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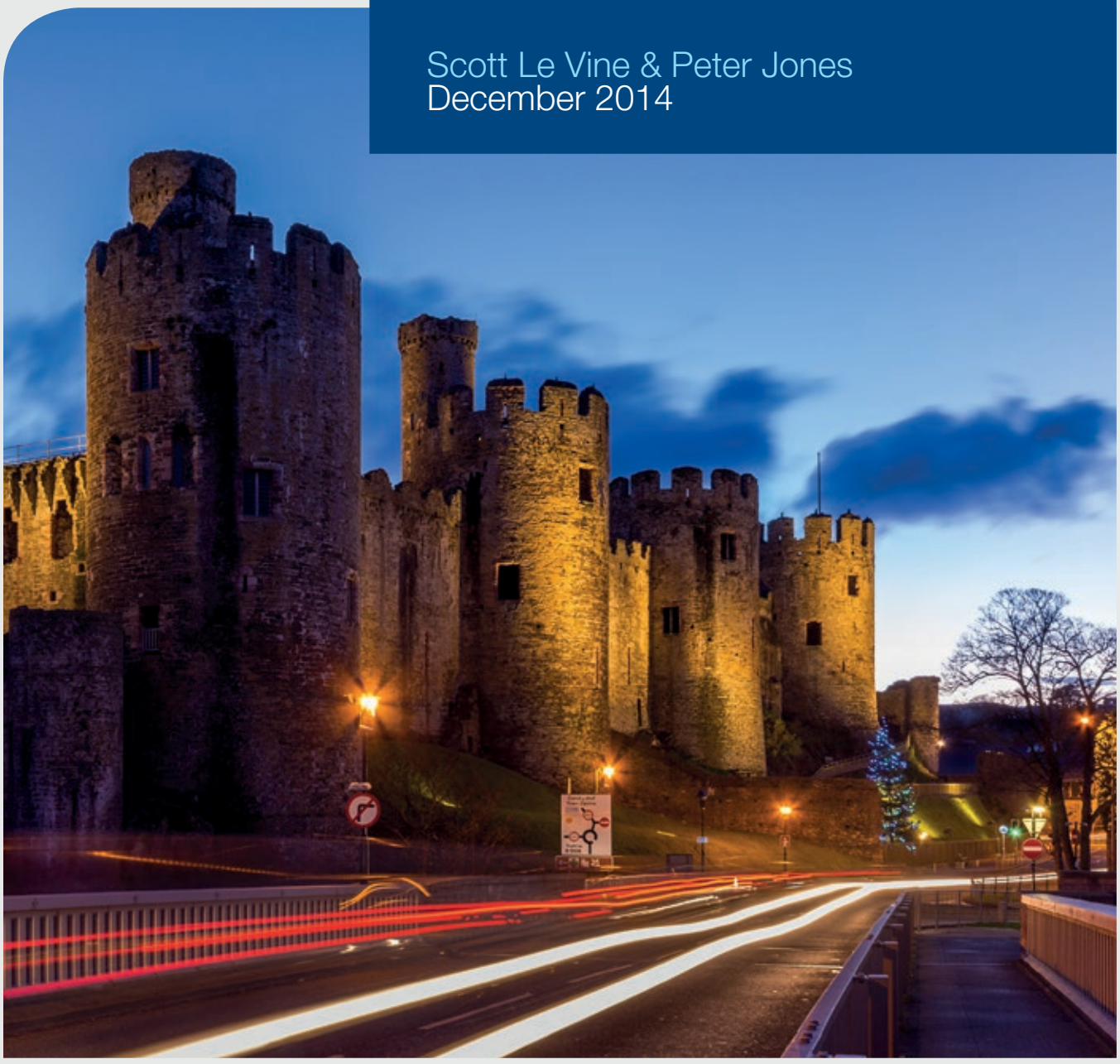
On the Move

Car, rail and bus travel trends in Wales

Scott Le Vine & Peter Jones

December 2014



This report has been commissioned by the Royal Automobile Club Foundation for Motoring Ltd and The Welsh Government.

The **Royal Automobile Club Foundation for Motoring Ltd** is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

The **Welsh Government** is responsible for implementing a range of transport policies and delivering transport investment in Wales. These include programmes managing, maintaining and improving the trunk road and motorway network in Wales; client management of the Wales and Borders Rail Franchise; and implementing a range of initiatives and grant schemes designed to improve transport services for all including walkers, cyclists and those who use public transport. This report, about personal travel trends in Wales, was commissioned by Knowledge and Analytical Services within the Welsh Government to provide data and analysis that will help with this policy and investment process.

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About the Authors

Scott Le Vine is a research associate in Imperial College London's Centre for Transport Studies. His writings include *On the Move*, and *Car Rental 2.0* (both free to download from the RAC Foundation website). Shifting travel trends is a major theme of his recent research; details, including a listing of academic articles, can be found at: www.imperial.ac.uk/people/s.le-vine.

Peter Jones is Professor of Transport and Sustainable Development in the Centre for Transport Studies at University College London, and has been the Project Director for this study; he was an author of *The Car in British Society* report, published by the RAC Foundation in 2009, which initially drew attention to the levelling off in car use nationally. He has carried out many studies, both in the UK and internationally, into travel patterns, public attitudes and factors affecting travel behaviour. He is a Member of the Independent Transport Commission and has recently served on the Mayor of London's Roads Task Force.

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The authors are grateful to Henry Small at the Welsh Government for guidance throughout this study. Particular thanks go to the RAC Foundation's Elizabeth Box for her efforts in the preparation and design of this report, as well as to Department for Transport's National Travel Survey team (led by Lyndsey Melbourne) for providing the bespoke datasets used in this study and their assistance in interpreting them.

Disclaimer

Contents

Executive Summary

The report from which this Executive Summary is here provided analyses trends in personal travel in Wales between 1995 and 2010, using data from the Great Britain National Travel Survey (NTS), supplemented by other data sources (the England and Wales Censuses of 2001 and 2011, Road Traffic Estimates, public transport journeys data as reported by service operators, and the National Rail Passenger Survey). It looks primarily at car driving and bus and rail passenger travel by Welsh residents, and is similar in format to an earlier report on comparable travel trends in Scotland.[1]

The British NTS in Wales has always consisted of a relatively small sample (approximately 400 households annually from 2002 to 2012, and smaller prior to that), and from 1 January 2013 the NTS has collected data only from residents of England. Throughout this study, confidence intervals for statistical calculations are shown so that the effects of the small Welsh sample size can be distinguished from true trends over time. As the NTS no longer samples in Wales, Section 4 proposes a method for calculating average annual mileage and journeys by specific modes of travel without the type of data the NTS collects.

Findings from the National Travel Survey

Across Great Britain, driving mileage per person (including both those travelling and those not) was stagnant in the 2000s, and then fell with the onset of the recession in 2008 (see the lower section of Table 1). The pattern in the early 2000s is quite unusual, as in previous decades economic growth had consistently been accompanied by increasing traffic levels. The experience in Wales was more in line with past trends – driving mileage increased in the 2000s until the disruption of the financial crash and the ensuing recession. Driving mileage per person in Wales was 13% higher in the 2005/7 period (the period just prior to the recession) than in the mid/late 1990s (the 1995/9 period), whereas in Great Britain in its entirety there was essentially no change (+0.1%). As elsewhere in Britain, there has been a divergence in driving mileage between people living in cities and those residing elsewhere. In Wales, it was found that driving mileage per capita increased more slowly in the South East Wales conurbation (+8%) than in the rest of Wales (+20%).

1 Latinopoulos et al. (2013)

Table 1: Average annual mileage per person by mode of travel, Welsh residents, also showing comparison with Britain as a whole

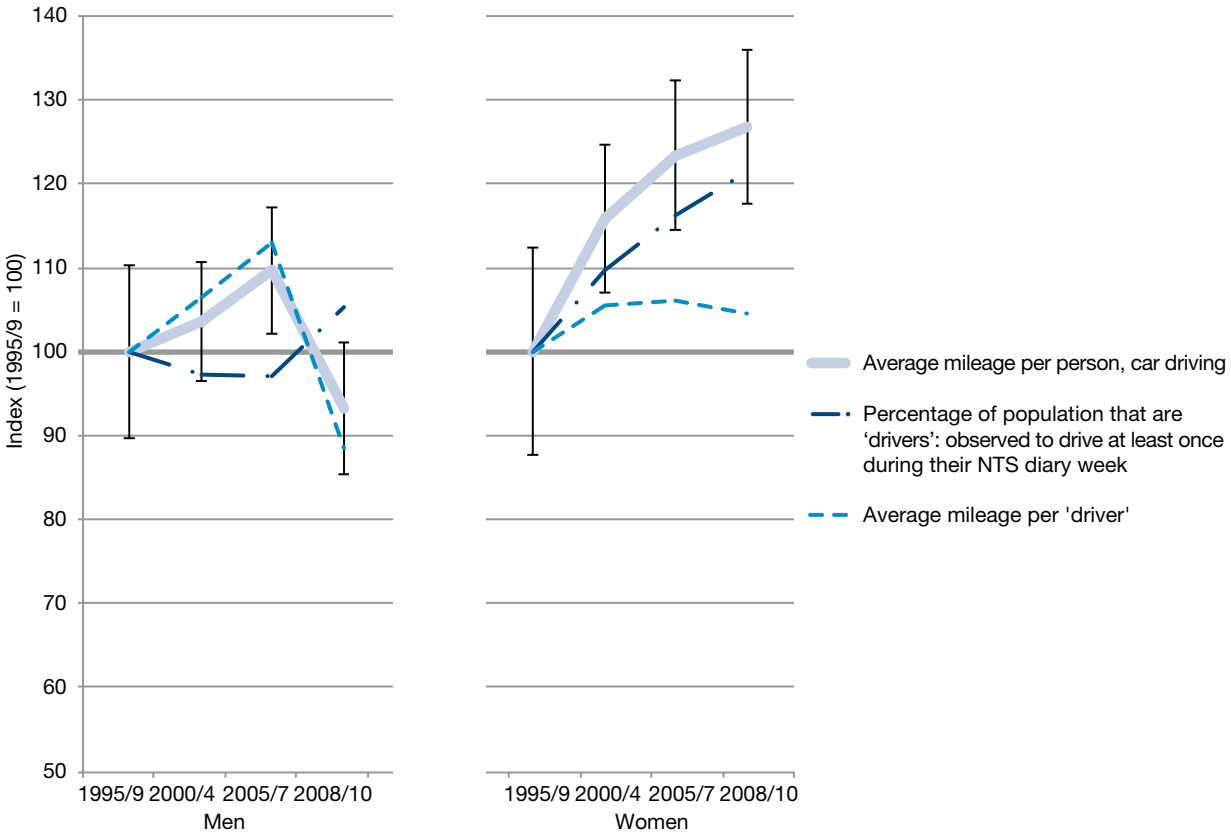
	Wales			
	1995/9	2000/4	2005/7	2008/10
Car driving	3,607 (152)	3,826 (111)	4,084 (124)	3,734 (116)
Bus	318 (35)	349 (27)	340 (25)	349 (27)
National Rail	113 (22)	163 (23)	198 (28)	300 (36)
	Great Britain			
	1995/9	2000/4	2005/7	2008/10
Car driving	3,658 (36)	3,676 (26)	3,661 (27)	3,415 (26)
Bus	363 (8)	356 (5)	364 (6)	367 (5)
National Rail	349 (12)	404 (9)	479 (11)	490 (11)

Source: National Travel Survey (standard errors in brackets)

When National Rail travel is considered, a further distinction is found between Wales and elsewhere in Britain. Rail travel has grown much faster in Wales, though even in the most recent period (2008/10) rail mileage per capita is substantially lower in Wales than elsewhere in Britain. Both the Welsh data and that for Great Britain as a whole show continued growth in rail use right through the recession, which is also a historic anomaly: rail use has typically dipped when economic activity has contracted.

There are important **gender differences** in the observed travel trends. In the case of car driving (Figure 1), females have shown a continual increase in average mileage per person, with an overall growth of over 25% between 1995/9 and 2008/10; conversely, males' mileage increased by roughly 10% between 1995/9 and 2005/7, but in 2008/10 dropped sharply to 7% below its 1995/9 level. For both genders, these trends result largely from a change in the proportion of the population who record driving trips, rather than from a change in the mileage of car drivers.

Figure 1: Changes in the proportion of Welsh NTS respondents who drove a car during their NTS diary week, and in car-driving mileage per person and per driver, by gender



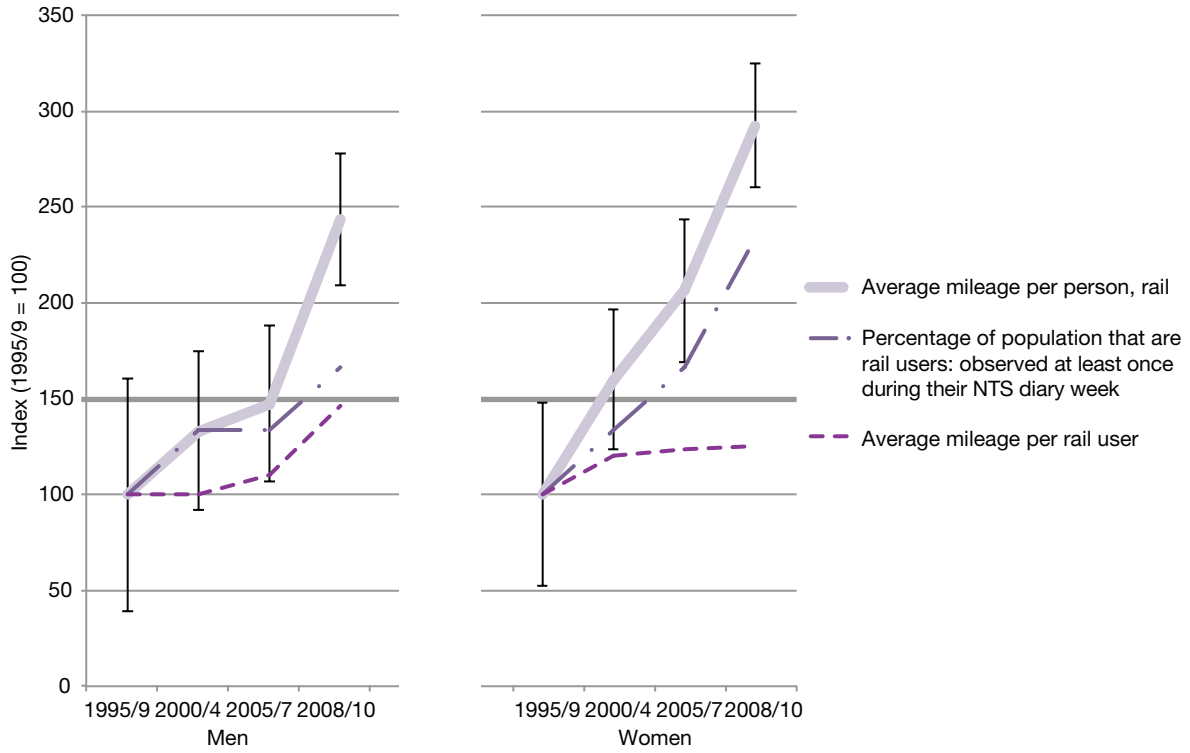
Source: National Travel Survey (95% confidence intervals are shown for index of average driving mileage per person)

When it comes to rail (Figure 2), we see a steady growth in average mileage travelled by both genders, but with a greater rise in the case of women. In both cases most of this growth owes more to an increase in the number of Welsh residents who are rail users than to any increase in mileage among users – although it is true that, in contrast to the situation across Great Britain as a whole, mileage per passenger has also increased. Nevertheless, the proportion of the population who recorded at least one rail trip during a randomly selected week in 2008/10 was only 6%, around half of whom also recorded some car driver mileage.

Comparing the **profile of the different mode users**, car drivers are on average older than bus and rail users, and are more likely to be male, in full-time employment and to have higher incomes. Rail users are younger than the average Welsh resident and more likely to be female, with personal incomes close to the Welsh average. During the 1995 to 2010 period that was studied, there has been a rapid growth in National Rail travel by young adults (age 16–29), particularly young women. Bus users are also more likely

to be female, but least likely to be in full-time employment or in a car-owning household.

Figure 2: Changes in the proportion of Welsh NTS respondents who used rail during their NTS diary week, and in rail mileage per person and per user, by gender



Source: National Travel Survey (95% confidence intervals are shown for index of average rail mileage per person)

Patterns of **car driving licence ownership** are similar in Wales to those seen in Great Britain as a whole. The proportion of men aged 30 or under in possession of a full driving licence has fallen over time (but appears to have now stabilised), while the proportion of those aged 60 and over who are licence-holders has increased, with peak penetration rates of around 90% for those in middle years. Among women, very rapid growth rates have been seen in licence-holding by those aged 50 and over, and a peak penetration rate of around 80%. Young Welsh women have not seen their rate of licence-holding fall, as young men have. If one examines young adults who do not have a full driving licence, more than 60% are either learning to drive or indicate that they are deterred by the costs of motoring (principally the costs of learning to drive).

Looking at **age effects** evident in car use, average car-driving mileage is at its highest for both men and women between the ages of 30 and 59, but the male

cohorts drive between 50% and 100% more than the corresponding female age groups; moreover, mileage is growing among the older age groups. In contrast to the picture across Great Britain as a whole, in Wales it is only since the start of the recession in 2008/10 that a reduction in car mileage among males below 30 has become apparent in the NTS data.

There are no clear and consistent trends in bus use over time among either men or women. There are relatively small differences in mileage by age group among males, whereas for women the higher-usage groups are to be found among the youngest (age 16 to 29) and oldest (60+) adults.

In the case of rail mileage, there is some evidence of a recent upward trend among men aged 30 and over, which can also be seen more strongly among women aged 60+. The most striking finding is a fourfold increase in average per-person rail mileage between 1995/9 and 2008/10 among women aged 16–29, which makes them by far the highest-mileage rail users, at around 800 miles per person per year.

The effects of **personal income** level on travel patterns are largely as would be expected. Car-driving mileage increases steadily with income, but with the largest drops in mileage over time among those with personal incomes of £40,000 and above; this seems to be linked mainly to reductions in company car mileage, which is probably due to a series of policy changes over time that have made company cars much less attractive as a form of compensation. People with incomes below £20,000 exhibit much higher bus mileages. In the case of rail mileage, this has grown among most income groups; levels are similar for all income groups up to £40,000, but much higher for those with incomes of £50,000 and above.

There are also major differences in travel patterns according to **occupation**. Car-driving mileage is highest amongst full-time workers, and in particular those in 'Employer/manager' and 'Professional' occupations; conversely, bus use is lowest among full-time workers. In the case of rail travel, students stand out as the group with the highest mileage, one which has also been growing strongly over time.

Turning to **journey purposes**, the highest mileages overall are for 'Other social/leisure' purposes (around 1,700 miles per person per year), followed by 'Commuting', 'Business' and 'Shopping', each at between 1,100 and 1,200 miles a year. Strongest growth has been among the 'Other social/leisure' and 'Escort' mileage, with declines in 'Shopping' and 'Business' mileage. Looking at modal variations, we see that by far the highest car mileage is for 'Commuting'; for bus is it 'Other social/leisure' and 'Shopping'; and for rail the highest mileages are for 'Visiting friends/relatives at private homes', 'Other social/leisure' and 'Business' travel.

Among the full population of Great Britain, reductions in **company car ownership and use** over time were highly significant, and indeed large enough to make a substantial impact on overall car mileage. In Wales, the effects are much less clear (due, at least in part, to small sample sizes), although some similar kinds of relationships can be observed. The NTS estimate of Welsh levels of company car ownership has fluctuated over time, rather than showing any strong downward trend, so that, by 2008/10, rates in Wales were similar to those in Great Britain as a whole; there is evidence, as in the rest of Great Britain, of a decline among 'Employer/manager' and particularly 'Professional' employees over time. But average company car mileage in Wales declined by 36% between 1995/9 and 2008/10 – later than in the rest of Great Britain and principally after the onset of the recession. The biggest drop in company car mileage has been amongst those with a personal income of £40,000 and above.

Options for future monitoring of Welsh travel patterns

As the NTS now no longer covers Wales, the question arises as to how best to monitor Welsh travel patterns in the future. Tracking future travel trends is important for a variety of governmental functions, including provision of transport infrastructure and the monitoring of progress towards sustainability targets. There are two main options:

- to conduct a survey that includes a one-day travel diary (as has been done in Scotland using the Scottish Household Survey (SHS)); and
- to ask questions that are more general in nature, about frequency of travel by mode and purpose.

Comparing average annual per-capita mileage estimates from the NTS and the SHS in Scotland, we see that the latter are significantly lower than the former, but this is thought to be mainly because the SHS estimates are based on straight-line (as opposed to network) distances.

The NTS also includes a question on frequency of travel by mode, so it is possible to compare these estimates with the results from the seven-day diary survey of the same sample of respondents. Section 3 proposes a simple and straightforward statistical method for obtaining annual mileage estimates by mode, by collecting data in a regular Welsh survey on frequency of mode use for different population subgroups (based on gender, age, and settlement size) and applying factors from the NTS to convert these into estimates of annual mileage by mode in Wales. The drawback is that the amount of statistically useful information available to transport planners would be greatly reduced, but the advantage is that it would be possible to credibly track population-level use of key forms of transport in Wales.

Findings from the Welsh Census of Population

A brief analysis was performed to investigate changing car ownership and commuter travel patterns, comparing findings from the 2001 and 2011 Censuses. This provided the opportunity to look at a much finer level of spatial disaggregation than is possible using the relatively small NTS sample of Welsh residents.

Census data shows that the number of cars per household has increased in all Welsh local authority areas, by between 5% and 20%; the average increase across Wales was 12%, which compares with 6% in England outside the Greater South East of England and a mere 2% in the Greater South East of England (the London, South East and East of England Government Office Regions). The average number of cars per household in Wales is now significantly higher than in England.

Over 50% of commuters say that car driving is their main mode of travel to work, a percentage which has increased in most Welsh local authority areas since 2001, remained stable in some, and declined only in Cardiff (from 56% to 54%). For Wales as a whole, at 64% in 2011 the proportion naming car driving is higher than in both Greater South East England (47%) and the rest of England (60%). Rail's modal share is quite low when it comes to commuting in Wales, but has been increasing in the South East Wales region.

Across Wales as a whole, straight-line commuting distances increased by 13% between 2001 and 2011 – in line with the finding from England outside of the Greater South East – and are higher than in England. As is the case outside Wales, Welsh rail passengers make longer commuting trips than people using other modes; men also make longer commuting trips than women.

Rail satisfaction levels in Wales

Here the analysis uses National Rail Passenger Survey data from between 1999 and 2012; it records satisfaction with rail trips made ***in*** Wales, rather than with rail trips made ***by*** Welsh residents, and reports results that are comparable with those seen in England and Scotland.

In general, overall satisfaction with rail services in Wales has been higher than in England, and just below the satisfaction levels found in Scotland. There was a jump in satisfaction in spring 2008 (from around 80% to 85%), particularly among commuters. There were also increases in satisfaction at this time, specifically with punctuality and service frequency.

