated variable elasticity models for concessionary pass-holders and these have been subsequently adopted in DfT guidance.

Estimation of market demand function parameters by segment

7.64. Our estimation of market demand functions was largely based on research by Dargay and Hanly (2002), DfT statistics on changes in commercial fares, alongside a number of assumptions regarding differences in average fare by market segment. We also used work by Preston (1998) to break down the metropolitan-wide demand function by market segment.

7.65. Dargay and Hanly (2002) estimated separate demand functions for local bus services in London, the English metropolitan areas and the rest of England, based on a dynamic model formulation, which allows for the adjustment of behavioural responses over time. They were therefore able to estimate short and long run demand functions. All our analysis is based on long run demand functions, although we report below what our estimate of user benefits would have been had we used short run results.

7.66. Long run functions provide more robust estimates of true economic benefits as they allow for users to respond in more flexible ways to changes in service attributes (for example, by changing jobs, moving houses or changing their car ownership status). However, short run results are arguably a better indicator of the level of inconvenience and, potentially, short term anxiety and financial distress, that changes in policy are likely to cause.

7.67. Because short run elasticities are, by definition, lower than long run elasticities, their effect would have been to increase user benefits and decrease non-user benefits and externalities as fewer people would be prepared to change their behaviour as the result of changes in the attributes of bus networks.

7.68. D&H's data set was based on the STATS100A database, which includes financial year returns from bus operators licensed for 20 or more vehicles. It contains information on vehicle miles, passenger receipts, passengers carried, number of vehicles and staff, concessionary fare reimbursement, public transport support and fuel duty rebate. The authors used annual data for the period between 1986 and 1996.

7.69. The D&H model expressed per capita bus patronage as a function of real per capita income, real bus fares, bus vehicle kilometres, real motoring costs and demographic variables. Fare was defined as the average fare-box revenue, excluding concessionary reimbursement, divided by the number of passengers.

7.70. D&H tested both constant elasticity and variable elasticity models and found more statistical support for the latter. They also tested constrained and unconstrained models, the latter allowing fare elasticities to vary by local authority area. We have adopted the variable elasticity, constrained model results, which give average England-wide point fare elasticities in 1995 prices of:

- -0.41 (Short-run)
- -0.86 (Long-run)

7.71. These figures are England-wide averages although D&H also estimated separate constant elasticities for metropolitan areas and English shire counties:

- -0.26 (SR; Met areas)
- -0.54 (LR; Met areas)
- -0.49 (SR; Shire counties)
- -0.66 (LR; Shire counties)

7.72. These figures give lower average elasticities than the variable elasticity model and also suggest that the difference between met areas and shire counties are smaller in the long run than in the short run. We weighed up this contrasting evidence and decided to adopt met area point elasticities (in 1995 prices) of:

- **-0.3 (Short-run)**
- **-0.75 (Long-run)**

7.73. In order to calculate variable elasticity demand model parameters in 2011 prices, we need to know the average fare (more rigorously speaking, average revenue per trip) from the dataset on which the original models were estimated as well as a comparable average fare in 2011. D&H quote an average fare in 1995 prices of 56p for the entire study area, the DfT Bus Statistics Table BUS0405a provides an index of bus fares going as far back as 1995, which also provides information on metropolitan area fares relative to the national average, and we can obtain current average commercial fares from farebox revenue data (DfT Bus Statistics Table BUS0501). In order to be able to estimate fares by market segment, we assumed concessionary and child fares were 70% of the average revenue per trip in 1995, and child fares were 50p in 2011 (equivalent to around 70% of the average farebox revenue per trip).

7.74. Based on the information above, we estimated the average revenue per trip in metropolitan areas in 1995 (53p) and 2011 (73p) as well as the average fare for each market segment (respectively, 65p and 115p, for adult non-concessionary passengers) – preceding figures are in current prices.

7.75. Having inferred average fares by market segment, as well as short and long run point elasticities for the metropolitan market as a whole, we proceeded to estimate the demand function parameters for each of the market segments under consideration.

7.76. For **older and disabled concessionary pass-holders**, we used the results from the DfT's research into Concessionary Reimbursement (Institute for Transport Studies 2010), from

which we estimated a long-run beta parameter of -0.788 in 2005 prices. We then re-based this figure back to 1995 prices and estimated a short-run beta using the ratio between the metropolitan short and long run point elasticities. This relationship was assumed to hold for all demand segments. With respect to fares, we assumed that in 1995, the average discount for concessionary passengers was 30% lower than the overall average for all passengers. This figure is required to ensure that the elasticities for other demand segments are consistent with the metropolitan area average.

