

National Concessionary Bus Travel for Apprentices

Executive Summary

June 2017

This report, originally published in March 2014, has been updated to account for a wider range of benefits and to incorporate the latest bus travel statistics. This forms part of a wider programme of work to update the economic assessment of different interventions in the local bus market produced by Greener Journeys since 2014.

The initiative provides a nationally funded scheme of concessionary bus travel for apprentices in the first year of their apprenticeship.

Rationale for the scheme

There are more than a million 16-24 year-olds in the UK who are not in education, employment or training; a large proportion of which are classified as long term unemployed. The problem is particularly acute amongst young people with no qualifications.

Apprenticeships are clearly part of the solution to this problem, providing a route to training and employment for more than 509,400 people in 2015/16¹.

Apprentices aged 16-18 and those aged 19 and over in the first year of their apprenticeship are entitled to the 'apprentice minimum wage' of £3.5 an hour or approximately £6,800 per year². The cost of getting to work can therefore account for a high proportion of the individual's income and create a substantial barrier to participation in apprentice schemes³.

The objective of the initiative is to improve access to jobs by making it easier and cheaper for apprentices to commute to work by bus. The initiative will also encourage young people to make more sustainable travel choices and could help promote the use of smart ticketing in the long term.

How the scheme would work

The proposed solution draws on experience of how similar schemes operate elsewhere, as well as feedback from an extensive consultation exercise with 54 stakeholders from local and central government, transport authorities, bus companies, business and special interest groups. In particular the solution draws on Transport for London's experience in operating a concessionary travel scheme for apprentices in London.

¹ <http://researchbriefings.files.parliament.uk/documents/SN06113/SN06113.pdf>

² <https://www.gov.uk/national-minimum-wage-rates>

³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/182518/DFE-RR009.pdf

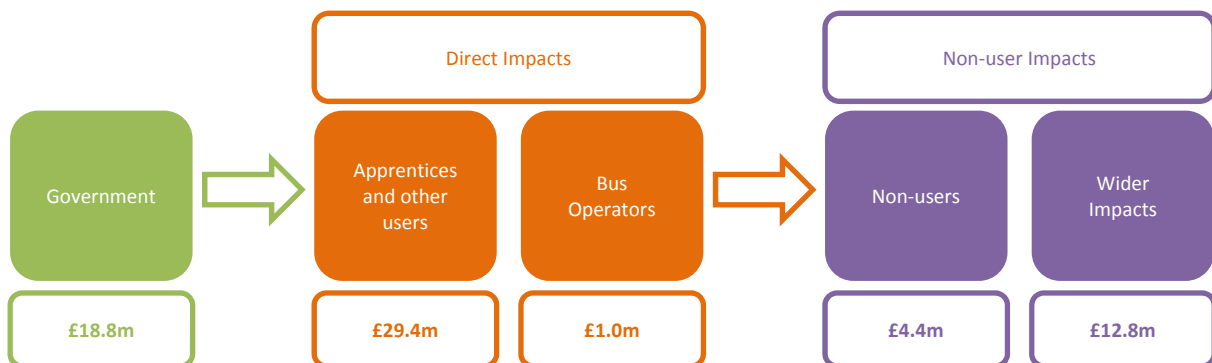
Box 1 – Operating model

- The scheme will be administered by a third party supplier who will issue vouchers to eligible apprentices on production of a Unique Learner Number, a UK Provider Reference Number and an administration fee. The value of the vouchers is capped at £250 a year and issued on a monthly basis.
- The apprentice uses the voucher to pay for stored travel rights (eg. carnet, season ticket or PAYG top-up) at a travel centre or online.
- The bus operator invoices the third party supplier for the value of the voucher that has been exchanged for stored travel rights.
- The third party supplier invoices the Government for the value of the voucher issued plus an administration fee.
- Bus companies may in addition choose to provide products specifically designed for apprentices.

Value for money

Working with KPMG LLP, Greener Journeys found that there is a strong Business Case for the scheme, estimating that it will generate a **net benefit of £28.8 million** per year to the UK economy. Figure 1 provides a breakdown of the annual costs and benefits of a scheme offering 1/3 off bus fares to first year apprentices with the maximum value of the discount to any individual capped at £250 per year.

Figure 1: Summary of the annual costs and benefits



The initiative is expected to cost the Treasury £18.8 million per year in terms of concessionary payments (£15.9 million), a reduction in fuel tax revenues from car-based commuting (£1.9 million), and an increase in BSOG (£1.0m).

In return, bus users benefit by £29.4 million, non-users by £4.4 million, bus operators benefit by £1.0 million and the wider economy by £12.8 million. The net benefits are expected to increase over time as new demand stimulates the need for additional capacity and further improvements in service quality benefiting all bus passengers.

The costs and benefits described above relate only to transport and transport-related impacts. They do not include the impact of the initiative on related policy areas such as social welfare and public health. Even so, the initiative provides £2.7 of benefits for every £1 invested. This represents **high value for money** according to the Department for Transport's appraisal guidance.

1 Introduction

This document presents the Business Case for a national concessionary travel scheme for apprentices.

The analysis is based on publicly available data⁴ that has been assembled in a way that is consistent with the Department for Transport's guidance on transport appraisal⁵ and structured in accordance with the Treasury's 'Five Case Model'⁶.

Before describing the Business Case in more detail, we identify the objective for the initiative, the relevant challenges and opportunities and possible solutions. The document includes appendices on the operation of similar schemes elsewhere in the world, the findings of an extensive stakeholder consultation and details of the analytical framework used to support the economic and financial analysis.