Road and rail traffic estimates from other sources

National estimates of travel in Wales from NTS data (using the sample of Welsh residents) have been compared with information from roadside traffic counts and public transport operators' estimates of the number of journeys made by bus and train in Wales.

For road traffic, the NTS underestimates annual vehicle miles travelled – a finding that is well established in Great Britain. This is partly because not all car and van travel is recorded in the NTS (in particular, the survey excludes trips when the vehicle is being used to transport goods), but in the case of Wales may also be because some traffic flows (for example during the summer) will include significant mileage by non-Welsh holidaymakers (if this outweighs mileage by Welsh holidaymakers travelling in the rest of Britain).

Overall, traffic count data (Figure 3) shows over a 20% growth in car traffic in Wales between 1995 and 2005, since which time it has dropped back a little. Non-car traffic increased at a faster rate between 1995 and 2005 – by around 40% in the South East Wales conurbation and by 50% in the rest of the country, again subsequently declining.

In contrast to road, NTS estimates for annual bus journeys have been higher than reported in ticket sales statistics, although the latter generally exclude the small operators and may not accurately record ticketless journeys or the use made of multi-journey tickets.

For rail journeys, the NTS and rail industry figures match well, when taking into account the small sample sizes in the NTS. Overall passenger journeys in Wales as recorded by ticket sales have increased steadily year on year, and roughly doubled between 1995 and 2010, with a higher rate of growth evident since the start of the recession in 2007. Closer examination shows that most of the growth has been in South East Wales, with rail traffic at the three main urban stations (Cardiff Central, Swansea, and Newport stations) doubling between 1995/6 and 2011/12, and increasing at a slightly higher rate at the other stations in the South East Wales conurbation. In the rest of Wales, rail traffic levels were relatively stagnant between 1997/8 and 2005/6, since when they have grown steadily, by around 40% in six years – thus accounting for the higher growth rate since the start of the recession.

Figure 3: Trends in road traffic mileage in the South East Wales conurbation and elsewhere in Wales

Source: Road Traffic Estimates

Conclusions

In broad terms, Welsh travel patterns mirror those found across Great Britain as a whole. In particular, the levelling off in car driving since the 2000s (due to a reduction in male driving mileage, offset by an increase in female mileage), and the steady growth in rail travel since the 1990s, seemingly unaffected by the recession in 2007, reflect the wider picture. Where differences have been found between the Welsh data and the Great Britain averages, the effect of the divergent trends has been mainly to reduce disparities over time between personal travel in Wales and in the rest of Great Britain.

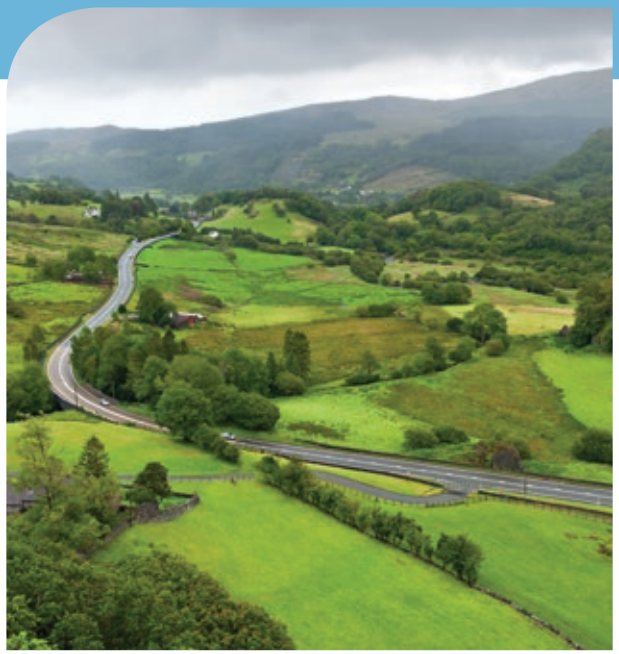
The significant reductions in car-driving mileages observed among men in their twenties has occurred more recently in Wales than in Great Britain as a whole, and reductions in company car mileage in Wales have been slightly less. As for rail travel, we find the strongest growth taking place in 'Business' mileage

and for the purpose of 'Visiting friends and relatives in private homes' – the latter seems to be associated with a large increase in rail travel by students. The strongest rail growth rates overall are to be found in the South East Wales conurbation, although there have been sharp increases in passenger numbers in the rest of Wales since the mid-2000s. Rates of satisfaction with rail services in Wales are generally higher than in England, and have increased since the mid/late 2000s.

The authors hope that this report will be of interest to transport policymakers in Wales and the wider community of interested parties. It is hoped that a better understanding of recent trends in personal mobility will form useful input to future transport policy and investment decisions.

1. Introduction

This report examines trends in personal travel by car, bus and rail[1] in Wales between the mid-1990s and late 2000s, using data primarily from the Wales-resident subset of the seven-day National Travel Survey (NTS), in conjunction with a range of other data resources such as the 2001 and 2011 Censuses, Road Traffic Estimates, the National Rail Passenger Survey, and the public transport journeys databases compiled from reports by service operators.



It was prepared as a follow-up to a wider study of car and rail travel trends across Great Britain (GB), based nearly exclusively on analysis of the NTS.

This report is a companion to a similarly structured report (published in June 2013) that investigated travel trends in Scotland.

The full set of reports in this series consists of:

1. the summary report – *On the Move: Making sense of car and train travel trends in Britain;*[2]
2. a *Technical Compendium* containing figures and tables that were prepared but not included in the summary report;
3. *Rail Demand Forecasting Using the Passenger Demand Forecasting Handbook;*[3]
4. *National Rail Passenger Survey Data Analysis;*[4] and
5. *On the Move: Car, rail and bus travel trends in Scotland.*[5]

1 In this report, the term 'rail' refers to travel by National Rail services except as where otherwise noted (this is the case only in Section 4).
2 Le Vine & Jones (2012)
3 Worsley (2012)
4 Preston & Jones (2012)
5 Latinopoulos et al. (2013)

These reports (and the present report) are publicly available to download from: www.racfoundation.org/research/mobility/on-the-move-main-research-page

1.1 Report structure

The report is organised into five main sections, which are followed by a brief concluding section:

- Section 2 investigates travel trends in Wales, using data from Welsh residents who have taken part in the British NTS, from 1995 to 2010.
- Section 3 looks at how Welsh travel trends might be monitored from 2013 onwards, after the transition from the British NTS to the English NTS.
- Section 4 compares Census 2001 and Census 2011 results from Wales.
- Section 5 investigates National Rail passenger satisfaction levels in Wales, and compares them with those in England and Scotland.
- Section 6 investigates trends in road traffic and public transport journeys, based on field observations rather than survey data.

Unless explicitly stated to represent an average across Great Britain, results presented in this report pertain to Wales.

1.2 Data and technical notes

The NTS has been undertaken on an ad hoc basis since the 1960s, and continuously since 1988. Prior to 2002, approximately 175 Welsh households were sampled annually; from 2002 this rose to about 400 households a year. NTS respondents take part in an interview that covers demographic data and mobility-related items such as car ownership, and compile a seven-day travel diary. All household members must take part for it to be considered a fully responding household.

In calculating average annual values of distance travelled by car, bus and rail, the convention employed in this study is to sum across journey *stages*, as opposed to allocating all journey distance to the 'main mode' (typically defined in NTS analyses as the mode of travel used for the longest part of multimodal journeys). For a single-stage journey the calculation is identical, and for a multimodal journey this ensures that the appropriate distance is allocated to each mode used to complete the journey.

In view of the small annual sample sizes in the NTS (i.e. around 175 Wales-resident households per year up to 2001, and 400 per year thereafter), the data is aggregated into multi-year averages, thus: 1995/9, 2000/4, 2005/7 and 2008/10.

Many of the results in Section 2 (which is based on the NTS) are broken down into South East Wales and the rest of Wales (see Table 1.1). In several places, results from Wales are compared with those from 'Greater South East England'; this encompasses Greater London as well as the two Government Office Regions that encircle it: South East and East.

Table 1.1: Listing of local authorities in Wales considered for the purposes of this study to be located in the South East Wales conurbation

Local authorities within the South East Wales conurbation
Blaenau Gwent
Bridgend
Caerphilly
Cardiff
Merthyr Tydfil
Monmouthshire
Neath Port Talbot
Newport
Rhondda Cynon Taf
Swansea
Torfaen
Vale of Glamorgan

Source: Authors' own

2. Car, Bus and Rail Patterns in Wales: Analysis Using NTS Data

This section looks at how usage of transport in Wales has evolved since the mid-1990s up to the late 2000s, focusing on car driving, bus use and rail travel.

2.1 Overall travel trends

2.1.1 Travel in Wales and travel by Welsh residents

Table 2.1 illustrates how much of the travel recorded by Welsh residents takes place entirely within Wales, and how much has either one or neither end of the journey in Wales; it also shows how much of the personal travel occurring within, partly within, and entirely outside Wales is undertaken by Welsh residents.

It shows that about 95% of all journeys by Welsh residents both begin and end in Wales, with the majority of the remaining 5% having either an origin or destination in Wales. Only 1–2% of Welsh residents' journeys take place completely outside Wales.

Table 2.1 also shows that 97% of journeys beginning and ending in Wales are performed by Welsh residents, a proportion which has remained stable over time.

Table 2.1: Percentage of Welsh residents' travel that takes place in Wales, and the percentage of travel in Wales that is performed by Welsh residents

Year	Breakdown of all journeys undertaken by residents of Wales, by location			Proportion of all journeys (by residents of anywhere in Britain) that is undertaken by residents of Wales, by location		
	% that both begin and end in Wales	% that begin **or** end in Wales (but not both)	% that both begin and end outside Wales	Of all journeys that both begin and end in Wales	Of all journeys that begin **or** end in Wales (but not both)	Of all journeys that both begin and end outside Wales
1995/9	94%	3%	2%	97%	52%	0.1%
2000/4	95%	3%	2%	97%	51%	0.1%
2005/7	94%	4%	2%	97%	49%	0.1%
2008/10	96%	3%	1%	97%	46%	0.1%

Source: NTS

2.1.2 Key travel indicators

Figure 2.1 shows trends in annual trip (journey) numbers, distances travelled and travel times per year, comparing figures for Wales (indicated by solid lines) with Great Britain as a whole (the dotted lines). Between 1995/9 and 2008/10, recorded annual journey numbers in Wales remained stable, while there was a reduction of 9% seen in Great Britain as a whole; by the end of the period, the number of journeys per year undertaken in Wales and in Great Britain as a whole were similar. Average annual distance travelled has remained stable overall, both in Wales and across GB, while average annual hours travelled has increased in Wales, bringing it up to the GB average. So, overall, Welsh residents' travel patterns were much closer to the GB average by the end of the study period than they were in the mid-1990s.

Figure 2.1: Average distance (left axis), number of journeys (right axis), and hours travelled (right axis) per person per year, Wales and Great Britain

Source: NTS

2.2 Travel trends by mode of transport

2.2.1 Annual mileage by mode of transport

Table 2.2 shows annual mileage travelled by residents of Wales between 1995/9 and 2008/10 by various modes of transport, and the standard error associated with each estimate. It reveals that average car-driving mileage per person in Wales increased by 13% between 1995/9 and 2005/7, but dropped substantially during the recession-affected time period (2008/10). There is no clear trend in bus mileage, but estimated rail mileage increased sharply.

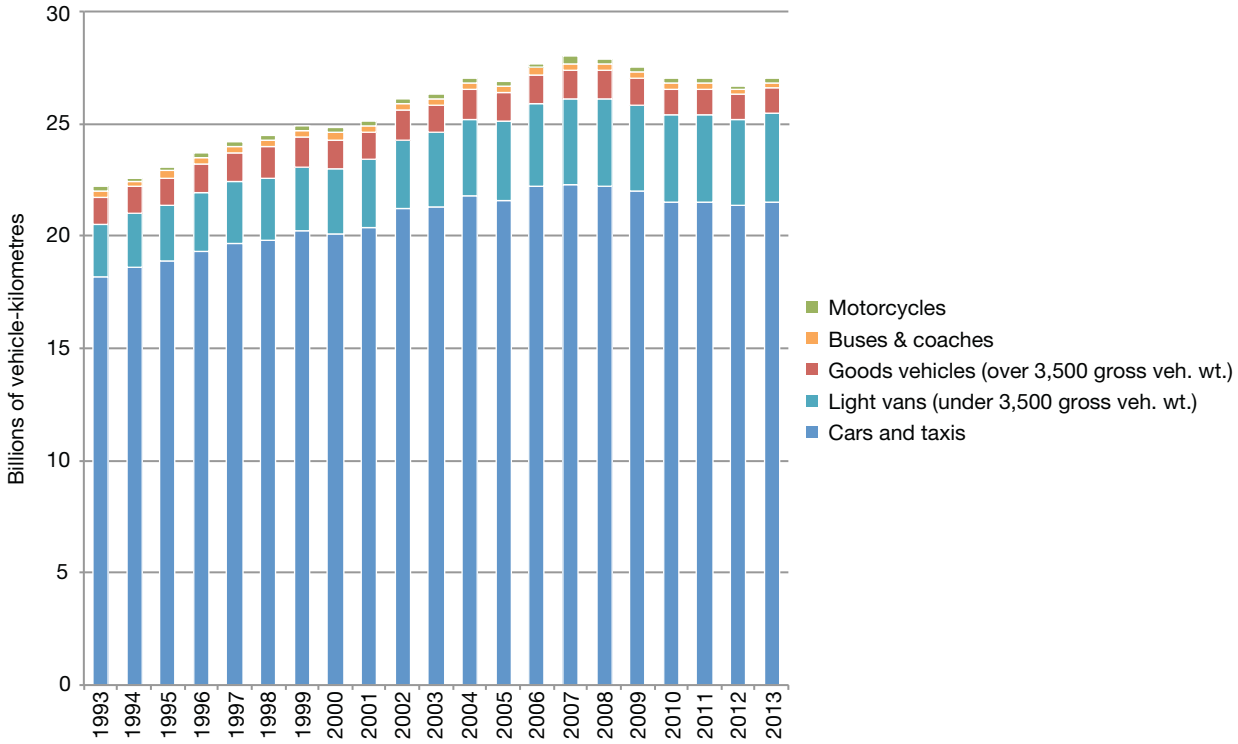
Table 2.2: Average annual mileage per person by mode of travel, Welsh residents

Mode	1995/9	2000/4	2005/7	2008/10
Car driving	3,607 (152)	3,826 (111)	4,084 (124)	3,734 (116)
Car passenger	2,329 (88)	2,169 (64)	2,348 (76)	2,090 (70)
Bus	318 (35)	349 (27)	340 (25)	349 (27)
Rail	113 (22)	164 (23)	198 (28)	300 (36)
Other public transport	22 (18)	55 (24)	45 (21)	0 (0)
Walking	175 (7)	160 (6)	157 (5)	170 (6)
Other private transport	232 (30)	257 (33)	176 (23)	231 (34)
Taxi/minicab	27 (3)	49 (5)	36 (5)	76 (9)
Motorcycle	37 (16)	27 (8)	21 (7)	32 (8)
Bicycle	22 (5)	18 (3)	17 (3)	31 (5)
Sum (all modes)	**6,883 (175)**	**7,073 (128)**	**7,423 (141)**	**7,014 (132)**

Source: NTS (standard errors in brackets)

Figure 2.2 shows road traffic data for Wales from vehicle count observations; this data series shows that car traffic (which includes taxis, as they cannot be separately identified by the traffic counting technology) increased fairly steadily until the onset of the recession, with the highest recorded traffic levels being seen in 2007. The Welsh population increased slowly over this period of time; when traffic levels are normalised by head-of-population, the highest recorded level of motorised traffic per capita was in 2007 (9,408 km per year, i.e. 5,846 miles per year). Between 1995 and 2007, light van traffic increased most rapidly (by 52%), whilst car traffic grew by 18%. Overall traffic reached a minimum level in 2012 of 4% below the peak level of 2007, and then increased less than 1% between 2012 and 2013.

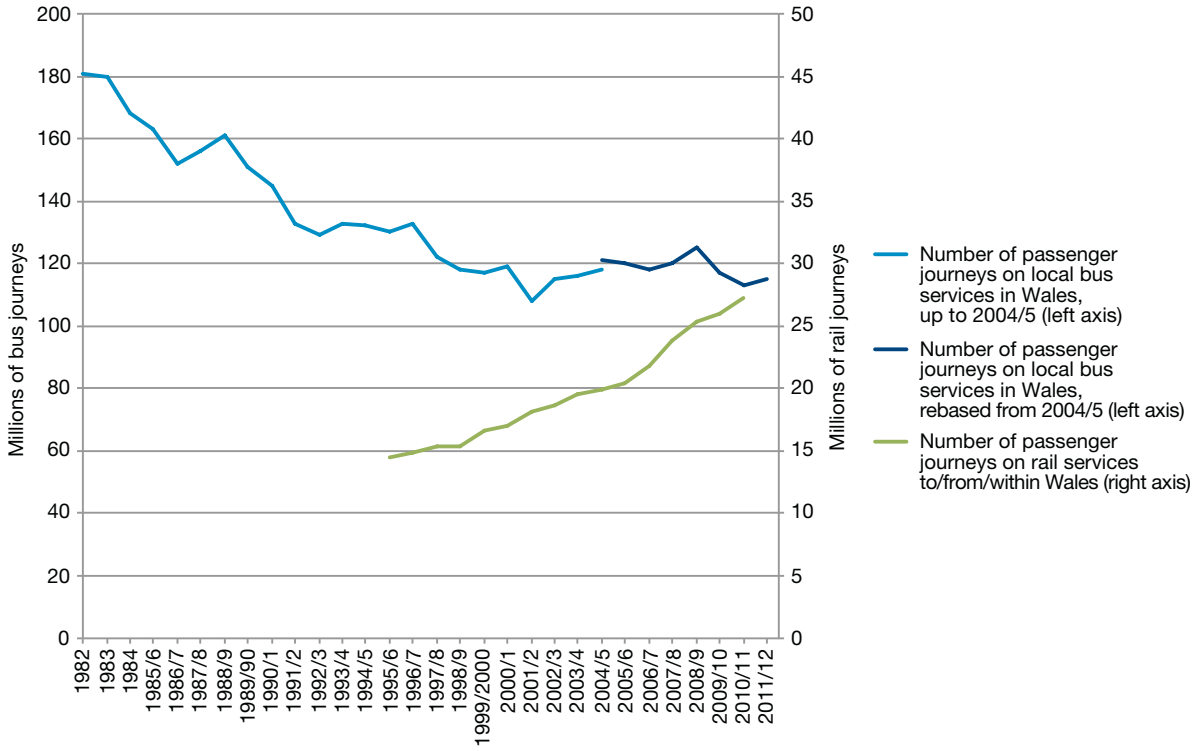
Figure 2.2: Road traffic levels



Source: DfT (2014)

Figure 2.3 shows the time trend in the number of bus and rail journeys in Wales, based on data provided by service operators. Since the start of the time series in the mid-1990s, this data shows rail travel to have grown robustly year-on-year, even during the recession-affected period since 2007/8, approximately doubling over the whole period. Conversely, the number of bus journeys in Wales reported by bus service operators generally fell by one third between the early 1980s and the early 2000s, since when it has stabilised. There are now approximately 115 million bus journeys annually in Wales, as compared to 27 million rail journeys.

Figure 2.3: Aggregate number of local bus and rail journeys in Wales, according to service-operator data



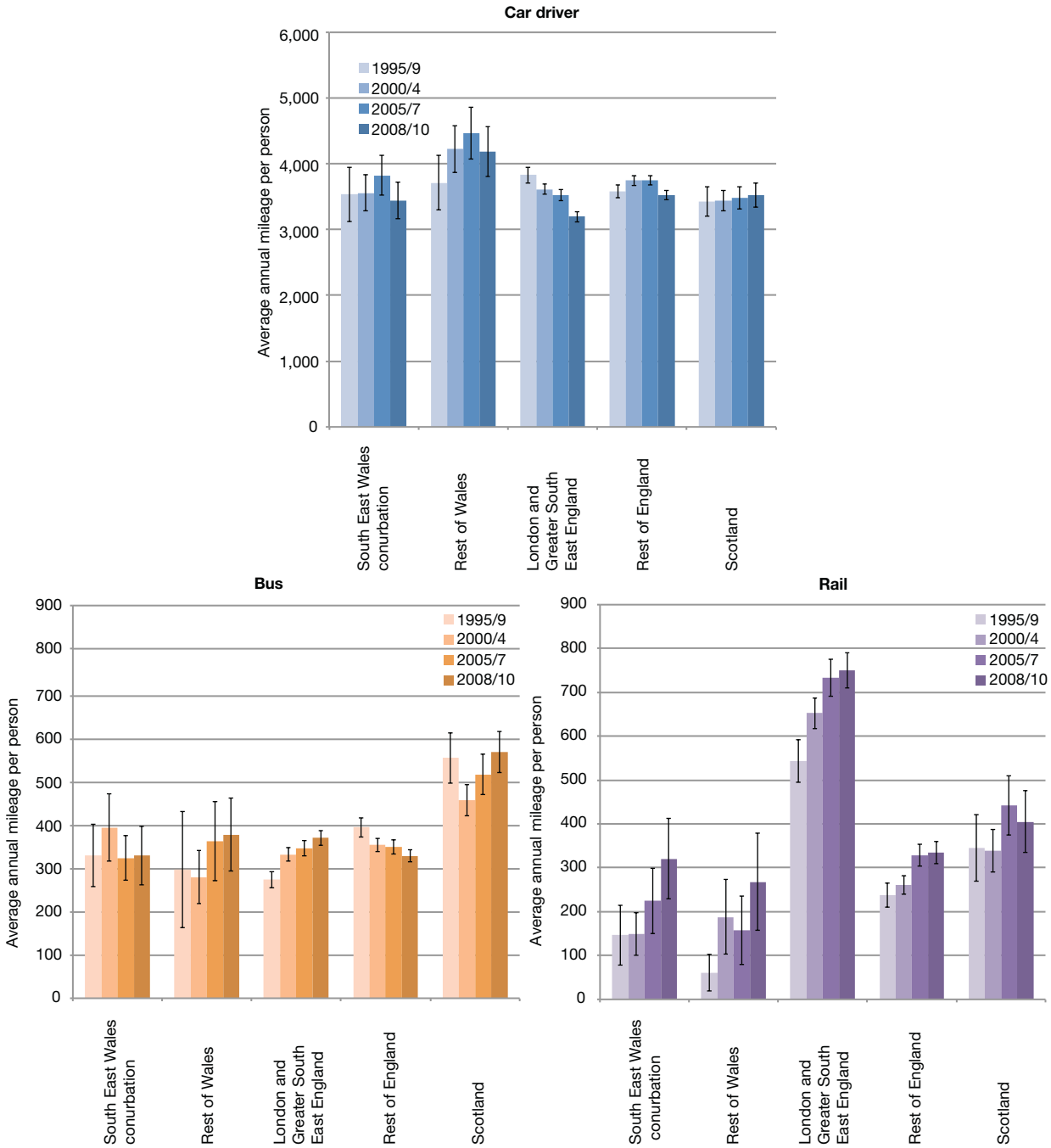
Source: DfT (2012) and ORR (2012)

2.2.2 Differences in mileage by type of area

Figure 2.4 shows how per-person car-driving, bus and rail mileage has changed over the four time periods, in the South East Wales conurbation and in the rest of Wales, with equivalent figures shown for comparison with London and Greater South East England; the rest of England; and Scotland.