7.77. For **children** (under 16s), we have taken a short run elasticity of -0.2 in 1995 prices and fares, based on TRL (2004) and internal ***pteg*** analysis. We assumed a similar level of fares discount as for concessionary passengers and followed a similar approach to estimate the long-run elasticitiy.

7.78. Our assumption about 2011 child fares and the estimated level of farebox revenue, mean that non-concessionary adult average fares need to be 22% higher than the overall metropolitan average farebox revenue per trip.

7.79. To estimate 1995 point elasticities by market segment we assumed that the ratio between these is consistent with the results reported by Preston (1998) and quoted in TRL (2004), and that the weighted average elasticity (using current proportions of demand by market segment) is consistent with the figures quoted earlier, inferred from the D&H paper.

7.80. Taking the inferred metropolitan area 1995 point elasticities (equal to $\beta.p$ for a negative exponential demand model), the inferred 1995 average fares and the retail prices index for the intervening period, we then estimated the β parameter for metropolitan areas for 2011.

7.81. Finally, the negative exponential function's alpha parameters were calibrated on the current level of demand and estimated average fare by demand segment.

7.82. Table 1 summarises our results. If we include concessionary passengers, then our results suggest PTE average point elasticities in 2011 prices and fares of -0.28 in the short-run and -0.7 in the long run. Excluding concessionary passengers, our results suggest average point elasticities in 2011 prices and fares of -0.39 in the short-run and -0.98 in the long run. The long run figure is perhaps higher than conventional wisdom but remains broadly consistent with the D&H results (which suggested a -0.86 long run point elasticity for the English bus market in 1995, including concessionary passengers) and the real terms increase in commercial fares between 1995 and 2011.

7.83. We have also compared our results with more recent work by Wheat and Toner (2010), who have repeated the D&H analysis using data from 1989/90 to 2006/07. The authors report average metropolitan area long-run point elasticities (for variable elasticity models) based on the average fare over the sample period (63p in 2005/6 prices):

- -0.607 (where the elasticity is allowed to vary between types of authority only)
- -0.699 (where the elasticity is allowed to vary between individual local authority areas)

7.84. Although there are practical challenges in comparing results from different studies due to changes in the proportion of concessionary passengers and variations in fares, the W&T results seem broadly in line with our own estimates based on the D&H paper, which suggest a met area whole market point elasticity of -0.7 at 2011 fares in 2011 prices[221].

[221] In comparing these figures, one needs to bear in mind two factors. Firstly, several PTEs already offered heavily discounted concessionary travel to older and disabled passengers prior to the national

Approach to the estimation of decongestion and other externalities

7.85. The calculation of externality benefits is in two main parts:

- firstly, we estimate the number of car-kms which bus services are expected to abstract from the road network;
- secondly, we estimate how much each car-km is worth in money terms for each market segment.

7.86. The number of abstracted car-kms is based on the following factors:

- Change in bus trips that would result from changes in bus services or fares. This is based on each segment's market share and demand function.
- Average diversion factors from bus to car (i.e.: the proportion of new or abstracted bus trips which would transfer from/to car). An overall market-wide figure of 31% was assumed (based on TRL, 2004). This was then allowed to vary by market segment based on subjective judgements about the relative value and alternatives available for each type of trip.
- Car occupancy per trip. An overall market-wide figure of 1.67 was assumed (based on WebTAG Unit 3.5.6, which also provides disaggregate information for some market segments). Where there was no matching segment in WebTAG, subjective judgement was used to decide on the most similar segments for which information was available.
- Mean trip length by bus and for an equivalent car trip. A uniform average bus trip length of 4.3 miles (6.88km) was assumed, based on NTS data. We have then added 1km for equivalent car trips since the access/egress portions would no longer be done on foot and because there may also be some additional parking search distance.

7.87. The factors above are then multiplied through to give a number of abstracted car-kms by market segment.

7.88. The monetary value of the externalities produced per car-km (decongestion, accidents, environmental externalities) is based on the following information;

- Marginal external costs in pence per car-km, by level of congestion and road type, taken from WebTAG unit 3.9.5.
- The proportion of bus passenger-kms by road type and level of congestion for each market segment. These figures were based on a degree of judgement, while ensuring that the average marginal cost for all markets was consistent with estimates sourced from PTEs, which are understood to come from network models. Our assumptions are documented in table 2[222].

concessionary scheme coming into operation. As such the proportion of concessionary passengers and the average concessionary fare changed by a much smaller proportion than in most other parts of England. Secondly, PTEs have seen steep increases in commercial fares of over the past decade (amounting to around RPI+3% per year), which would have significantly increased the point elasticity relatively to the W&T estimate.