2 Objective of the initiative

The objective of the initiative is to increase participation in apprenticeship schemes and improve their completion rates by reducing the cost of commuting to work by bus.

3 Challenges and opportunities

Unemployment among young people is high and has increased during the recession

Almost 13.4% of 18 - 24 year olds are not in education, employment or training and almost 42%⁷ of those are unemployed (see Figure 2 below). Participation in education and training can make a lasting difference to young people and is key to the Government's objectives to stimulate economic growth, competitiveness and improve social mobility.

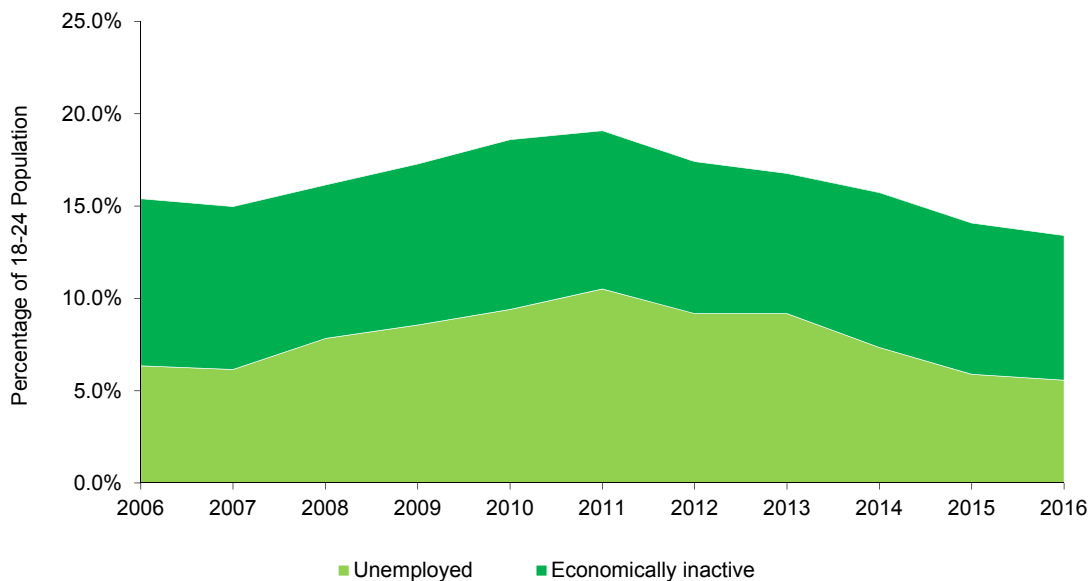
⁴ The data used in this analysis is from publicly available sources such as the Office of National Statistics and the Department for Transport. Further details are provided in Appendix C.

⁵ <http://www.dft.gov.uk/webtag/documents/webtag2.php>

⁶ <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

⁷ <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/unemployment/bulletins/youngpeoplenotineducationemploymentortrainingneet/feb2017>

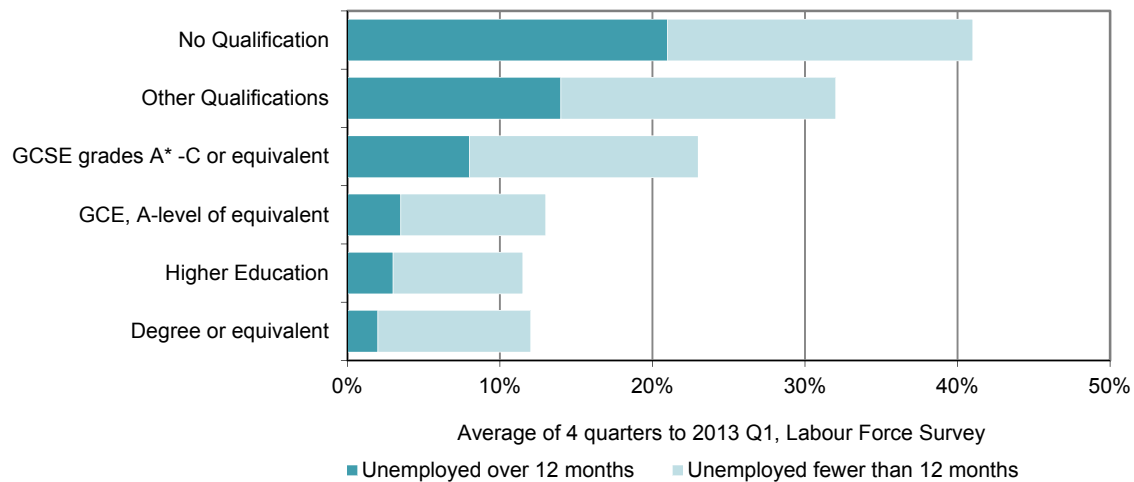
Figure 2: Proportion of 18-24 year olds not in employment, education or training (source: ONS February 2017⁸)



Apprenticeships are a vital route to employment for young people

Young people without qualifications experience much higher rates of unemployment than those with qualifications and are typically unemployed for longer periods (see Figure 3 below).

Figure 3: Youth unemployment by qualification level (source: Work Foundation 2013⁹)



Apprenticeship schemes are a particularly important route to employment for young people without qualifications. Evidence suggests that those who achieve a qualification through an apprenticeship

⁸ Data related to Young people not in education, employment or training (NEET), UK: Feb 2017
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/unemployment/bulletins/youngpeoplenotineducationemploymentortrainingneet/feb2017/relateddata>

⁹ Reid, B. and Cominetti, N. (2013) The voices of UK young people on their experience of the world of work, and their aspirations for the future, The Work Foundation, London

earn substantially more after completion than those who start but do not achieve a qualification. Those who complete an apprenticeship are also more likely to be employed¹⁰.