In the case of car-driving mileage, there has been little change over time in South East Wales, which is comparable to the situation in the rest of England and in Scotland; the rest of Wales did show a strong upward trend pre-recession, since when it has dropped back somewhat. Bus use has also remained flat in South East Wales, compared with a recent upward trend in bus mileage in the rest of Wales – this contrasts with a clear downward trend in the rest of England. For rail mileage the picture is different: there has been significant growth in rail mileage in both regions of Wales, which mirrors that found in other parts of Great Britain.

Figure 2.4: Average annual mileage, car driving, bus and rail, by broad region within Great Britain



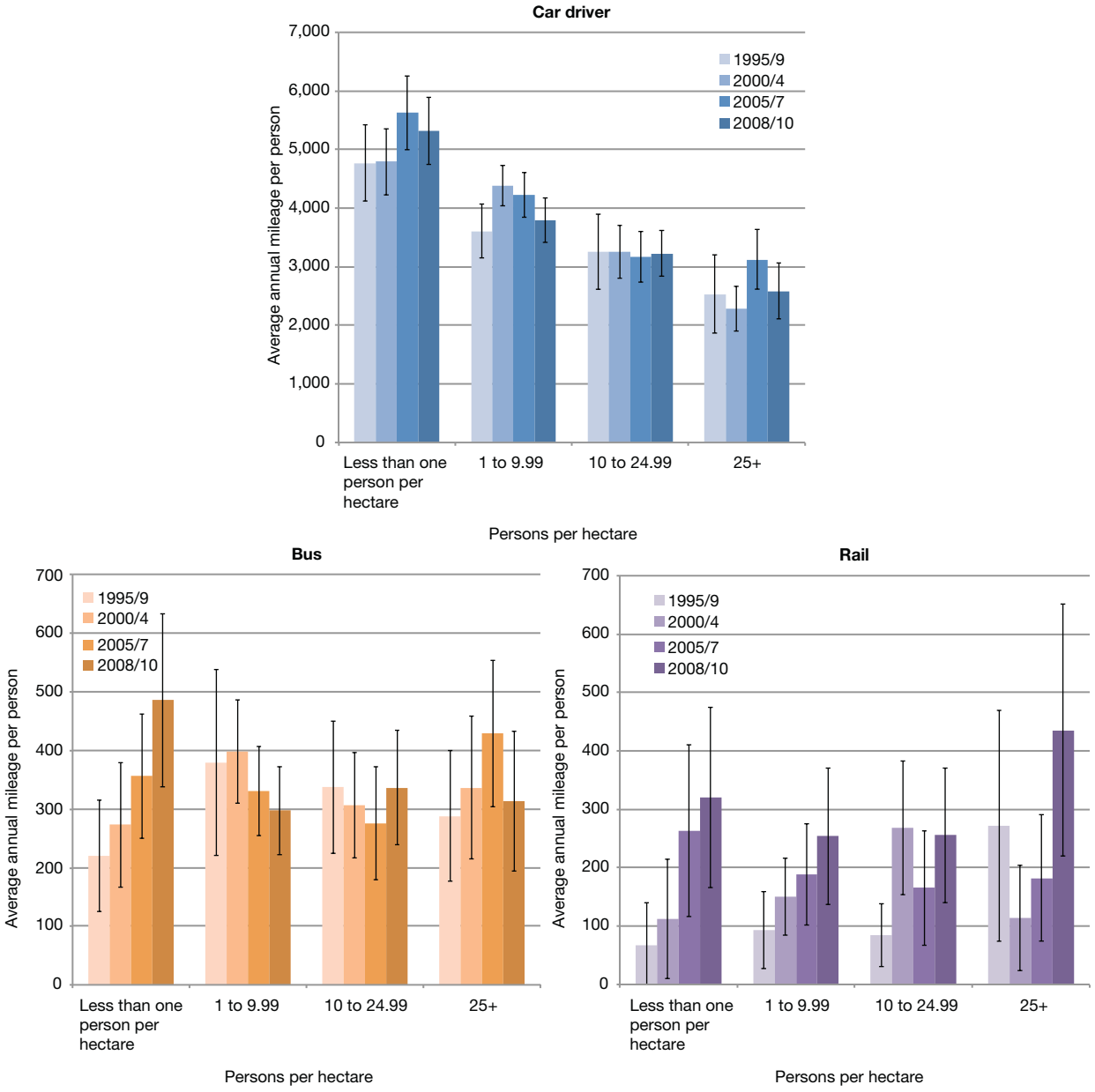
Source: NTS (error bars: 95% confidence interval)

In Figure 2.5 the equivalent relationship is shown between neighbourhood density and annual mileage per person by mode for Wales. Average car-driving distance is approximately twice as much in the low-density areas (those with less than one person per hectare) as in the high density ones (which accommodate over 25 persons per hectare); there are no clear trends over time.

Average annual bus and rail mileage per person do not vary by settlement density in Wales. In the case of bus, there has been a significant increase in mileage over time in the lowest density areas, but not elsewhere. For rail too, growth patterns have been more consistent in the lower density areas.

In 2005/7 the correlation between residential density (persons/hectare) and average car-driving mileage was –0.08 (significant at $p<0.01$), whereas it was not statistically significant for either bus or rail (-0.01and $p = 0.59$ for bus; -0.002 and $p = 0.90$ for rail).

Figure 2.5: Average annual mileage, car driving, bus and rail, by density of postcode sector (persons/hectare)



Source: NTS (error bars: 95% confidence interval)

2.2.3 Trends in average distances and speeds, by mode

In this section we look at trends in average distance and speed per journey, by mode. Table 2.3 shows that car-driving journey lengths have fluctuated over time, but with no consistent trend. Conversely, bus journey length has steadily increased, by 17% over the four time periods, and average rail trip lengths have increased by 27% over the same time period.

Table 2.3: Average journey distance (miles/journey) for car driving, bus and rail

Period	Car driving	Bus	Rail
1995/9	9.0 (0.1)	5.2 (0.1)	29.1 (2.4)
2000/4	8.4 (0.05)	5.3 (0.1)	29.9 (1.7)
2005/7	9.0 (0.1)	5.5 (0.1)	30.8 (1.6)
2008/10	8.7 (0.1)	6.1 (0.1)	37.0 (1.8)

Source: NTS (standard errors in brackets)

Travel speeds decreased for car journeys in the early years, but there is no clear trend over time in speeds by bus or rail (Table 2.4). Rail journeys have the fastest average speeds of the three modes, as they tend to be longer-distance journeys (an average of around 37 miles per journey in 2008/10).

Table 2.4: Average travel speed (mph) by car, bus and rail

Period	Car driving	Bus	Rail
1995/9	28.5	12.2	28.3
2000/4	26.8	11.6	31.5
2005/7	27.3	11.4	28.4
2008/10	27.0	12.3	31.5

Source: NTS (standard errors in brackets)

2.3 Factors underlying the changes in travel by mode

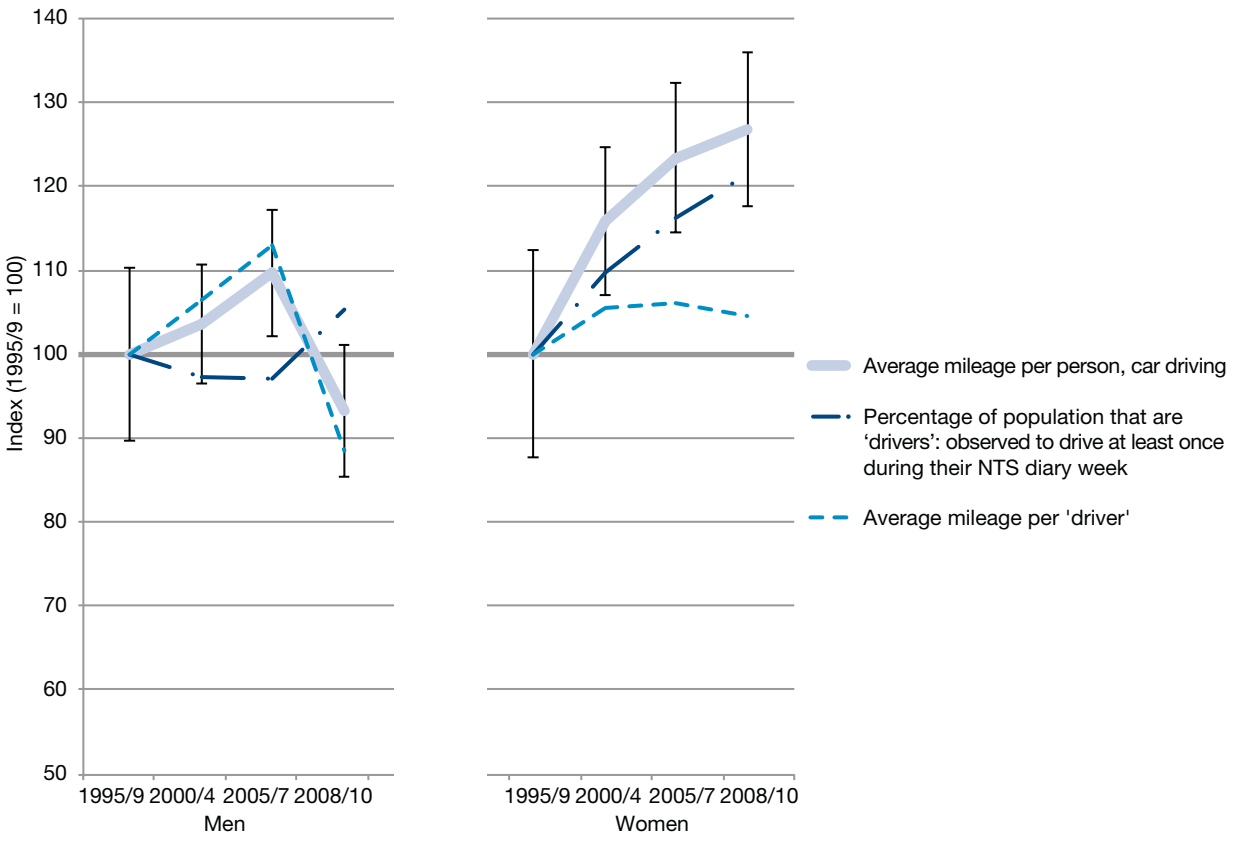
Changes in the average annual mileage per head-of-population for a particular mode can result from two separate factors (or a combination of them):

1. a change in the proportion of the population using that mode ('market penetration'); and
2. a change in annual mileage per user ('intensity of use').

Here we look at the contribution of these two components to the observed changes over time in the average per-person car-driving, bus and rail mileage. Figures 2.6, 2.7 and 2.8 show, disaggregated by gender, the findings for car-driving, bus and rail mileages respectively, in terms of changes since 1995/9, which is used as the base period.

From Figure 2.6 it can be seen that the average number of miles driven by Welsh men increased by around 10% between 1995/9 and 2005/7, but then dropped back sharply to 93% of the 1995/9 level in 2008/10; this pattern was caused mainly by a change in the proportion of men who recorded any car mileage (down 11%), rather than a change in average mileage per driver (which rose by 5%). The average car mileage per woman has seen a consistent increase over time – unaffected by the recession – with an overall growth of 27% over the four time periods. Again, this is primarily due to an increasing percentage of women who are drivers (up 22%), rather than increases in mileage per driver (up 5%).

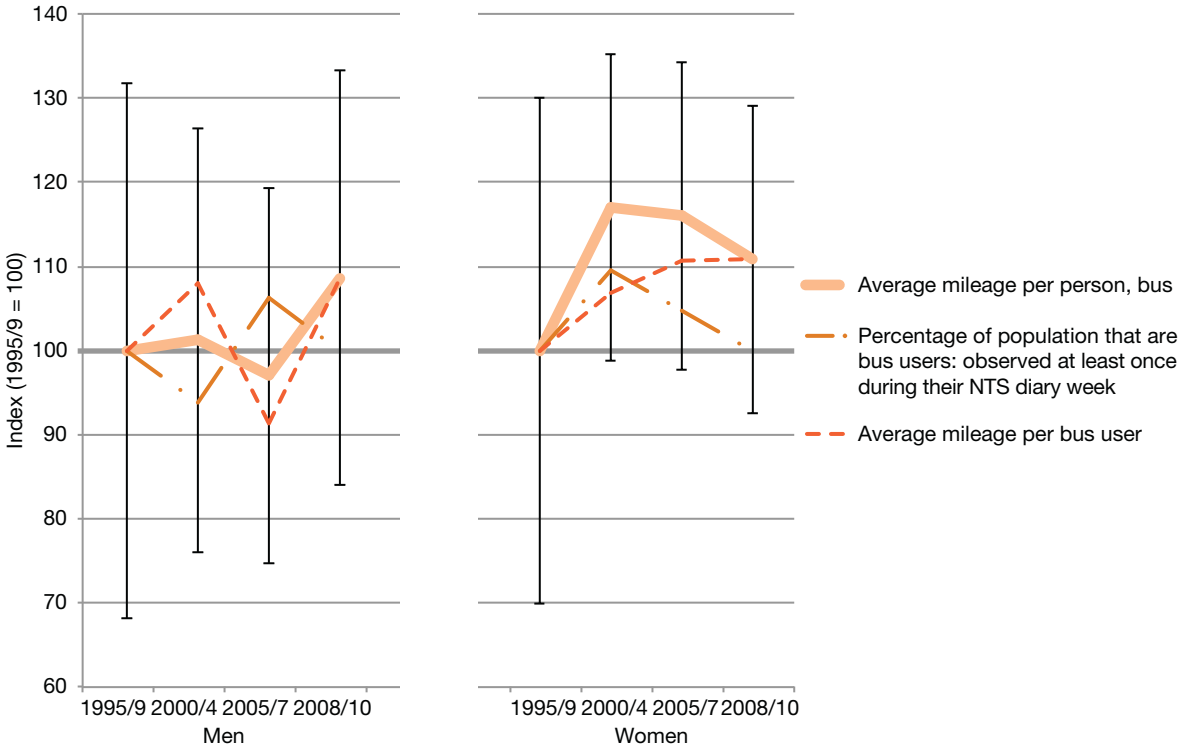
Figure 2.6: Changes in the proportion of Welsh NTS respondents who drove a car during their NTS diary week, and in car-driving mileage per driver and per person, by gender



Source: NTS (95% confidence intervals are shown for index of average driving mileage per person)

Figure 2.7 presents the equivalent figures for average annual bus mileage per person, but the very wide confidence intervals make it impractical to draw any clear conclusions.

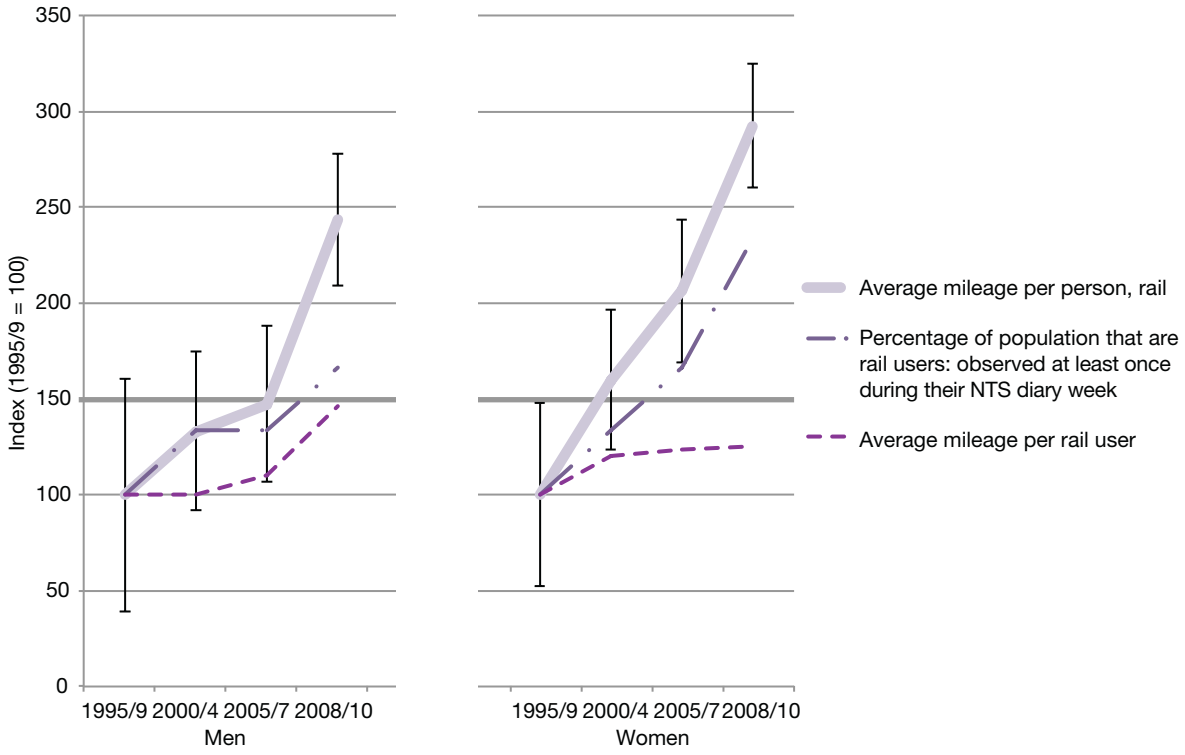
Figure 2.7: Changes in the proportion of Welsh NTS respondents who used a bus during their NTS diary week, and in bus mileage per user and per person, by gender



Source: NTS (95% confidence intervals are shown for index of average bus mileage per person)

Finally, Figure 2.8 presents the same data for rail; here, firmer conclusions can be drawn. Since the mid-1990s, annual rail mileage per person for men has increased to nearly 250% of the base level and for women it has nearly trebled. In the case of women, virtually all the growth is attributable to a higher proportion of the group becoming rail users over time.

Figure 2.8: Changes in the proportion of Welsh NTS respondents who used rail during their NTS diary week, and in rail mileage per user and per person, by gender



Source: NTS (95% confidence intervals are shown for index of average rail mileage per person)

The next three tables look at how being a car driver, a bus passenger or a rail passenger relates to being a user of the other two modes. These analyses are based on the all-ages population, including both children and adults.

Table 2.5 shows what proportion of the population report being a car driver and using rail during their diary week. Here we see that the proportion of people using both modes is very small, but has increased from 1% to 3% over time. The proportion of those driving a car but not using rail increased from 43% in 1995/9 to 48% in 2008/10 – and those not reporting using either mode of travel has decreased over time (down from 53% in 1995/9 to 46% in 2008/10).

Table 2.5: Cross-tabulation of car driving and rail use

Period	Car driver but not rail user		Car driver and rail user		Rail user but not car driver		Neither car driver nor rail user	
1995/9	43%	(2%)	1%	(<0.5%)	2%	(1%)	53%	(2%)
2000/4	48%	(2%)	1%	(<0.5%)	2%	(<0.5%)	49%	(2%)
2005/7	48%	(2%)	2%	(<0.5%)	3%	(1%)	48%	(2%)
2008/10	48%	(2%)	3%	(1%)	3%	(1%)	46%	(2%)

Source: NTS (standard errors in brackets)

Corresponding figures for car and bus users are shown in Table 2.6. Again, the proportion of respondents using both modes is very small – although slightly higher than for car and rail – increasing over time from 2% to 4%. Those driving a car but not using bus have increased as a proportion of the population over the four time periods, from 42% to 47%, while the proportion of those not using either mode has dropped from 39% to 35%.

Table 2.6: Cross-tabulation of car driving and bus use

Period	Car driver but not bus user	Car driver and bus user	Bus user but not car driver	Neither car driver nor bus user
1995/9	42% (2%)	2% (1%)	17% (2%)	39% (2%)
2000/4	46% (2%)	3% (1%)	17% (1%)	34% (2%)
2005/7	46% (2%)	3% (1%)	16% (1%)	34% (2%)
2008/10	47% (2%)	4% (1%)	14% (1%)	35% (2%)

Source: NTS (standard errors in brackets)

Finally, Table 2.7 shows the third cross-tabulation, of bus and rail usage. Again, the overlap between modes is very small: by the end of study period only 2% of respondents use both modes; 4% use rail but not bus, both of these percentages having increased slightly over time. The proportion who use neither mode has barely changed, standing at 78% in 2008/10.

Table 2.7: Cross-tabulation of rail and bus use

Period	Rail user but not bus user	Rail user and bus user	Bus user but not rail user	Neither rail user nor bus user
1995/9	2% (1%)	1% (<0.5%)	17% (2%)	79% (2%)
2000/4	2% (1%)	1% (<0.5%)	18% (1%)	78% (1%)
2005/7	3% (1%)	2% (<0.5%)	18% (1%)	78% (1%)
2008/10	4% (1%)	2% (<0.5%)	17% (1%)	78% (2%)

Source: NTS (standard errors in brackets)

2.4 Mode user profiles

Next we look at the profiles of the respondents who travel as car drivers, bus passengers and rail passengers – we investigate how these differ between modes, and how they compare to the adult Welsh population as a whole, at the four periods of time. A respondent is classed as a 'user' of a mode of transport if they report using it in their NTS diary week at least once. The results are shown in Table 2.8.

Here we look at the changing characteristics of the sample as a whole, between 1995/9 and 2008/10. Over this period, the population aged by 1.0

years, there was a three percentage point increase in those working full-time (up from 29% to 32%) and a five percentage point decline in the prevalence of living with children (down from 48% to 43%). The incidence of having a car in one's household increased noticeably (up from 78% to 84%), and the proportion of 'main drivers' of a car (defined as the person who drives the car more than anyone else in that household drives it) also increased by eight percentage points (from 38% to 46%). Both personal and household incomes grew by 22% in real terms. We now compare user profiles of each mode against this background trend.

The average age of car drivers increased from 44.0 to 46.3 years old between 1995/9 and 2008/10, in line with the situation for users of bus and rail. The percentage of car drivers who are female increased from 42% to 44%, while the corresponding proportion for bus and for rail remained stable at 58% and 56% respectively.

As car ownership has risen in Wales, the proportion of bus users who have a car in their household has increased, from 49% to 57%. There has been a less pronounced trend for rail: up from 64% to 69%. The percentage of users of all three modes who are main drivers has also increased over time. The proportion for rail users has doubled (from 17% to 34%) and that for bus users has more than doubled (from 7% to 17%).

A much higher percentage of car drivers (51% in 2008/10) than bus users (15%) work full-time, while 30% of rail users are full-time workers. There is an eight percentage point drop in the proportion of car drivers living in households with children; there has been a slightly larger drop among bus users (down from 46% to 37%), and a much sharper drop for rail users (down from 59% to 37%).

The highest average personal incomes are found amongst car drivers (£18,873 in 2008/10), followed by rail users (£12,909 in 2008/10), with bus users earning the least, at £7,978.