[222] Our allocation of bus passenger-kms admittedly differs from DfT Road Traffic Statistics, which allocate more bus mileage to minor roads. However, it is important to highlight that average bus load factors vary markedly both by time of day and by route section. So whereas a bus may be carrying few passengers towards the periphery of an urban area where it serves residential streets, it will be much closer to capacity when travelling along main roads and especially in city centres.

7.89. The factors above are multiplied through to give a marginal external cost per abstracted car-km by market segment. Finally, marginal external costs per car-km are multiplied by abstracted car-kms to give total monetised externality benefits. Table 3 summarises the key steps, inputs and results of the calculation.

7.90. Although there are a number of important assumptions implicit in this calculation, we would argue that the majority of these are relatively conservative. In particular, we have assumed that the WebTAG marginal external costs would apply, despite the fact that our scenarios would potentially lead to non-marginal changes in car traffic, compared to the types of piecemeal scheme which WebTAG is used to assess. It is therefore likely that congestion would increase much more severely than has been assumed, in particular in the scenarios looking at the scrapping of BSOG and the complete withdrawal of bus networks.

Approach to the estimation of changes in indirect taxation due to loss of fuel duty

7.91. For simplicity, we have adopted a uniform rate of fuel duty of 5.5p/car-km (2010 prices) based on the average between the figures quoted in WebTAG Unit 3.9.5 for A-roads and local roads. This figure is then applied to the number of abstracted car-kms, estimated as described in the previous section.

Bus congestion and externalities

7.92. Where the policies tested result in a change in bus mileage, we have included its impact on road congestion, using the formula. We have assumed that a bus is equivalent to 2.5 pcus (passenger car units), in accordance with HA (1996). We then applied a tidal factor of 0.5 to average marginal external costs per car-km, to reflect the fact that half all bus mileage is in the opposite direction to peak flows and also to take into account that buses make use of exclusive infrastructure which could not be used effectively were it open to all traffic. Total bus externalities then equal additional bus-kms multiplied by the 2.5 pcu factor, 0.5 tidal factor and average marginal external costs per car-km.

Approach to the estimation of wider economic impacts (WI1)

7.93. The calculation of Agglomeration Impacts (WI1) largely follows the methodology set out in WebTAG Unit 3.5.14, which, for a given zone i, employment sector k, and under certain assumption, simplifies to the following formula:

$$WI1_i^k = GDPW_i^k . E_i^k . \left(\frac{GC_{1_i}{}^k}{GC_{0_i}{}^k} \right)^{\alpha^k . \rho^k} - 1$$

Where $WI1_i^k$ represents the monetised productivity benefits of agglomeration, $GDPW_i^k$ is the GDP per worker, E_i^k is the number of workers who use the car, $GC_{1_i}{}^k$ represents the average Generalised Cost per car trip in the absence of bus networks, $GC_{0_i}{}^k$ represents the average Generalised Cost per car trip at present, ρ^k is the elasticity of productivity with respect to effective density for sector k and α^k is a decay parameter for sector k, which reflects role of distance for the interactions within the industry.

7.94. Below we summarise the key simplifying assumptions implicit in this formula:

- The number of workers, their location and mode of travel are assumed constant between the scenarios. These assumptions are all likely to underestimate benefits.
- We only take into account travel by car and assume that all travel from all zones can be represented by an average Generalised Cost, which is the same for all locations in the base but is allowed to vary between town/city centres and suburban locations in the absence of bus services.

7.95. We have made the following additional assumptions:

- We assume that the proportion of business-related travel by car is equivalent to car's average mode share for peak travel into city centres (40%), in the case of town and city centre jobs, and for off-peak travel (70%), in the case of suburban jobs. Given that the proportion of business-related travel is greater by car than for other purposes this is likely to underestimate benefits.
- Half of all producer and consumer services are assumed to be located in town and city centres, with all other jobs located in suburban locations.

7.96. It is relatively clear from the formula and assumptions above that changes in average Generalised Cost of car travel are the drivers of agglomeration benefits. We estimated current average car Generalised Cost at £3.90, based on National Travel Survey data for metropolitan areas (average car journey time, average distance travelled, 2009/10 figures) and WebTAG Unit 3.5.6. (value of time, car fuel consumption and car non-fuel costs, 2010 values and prices). We assumed car fuel costs of £1.35/litre.

7.97. In order to work out the increase in Generalised Cost in the absence of bus networks, we used our earlier estimate of abstracted car trips and assumptions about car's mode share for each market segment to estimate the total number of car trips currently being made (ensuring that the relative proportion of car and bus trips matches the trip rates from the National Travel Survey). We assumed that for town and city centres, two thirds of travel would take place under peak conditions and one third under off-peak conditions. For suburban locations, we assumed all travel taking place in off-peak conditions. We then divided the decongestion benefits estimated earlier by the total number of trips by market segment, which gave an increase in GC of 91p for town/city centres and 4p elsewhere.