As a result, the Government has made this a priority policy area. It intends to increase the budget for apprenticeships over this Parliament and has introduced a range of policies to encourage people to take up apprenticeships and to encourage businesses to take on more apprentices. In 2012/13, 510,200 people started apprenticeships, 10,400 fewer than in 2011/12, but 230,500 more than in 2009/10.

Public transport costs are a barrier to the take-up and completion of apprenticeships

Apprentices aged 16-18 and those aged 19 and over in the first year of their apprenticeship are entitled to the 'apprentice minimum wage' of £3.5 an hour (approximately £6,800 per year). After the first year of their apprenticeship, apprentices over 19 are entitled to the National Minimum Wage rates which are age dependent and rise from £7.05 an hour for 21 to 24 year olds to £7.5 an hour for people aged 25 and over¹¹.

The cost of getting to work can therefore account for a large proportion of their income, creating a substantial barrier to participation in the labour market. According to Department for Transport research, around a third of young people who are not in employment, education or training think that they would have chosen to participate in education or training if they had more money to cover the cost of transport¹².

Funding for apprenticeships

Created in April 2009, the National Apprenticeship Service has 'end-to-end' responsibility for apprenticeships in England, while Skills Development Scotland and the Welsh Assembly Government also run policies to encourage apprenticeships in Scotland and Wales respectively.

Apprenticeships for people aged under 19 are funded by the Department for Education. Apprenticeships for people aged 19 and over are funded by the Department for Business Innovation and Skills. Total spending by the Government on apprenticeships (in England alone) is expected to increase from approximately £1 billion in 2009/2010 to over £1.5 billion by 2013/14¹³.

4 Preferred operating model specification

In developing the proposed solution, we have undertaken an extensive consultation exercise with 54 stakeholders from local and central government, transport authorities, bus companies, business and special interest groups. We have also looked to existing concessionary travel schemes for apprentices, most notably the scheme run by Transport for London.

The principal lessons learnt from our stakeholder consultation highlight that the scheme must:

- Avoid complex reimbursement arrangements for operators
- Minimise administration costs for employers
- Include some financial contribution from the apprentice.

¹⁰ Conlon, G. and Patrignani, P. (2013) A disaggregated analysis of the long run impact of vocational qualifications, Research Paper Number 106, Department for Business, Innovation and Skills, London

¹¹ <https://www.gov.uk/national-minimum-wage-rates>

¹² Spielhofer, T., Golden, S., Evans, K., Marshall, H., Mundy, E., Pomati, M. and Styles, B. (2010) Barriers to participation in education and training, Department for Education, London.

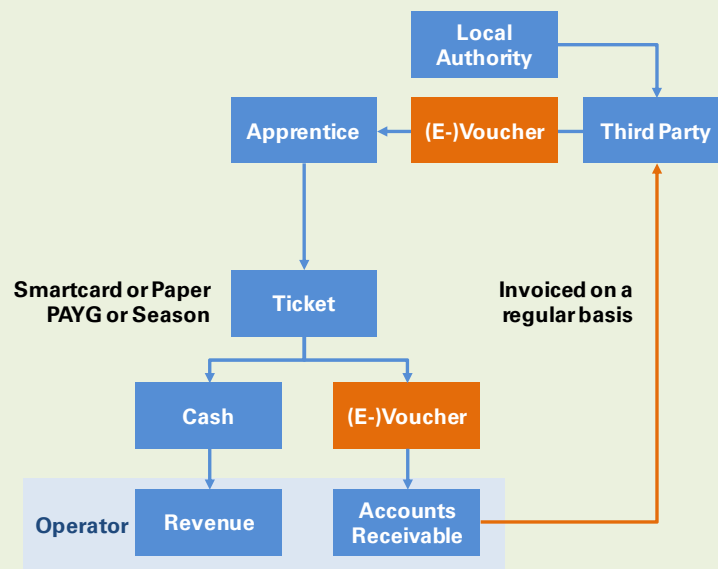
¹³ Mirza-Davies, J. (2013) Apprenticeships policy, House of Commons Library Standard Note: SN/EP/3052, London.

Further details of existing schemes are provided in *Appendix A* and further details of the stakeholder consultation are provided in *Appendix B*.

Box 2 shows an outline of the proposed operating model for the scheme.

Box 2 – Operating model

- The scheme will be administered by a third party supplier who will issue vouchers to eligible apprentices on production of a Unique Learner Number, a UK Provider Reference Number and an administration fee. The value of the vouchers is capped at £250 a year and issued on a monthly basis.
- The apprentice uses the voucher to pay for stored travel rights (eg. carnet, season ticket or PAYG top-up) at a travel centre or online.
- The bus operator invoices the third party supplier for the value of the voucher that has been exchanged for stored travel rights.
- The third party supplier invoices the Government for the value of the voucher issued plus an administration fee.
- Bus companies may in addition choose to provide products specifically designed for apprentices



The preferred specification of the operating model is based on the design principles identified during the stakeholder consultation. It is:

- **Simple and familiar:** This specification avoids the complex reimbursement mechanisms associated with concessionary schemes for the over 60s by providing the benefit directly to the individual via a voucher or e-voucher.
- **Flexible:** The specification provides flexibility to the user who is free to choose the travel product that best meets their needs, avoiding high up-front costs or long term commitments.
- **Low administrative cost:** Employers face no significant administrative costs as their role is to simply confirm the apprentice's position. The onus is on the apprentice to apply for the vouchers.
- **Effective and targeted:** The use of nationally-recognised ID allows the scheme to be targeted, making sure that potential fraud or misuse of cards is kept to a minimum.
- **Cost-effective:** The specification is cost effective and delivers good value for money.