The percentage of users whose household owns their residence (as opposed to renting or living rent-free) is highest amongst car drivers (at 82% in 2008/10) followed by rail users (62%) and then bus users (55%).

Table 2.8: Welsh user profiles for car driving, bus usage and rail usage

Indicator	Year group	Car drivers		Bus users		Rail users		Welsh population (all ages within NTS sample)	
Average age	1995/9	44.0	(0.5)	37.9	(1.3)	31.9	(2.7)	38.2	(0.5)
	2000/4	45.9	(0.4)	41.1	(1.0)	33.0	(1.7)	39.8	(0.4)
	2005/7	46.3	(0.4)	40.4	(1.0)	33.2	(1.7)	39.5	(0.4)
	2008/10	46.8	(0.4)	41.4	(2.1)	34.2	(1.6)	39.2	(0.4)
% female	1995/9	42%	(2%)	58%	(3%)	56%	(6%)	51%	(1%)
	2000/4	43%	(1%)	63%	(2%)	52%	(5%)	52%	(1%)
	2005/7	44%	(1%)	59%	(2%)	54%	(4%)	52%	(1%)
	2008/10	44%	(1%)	58%	(2%)	56%	(4%)	51%	(1%)
% who have cars in household	1995/9	98%	(1%)	49%	(3%)	64%	(6%)	78%	(1%)
	2000/4	99%	(<0.5%)	54%	(2%)	67%	(4%)	81%	(1%)
	2005/7	>99.5%	(<0.5%)	54%	(2%)	70%	(4%)	83%	(1%)
	2008/10	99%	(<0.5%)	57%	(2%)	69%	(4%)	84%	(1%)
% who are main drivers* of a car	1995/9	83%	(1%)	7%	(1%)	17%	(5%)	38%	(1%)
	2000/4	85%	(1%)	11%	(1%)	28%	(4%)	44%	(1%)
	2005/7	87%	(1%)	13%	(1%)	30%	(4%)	45%	(1%)
	2008/10	86%	(1%)	17%	(2%)	34%	(4%)	46%	(1%)
% who work full-time	1995/9	54%	(2%)	16%	(%)	27%	(6%)	29%	(1%)
	2000/4	56%	(1%)	16%	(1%)	43%	(5%)	34%	(1%)
	2005/7	59%	(1%)	18%	(2%)	37%	(4%)	36%	(1%)
	2008/10	51%	(1%)	15%	(2%)	30%	(4%)	32%	(1%)
% living in a household with children	1995/9	40%	(2%)	46%	(3%)	59%	(6%)	48%	(1%)
	2000/4	32%	(1%)	42%	(2%)	45%	(5%)	43%	(1%)
	2005/7	36%	(1%)	42%	(2%)	47%	(4%)	46%	(1%)
	2008/10	32%	(1%)	37%	(2%)	37%	(4%)	43%	(1%)
Average **personal** income (2010 prices)	1995/9	£17,222	(£465)	£5,729	(£353)	£11,187	(£2,450)	£9,834	(£267)
	2000/4	£18,754	(£342)	£7,929	(£359)	£14,463	(£1,537)	£12,238	(£224)
	2005/7	£19,526	(£384)	£8,732	(£483)	£13,810	(£1,390)	£12,699	(£258)
	2008/10	£18,873	(£387)	£7,978	(£410)	£12,909	(£1,247)	£12,003	(£251)
Average **household** income (2010 prices)	1995/9	£34,565	(£709)	£19,517	(£825)	£30,616	(£2,965)	£28,175	(£450)
	2000/4	£38,548	(£597)	£25,445	(£729)	£40,891	(£2,770)	£33,656	(£400)
	2005/7	£41,038	(£676)	£27,987	(£995)	£38,276	(£2,290)	£36,058	(£478)
	2008/10	£39,694	(£674)	£24,434	(£852)	£39,832	(£2,195)	£34,335	(£451)

Indicator	Year group	Car drivers	Bus users	Rail users	Welsh population (all ages within NTS sample)
% who head their household (highest income in household)	1995/9	64% (2%)	42% (3%)	34% (6%)	44% (1%)
	2000/4	63% (1%)	44% (2%)	43% (5%)	47% (1%)
	2005/7	62% (1%)	45% (2%)	47% (4%)	46% (1%)
	2008/10	61% (1%)	48% (2%)	44% (4%)	46% (1%)
% who own their residence	1995/9	85% (1%)	55% (3%)	65% (6%)	72% (1%)
	2000/4	88% (1%)	63% (2%)	77% (4%)	77% (1%)
	2005/7	88% (1%)	60% (2%)	63% (4%)	75% (1%)
	2008/10	82% (1%)	55% (2%)	62% (4%)	70% (1%)
% living in a flat	1995/9	2% (<0.5%)	13% (2%)	5% (3%)	6% (1%)
	2000/4	2% (<0.5%)	6% (1%)	6% (2%)	4% (<0.5%)
	2005/7	3% (<0.5%)	9% (1%)	11% (3%)	6% (<0.5%)
	2008/10	3% (<0.5%)	10% (1%)	2% (1%)	5% (<0.5%)

Source: NTS (standard errors in brackets)

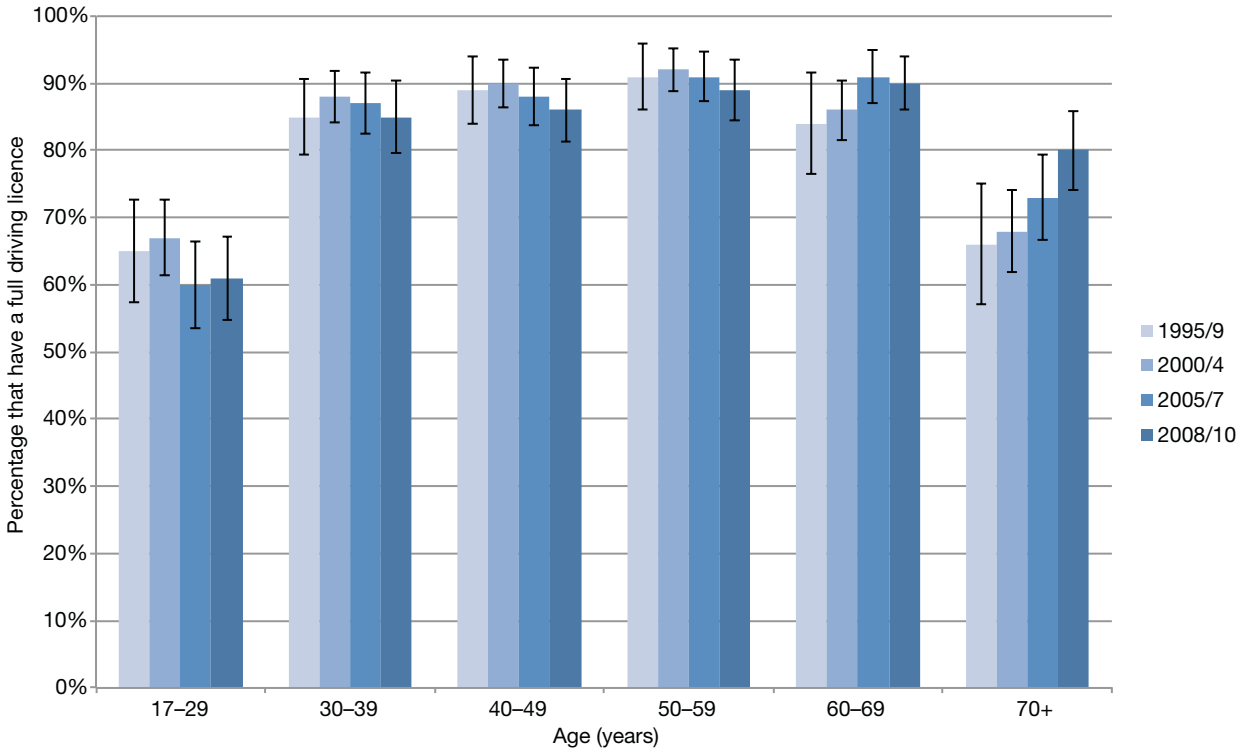
Note: *the 'main driver' is defined as the person who drives the car more than anyone else in that household drives it.

2.5 Patterns of driving licence ownership

2.5.1 Relationship with age and gender

The proportion of men holding a full car driving licence in 2008/10 ranges between 85% and 90% for those aged between 30 and 69, but is only 60% for those in their twenties (see Figure 2.9); moreover, it has been decreasing slightly in recent years among those aged up to 59. For those aged 60 and above, there has been a trend towards increasing licence ownership – particularly among men in their 70s, which in 2008/10 reached 80%.

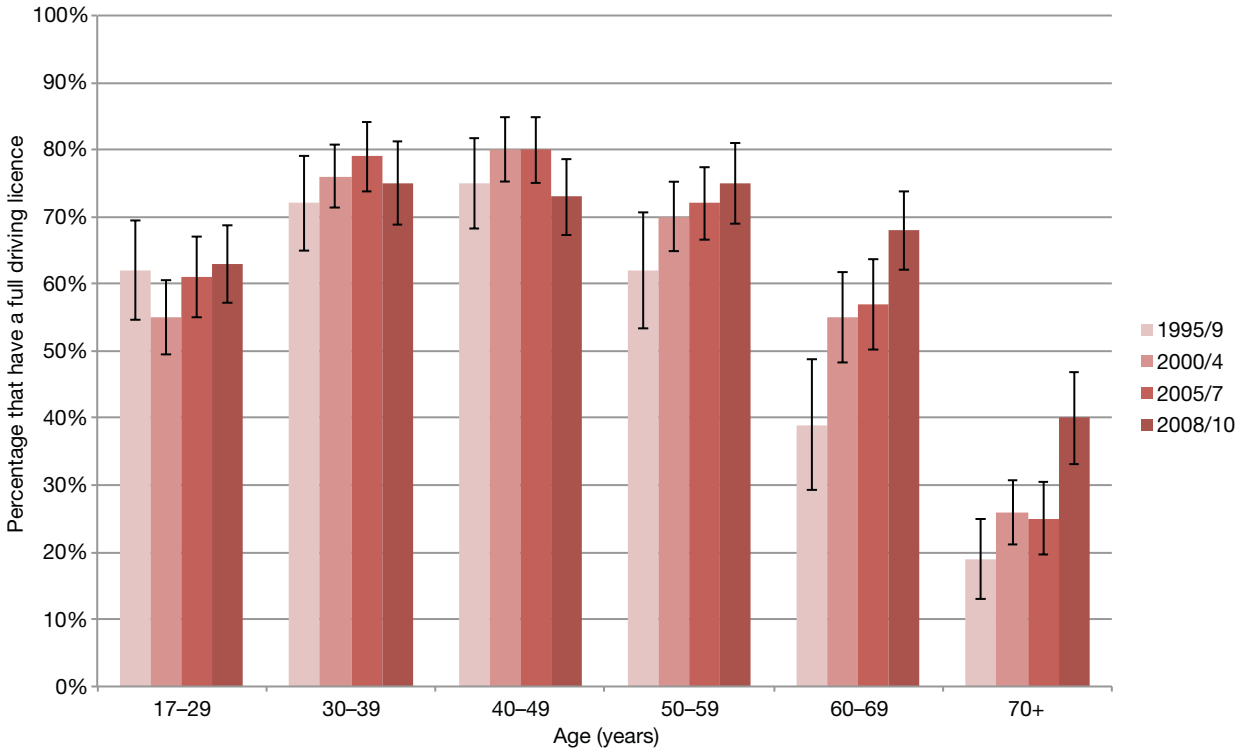
Figure 2.9: Percentage of men holding a full car driving licence, by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

Equivalent information for women is shown in Figure 2.10, where there are some interesting similarities and differences. Among women aged under 30, full car driving licence ownership has remained at around 60%; for those aged between 30 and 49, ownership peaked at 80% in 2005/7, but has since dropped back to around 75%. For women aged 50 and over, there has been a consistent upward trend, strongest in absolute terms amongst those in their 60s, where it has risen sharply from just under 40% in 1995/9 to nearly 70% in 2008/10; and in relative terms for those aged 70 and over (with a doubling from 20% to 40%).

Figure 2.10: Percentage of women holding a full car driving licence, by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

2.5.2 Reasons for not having a driving licence

Since 2006 the NTS has asked a question about the reasons why adults without driving licences (and not currently learning to drive) do not have one. From 2006 to 2008 this set of questions was asked only of people who do not plan to learn to drive; in 2009 this began to be asked of all adults aged 17 upwards who did not have a full driving licence and were not learning to drive, thus including those who were planning to.

Respondents were asked to select, from a list, all factors that contributed to them not driving, and were then asked to indicate which was the main reason.

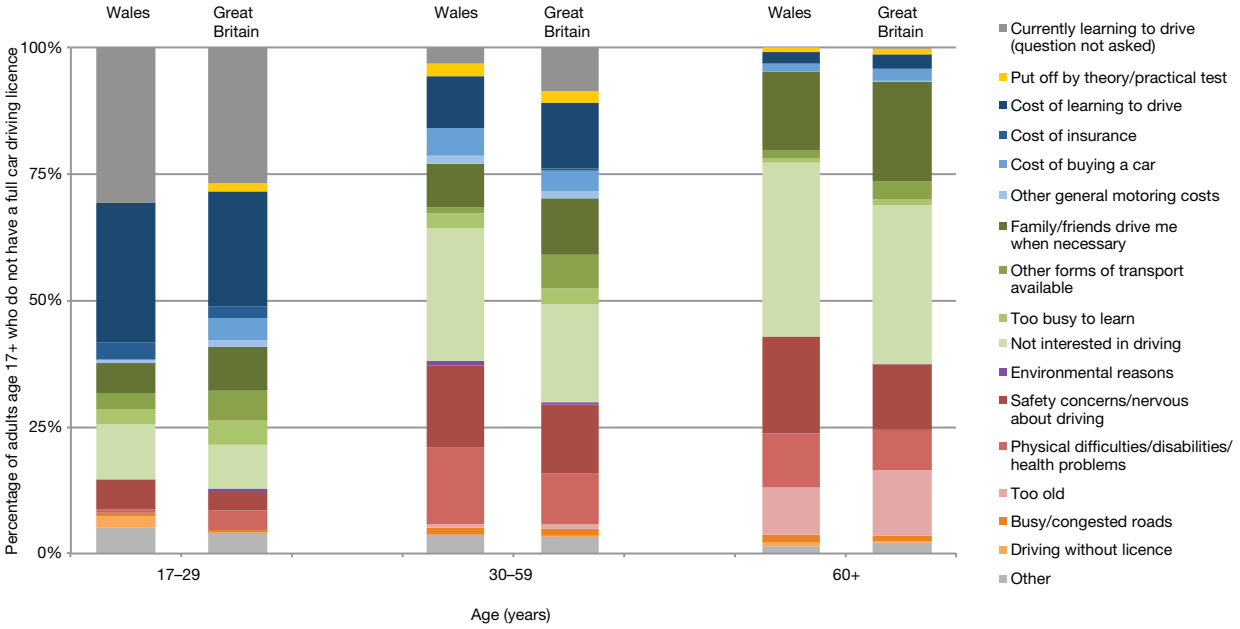
Figures 2.11 and 2.12 show the results from the Welsh NTS respondents in 2009/10, broken down by age band and gender respectively. (For comparison, both figures show the results for both Wales and Britain. Numbers referenced in the text refer to the Welsh results.) The percentage shown in these charts is the proportion of all adults who do not have a full car driving licence, so along with the stated 'main reason' for not driving, these charts also show the proportion who said they were learning to drive.

Figure 2.11 shows that amongst young Welsh adults (under the age of 30), nearly a third (31%) of those without a full driving licence were learning to drive.

Another 32% said they were deterred by one of the types of costs associated with driving, with the cost of learning to drive the most prevalent (28%). Taken together, more than three in five (62%) young adults who do not drive indicate that they are either learning to or are deterred by the costs. The percentages for Wales are somewhat higher than the corresponding figures for Great Britain as a whole, where 27% of unlicensed adults under the age of 30 report that they are learning to drive, and another 31% that they are deterred by the various costs of motoring.

The reasons for not driving change as one moves up the age bands, so that half (50%) of those in Wales aged 60 and over said that they do not drive either because they are not interested in driving, or because they are driven by family/ friends when necessary.

Figure 2.11: Main reported reasons for not driving, by age band, for Wales (L) and Great Britain (R) in 2009/10

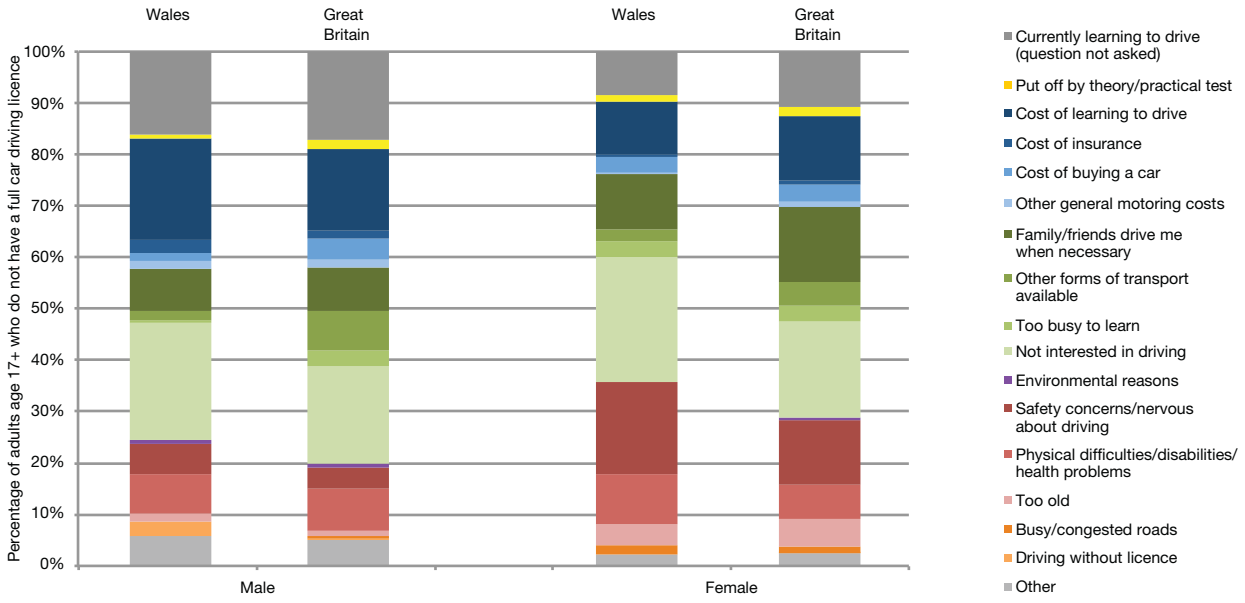


Source: NTS

Note: Sample sizes for each age group in Wales: 117, 129 and 130 respectively; and for GB: 2,807, 2,785 and 2,556

Figure 2.12 shows how the reasons that people do not drive differ between the genders. Unlicensed men are more likely than unlicensed women to be learning to drive (16%, as compared with 8%) or to say that one of the costs of driving is the main reason that they do not drive (25% of men as compared with 14% of women). Women are more likely to say they are driven by family/friends when necessary (11%, against 8% of men), or to have safety concerns / be nervous about driving (18%, against 6% of men).

Figure 2.12: Main reported reasons for not driving, by gender, for Wales (L) and Great Britain (R) in 2009/10



Source: NTS

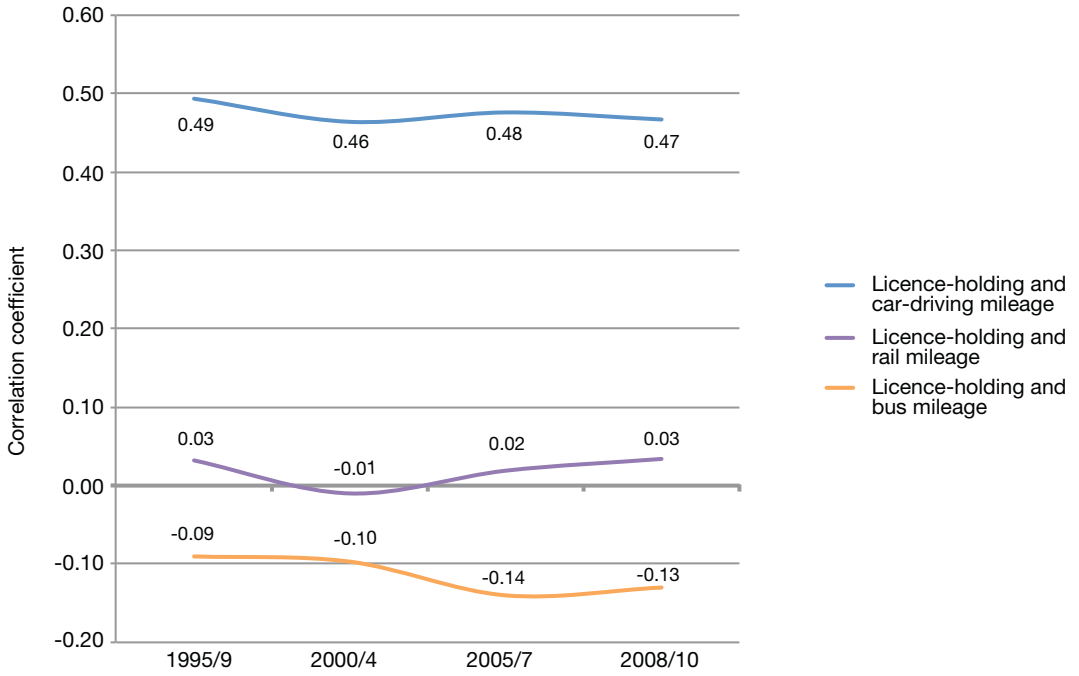
Note: Sample sizes for Wales: 119 men, 257 women; and for GB: 2,507 men, 5,649 women

2.5.3 Correlations between licence-holding and use of car, bus and rail

Figure 2.13 shows how statistical correlation between licence-holding and car, bus and rail use has changed over time. The analysis is based on individuals as the unit of analysis, using data from each NTS diary on their reported mileage for the three modes of transport. Two variables are positively correlated if high values on one variable tend to be observed for the same people with high values of the other variable. Likewise, two variables are negatively correlated if low values of one tend to be observed alongside high values of the other.

A number of results from this analysis are noteworthy. The largest correlation, not surprisingly, is between licence-holding and car-driving mileage, although it appears that this relationship may be very slightly weakening over time. There is also a far weaker positive correlation between rail use and licence-holding, and one that has been increasing during the 2000s; and a low – but growing – negative correlation between licence-holding and bus mileage.