7.98. The calculations are all done at local authority level (split by sector and location type) and then aggregated up to give a metropolitan area total. Based on our calculations, 90% of WI1 benefits accrue in town/city centre areas.

7.99. For the scenario described in Chapter Three, where metropolitan bus networks are withdrawn altogether, WI1 impacts are estimated to be 46% of total car externalities. We have subsequently applied this ratio to our estimates of car externalities in order to calculate WI1 benefits for the scenarios in Chapter Six.

Concessionary Travel

7.100. The computation of the benefits from free concessionary travel for older and disabled people is based on the following components:

- The gain in net consumer surplus to those passengers who would have travelled at the commercial fare in the absence of the concession. This is largely based on the methodology set out in the DfT's Concessionary Reimbursement guidance and some information provided by the PTEs.

- The gain in net consumer surplus to those passengers who decide to travel by bus as the result of the concession. This uses the demand function estimated for this market segment (based on the DfT's reimbursement guidance) – see figure 5.
- Deadweight loss. This is the increase in net consumer surplus relating to those passengers who would not have been willing to pay even their own marginal cost to use the bus.
- Decongestion and other externalities, following the methodology set out earlier, which is applied to the passengers which are generated by the concession.
- Agglomeration benefits (WI1), assumed to be a fixed proportion of decongestion and other externalities, as calculated in the scenario of a complete withdrawal of bus services.
- Indirect tax and bus externalities, following the methodology set out earlier
- Mohring effect, calculated as the increase in net consumer surplus from an increase in frequency, determined in accordance with the DfT's reimbursement guidance (Mohring factor = 0.6 and frequency elasticity = 0.66)
- Physical health benefits, described below.

7.101. The key elements of this calculation are:

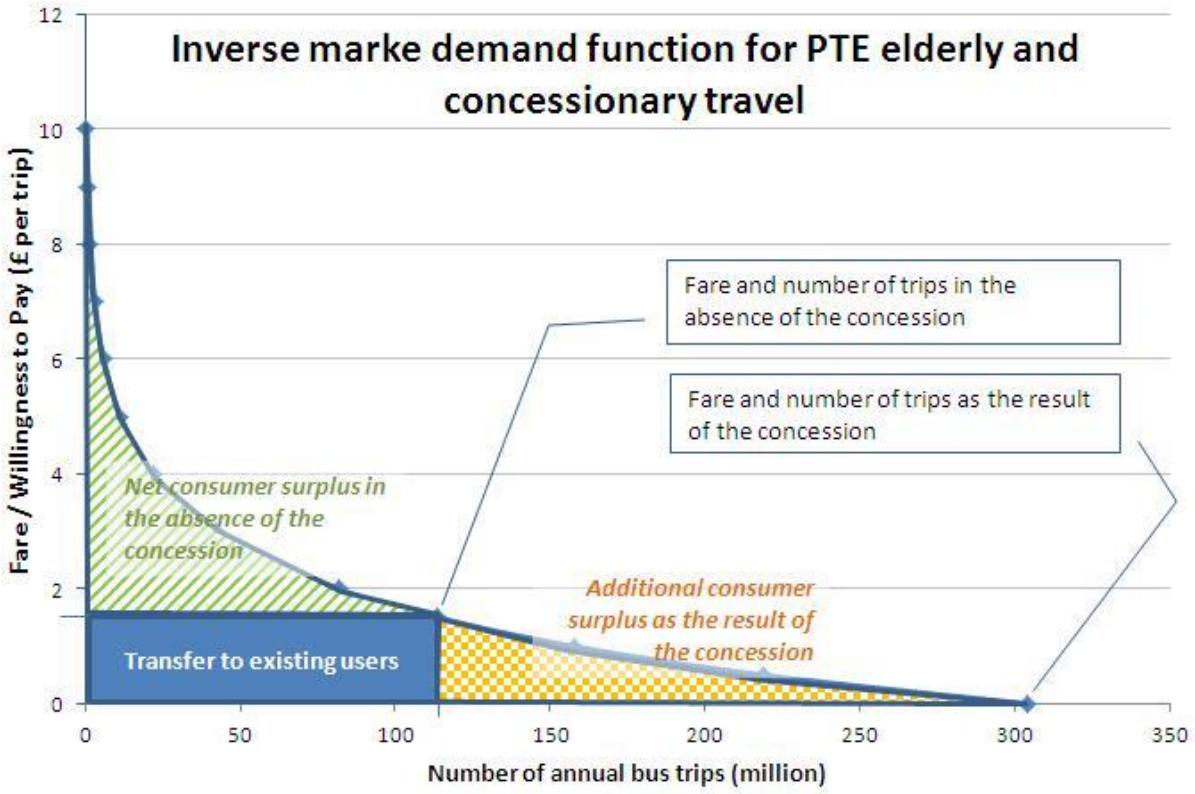
- the assumed level of reimbursement per generated trip, which was taken as 15p per generated passenger based on information from the PTEs
- the assumed commercial fare in the absence of the concession, which was estimated from the current level of reimbursement, the implicit reimbursement factor (see below) and the assumed level of reimbursement per generated trip (see above).
- the demand function for concessionary passengers, which allows the estimation of the proportion of generated passengers from any given commercial fare. As set out earlier, the demand function was estimated so as to be consistent with the results from the DfT-sponsored Concessionary Reimbursement research.