5 The Business Case

5.1 Introduction

In this section we set out the Business Case for a national concessionary travel scheme for apprentices following the 'Five Case Model' as recommended by HM Treasury. The five cases include:

- Strategic case
- Economic case
- Financial case
- Commercial case
- Management case.

Please note that at this stage the analysis centres on the strategic, economic and financial cases.

5.2 Strategic case

The Strategic case for this initiative is centred on helping young people who are not in education, employment or training take up an apprenticeship.

Unemployment amongst young people is high and has increased during the recession. Improving access to apprenticeships is therefore a priority policy area for the Government.

As apprentices typically receive low wages, the cost of getting to work can account for a large proportion of their income and high transport costs present a genuine barrier to participation in employment, education or training.

Reducing the cost of transport will reduce the barrier to participation in employment, education or training, enabling more young people access apprenticeship schemes that meet their needs and aspirations.

5.3 Economic case – value for money

5.3.1 Overview of the results

Working with KPMG LLP, Greener Journeys estimate that a concession scheme providing 1/3 off bus travel for those in the first year of their apprenticeship would generate a **net benefit of £28.8 million** per year to the UK economy, with benefits to users, non-users and the wider economy totalling £45.7 million per year.

5.3.2 Costs and benefits

The costs and benefits presented in Table 1 below are estimated in accordance with the Department for Transport's guidance on transport modelling and appraisal. The methodology is similar to that used to estimate the economic impacts associated with the Bus Bonus scheme. Further details on data and assumptions are presented in *Appendix C*. The results are shown for 2015/16 in 2010 prices.

Table 1: Costs and benefits from concessionary travel for apprentices

	Annual Impact	£ million
a)	User benefits: Fares benefit Generalised journey time benefit arising from improvements in service quality	£18.8 £10.7
b)	Non-user benefits Decongestion, Safety, Local Air Quality, Noise, Greenhouse Gases Wider public finances (indirect tax)	£4.4 £-1.9
c)	Bus operator benefits Change in operating profits	£1.0
d)	Wider economic benefits Improved labour market accessibility and jobs from increased retail spend Fiscal savings from improved health from increased employment Option values Volunteering contributions Psychological wellbeing from improved commuting Health benefits Fiscal savings from increased education	£4.0 £0.2 £0.4 £0.4 £0.2 £5.5 £2.1
e)	Cost to Government Apprentice concession Concessionary fares BSOG	£15.3 £0.6 £1.0

a) User benefits

User benefits arise from the 1/3 reduction in fares for apprentices and the improvement in service quality associated with additional capacity. Fare benefits are estimated to be valued at £218.8 million and service quality benefits valued at £10.7 million per year.

b) Non-user benefits

The discounted fares and improvement in service quality are expected to generate an additional 14.9 million bus trips per year, some of which will have switched from car. The corresponding reduction in car kilometres will lead to annual decongestion benefits valued at £3.4 million as well as a reduction in noise pollution, improved local air quality, fewer greenhouse gases and fewer accidents. The estimated monetised benefits of these are listed below.

- Noise £0.04 million
- Local air quality £0.04 million
- Greenhouse gases £0.3 million
- Accidents £0.6 million

c) Bus operator benefits

Bus operators are expected to benefit by £1.0 million per year. Increased demand leads to an increase in revenues and operating costs, valued at £15.1 million and £14.1 million per year respectively.

d) Wider economic benefits

Improved connectivity in the labour market is expected to generate wider economic benefits valued at £4.0 million per year, while total wider economic and social benefits are estimated to be £12.8 million

e) Cost to Government

The initiative would cost the Treasury £16.9 million per year, including £15.3 million to fund the concessionary travel for apprentices, £0.6 million to fund other types of concessionary travel as a result of overall increased bus demand, £1.0 million increase in BSOG as a result of increased supply of local bus services, plus £1.9 million associated with lower fuel tax revenues from car-based commuting. In line with the latest Department for Transport appraisal guidance, changes to indirect tax revenues have been included in the calculation of total benefits.

The costs and benefits described above include transport and transport-related impacts, as well as a wider set of social and economic impacts that aim to capture the value of local bus services to society. . Accounting for all the benefits identified, the initiative provides £2.70 of benefits for every £1 invested¹⁴. This represents **high value for money** according to the Department for Transport’s appraisal guidance.

5.4 Financial case – affordability

The total cost to Government of implementing the concession is estimated at £15.3 million per year. This cost depends on the volume of apprentices taking advantage of the benefit.

Table 2 shows the results of a sensitivity analysis which tests the assumed take-up rate amongst apprentices.

Table 2: Cost benefit-sensitivity analysis

Sensitivity	Annual net benefit £ million	Annual cost to government £ million
1. Half the take-up rate	£14.5	£8.5
2. Twice the take-up rate	£57.4	£33.9

The results of the sensitivity analysis suggest that there is a risk to Government of £17 million per year if the base number of trips taken by apprentices is twice the expected number of approximately 40 million.

5.5 Management case – deliverability

The preferred operating model outlined in Section 4 above requires the co-operation and support from:

- National Apprenticeship Service
- Department for Transport
- Department for Education

¹⁴ The report published in March 2017 showed a BCR of £2.4. Therefore, the BCR of this bus policy has increased as a result of the inclusion of additional wider social and economic impacts. More details on the updated methodology are provided in the appendices.