Figure 2.13: Correlation between driving licence-holding and car-driving, bus and rail mileage, at the person level



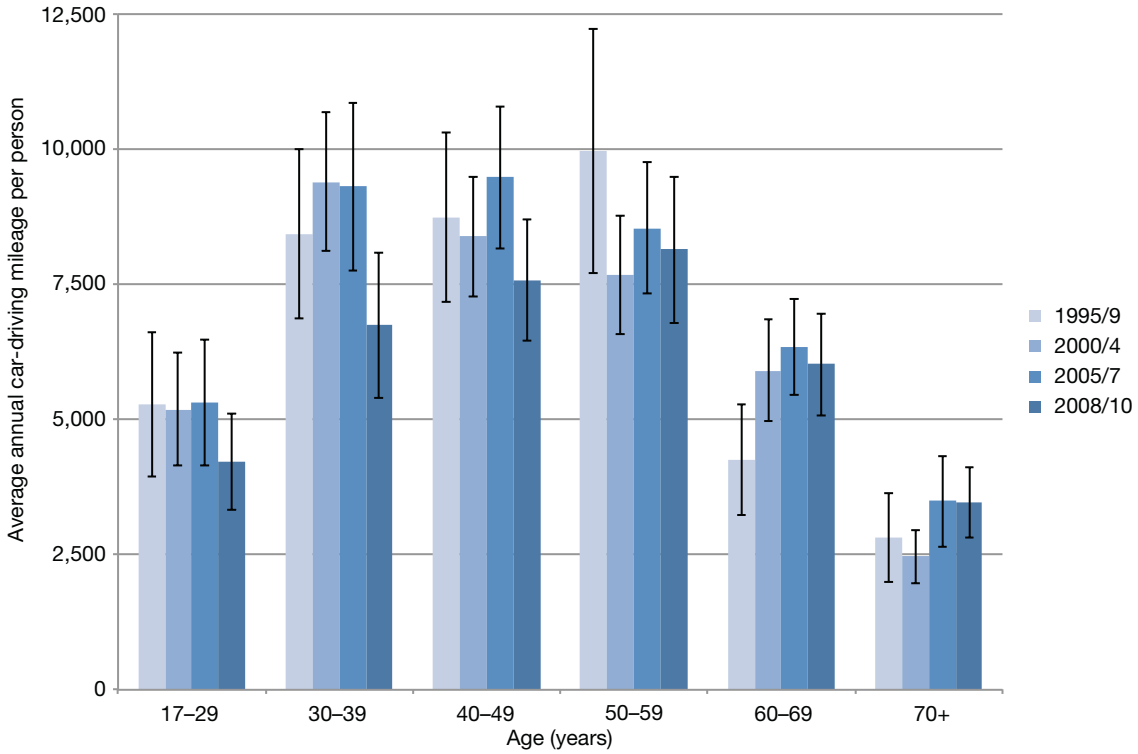
Source: NTS

2.6 Differences in travel patterns, by age and gender

2.6.1 Annual car-driving mileage

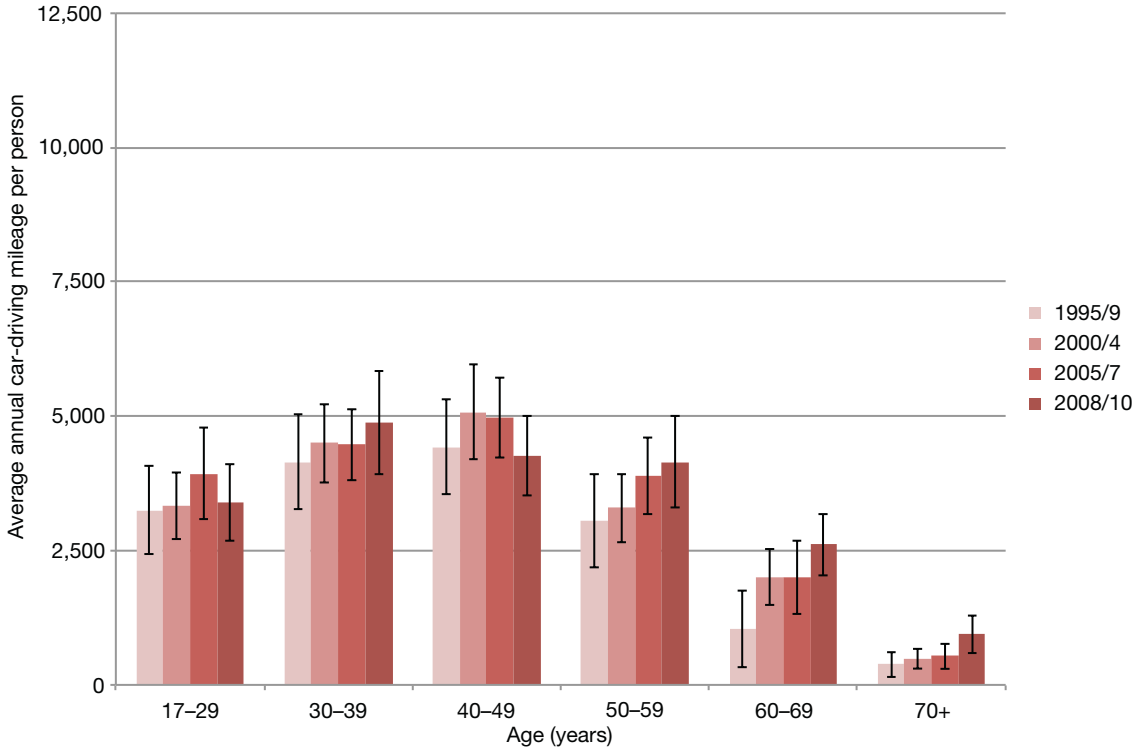
Figures 2.14 and 2.15 show average annual car-driving mileages, for men and women respectively, over time, broken down by age band. As with licence-holding (see Figures 2.9 and 2.10), driving mileage per person is low in early adulthood and higher in middle age, but the drop-off after middle age is sharper for driving mileage. This means that older licence-holders tend to drive fewer miles on average than younger licence-holders.

Figure 2.14: Average annual car-driving mileage of men, by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

Figure 2.15: Average annual car-driving mileage of women, by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

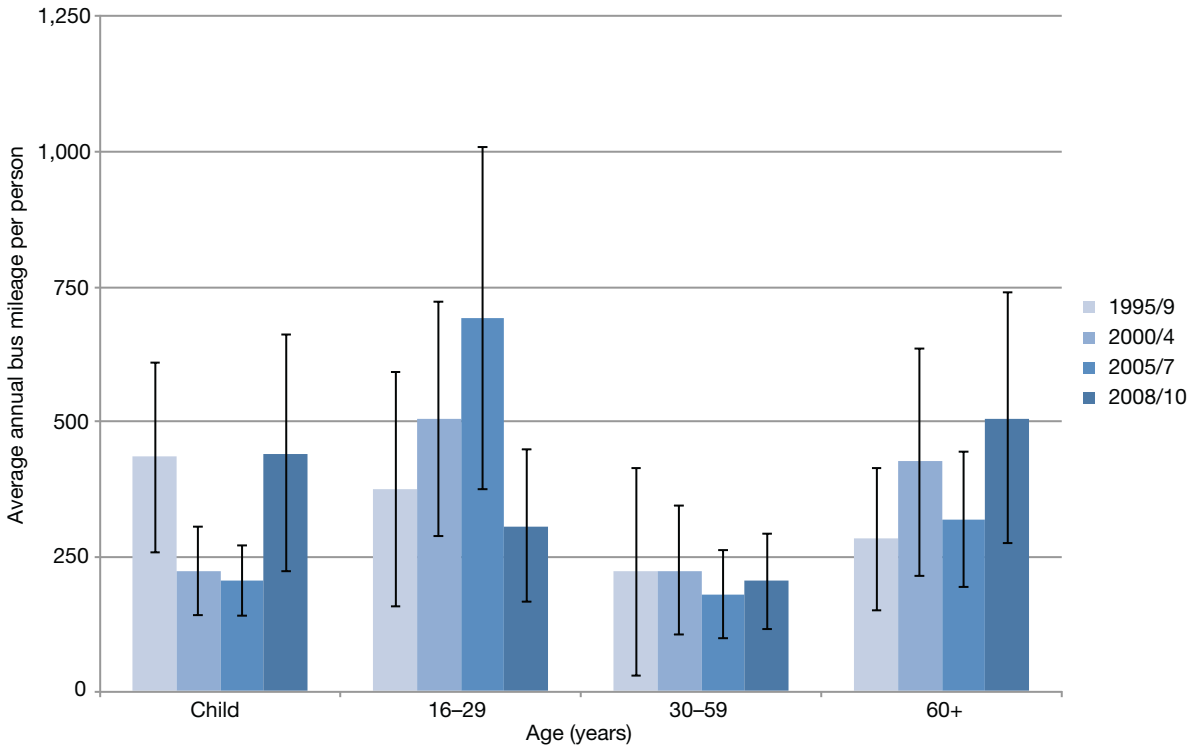
Men aged up to 29 have a lower average annual car-driving mileage than all age groups except those aged 70 and over (Figure 2.14). There was a drop in reported mileage between 2005/7 and 2008/10 among all age groups up to 70, with the largest drop (of over 25%) seen among those aged 30–39.

Women's annual car-driving mileage (Figure 2.15) is around half that of men in most age groups. Here, too, there is a reported drop in average mileage between 2005/7 and 2008/10, but in this case only among those aged 17–29 and 40–49; a consistent upward trend is evident for those aged 50 and above.

2.6.2 Annual bus mileage

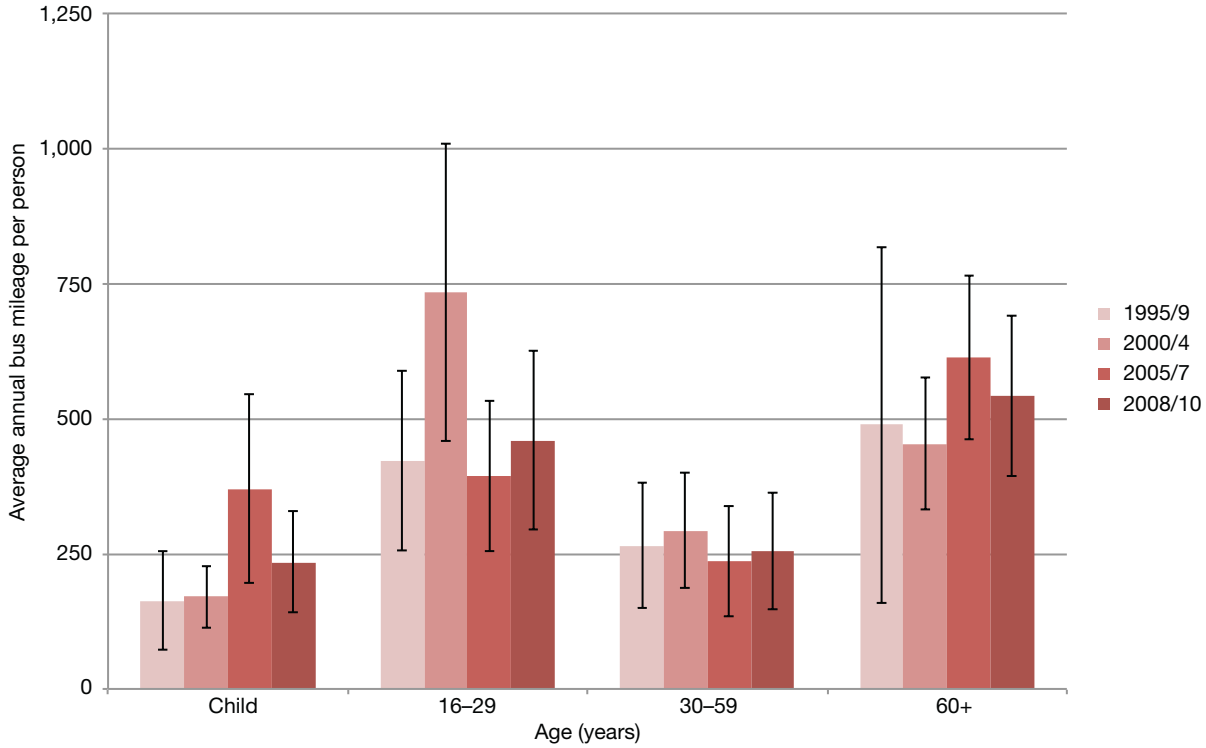
Trends in annual bus travel mileage show very different patterns from those evident in car driving (see Figures 2.16 and 2.17, for men and women respectively). For both sexes, bus usage is lowest in middle age (30–59) and higher on either side. Otherwise, there are no discernible consistent trends over time, partly as a result of the wide confidence intervals.

Figure 2.16: Average annual bus mileage (males), by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

Figure 2.17: Average annual bus mileage (females), by age, Welsh residents

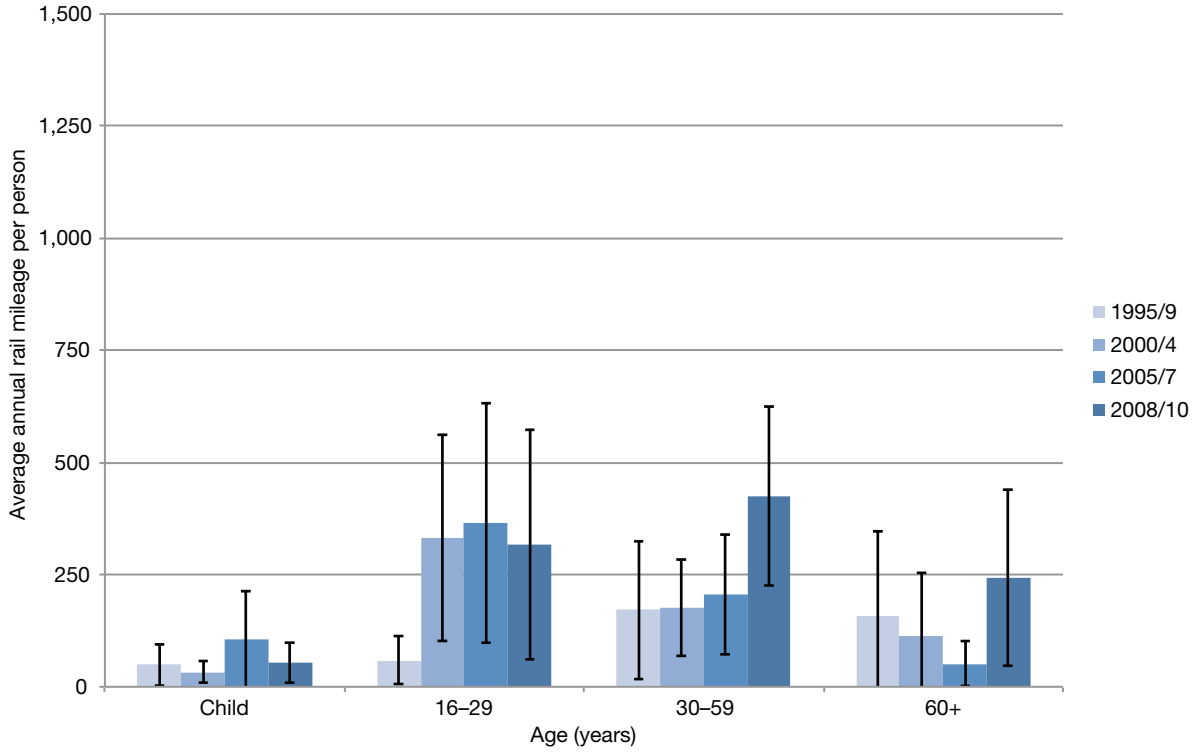


Source: NTS (error bars: 95% confidence interval)

2.6.3 Annual rail mileage

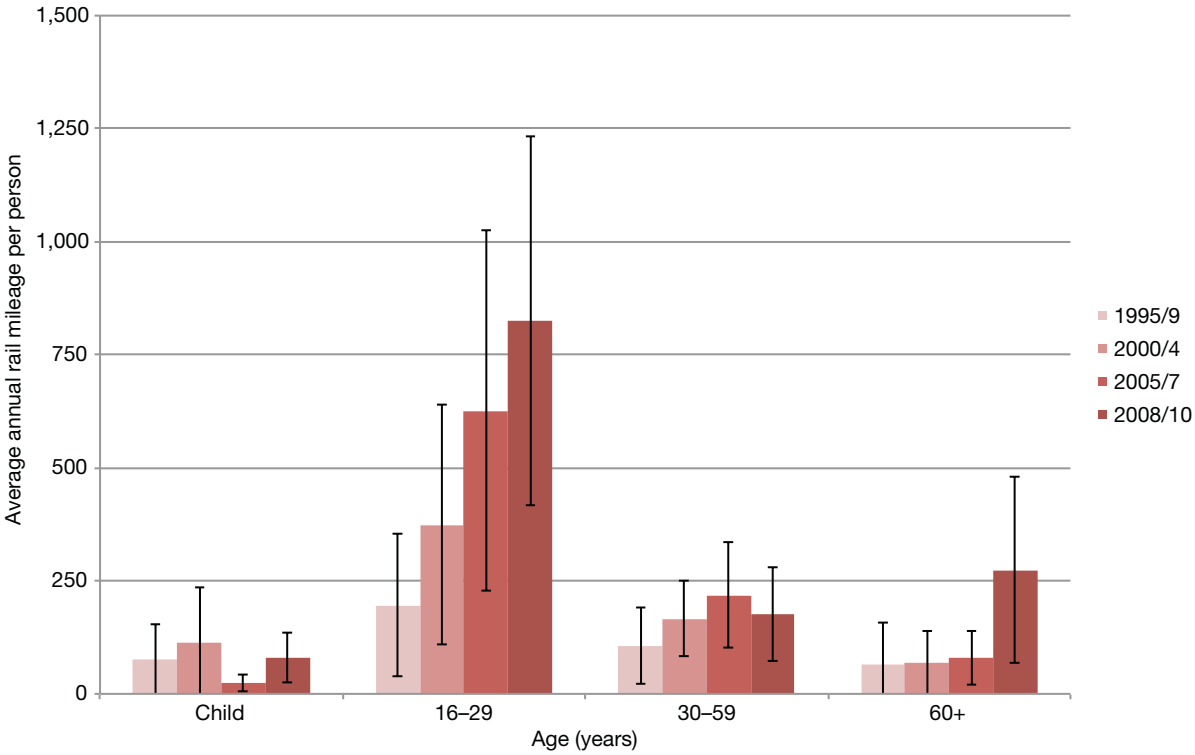
The trends in rail mileage estimated from the NTS are highly variable, owing to the very small numbers of rail users in the Welsh NTS data, but some broad trends can nevertheless be observed. Among males (Figure 2.18), rail mileage is highest among those aged 16–59 and lowest among children. For females (Figure 2.19), those aged 16 to 29 now have an annual mileage which is three times that of other age groups – and two and a half times that of men in the same age group.

Figure 2.18: Average annual rail mileage (males), by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

Figure 2.19: Average annual rail mileage (females), by age, Welsh residents



Source: NTS (error bars: 95% confidence interval)

2.7 Young men's travel

2.7.1 Licence-holding

On the Move (Le Vine & Jones, 2012) identified young men, in particular, as exhibiting recent behaviour which countered past trends. Three aspects are examined here, for the Welsh sample: licence-holding, personal income and travel behaviour.

Licence-holding (shown in Table 2.9) fell amongst young men in Wales, as has been found in the rest of Great Britain. In Wales, full driving licence ownership dropped from 75% in 1995/9 to 70% in 2008/10 – but this is a much lower drop than in Great Britain as a whole, where it declined from 80% to 65% over the same time period.

There has been a small increase in provisional-licence-holding (up from 11% to 14%) and in the percentage of with no licence (from 14% to 16%), but these increases are much less than in Great Britain as a whole.

Table 2.9: Percentage of men aged 20–29 by licence-holding status, Wales and Great Britain

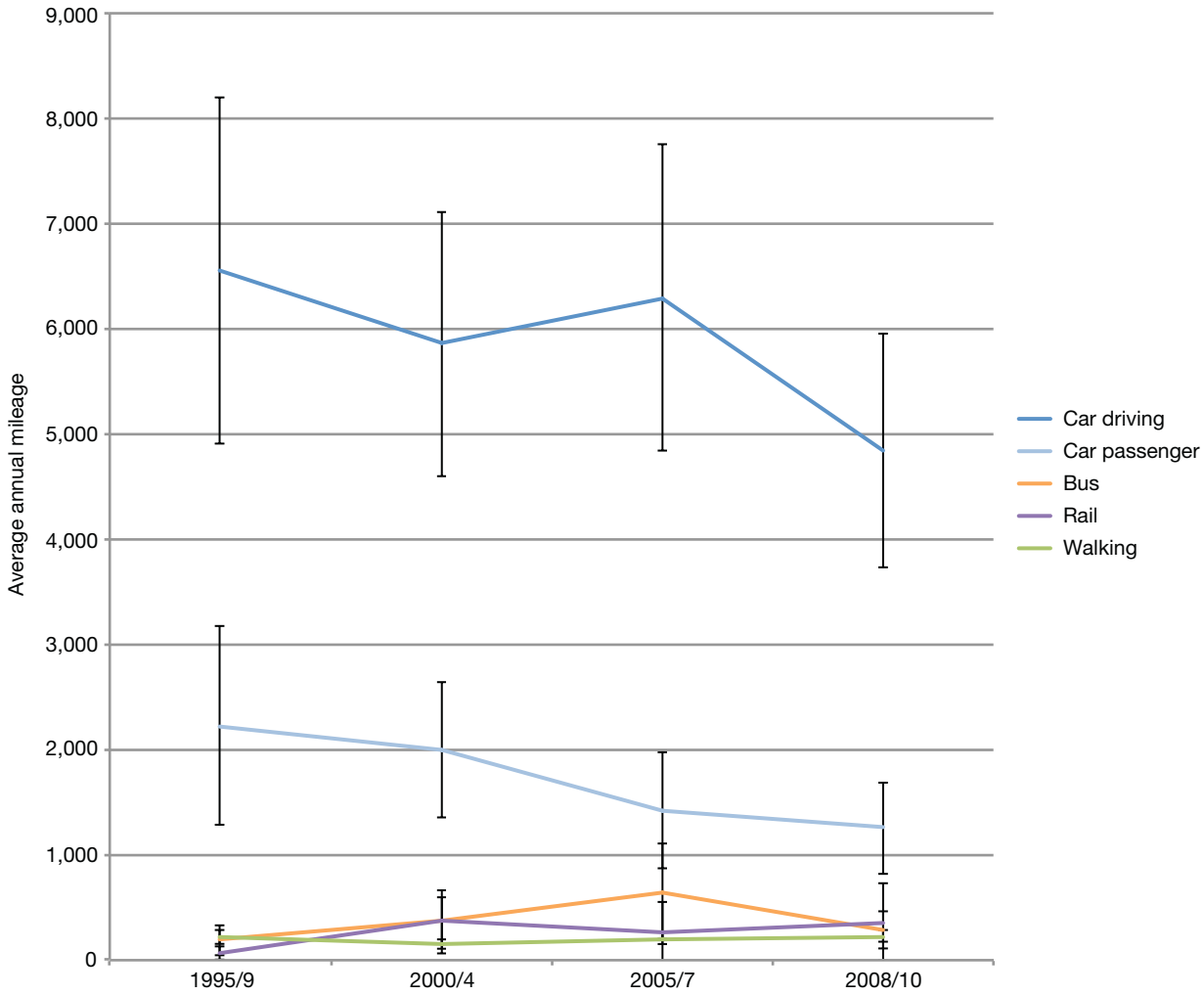
	Wales			Britain		
Period	Percentage of men in their 20s with a full car driving licence	Percentage of men in their 20s with a provisional car driving licence	Percentage of men in their 20s with neither	Percentage of men in their 20s with a full car driving licence	Percentage of men in their 20s with a provisional car driving licence	Percentage of men in their 20s with neither
1995/9	75% (4%)	11% (3%)	14% (3%)	80% (1%)	9% (1%)	12% (1%)
2000/4	76% (3%)	12% (2%)	12% (2%)	70% (1%)	13% (<0.5%)	17% (1%)
2005/7	72% (3%)	13% (3%)	15% (3%)	68% (1%)	13% (1%)	20% (1%)
2008/10	70% (4%)	14% (3%)	16% (3%)	65% (1%)	16% (1%)	19% (1%)

Source: NTS (standard errors in brackets)

2.7.2 Patterns of travel by mode

Looking now at their general travel behaviour, Figure 2.20 shows the trends in car, bus and rail mileage (and miles travelled on foot) by Welsh men in their twenties, between the mid-1990s and late 2000s. The mean estimate from the NTS is that their driving mileage fell 26% between 1995/9 and 2005/7. However, there is no evidence of a shift of mileage from car driving to bus, rail or walking; in fact, being a car passenger also declined sharply.