7.102. The quantification of physical health benefits follows the approach set out in Kelly (2011), based on the estimated increase in the number of walking days by pass-holder reported by the same author (0.5 days per month) and the valuations recommended by the NZTA (2011) (£1/km, 2011 prices). We have assumed an average daily walking distance of 1.5km (equivalent to a 7 minute walk at either end of the bus journey and an additional 7 minute stroll at the destination), and the proportion of pass-holders in metropolitan areas to be 84% of the eligible population, based on Dargay and Liu (2010).

7.103. The NZTA guidance then suggests that half of all benefits should accrue to users and the rest to health providers, which we have illustrated in our summary tables in the main report.

7.104. One important point to note is that this is an estimate of physical health benefits alone. It could be argued that there significant mental health benefits from being able to maintain an independent life style and getting out and about more often. Some of these are captured in our assessment of Net Consumer Surplus but this excludes any external benefits to government agencies, in particular to health and social care providers.

Figure 5.



BSOG

7.105. The key assumption in the calculation of the economic benefits of BSOG is that it amounts, in practice, to a direct fare subsidy to passengers without any leakage into higher operating costs (including through higher profits). Although it could be argued that there may be more effective and targeted ways to provide fare subsidies or to incentivise operators to do so, the purpose of this exercise is to demonstrate that fare subsidies (whether routed through BSOG or some other mechanism) can be a cost effective application of public funds.

7.106. The computation of benefits is based on the following components:

- The gain in Net Consumer Surplus to those passengers who would have travelled at the prevailing commercial fare in the absence of BSOG. This has two elements: one relating to the reduction in fare and the other relating to the increase in capacity required to accommodate to generate additional passengers.
- The gain in net consumer surplus to those passengers who decide to travel by bus as the result of the reduction in fares and increase in capacity required to accommodate those passengers (see figure 3).
- Decongestion and other externalities, following the methodology set out earlier, which is applied to the passengers which are generated by the concession.
- Agglomeration benefits (WI1), assumed to be a fixed proportion of decongestion and other externalities, as calculated in the scenario of a complete withdrawal of bus services.
- Indirect tax and bus externalities, following the methodology set out earlier.

7.107. The key input to this calculation is the fare reduction which bus operators will have introduced as the result of BSOG. This figure is estimated iteratively by searching for the fare change which would lead to a net revenue loss to bus operators equivalent to the amount of BSOG available. Below we set out the components which make up this calculation:

- First order demand response to the reduction in fares.
- Mileage required to accommodate additional passengers. This is based on a Mohring factor of 0.5, which has been demonstrated to be welfare maximising under certain conditions[223].
- Second order demand response to the increase in mileage. This effectively amounts to a shift in the demand curve representing the effect of the increase frequency. We have assumed a frequency elasticity of 0.3, rather than the higher value of 0.66 recommended in the DfT's Concessionary Reimbursement guidance and TRL (2004), to take into account the fact operators may be more conservative in their assessment of the effect of changes in frequency. We have implemented this increase in demand by adjusting the alpha parameter in our exponential demand curve while leaving the beta parameter unchanged.
- Revenue gain, due to the overall increase in demand.
- Revenue loss, due to the loss of revenue from existing passengers who continue to travel by bus
- Increase in operating costs (based on marginal cost of 7p per passenger, a capacity cost of 40p per passenger, estimated from the DfT's Concessionary Reimbursement Calculator, and a reduction in peak vehicle requirements proportional to the average reduction in mileage).
- Reduction in concessionary reimbursement due to the higher commercial fare (we assume the number of concessionary passengers to remain constant and therefore ignore second order effects due to increased frequency).

7.108. It is worth dwelling on the last bullet point. Our calculation treats central government (BSOG) and local government costs (concessionary reimbursement) independently. Our reported BCR of 2.8:1 is therefore the figure that central government would obtain if excluding any transfers to/from local government. In reality, nearly all local government funding comes from taxpayers and the majority of this originates from central government.