- Department for Business, Innovation and Schools
- Department for Work and Pensions
- Local authority travel card providers
- Bus operators

Consultation with a broad range of stakeholders has confirmed good support for the initiative, including from those listed above. The priority is now to identify which Government Department would be responsible for implementation and delivery.

Appendix A – Evidence from elsewhere

5.6 Travel concessions for apprentices

There are a number of examples from around the world in which travel concessions are provided to apprentices, including in London and New South Wales.

5.6.1 UK - Transport for London¹⁵

The Mayor of London introduced the concession for apprentices scheme to coincide with National Apprentice week in May 2013. The scheme covers apprentices in the first year of their programme, providing a 30% discount on adult fare rates. Travelcards and Bus and Tram passes are both covered by the scheme, which could benefit up to 40,000 apprentices in the city.

The maximum amount that could be saved by an apprentice over the year is £668¹⁶. Only apprentices that comply with Specification for Apprenticeship Standards in England (SASE) and are provided by a further education college or approved Skills Funding Agency are able to apply for this scheme.

Apprentices must also be above 18 to apply for the discount; with younger apprentices being covered by TfL's 16-18 Zip pass. There is a mandatory £10 fee for the card.

5.6.2 Australia – Transport for New South Wales¹⁷

A travel concession is provided to both apprentices and trainees which entitles them to a half-fare concession on most public transport services. Public transport services that are included are rail, bus, ferry and light rail. To be eligible the individual in question must be registered with NSW Department of Education and Communities (DEC).

Apprentices and trainees in rural and regional areas are also entitled to a half fare concession on local regulated bus services in rural areas as well as metropolitan and outer metropolitan areas. However, if the apprentice or trainee is classed as an '*existing worker traineeship*' they are not entitled to the discount.

The pass is valid for the life of the traineeship and up to a maximum of three years for apprentices. There are no fees for the original pass, but replacement cards cost \$27AUD.

¹⁵ <http://www.tfl.gov.uk/corporate/media/newscentre/metro/27433.aspx>

¹⁶ <http://www.tfl.gov.uk/tickets/27809.aspx>

¹⁷ <http://www.transport.nsw.gov.au/content/travel-concessions-apprentices-and-trainees>

6 Appendix B – Stakeholder consultation

The stakeholder consultation was undertaken in three stages. The first stage was with specialists and groups familiar with the bus industry. The second stage involved consultation with local government and transport authorities. The final stage will involve interaction with central government policy makers and the political parties.

From mid-November 2013 to mid-February 2014, we have conducted consultations with 54 individuals from 42 organisations, broken down by category in Table 3 below.

Table 3: Stakeholder consultation

Category	Consulted Organisations	Consulted Individuals
Central Government	5	6
Political Parties	1	1
Local Government	5	5
Local Transport Authority / PTE or Equivalent	7	11
Bus companies	6	10
Local Transport Interest Groups	1	2
Employers	4	4
National Transport Interest Groups	6	6
Business Groups	4	6
Academic Specialists / Institutes	3	3
Total	42	54

Key issues highlighted from the consultations are shown in Table 4.

Table 4: Stakeholder consultation – highlighted issues

Issue	Details
Importance of “turning points”	One of the aims of the scheme is to create modal shift. Various stakeholders suggested there are key turning points where habits are formed. Becoming an apprentice is seen as one of these events. The habit of taking the bus to work could therefore become the norm for this group.
“Why just apprentices?”	A challenge that was raised was the decision to limit this to apprentices – rather than other deserving social groups. Scope expansion suggestions included students, key workers and graduate trainees. Bus operators though felt that the policy should be limited to apprentices, so as not to shrink the commercial market.
Funding remit	The consultees had mixed views on what was the most appropriate government department to fund such a scheme. Funding for apprenticeships comes under the remit of BIS, although for individuals between the ages of 16-19 this cost is shared with the Department for Education. DWP also works with operators to provide travel passes for the unemployed. Finally local authorities are involved in the direct funding of the OAP concession scheme

	<p>and could arguably do the same for other concessions.</p> <p>This led to the challenge of which government body would take responsibility for the funding of such a scheme and not try to pass it on.</p>
Current concession mechanism	<p>Most operators and a number of other stakeholders were not satisfied with the reimbursement mechanism for the OAP concessions. The operators felt that the amount reimbursed was insufficient to cover the true costs, and the length of time to negotiate with each local authority was also seen as a costly process. Local authorities in turn felt central government underfunded them and this had to be passed on to operators.</p> <p>Future concession schemes need to be undertaken via a revised mechanism. Different methodologies that were explored included a fixed reimbursement system.</p>
Diversity	<p>Apprentices are a diverse group. They vary greatly based on qualification level, age and wage. The minimum wage for apprentices is much lower than for the rest of the populace. Having spoken to the National Apprenticeship Service it is clear some are paid more than the minimum. Whilst most stakeholders associated apprentices with young people, the National Apprenticeship Service highlighted the growing popularity with the over 25s. When we consider this group we must be careful not to see them as one homogenous entity.</p>
Administrative challenges	<p>TfL already has experience of operating a concession scheme for apprentices. The scheme is in its early stages, running for less than a year so far. The main administrative challenge TfL faced related to the identification of apprentices. They experienced some challenges dealing with the central government agencies responsible for apprentices. One of the bus operators had a similar problem of identifying apprentices when they were considering their own apprentice concession scheme. The National Apprenticeship Service felt that this issue could be overcome though.</p> <p>The actual mechanics of such a scheme were deemed not to pose a great challenge. Both a 3rd party operator and local government officials cited previous experience of dealing with the administration of concessions.</p>

7 Appendix C - Modelling Framework

7.1 Introduction

This appendix describes the modelling framework used to calculate the costs and benefits of the proposed apprentice concessions scheme. We initially describe the inputs, key assumptions, calculations used in the revenue and demand modelling, and finally the calculations used in the welfare analysis.