Figure 2.20 Average annual mileage by car driving, car passenger, bus, rail and walking, men aged 20–29



Source: NTS (error bars: 95% confidence interval)

Table 2.10 compares these Welsh trends with those in Great Britain as a whole, between 1995/9 and 2008/10. Over this period, the drop in young men's car-driving mileage in Wales has been much less than in Great Britain as a whole (26% as against 41%); however, the recession in Wales seems to have had a much bigger impact than in Great Britain as a whole – with a 23% drop in average car-driving mileage in Wales for young men between 2005/7 and 2008/10, compared to a 16% drop across Great Britain as a whole. A very sharp increase in rail mileage was recorded between the 1995/9 and 2000/4 periods, but the standard errors are very large, so the magnitude of this is probably due to sampling error.

Finally, Table 2.11 looks again at licence ownership and examines how the annual driving mileage of fully licensed young men has changed over time. What it shows is that, alongside the reduction in their ownership of full driving licences (shown in Table 2.9), the number of miles that licensed young men are driving has also fallen, by around 25% between 1995/9 and 2008/10 – although bearing in mind the sample size, this effect is not statistically significant.

Table 2.10: Average annual mileage, men aged 20–29, car driving, bus, and rail, Wales and Great Britain

Period	Wales			Britain		
	Car driving	Bus	Rail	Car driving	Bus	Rail
1995/9	6,555 (843)	180 (72)	58 (31)	6,411 (180)	325 (22)	646 (59)
2000/4	5,853 (641)	367 (114)	356 (156)	4,912 (118)	458 (24)	857 (53)
2005/7	6,294 (644)	644 (229)	260 (147)	4,497 (121)	449 (27)	753 (51)
2008/10	4,838 (278)	278 (89)	354 (189)	3,783 (109)	482 (26)	740 (47)

Source: NTS (standard error in brackets)

Table 2.11: Average annual car-driving mileage per licence-holding man aged 20–29, Welsh residents

Period	Average annual driving mileage amongst full-licence-holding men in their 20s
1995/9	9,029 (1,017)
2000/4	7,700 (775)
2005/7	8,456 (903)
2008/10	6,739 (717)

Source: NTS (standard error in brackets)

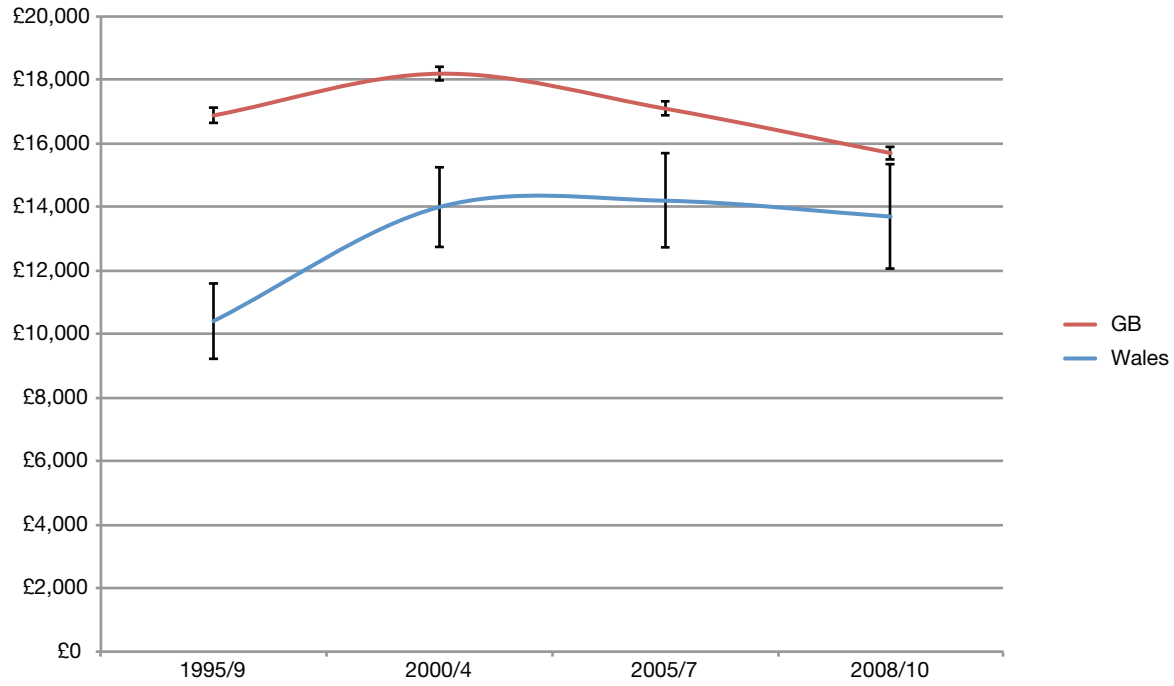
2.7.3 Personal incomes and other sociodemographic characteristics

On the Move (Le Vine & Jones, 2012) found that the sharp drop in car use by young British men coincided with other important changes in their economic and sociodemographic circumstances. In this section we examine the evidence for similar sorts of relationships in Wales.

Figure 2.21 compares the annual personal income of young men in Wales with the GB average, with the former found to be lower than the latter. But, over time, we can see a very large narrowing of the difference (down from a gap of around £6,500 in 1995/9 to only £2,000 in 2008/10) – in the early years due to a rapid increase in Welsh incomes, and in later years due to a much sharper decline in GB incomes.

This is noteworthy, because rising income levels have, at least in the past, been associated typically with increasing car use. Whilst both young men's income levels and their car-driving mileage have trended down simultaneously across GB, the situation in Wales is somewhat different, where their car use seems to have trended down since the late 1990s despite their incomes rising or stabilising over time.

Figure 2.21: Average annual personal income, men aged 20–29, Wales and Great Britain



Source: NTS (error bars: 95% confidence interval)

Whilst income is a strong predictor of how much – and how – one travels, other sociodemographic characteristics are also important influences. Table 2.12, which lists various demographic characteristics alongside their relationship to young Welsh men and the distance that they drive, shows that the percentage of young men with various personal attributes which are typically associated with high levels of car use (working full-time, living without parents in a house that one owns) has trended down, whilst the ranks of those in other categories associated with low levels of car use (being a student, being unmarried) have increased in proportionate terms.

Table 2.12: Various sociodemographic characteristics of young Welsh men, and associated average car-driving mileage

Period	Characteristic	Percentage of young men (aged 20–29)	Average car-driving mileage of young men having relevant characteristic
1995/9	Working full-time	78% (4%)	8,267 (992)
2000/4		81% (3%)	6,653 (747)
2005/7		77% (4%)	7,754 (893)
2008/10		63% (4%)	6,750 (784)
1995/9	Single (not married)	54% (5%)	5,314 (1,127)
2000/4		58% (4%)	4,285 (702)
2005/7		61% (4%)	5,150 (899)
2008/10		Not available	Not available
1995/9	Living with at least one adult over the age of 34 in household (typically a parent)	34% (5%)	5,149 (1,390)
2000/4		46% (4%)	4,604 (785)
2005/7		44% (4%)	5,496 (963)
2008/10		53% (4%)	5,214 (798)
1995/9	Living in the South East Wales conurbation	65% (5%)	6,203 (1,156)
2000/4		66% (4%)	6,211 (891)
2005/7		65% (4%)	5,237 (802)
2008/10		66% (4%)	4,345 (679)
1995/9	Student	8% (3%)	Not presented owing to very small sample size
2000/4		4% (1%)	
2005/7		4% (2%)	
2008/10		12% (3%)	
1995/9	Residence is owned (and no adult over the age of 34 lives in household)	33% (5%)	5,376 (1,670)
2000/4		31% (4%)	4,876 (864)
2005/7		23% (4%)	6,008 (1,025)
2008/10		13% (3%)	5,457 (907)
1995/9	**Average for all Welsh men aged 20–29**	—	**6,555 (843)**
2000/4		—	**5,853 (641)**
2005/7		—	**6,294 (644)**
2008/10		—	**4,838 (278)**

Source: NTS (standard error in brackets)

So, whilst one must be cautious about drawing firm conclusions from the small sample of Welsh men in their twenties in the NTS dataset, several

relationships seen in both Wales and all of Great Britain are worth noting. First, the fall in numbers holding a full driving licence in Wales (which is far less than that observed in Great Britain as a whole) has been partly, but far from fully, compensated for by an increase in the numbers holding a provisional licence. Second, young men's falling driving mileage has not been compensated for by any increase in mileage travelled by other modes. Third, there has been a shift away from sociodemographic circumstances associated with high levels of driving (e.g. full-time employment) and towards those associated with less driving (e.g. being single).

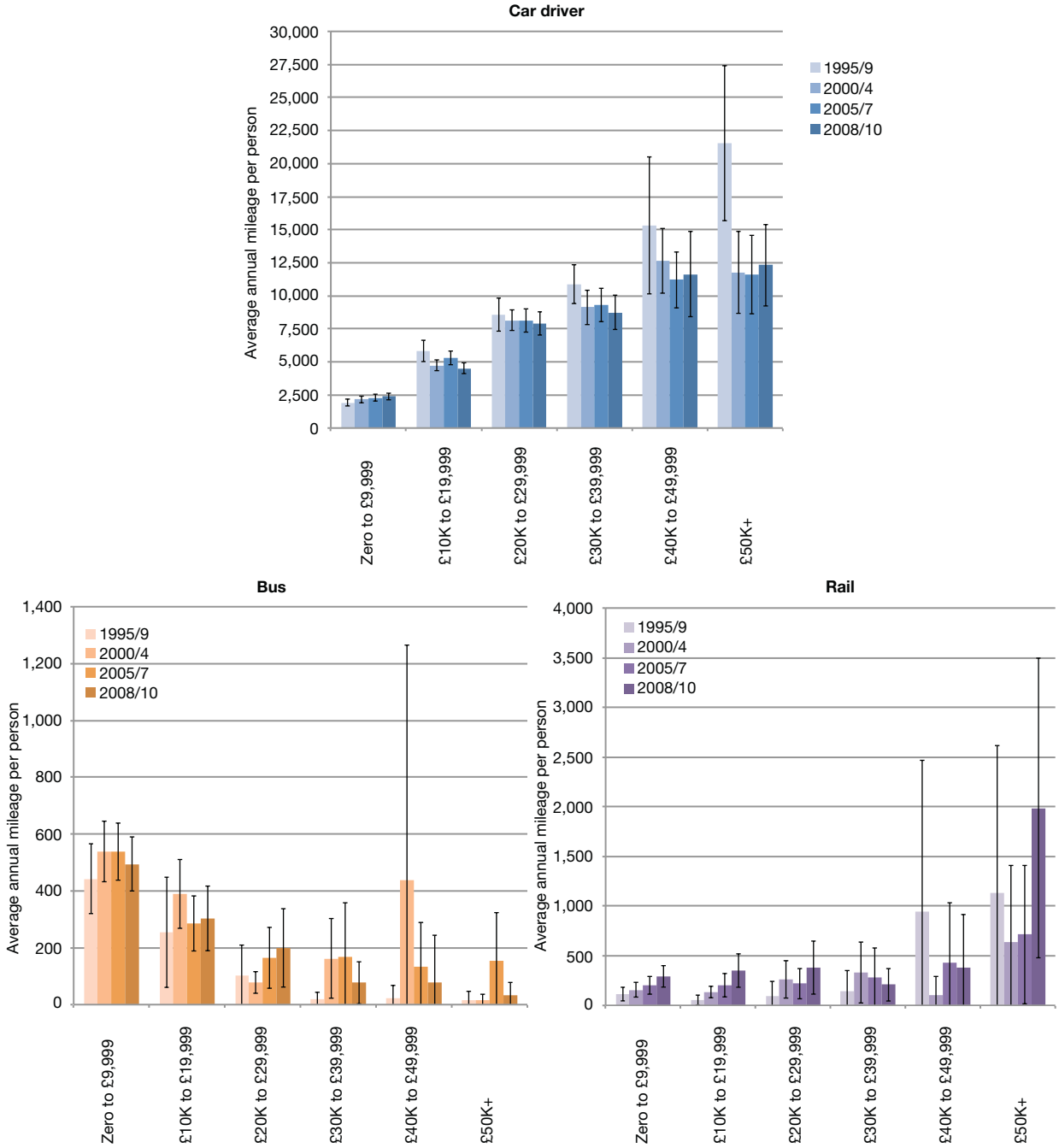
As already mentioned, the fall in driving mileage has been less in Wales than in Britain (26% as compared with 41% between 1995/9 and 2008/10); this may be due in part to the average personal income of young men having risen faster in Wales than in Britain (prior to the recession).

2.8 Influences of income and occupation on travel patterns

2.8.1 Income effects

This section looks at how travel relates to income, and Figure 2.22 shows that both car driver and rail passenger mileages increase as personal incomes increase, but that the opposite is true for bus usage. But when we look at trends over time within an income band, we then observe that the distance driven by all those earning over £10,000 per annum seems to have fallen over time. Thus, were it not for rising incomes, we would be seeing a sharper downward trend in driving. As previously noted in section 2.4, real income per person in Wales in the NTS sample rose by 22% in real terms between 1995/9 (£9,834) and 2008/10 (£12,003).

Figure 2.22: Average annual mileage, car driving, bus and rail, by personal income class (2010 price levels)



Source: NTS (error bars: 95% confidence interval)

Table 2.13 shows the correlations between income (at both personal and household level) and mileage for car drivers, bus passengers and rail passengers. The highest of the correlations is between personal income and car driving, and what is interesting is that it is about twice that of the correlation between *household* income and car mileage. Consistent with the results shown in Figure 2.22, income (whether personal or household) is correlated negatively

with bus use and positively with rail mileage. In general, the correlations have changed very little over time.

Table 2.13: Correlations between income (at personal and household level) and average annual mileage per person, car driving, bus and rail, in Wales

Factors correlated	1995/9	2000/4	2005/7	2008/10
Personal income and car-driving mileage	0.47	0.45	0.44	0.47
Household income and car-driving mileage	0.24	0.24	0.19	0.25
Personal income and bus mileage	-0.06	-0.04	-0.06	-0.08
Household income and bus mileage	-0.07	-0.04	-0.06	-0.09
Personal income and rail mileage	0.07	0.06	0.06	0.09
Household income and rail mileage	0.04	0.03	0.04	0.05

Source: NTS (all correlations shown are statistically significant at the 5% level)

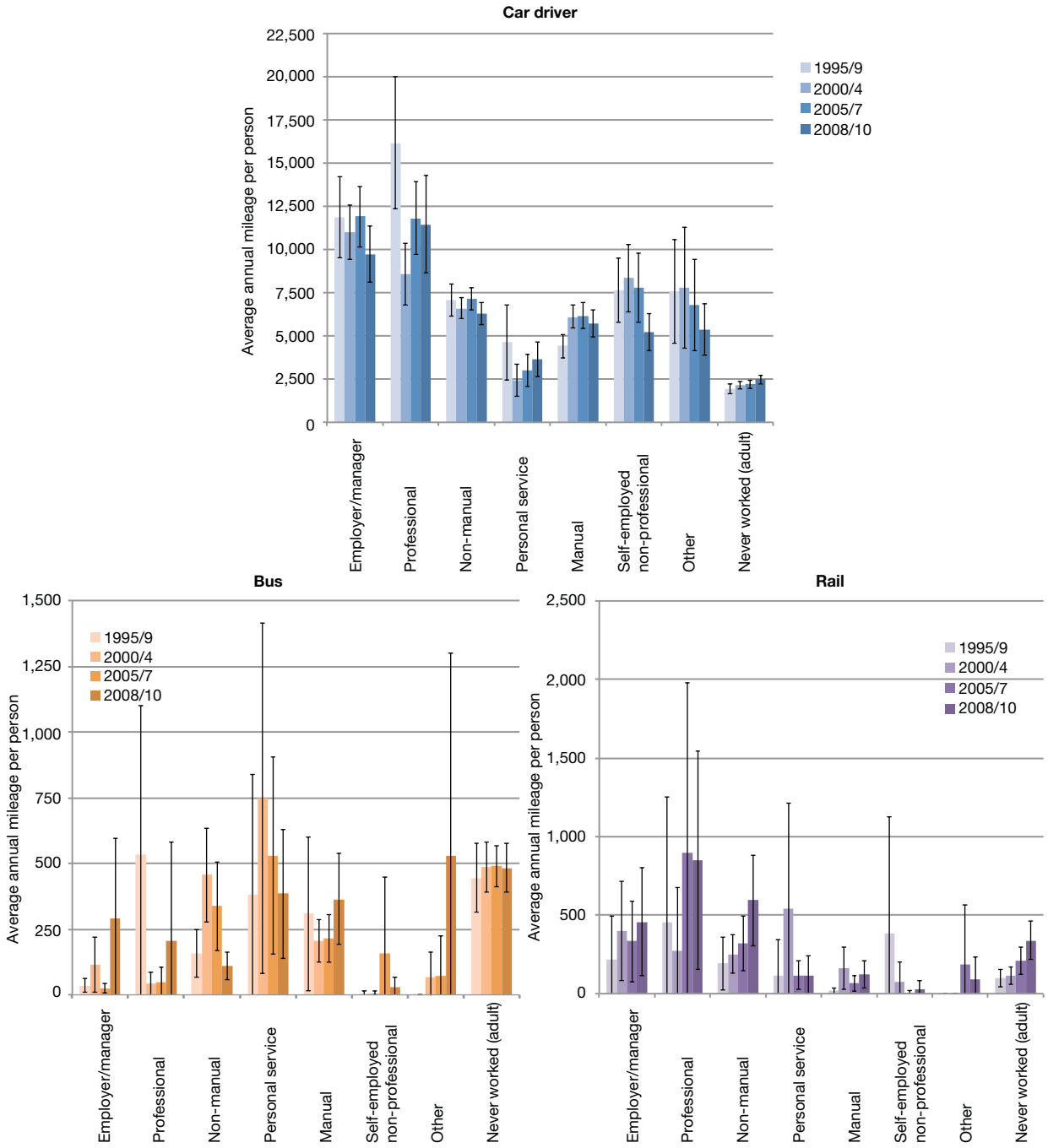
2.8.2 Influence of type of occupation

Figure 2.23 shows how car, bus and rail mileage varies among adults by current employment type (or, for those not presently working but who have at some time worked, the most recent type). Confidence intervals are generally fairly wide, so most observations are indicative only.

Car-driving mileage is seen to be highest amongst the highest-status groups – 'Employer/manager' and 'Professional' – and lowest among the 'Personal service' class and adults who have never worked. It is, moreover, precisely the latter two groups which have the highest level of bus usage. Similar trends were found in Scotland.

Rail usage has grown rapidly amongst 'Professionals' – approximately doubling between 1995/9 and 2008/10 – whilst their driving mileage seems to have fallen sharply between 1995/9 and 2000/4, but seems to have recovered to some extent since then. Rail usage seems to have grown most steadily among the 'Non-manual' and 'Never worked' groups.

Figure 2.23: Average annual mileage, car driving, bus and rail, by socioeconomic group in Wales



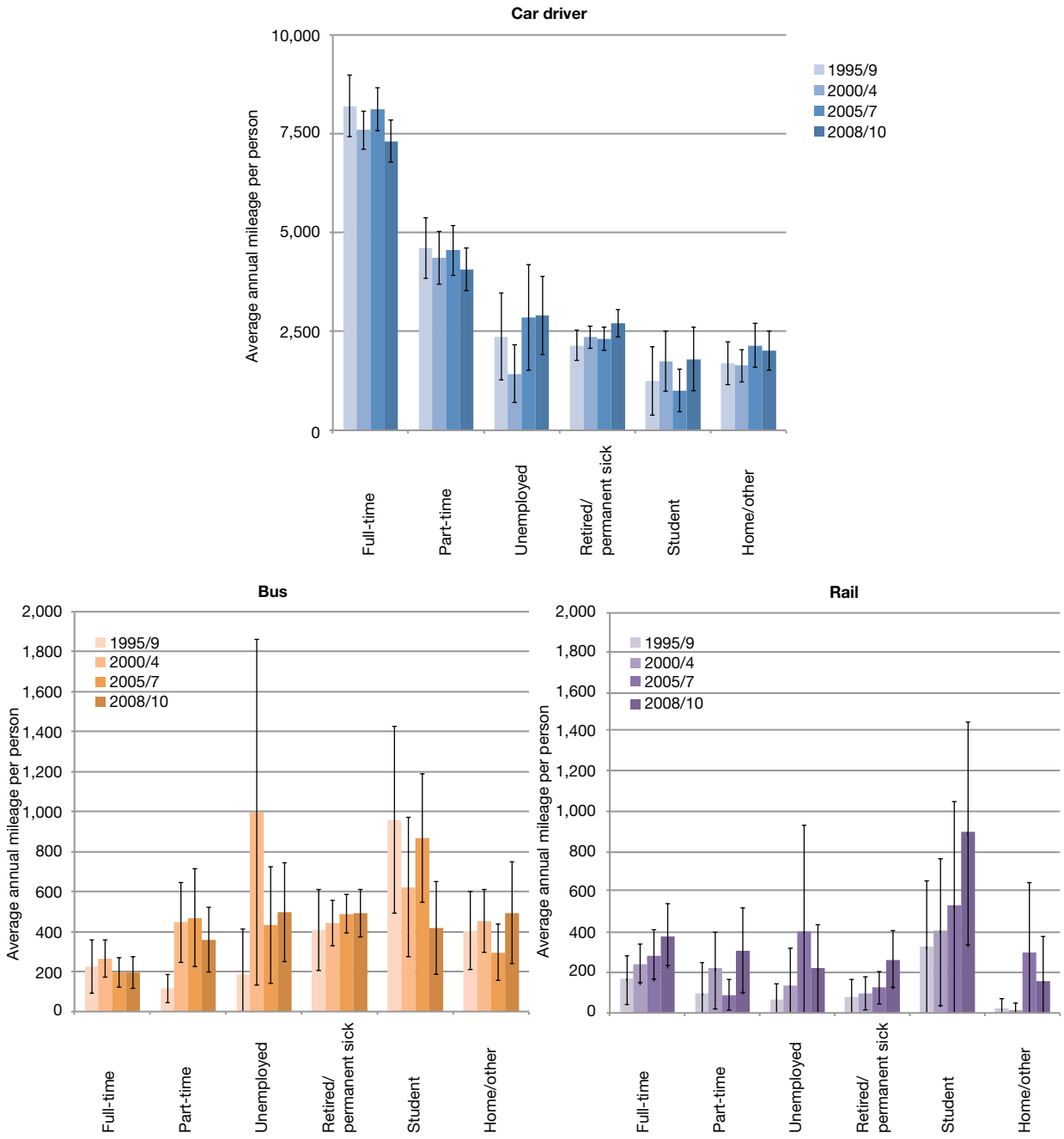
Source: NTS (error bars: 95% confidence interval)

Figure 2.24 shows similar information, but by economic status rather than occupational type. Here we can see that average annual car-driving mileage is nearly twice as high among full-time workers (at *c.*7,500 miles) as among part-time workers (*c.*4,000 miles); and that the other groups average below 3,000 miles per year. There are weak trends suggesting a declining mileage over time among working adults and a small increase, or steady state, among the other groups.