7.109. When we take this into account, then the overall public cost of BSOG should equal total payments from the DfT to operators (assumed to be £111m per year in 2011/12) minus any savings in reimbursement to local government (which we estimate to be £12m per year). Effectively, if the DfT were to withdraw BSOG altogether and operators were to behave in the way we have hypothesised, the public sector as a whole would only be saving £99m. Taking public sector costs as a whole the BCR of BSOG would therefore be **3.18:1**.

7.110. An alternative approach would be to estimate the fare reduction which operators would pass through to passengers, while assuming reimbursement was constant and independent of commercial fare levels. In this case we get a fare reduction of 29p and a BCR of **3.23:1**.

[223] See, for example, Mohring (1972) for the seminal work in this area or Jara-Díaz and Gschwender (2009) for a more recent treatment of this topic.

7.111. Going back to demand response and user benefits, we have represented the non-concessionary market by a single demand curve, based on an average between the short run and long run demand functions which we have previously estimated. The problem with using our long run demand function is that it implies a very high elasticity, which suggests that it would be profit maximising for operators to reduce fares in some market segments. In reality, there are no signs at present that operators believe this to be the case and so it seems more realistic to model operator behaviour as more risk averse using a lower elasticity.

7.112. Welfare benefits from the fare reduction which results from BSOG follow the approach illustrated in figure 3. The calculation of decongestion benefits, agglomeration effects (WI1) and other externalities follow the methodologies set out earlier, applied to the estimated increase in demand.

7.113. One point to note is that we have not included in our benefits an estimate of the option value of the additional mileage which BSOG leads commercial operators to provide (the Mohring effect). The reason for this is that it remains challenging to apportion option values, for which we have only robust aggregate estimates, to more disaggregate changes in bus mileage. However, if we were to follow the methodology in the main body of the report, where we apportioned option values on the basis of bus mileage, then the option value of BSOG could amount to as much as £10m per year in metropolitan areas, taking the estimated BCR of this funding stream from 2.84:1 to 2.94:1 (or, by considering overall public sector costs, from 3.18:1 to 3.28:1).

7.114. An additional point to note is that we have made no attempt to directly estimate the impact of lower bus fares and more extensive networks on job search effort, on the willingness to commute further or through reduced wage levels, and hence costs (see, for example, Zenou, 2009 for a discussion of these effects).

7.115. Although most of the direct benefits to users are likely to be captured implicitly in our Net Consumer Surplus approach any external benefits to government agencies and society at large, for example, in the form of lower welfare payments, are likely to be additional to our benefit estimate.

Tendered services

7.116. Our analysis of tendered network support is based on a notional bus route, for which we estimated subsidy requirements and net economic benefits as a function of the number of boardings, separately for early morning, late evening and Sunday departures. For a given number of boardings commercial revenue and operating costs are assumed constant for all market segments but economic benefits are allowed to vary in accordance with our earlier analysis.

7.117. We have taken a 10km bus route (i.e.: 20km round trip), assumed an operating cost of £1.80/bus-km[224], and an average farebox revenue per commercial passenger of £1.15

[224] This figure is based on average costs reported by the PTEs and is also broadly consistent with the data and assumptions in the MVA Metropolitan Bus Model. Our figure is lower than that obtained by dividing total operating costs by total bus-kms for metropolitan areas, which comes to £2.10 in 2011/12, based on DfT statistics. The difference between the two figures is likely to be due to the way in which operators allocate vehicle costs between commercial and tendered services as well as the less congested conditions in which tendered services tend to operate.

(based on our earlier analysis and assumptions[225]). From this we can estimate the subsidy per passenger-trip as a function of the number of boardings, which varies between £2.45 at 5 boardings per leg and £0.05 at 15 boardings per leg. Above this level, the bus route is financially viable without public support.

7.118. Average economic benefits per bus trip are taken from our earlier analysis of user benefits, externalities, indirect taxation and option values. Economic benefits the differences in the value for money of different types of service for a given level of patronage. In the absence of tendered services, it was assumed that those trips currently being made by bus would either transfer to a different mode or no longer be made at all. While this is likely to be a valid assumption for the withdrawal of entire services or where there is a relatively long headway between consecutive services, it may over-estimate benefits when services are close together or there are available bus routes within a short distance. Our approach is therefore less appropriate for dealing with subsidised services in urban settings, during the peak and inter-peak periods.

In the case of early morning and late evening services, value for money is dominated by user benefits given that car externalities, bus externalities and indirect taxation largely cancel out. In the case of Sunday services, option values amount to around half of total economic benefits for an average number of passenger boardings of 10/leg.