The modelling framework used to obtain the results presented in this report has been refined with respect to the framework underpinning the Bus Bonus report published in March 2014. As part of this update, we have included additional benefits and costs based on our latest research. The update has also incorporated the latest statistics on demand travel and bus services.

7.2 Inputs

The inputs for the framework are derived from Department for Transport and National Travel Survey (NTS) data except where specified.

Input	Source
Number of passenger trips	DfT Bus Statistics, 2015/16, Table BUS0103
Patronage by ticket type	<i>Green Light for Better Buses</i> , DfT 2012, Figure 2.7
Patronage by journey purpose	NTS, 2012, Table NTS0409
New starters, Apprenticeships	Apprenticeship, Workplace Learning, Community Learning and overall FE and Skills data for the full 2012/13 academic year for FE and Skills, ONS
Trip Rate, No access to car	NTS, 2012, Table NTS0702
Average revenue per passenger	DfT Bus Statistics, 2015/16, Table BUS0402
Mode share (car and bus)	NTS, 2012, Table NTS9903
Vehicle kilometres travelled	DfT Bus Statistics, 2015/16, Table BUS0203b

The model calculates impacts in the following geographical zones: London; English Metropolitan Areas; English Non-Metropolitan Areas; Scotland; and Wales. Bus patronage is further broken down by ticket type categories, which are: Ordinary Adult; Season Ticket; Concessionary Fare; and Other.

The inputs listed above provide the base data for the year 2012/13. The model is then programmed to calculate the following:

- A Do Minimum scenario, which estimates the future year values for patronage and fares under no further government intervention
- A Do Something scenario, which estimates the impacts of the apprentice concessions scheme on patronage, by changing the assumed fare level in 2015/16

The Do Minimum scenario requires assumptions about underlying patronage and fares growth, which will be covered in the next section on assumptions.

The Do Something scenario requires further inputs on how bus users will react to an implied change in the fare level. Such changes in demand are derived from elasticity of demand inputs, which are as follows:

Fare Elasticity of Demand	Value	Source
Ordinary Adult, National	-0.58	Wardman and Muller, 2010
Season Ticket, National	-0.48	Wardman and Muller, 2010
Concessionary Pass, National	0.00	Wardman and Muller, 2010
Other including Free, National	-0.75	Wardman and Muller, 2010
London, Ordinary Adult	-0.57	Dargay and Hanly, 2002
English Metropolitan, Ordinary Adult	-0.47	Dargay and Hanly, 2002
English Non-Metropolitan, Ordinary Adult	-0.99	Dargay and Hanly, 2002
Scotland, Ordinary Adult	-0.82	Dargay and Hanly, 2002
Wales, Ordinary Adult	-0.95	Dargay and Hanly, 2002

The fare elasticities split by ticket type and by geographical area are combined by calculating the mark-up on ordinary adult for season ticket, concessionary pass and other fare elasticities and applying to the geographic-specific ordinary adult fare elasticity. For example, this means that the fare elasticity for a season ticket holder in Scotland is $(-0.48/-0.58) \times -0.82 = -0.68$.

In addition, the analysis of service changes as a result of increased patronage through the Mohring Effect requires the following further inputs:

Input	Value	Source
Travel Time Elasticity	-0.50	Balcombe et al (2004)
Wait Time value of time factor	2.00	WebTAG 3.5.6 (August 2012)

7.3 Assumptions

7.3.1 Apprentices market size

The market size for those potentially benefitting from the concessions scheme is calculated to form a base market size for this group. There is no published information on the trip rates exhibited by apprentices in the UK. We have assumed that a large factor at play for apprentices is the lack of ability to travel by car as, given the average income levels for apprentices, a car is unlikely to be an affordable solution. We have therefore used a trip rate of 167 bus trips a year for every apprentice in

Great Britain, which is the trip rate exhibited by those with no car available in the household. Additionally, this scheme would only have additional impacts on schemes outside of London, as apprentices are eligible for a discount through a similar scheme on Transport for London-operated buses. As a result, we estimate that the annual number of trips made by this population is 74 million, or 1.6% of all bus trips undertaken in Great Britain.

Based on take-up rates of bus discount schemes (not the current national concessionary scheme which allows passengers to travel for free, but in its pre-2006 form) of 40-50%, but acknowledging the higher dependence of this population group on public transport, we assume a take-up rate of 55%. This results in 41 million trips affected by the discount.

7.3.2 Maximum voucher value

The model is based on a discount being received by a bus user as a result of a direct government grant. The assumed maximum grant per year per apprentice is 1/3 of the assumed average annual cost of return commuting of £750, which is £250. This limit means that all bus fares up to £750 per year will get a full 1/3 discount, but any value beyond will have no further discount applied.

7.3.3 Underlying trends: Do Minimum Scenario

Do minimum demand is based on a series of underlying trends which, in summary, result in a 4% national decline in bus patronage in 2015/16 if no further intervention is made. This decline is generated as a result of the following assumptions on underlying trends such as the increase in car ownership and decrease in motoring costs.

Year on Year Change	2015/16
Real Fares (London)	1.50%
Real Fares (non-London)	0.50%
Headway	0.50%
GVA	2.58%
Employment	0.68%
Population	0.59%
Car Ownership	1.56%
Car Time	1.00%
Car Cost	-2.02%
Rail Cost	1.00%

We assume no underlying growth in in-vehicle time, walk time or delay time.