For bus use, the pattern is to some extent inverted: full-time workers travel the lowest annual mileage by this mode (*c.*200 miles); in recent years average annual bus use among all other groups has been broadly similar, at between 350 and 500 miles.

In the case of rail, the strongest growth by far has been among students – nearly trebling over the four time periods (although confidence intervals are very wide). There also appears to be a consistent increase among full-time workers and those who are retired, whereas for other groups the temporal pattern is more mixed.

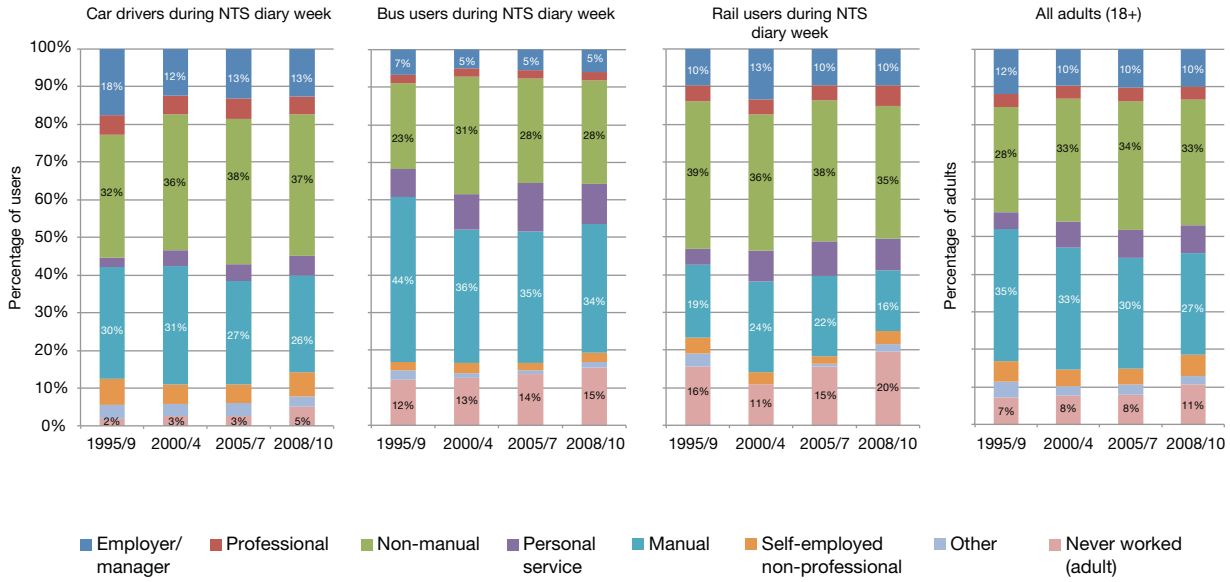
Figure 2.24: Average annual mileage, car driving, bus and rail, by economic status in Wales



Source: NTS (error bars: 95% confidence interval)

Figure 2.25 illustrates the relationship between type of work and mode use from a different perspective, in terms of the occupational mix of people who report driving a car, being a bus user, and/or being a rail user, during their NTS diary week. For comparison, the occupational distribution for all adults is also shown.

Figure 2.25: Distribution of socioeconomic grouping amongst car drivers, bus users, rail users and all adults



Source: NTS

As compared to 'all adults', a higher proportion of car drivers fall into the 'Employer/manager' category. 'Personal service' workers are over-represented amongst bus users, as are adults who have never worked. Interestingly, both 'Professional' and 'Personal service' workers are over-represented amongst rail users, whilst 'Manual' workers are under-represented relative to all adults.

2.9 Trends in travel by journey purpose

This section examines how travel by journey purpose has changed over time.

The NTS classifies journeys into up to 23 purpose categories (definitions can be found in Appendix A). For this study, the NTS's less complex 15-purpose classification was used, which was then further combined into fewer classes of journey purposes using the following definitions (which are also used in *On the Move* (Le Vine & Jones, 2012), to facilitate comparison):

- **Escort** – this consists of the NTS categories Escort-to-education and Escort-to-all-other
- **Other social/leisure** – Visit friends/relatives (not at private homes), Entertainment/public activity, Participate in sport, Holiday base, Day trip, Other including just walk
- **Shopping** – Food shopping, Non-food-shopping
- **Education** – the same as the NTS category

- **Commuting** – same
- **Business** – same
- **Personal business** – same
- **Visit friends/relatives at private homes** – same

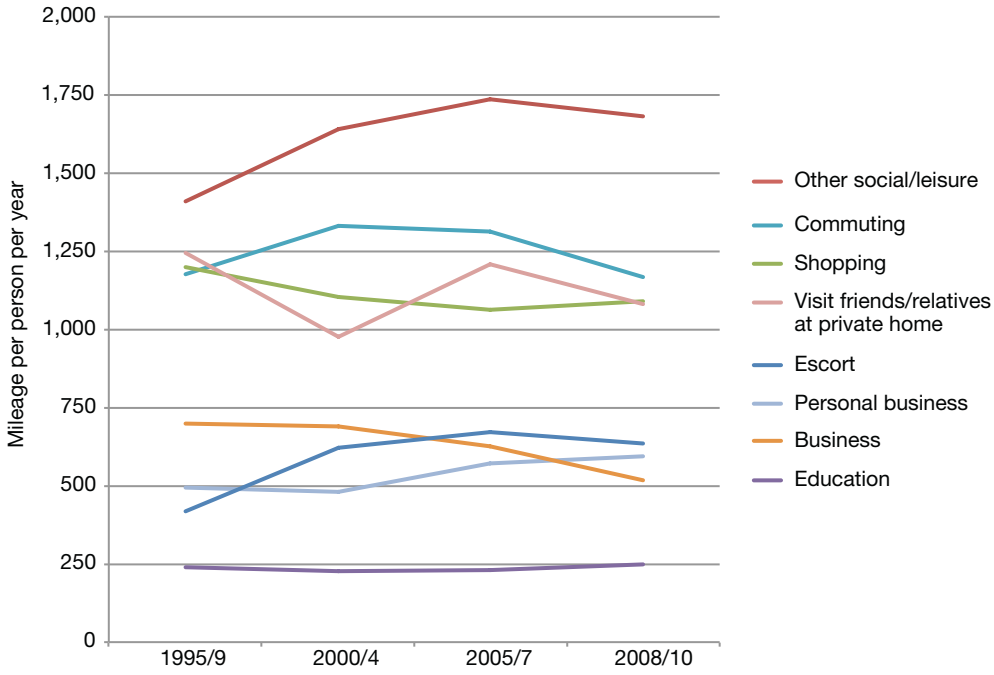
2.9.1 Overall travel

Trends in overall mileage by journey purpose are illustrated in Figure 2.26. The largest distance travelled (around 1,700 miles per person per year in 2008/10) is accounted for by the combined 'Other social/leisure' category (note that 'Visit friends/relatives at private homes' is treated as a separate journey purpose). Travel in this category has trended upwards until the mid-2000s; much of the growth is accounted for by travel to/from holiday locations.

'Commuting' accounts for the second-highest amount of distance travelled (about 1,200 miles a year), and shows no clear directional trend over time. 'Visit friends/relatives at private homes' and 'Shopping' are both responsible for an average of about 1,100 miles of travel per year, with all other purposes accounting for less than 700 miles per year each.

The only journey purpose to have trended monotonically up or down in all time periods was business, which has fallen over time (by nearly 30% between 1995/9 and 2008/10).

Figure 2.26: Average annual mileage by journey purpose, Welsh residents

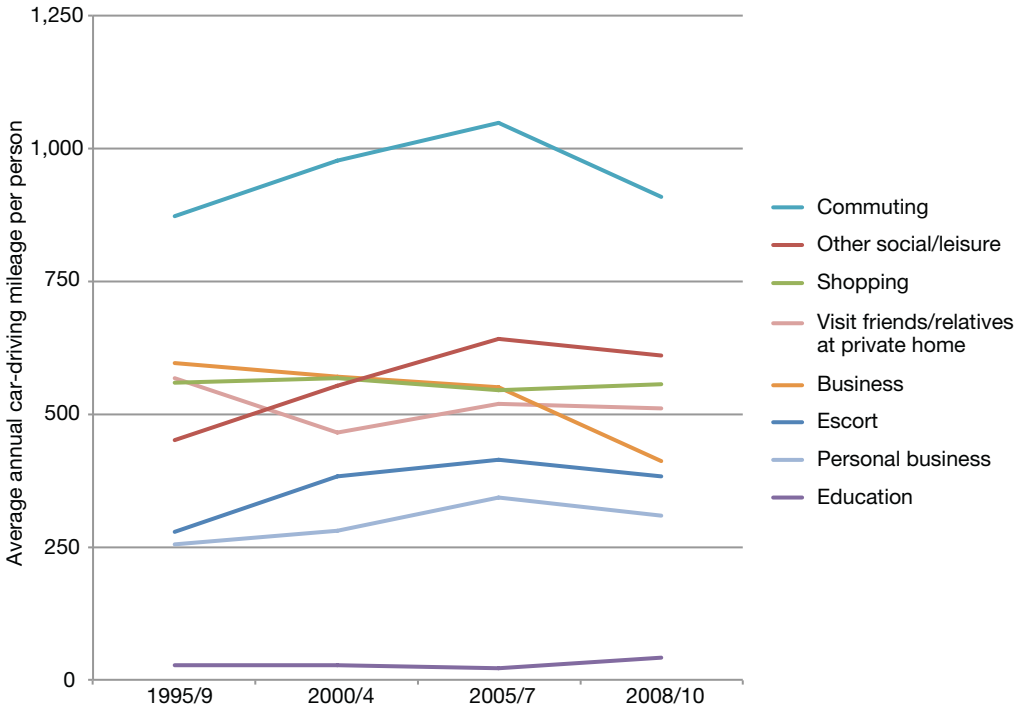


Source: NTS

2.9.2 Journey purpose, car drivers

Figure 2.27 shows the same purpose categories of travel as in Figure 2.26, but for car-driving mileage only. Of the journey purposes shown, the highest-mileage class is commuting to work, at about 900 miles per person annually. Next is the 'Other social/leisure' class at over 600 miles per year, followed by the 'Shopping' and 'Visit friends/relatives at private homes' travel categories at just over 500 miles per year each. 'Business' car mileage has dropped consistently over time, from an average of over 600 miles to under 400 miles per year.

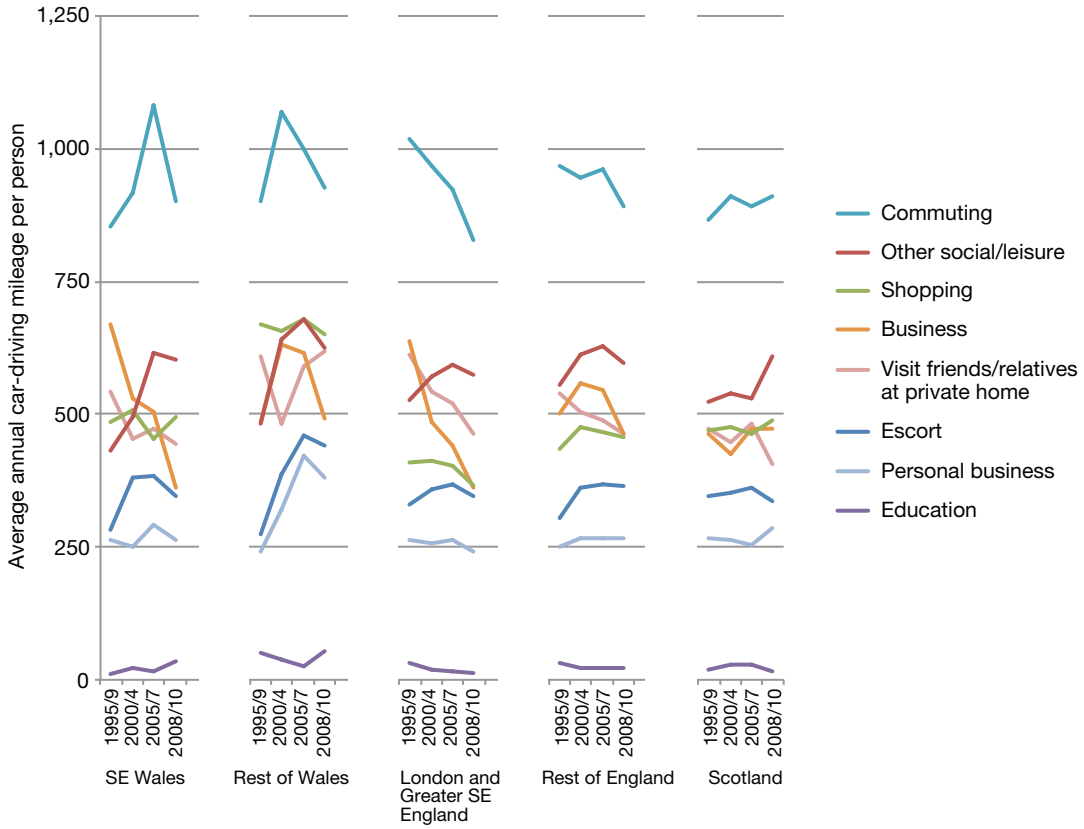
Figure 2.27: Average annual car-driving mileage by journey purpose, Welsh residents



Source: NTS

Figure 2.28 breaks down car-driving mileage for the various journey purposes into two spatial classes within Wales – the South East Wales conurbation and the rest of Wales – and, for comparison with the rest of Great Britain, also shows mileage by purpose category for London and Greater South East England; the rest of England; and Scotland. For all of the major car-driving journey purposes except commuting, mileage is higher in the more rural areas of Wales, as would be expected.

Figure 2.28: Average annual car-driving mileage by journey purpose, by broad region within Great Britain

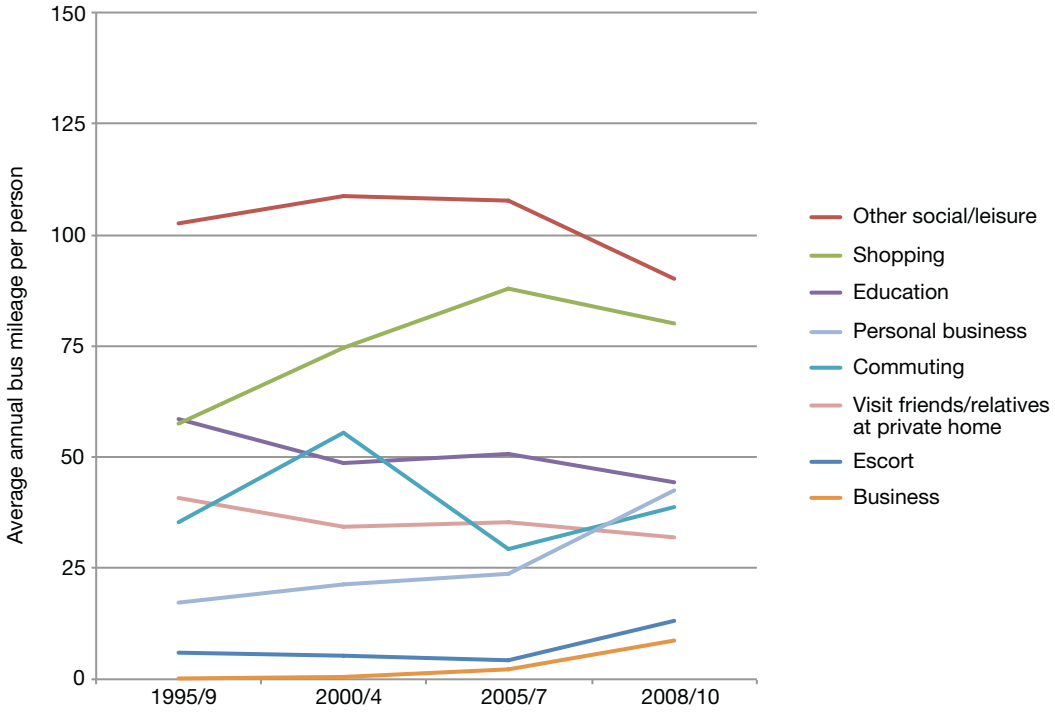


Source: NTS

2.9.3 Journey purpose, bus passengers

Figure 2.29 shows bus mileage by type of journey purpose. 'Other social/leisure' and 'Shopping' purposes are each responsible for between 80 and 90 bus miles per person per year. Buses are least used for 'Business' and 'Escort' purposes, at under 20 miles per year in each case.

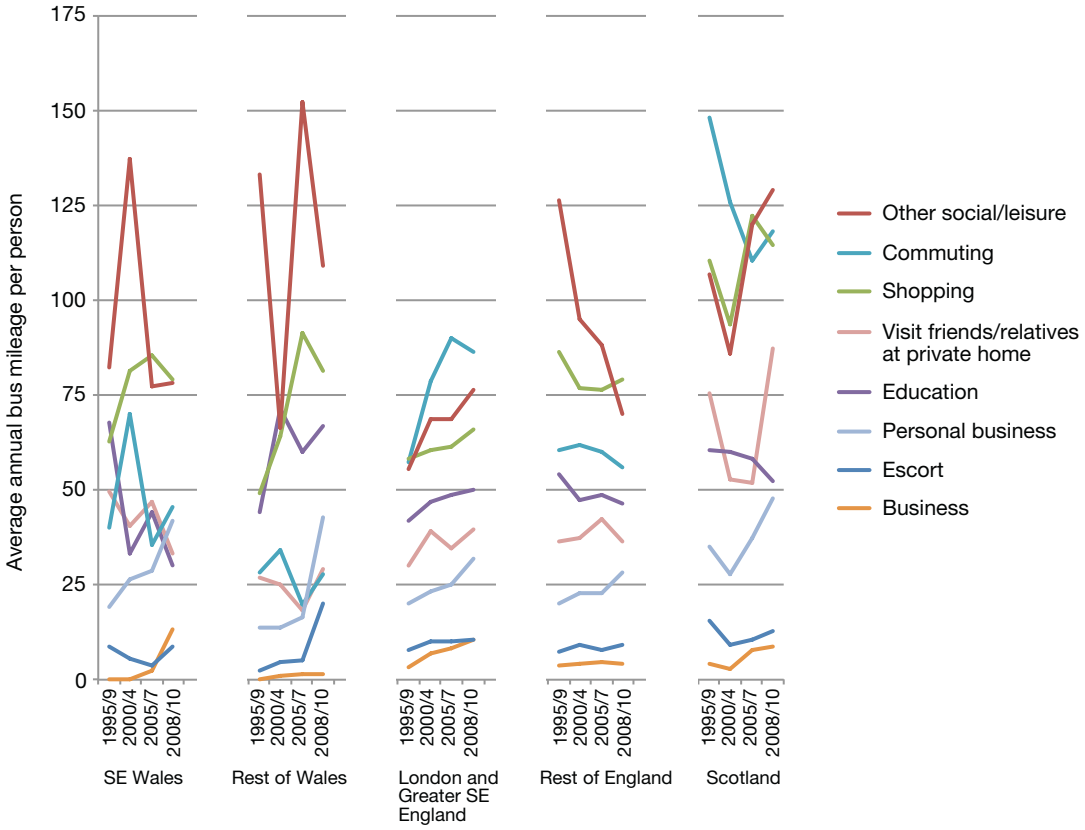
Figure 2.29: Average annual bus mileage by journey purpose, Welsh residents



Source: NTS

Figure 2.30 shows how bus mileage varies, for the various purposes, between South East Wales and elsewhere in Wales, with the same three other areas of Great Britain again also shown for comparison.

Figure 2.30: Average annual bus mileage by journey purpose, by broad region within Great Britain



Source: NTS

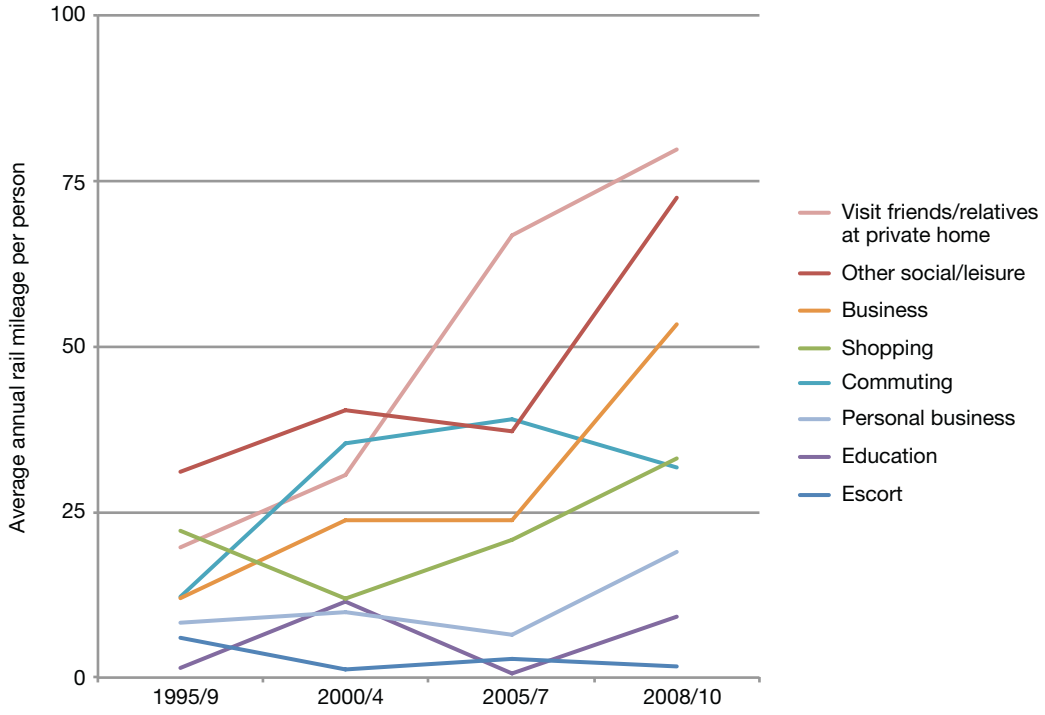
2.9.4 Journey purpose, rail passengers

Turning to rail travel, Figure 2.31 shows that mileage associated with 'Visit friends/relatives at private homes' has been growing very strongly and systematically over time – up from around 20 miles to 80 miles per year over the four time periods, closely followed in 2008/10 by 'Other social/leisure'. 'Business' travel mileage has also increased fourfold over this time period, but from a much lower base. Overall, rail in Wales is least used for 'Personal business', 'Education' and 'Escort' purposes.