[225] It is assumed that all passengers are adult non-concessionary. While this seems to be an appropriate assumption for early morning and late evening services, it is likely to under-estimate the subsidy requirements of Sunday services.

Table A1. Derivation of demand function parameters

	Dargay and Hanly (2002)			Demand model parameters						Implied point elasticities		
	SR	LR		SR			LR				SR	LR
market segment	**SR fare elasticity at 56p in 1995 prices**	**LR fare elasticity at 56p in 1995 prices**	**estimated fare at which elasticity was calculated**	**beta (1995 prices)**	**beta (2005 prices)**	**beta (2011 prices)**	**beta (1995 prices)**	**beta (2005 prices)**	**beta (2011 prices)**	**average yield at current prices (11/12)**	**SR elasticity at current av yield**	**LR elasticity at current av yield**
England	**-0.41**	**-0.86**	0.56	-0.73	-0.59	-0.50	-1.54	-1.25	-1.04	0.64	-0.32	-0.67
PTE total	-0.30	-0.75	*0.53*	-0.56	-0.46	-0.38	-1.41	-1.14	-0.95	0.73	-0.28	-0.70
											(inc. concessionary)	
Concessionary	-0.22	-0.54	0.37	-0.39	-0.32	**-0.26**	-0.97	-0.79	**-0.66**	0	-	-
Children (<16)	-0.2	-0.5	0.37	-0.54	-0.44	**-0.36**	-1.34	-1.09	**-0.91**	0.5	-0.18	-0.45
com./business/educ.	-0.26	-0.65	0.65	-0.40	-0.32	**-0.27**	-1.00	-0.81	**-0.68**	1.15	-0.31	-0.78
leis./pers./shopping	-0.40	-1.00	0.65	-0.62	-0.50	**-0.42**	-1.55	-1.26	**-1.05**	1.15	-0.48	-1.20
early morning (6-7am)	-0.21	-0.52	0.65	-0.32	-0.26	**-0.22**	-0.80	-0.65	**-0.54**	1.15	-0.25	-0.62
eve./night (7pm-6am)	-0.25	-0.62	0.65	-0.38	-0.31	**-0.26**	-0.95	-0.77	**-0.64**	1.15	-0.30	-0.74
Sunday	-0.89	-2.24	0.65	-1.38	-1.12	**-0.93**	-3.44	-2.80	**-2.33**	1.15	-1.07	-2.68
control total	**-0.30**	-0.75	0.53			-0.38			-0.94		-0.39	-0.98
												(exc. concessionary)

Table A2. Estimated proportion of bus passenger-kms by road type

Congestion band	ENCTS		ENCTS		Comm/bus/ed		Leis/pers/shopping	
	A Roads	Other Roads	A Roads	Other Roads	A Roads	Other Roads	A Roads	Other Roads
1	10.0%	25.0%	10.0%	0.0%	5.0%	5.0%	20.0%	10.0%
2	30.0%	50.0%	20.0%	25.0%	5.0%	35.0%	30.0%	40.0%
3	45.0%	25.0%	40.0%	50.0%	35.0%	30.0%	35.0%	40.0%
4	15.0%	0.0%	30.0%	25.0%	40.0%	20.0%	15.0%	10.0%
5	0.0%	0.0%	0.0%	0.0%	15.0%	10.0%	0.0%	0.0%
A-/minor road split	60.0%	40.0%	50.0%	50.0%	70.0%	30.0%	65.0%	35.0%
Congestion band	Early am		Late pm		Sunday			
	A Roads	Other Roads	A Roads	Other Roads	A Roads	Other Roads		
1	40.0%	30.0%	10.0%	10.0%	20.0%	25.0%		
2	30.0%	40.0%	30.0%	25.0%	35.0%	50.0%		
3	20.0%	20.0%	40.0%	45.0%	40.0%	20.0%		
4	10.0%	0.0%	20.0%	20.0%	5.0%	5.0%		
5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		
A-/minor road split	70.0%	30.0%	70.0%	30.0%	65.0%	35.0%		