We have also made supply-side assumptions for underlying service level trends. Underlying trends in the number of bus kilometres are determined by the increase in headway for all areas (0.50% increase per annum) and cuts in tendered services of 5.20% per annum between 2013/14 and 2015/16 for all non-London services. The resulting underlying trend in non-London areas is between -1.00% and -1.50% per annum until 2015/16.

7.4 Demand, revenue and cost modelling

7.4.1 Demand

The demand model is the driver of the entire modelling framework. Changes in demand for bus services are what lead to economic benefits, changes in revenue and changes in costs as a result of service level changes.

The model is based on a transport user's demand curve, where the price of travel is the generalised cost of travel. This model keeps the impact of fare changes and the impact of generalised journey time changes separate:

Generalised Cost = Fare + Generalised Journey Time

Changes in either element of generalised cost will affect demand. The magnitude of the impact on demand is determined by the elasticity of demand for the relevant elements of generalised cost:

Change in Demand (%) = Fare elasticity x Change in Fare (%) + Travel Time elasticity x Change in Generalised Journey Time (%)

For the implementation of the apprentice concessions scheme, the change in demand will largely be driven by the change in fare. The assumed discount results in an effective 33% decrease in fare. The fare elasticities are multiplied by this percentage change to calculate a percentage change in demand.

There is also a feedback from generated demand, where there is an increase in service frequency (decreased headway) as a result of an increase in demand.

The increase in demand means that it is more efficient for bus services to operate. They will increase frequency as a result, capturing the extra demand. The improved frequency attracts further demand, and the virtuous circle of benefits and wider benefits continues. These benefits are described in the next section.

As a result of the mechanics of the model, we have assumed that service frequencies are based on the previous year's change in demand:

Change in Headway (%) = - Change in Frequency (%) + underlying headway changes

Change in Frequency (%) = Previous year demand change (%) ^0.6

Therefore:

Change in Headway (%) = - Previous year demand change (%) ^0.6 + underlying headway changes

The resulting change in frequency changes the generalised journey time because average wait times decrease. Every minute of wait time saved is worth two minutes of journey time saved. We use this value of time factor to convert changes in frequency to changes in generalised journey time. The travel time elasticity of -0.5 is then applied to these changes in generalised journey time to calculate the percentage change in demand.

7.4.2 Revenue

Farebox revenue is simply calculated as the demand multiplied by the relevant real fares. However, the mechanics of the model means that, due to the decrease in fare as a result of the concessions, this revenue figure will at first appear smaller than the change that the policy would actually result in. That is, this figure includes the revenue *as if* the operators offered the discount themselves. The farebox revenue paid by government through the concessions grant is calculated as:

Total Apprentice Concessions = (Full fare – Fare after concession) x Demand

This value is added to farebox revenue to represent the true operator revenue as a result of the concessions scheme.

BSOG, a form of revenue support paid by the government to operators based on fuel consumption, which was excluded in the previous version of the analysis published in March 2014, has been included in the results presented in this report. This is calculated based on the current payments received by operators by area type in Great Britain and the estimated change in vehicle km resulting from changes in services. This has a small impact on both operators' revenue and government costs.

Finally, concessionary payments are also included in the current version of the analysis, reflecting the potential increase in both operator revenue and government costs as a result of an increase in concessionary trips. Although services are likely to increase mainly during peak time as a response to demand increases in commuters, and concessionary pass holders are not eligible for free travel (before 9:30 AM) in the morning peak, we can expect a small increase in concessionary travel in the evening peak and throughout the day, depending on how service increases are implemented.

The inclusion of concessionary fares in the analysis has a small impact on both operators' revenue and government costs.

7.4.3 Cost

The modelling framework assumes that operators will expand operations but receive the same profit margin as in the base year. These profit margins are:

- Non-London Areas: 8.8%
- London: 2.6%

This is a national average of 6.7%, as reported by TAS in its most recent bus industry monitor summary¹⁸. The model then fixes these profit margins to calculate the resulting cost based on regional bus revenues calculated as described in 6.4.2 above.

7.5 Cost-benefit analysis and appraisal

The purpose of the cost benefit analysis is to analyse the economic costs and benefits of the apprentice concessions scheme compared to a situation where no further government intervention is made. The DfT's WebTAG provides the framework under which the majority of the analysis sits. However, due to the nature of the scheme (which is a direct grant from government to users and businesses) and the need to calculate wider economic benefits, we have not followed the guidance in some aspects of our analysis. We have noted these cases below.

7.5.1 Benefits

Benefits and dis-benefits are experienced by those directly affected by the policy and also by third parties who have acquired some sort of benefit as a result of the policy. The benefits are grouped as follows: bus-user benefits; non-bus-user benefits; private sector provider impacts; and wider impacts

7.5.1.1 Bus-user benefits

User benefits are formed of two separate elements:

Fares benefits

The reduction in fares enjoyed by all passengers who take up the scheme, including generated passengers. This is calculated using the rule of a half:

Fares benefits = $\frac{1}{2} \times$ – change in fare x (Demand under Do Minimum + Demand under Do Something)

¹⁸ <http://www.tas.uk.net/content/index.php/news/112-bus-profits-down-for-second-year-in-a-row-as-real-term-revenue-falls-again>

Generalised Journey Time benefits

The reduction in generalised journey time caused by increases in frequency as a result of the Mohring Effect. This is also calculated using the rule of a half and values of time as included in WebTAG A1.3.1:

GJT benefits = $\frac{1}{2} \times \text{change in GJT} \times \text{Value of Time} \times (\text{Demand under Do Minimum} + \text{Demand under Do Something})$

7.5.1.2 Non-bus-user benefits

Non-user benefits are calculated on principles set out in WebTAG unit A5.4.2. Whilst this unit is usually used for rail appraisal, we have adapted it for use in this context. We have assumed a diversion factor of 31% for the number of kilometres travelled by a car driver as a result of an increase in the number of bus kilometres travelled¹⁹. Simply put, for every 10 km additional bus kilometres travelled, we assume 3.1 km of the additional 10 km came from car drivers shifting mode to bus.

The remainder of the methodology is based on WebTAG unit A5.4.2: The diverted car kilometres are split by five congestion traffic bands, and by road type. Once split, we calculated the decongestion benefits by using the following values (also from WebTAG A5.4.2):

Values, pence, 2010	
Weighted Average p/car km	2015
Congestion Band 1	1.2
Congestion Band 2	2.9
Congestion Band 3	9.8
Congestion Band 4	78.3
Congestion Band 5	167.2
Infrastructure	0.1
Accident	1.7
Local Air Quality	0.1
Noise	0.1
Greenhouse Gases	0.8
Indirect Taxation	-4.1

7.5.1.3 Private sector provider benefits

Private sector provider benefits are based predominantly on the financial impacts on the bus companies. This includes the difference between the Do Something scenario and the Do Minimum scenario in:

- Operating costs
- Revenue

7.5.1.4 Wider Impacts

¹⁹ As stated in the document "The Demand for Public Transport: a practical guide", TRL (2004)

The wider impacts calculated in this analysis correspond to a set of wider social and economic benefits identified in the literature. These benefits reflect the role of buses in keeping people active and providing access to key opportunities and services, such as employment centres, education and health centres. Although some of them may be subject to high uncertainty, most of these benefits are increasingly accepted by the Department for Transport in transport appraisals.

Over the last years, Greener Journeys' assessment of different interventions in the local bus market has evolved to incorporate a larger set of wider benefits that captures the full value of the bus to society²⁰. This has led Greener Journeys to update their economic assessment of various interventions in the local bus market published over recent years in order to provide a consistent assessment across all policies analysed that captures a more comprehensive set of impacts. As a result, the present analysis incorporates a larger set of wider benefits than the analysis published in March 2014.

The benefits that have been added and the methodology to estimate these are shown in the table below.

²⁰ See "A study on the local bus to society", KPMG (2016) available at <http://www.greenerjourneys.com/publication/study-value-local-bus-services-society/>

Policy / investment	Level of uncertainty (DfT perspective)	Sources	Methodology
Economic impacts			
Employment benefits (additional tax revenue or tax savings)	Medium	Buses and the Economy II, ITS report for Greener Journeys (2014), ONS, DfT WebTAG	An elasticity of journey time to employment (ITS 2014) is applied to changes in generalised journey time and the employment affected by the scheme (ONS) to obtain the number of potential new jobs. New jobs are then multiplied by the median wage (ONS) and the tax take on those jobs (WebTAG).
Health fiscal savings from increased employment	Medium	New Economy Tool (NET) (2016)	New jobs estimated as part of employment impacts are multiplied by the health fiscal saving of new jobs (NET).
Fiscal savings from increased education	Medium	New Economy Tool (2016) and National Travel Survey (2014)	The number of new people in education – estimated based on forecast additional bus demand that was not displaced from other modes, the average proportion of education trips out of total bus trips, and education trips per person – is multiplied by the NET fiscal savings of new people in education.
Social impacts			
Option and non-use values	Low	ONS, UK Bus statistics, DfT WebTAG	The change in households with good access to bus services – estimated based on existing households with poor access to buses and changes in bus services (measured as vehicle km) - is multiplied by an option value from WebTAG.

Health and wellbeing	Low	New Zealand Transport Agency (NZTA)	The change in walked km as a result of trips shifting from car to bus and generated bus demand (not displaced from other modes) is multiplied by the NZTA health benefit per walked km.
Volunteering	Medium	Royal Voluntary Service (RVS) (2011)	Using shadow prices, average number of hours devoted to volunteering activities per person from the RVS, the proportion of how many of these activities may be accessed by bus, as well as generated bus travel demand by the scheme (not displaced from other modes), the value of the change in voluntary activity is estimated.
Psychological wellbeing	High	ONS research on commuting and wellbeing (2014), New Economy Tool (2016)	Using the improvement in wellbeing researched by the ONS as a result of increased commuting by public transport and reduced commuting time, as well as the value of emotional wellbeing from the NET, the value of changes to psychological wellbeing are estimated.

7.5.2 Costs

Costs are made up of two broad categories:

1. Total Apprentice Concessions:

The total grant provided to apprentices as part of the concessions scheme calculated as described in 7.4.2 above.

2. Indirect Tax Revenue:

Indirect tax losses are usually included in the present value of benefits when following methodology. However, as this analysis seeks to assess the impact on central government overall, rather than any one particular government department, losses in fuel duty revenue are included as part of the costs. We have not modelled the potential increase in fuel duty net of BSOG paid by bus operators to the government as a result of increased services. Therefore, this figure is likely to over-estimate the loss in indirect tax revenue to the government.

In addition, changes to BSOG and concessionary fares also constitute an additional small cost to Government associated with this policy.

7.5.3 Appraisal Summary

The results of the appraisal are summarized in a table listing all monetised costs and benefits. The table presents annual values for 2015/16 only, at current values, but 2010 prices. A Benefit-Cost Ratio is formed because the concessionary grant, the majority cost of the scheme, is taken into account in the costs in this appraisal.

Wider impacts are presented as part of the net benefit of the scheme, and the benefit cost ratio, and are the average number of jobs generated, and the annual monetised impact of these jobs.