Table A3. Derivation of decongestion benefits and externaltities

	Key parameters							non-user benefits and externalities											
			km	km				£/car-km, 2010 prices							£	£m	£	£m	£	£m
	div. factors	car occ.	mean trip length (bus)	mean trip length (car)	additional car trips in absence of bus network	*base car demand (estimate)*	*new car (vehicle) trips as a proportion of existing bus trips*	congestion	Infrastructure	Accident	Local Air Quality	Noise	Greenhouse Gases	total Indirect taxation (dis)benefits	decongestion benefits per bus trip	**total decongestion benefits**	externality benefits per bus trip	**total externality benefits**	indirect taxation (dis)benefits per bus trip	**total Indirect taxation (dis)benefits**
Concessionary	23%	1.81	6.88	7.88	38	*1115*	*12%*	0.24	0.00	0.03	0.00	0.00	0.01	-0.05	0.24	**72**	0.04	**13**	-0.05	**-16**
Children (<16)	25%	1.81	6.88	7.88	18	*1310*	*14%*	0.52	0.00	0.03	0.00	0.00	0.01	-0.05	0.56	**73**	0.05	**6**	-0.06	**-8**
com./business/educ.	50%	1.20	6.88	7.88	85	*407*	*42%*	0.82	0.00	0.03	0.00	0.00	0.01	-0.05	2.70	**549**	0.14	**29**	-0.18	**-36**
leis./pers./shopping	30%	1.81	6.88	7.88	51	*3102*	*17%*	0.30	0.00	0.03	0.00	0.00	0.01	-0.05	0.39	**120**	0.06	**18**	-0.07	**-22**
early morning (6-7am)	43%	1.13	6.88	7.88	6	*171*	*38%*	0.17	0.00	0.03	0.00	0.00	0.01	-0.05	0.49	**8**	0.13	**2**	-0.16	**-3**
eve./night (7pm-6am)	25%	1.50	6.88	7.88	7	*431*	*17%*	0.40	0.00	0.03	0.00	0.00	0.01	-0.05	0.52	**22**	0.06	**2**	-0.07	**-3**
Sunday	20%	1.88	6.88	7.88	3	*321*	*11%*	0.18	0.00	0.03	0.00	0.00	0.01	-0.05	0.15	**5**	0.04	**1**	-0.05	**-1**
control total	31%	1.67			209	*6857*		**0.408**	0.001	0.03	0.001	0.002	0.01	-0.05	0.82	**850**	0.07	**72**	-0.09	**-90**
						6852	***control total (NTS)***													

Endnotes

[i] http://www.reportlinker.com/p091961-summary/World-Buses-Market.html
[ii] http://www.heatherwick.com/london-bus/
[iii] TfL 'Designed for Londoners' leaflet http://www.tfl.gov.uk/assets/downloads/corporate/new-bus-leaflet.pdf
[iv] http://www.tfl.gov.uk/corporate/projectsandschemes/15493.aspx
[v] http://www.heatherwick.com/london-bus/
[vi] BBC 'Wrightbus set to supply 600 London buses' 21/09/12 http://www.bbc.co.uk/news/uk-northern-ireland-19667158
[vii] http://www.wrightbus.com/site/default.asp
[viii] http://www.wrightbus.com/site/default.asp?CATID=85
[ix] http://www.wrightbus.com/site/default.asp?CATID=85
[x] http://www.belfasttelegraph.co.uk/business/top-100-companies/company-list/39-wright-group-16140713.html
[xi] http://www.optare.com/og_milestones.htm
[xii] http://www.transportxtra.com/magazines/local_transport_today/news/?id=33149
[xiii] http://www.optare.com/ca_introduction.htm
[xiv] Optare Report and Financial Statements for the period ended 31 March 2012 http://www.optare.com/images/pdf/AR&A%202011.pdf
[xv] 'Optare scoops Britain's top automotive award with innovative fast charging bus' – Optare press release 28/11/12
[xvi] http://www.alexander-dennis.com/alexander-dennis-limited.php?s=77&subs=38
[xvii] Financial Times 'Alexander Dennis runs to its target timetable' 14/02/12 http://www.ft.com/cms/s/0/1762d940-4e7c-11e1-aa0b-00144feabdc0.html#axzz2EwCPHx55
[xviii] Financial Times 'Alexander Dennis runs to its target timetable' 14/02/12 http://www.ft.com/cms/s/0/1762d940-4e7c-11e1-aa0b-00144feabdc0.html#axzz2EwCPHx55
[xix] http://www.alexander-dennis.com/
[xx] Financial Times 'Alexander Dennis runs to its target timetable' 14/02/12 http://www.ft.com/cms/s/0/1762d940-4e7c-11e1-aa0b-00144feabdc0.html#axzz2EwCPHx55
[xxi] Financial Times 'Alexander Dennis runs to its target timetable' 14/02/12 http://www.ft.com/cms/s/0/1762d940-4e7c-11e1-aa0b-00144feabdc0.html#axzz2EwCPHx55
[xxii] 'Orders secured for 1,000 buses as Alexander Dennis Limited steps up the technology race' – Alexander Dennis press release 06/11/12.

pteg

the voice of urban transport

pteg Support Unit

40-50 Wellington Street
Leeds LS1 2DE
Tel: 0113 251 7204
www.pteg.net
Email: info@pteg.net