Figure 2.32 shows the breakdown of rail mileage by purpose and region: South East Wales is compared with the rest of Wales, and the three other regions of Great Britain are also shown for broader comparison. The data is noisy,[6] given the small sample size, but it seems clear nevertheless that 'Commuting' by rail is much higher in South East Wales than elsewhere in Wales, although 'Visit friends/relatives at private homes' and 'Other social/leisure' trip purposes account for most mileage in both areas.

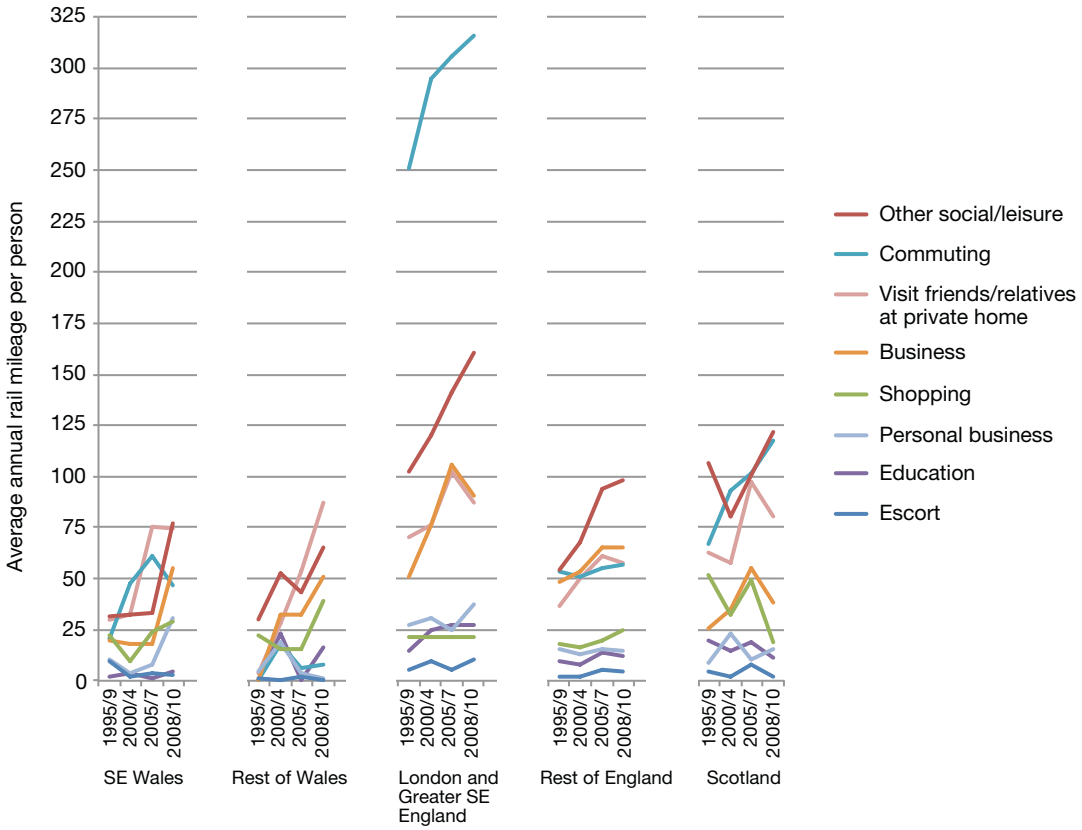
6 In this context, *noisy* refers to random fluctuations that obscure or do not contain meaningful time trend.

Figure 2.31: Average annual rail mileage by journey purpose, Welsh residents



Source: NTS

Figure 2.32: Average annual rail mileage by journey purpose, by broad region within Great Britain



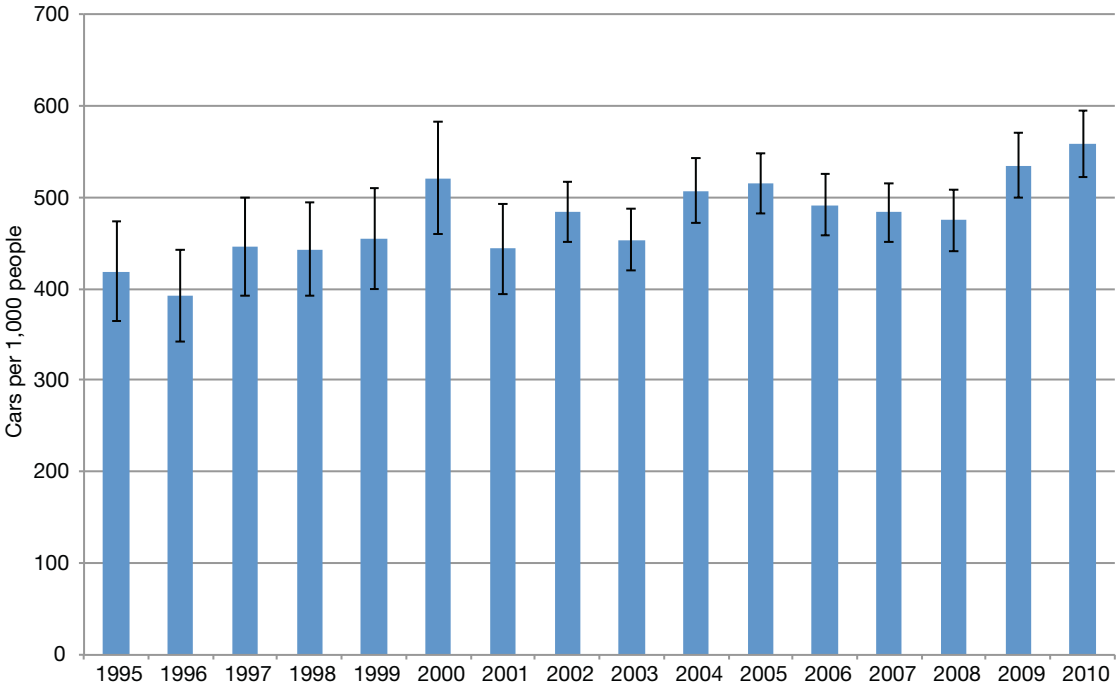
Source: NTS

2.10 Trends in car ownership

2.10.1 Overall car ownership

Figure 2.33 shows how the rate of car ownership per person in Wales has trended over time. Despite year-on-year fluctuations, car ownership has generally increased with time, from around 450 cars per 1,000 people in the mid-1990s to 550 cars per 1,000 people in 2010. This historical trend seems to have continued even during the current economic recession, after a small dip between 2006 and 2008, and has resulted in higher car ownership rates in Wales than in England or Scotland.

Figure 2.33: Car ownership per 1,000 people, Welsh residents



Source: NTS (error bars: 95% confidence interval)

These overall figures include two different forms of car ownership: privately owned cars and company cars; the latter are examined further in the next section.

In addition, drivers may drive a third category of car: a 'non-household car'. This refers to any car that is neither a company car (as defined in 2.10.2) nor a personal car owned by a household member. If a person uses an employer's pool car, they are classified in the NTS as using a non-household car. Driving by a person who borrows a car that is owned by someone that does not live in their household is also categorised as driving a non-household car, as is use of a rental car.

2.10.2 Company car ownership

A 'company car' is defined as one that an employee receives from their employer for continuous personal use, and for which they pay income tax for receiving the car as a benefit in kind. This definition excludes pool cars and other types of cars that are registered in a company's name but not made available to a single employee for continuous usage. Cars used by self-employed people for their business are not classified as company cars.

Table 2.14 shows how car ownership has changed over time, broken down by personal and company cars. What can be seen from the table is that it is entirely personal cars that are responsible for the growth in car ownership that is seen in Figure 2.34. In contrast to the full British sample, which shows a continuous downward trend in company car ownership, ownership rates in Wales have fluctuated – which is probably a result of the smaller sample size. Rates between Wales and Great Britain as a whole are now comparable.

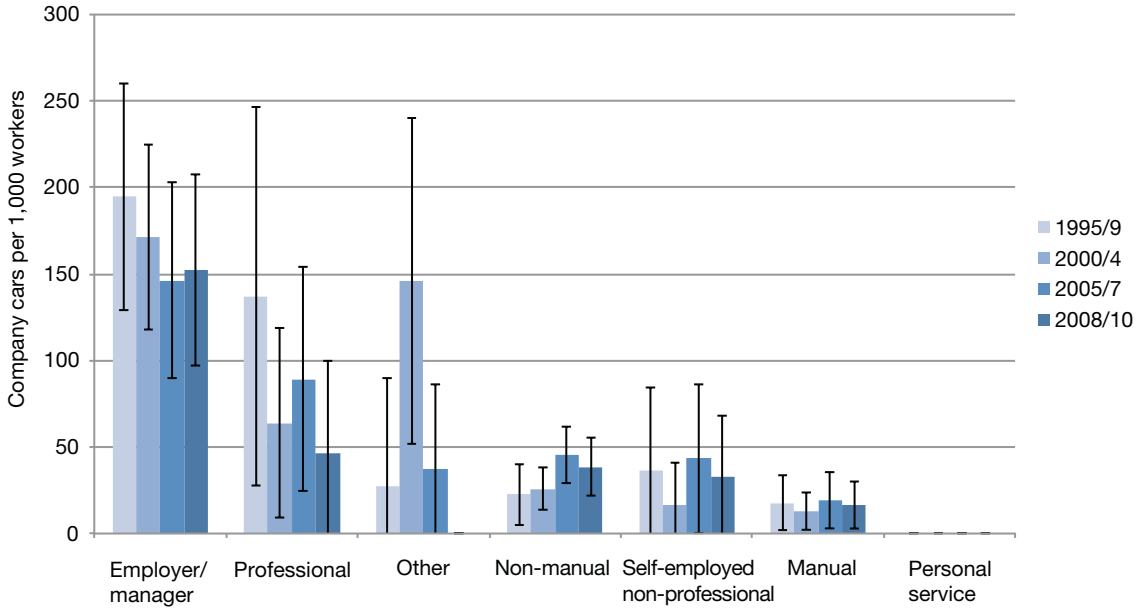
Table 2.14: Personal and company car ownership per 1,000 population, Wales and Great Britain

Period	Wales		Britain	
	Personal cars	Company cars	Personal cars	Company cars
1995/9	389 (11)	22 (3)	397 (<0.5)	30 (1)
2000/4	447 (9)	18 (2)	432 (<0.5)	27 (1)
2005/7	458 (9)	22 (3)	458 (<0.5)	23 (1)
2008/10	478 (10)	19 (2)	462 (<0.5)	20 (1)

Source: NTS (standard errors in brackets)

Figure 2.34 shows how company car ownership has changed in Wales over time by type of occupation. As has been seen when the entirety of Great Britain is examined, in Wales the prevalence of company car ownership fell most markedly amongst 'Employer/manager' and 'Professional' classes of worker – by around a quarter among the former group and by two thirds among the latter.

Figure 2.34: Company cars per 1,000 workers by socioeconomic group, Welsh residents



Source: NTS (error bars: 95% confidence interval)

Note: No 'Personal service' workers in the Wales NTS sample were observed to keep a company car during any time period.

2.11 Trends in car mileage by type of car ownership

2.11.1 Overall patterns

An important set of findings in the *On the Move* report (Le Vine & Jones, 2012) highlighted the significant contribution made by company cars to overall trends in car driving across Britain. While there was an increasing trend in personal car use up to the 2008 recession, the sharp drop in company car mileage over this period more than compensated for this increase, resulting in a downward trend in overall driving mileage since about 2000. The reduction in company car use in GB for business purposes was mirrored by growth in rail travel for business purposes of about one quarter the magnitude. This section investigates how car usage has trended in Wales, according to type of car ownership.

Table 2.15 summarises the changes in average mileage over time, in personal cars, company cars and non-household cars, again providing GB figures for comparison with Wales. Personal car use rose by 12% on a per-person basis amongst Welsh residents between 1995/9 and 2008/10, which contrasts with an increase of only 3% across Great Britain as a whole. Annual car mileage in Wales in 2008/10 stood at 9% above the GB average.

Company car usage fell by a slightly smaller amount in Wales than in GB between 1995/9 and 2008/10 (by 43% as against 49%). These two effects

– the increase in use of personal and decrease in use of company cars – balanced each other out, resulting in a mere 3% increase in car use in Wales between the late 1990s and late 2000s, which is not statistically significant.

Whilst caution must be exercised owing to the large standard errors (arising from the small Welsh sample size), it does appear that, as across Great Britain as a whole, there was an upward trend in overall car-driving mileage in Wales prior to the recession. There has subsequently been a decrease in driving mileage per person in the 2008/10 period across Britain. In Wales, company car and non-household car mileage have dropped sharply between 2005/7 and 2008/10, by 36% and 30% respectively – this is a much faster decrease than that seen in Great Britain as a whole.

Table 2.15: Average annual car-driving mileage per person, by personal cars, company cars and non-household cars, Wales and Great Britain

Period	Wales				Britain			
	Personal cars	Company cars	Non-household cars	All cars	Personal cars	Company cars	Non-household cars	All cars
1995/9	2,964 (115)	488 (88)	163 (32)	**3,615**	2,904 (29)	581 (21)	168 (9)	**3,653**
2000/4	3,294 (89)	294 (42)	199 (28)	**3,788**	3,062 (22)	465 (13)	146 (6)	**3,673**
2005/7	3,453 (100)	435 (57)	166 (27)	**4,053**	3,156 (23)	372 (12)	131 (6)	**3,659**
2008/10	3,327 (101)	279 (43)	115 (20)	**3,722**	2,991 (23)	299 (12)	123 (6)	**3,413**

Source: NTS (standard errors in brackets)

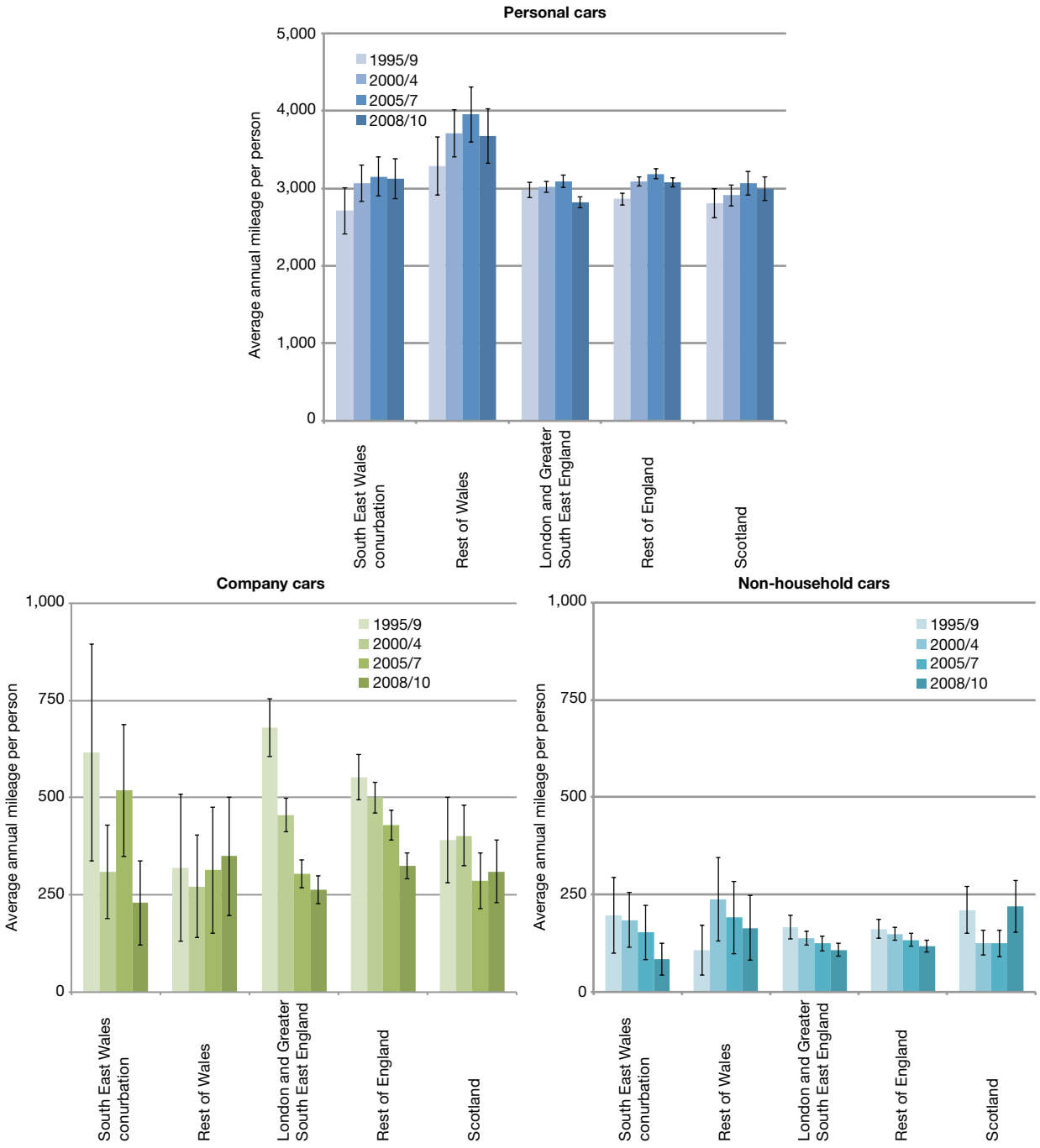
2.11.2 Influence of settlement size

Figure 2.35 illustrates patterns of car usage for the three types of ownership, for South East Wales and the rest of Wales, compared to various other parts of Great Britain. When it comes to personal cars, South East Wales residents exhibit very similar levels of use and time trends as can be found in non-South East England and in Scotland. Annual personal car mileage in rural Wales has been 500 to 1,000 miles per year higher than in South East Wales, and has possibly dropped more during the recession.

While numbers are small, it appears that company car use in South East Wales has declined in a way that resembles England's pattern, while mileage in rural Wales has been much more stable and now exceeds that in South East Wales.

Non-household car use has declined in both regions of Wales, mirroring trends in England.

Figure 2.35: Average annual car-driving mileage per person, personal cars, company cars and non-household cars by broad region within Great Britain



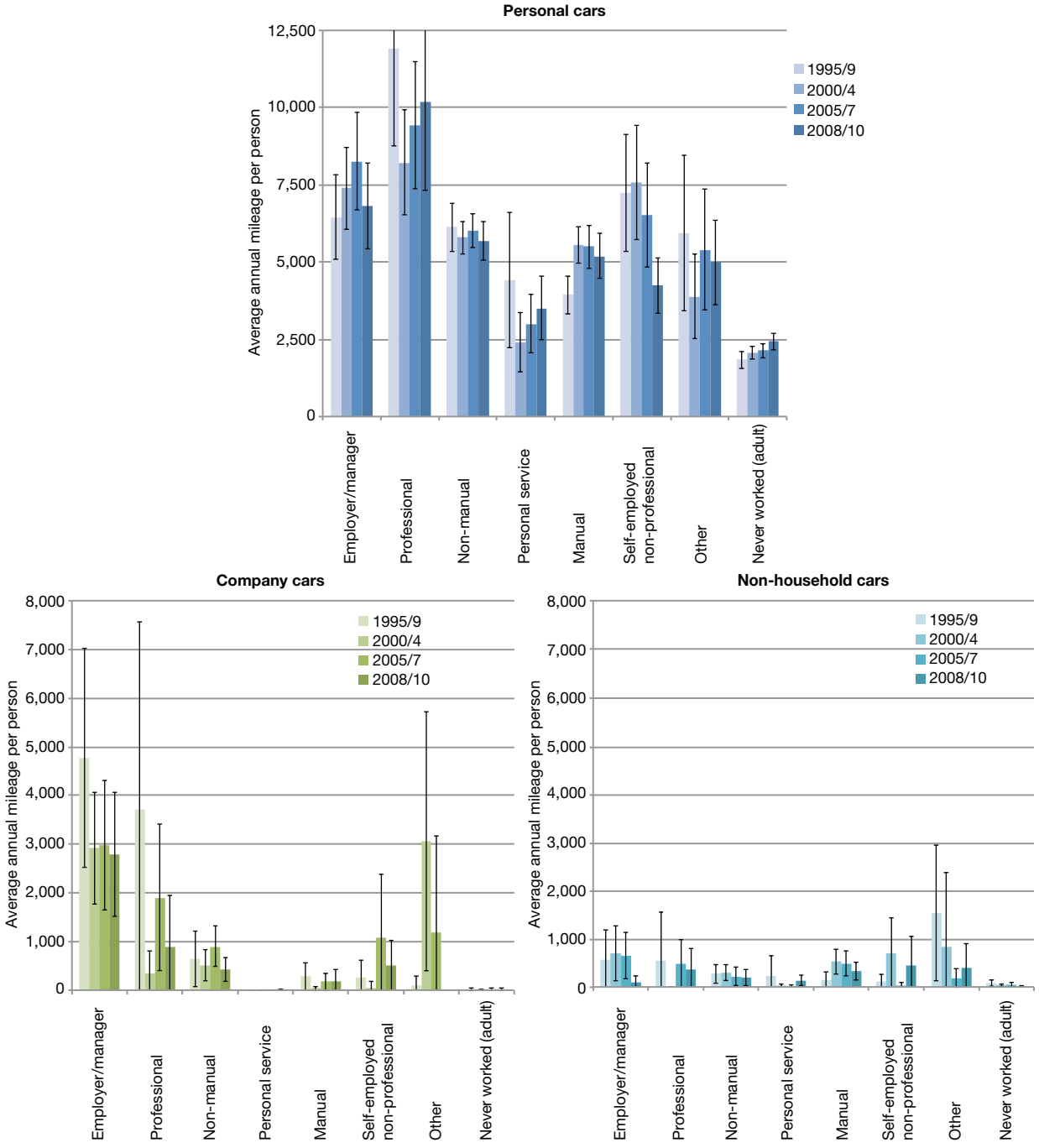
Source: NTS (error bars: 95% confidence interval)

2.11.3 Influence of occupation and personal income

Figure 2.36 shows that, when car usage is broken down by type of ownership and type of occupation, company car usage amongst Welsh residents is nowadays concentrated in the 'Employer/manager' class of workers. 'Professionals' had a high level of company car mileage in 1995/9, but in

subsequent periods this became much lower and has remained relatively stable. Note that there has been a marked decline in personal car use among the 'Self-employed non-professional' group. There are no strong trends in the mileage travelled by non-household car.

Figure 2.36: Average annual car-driving mileage per person, personal cars, company cars and non-household cars, by socioeconomic group

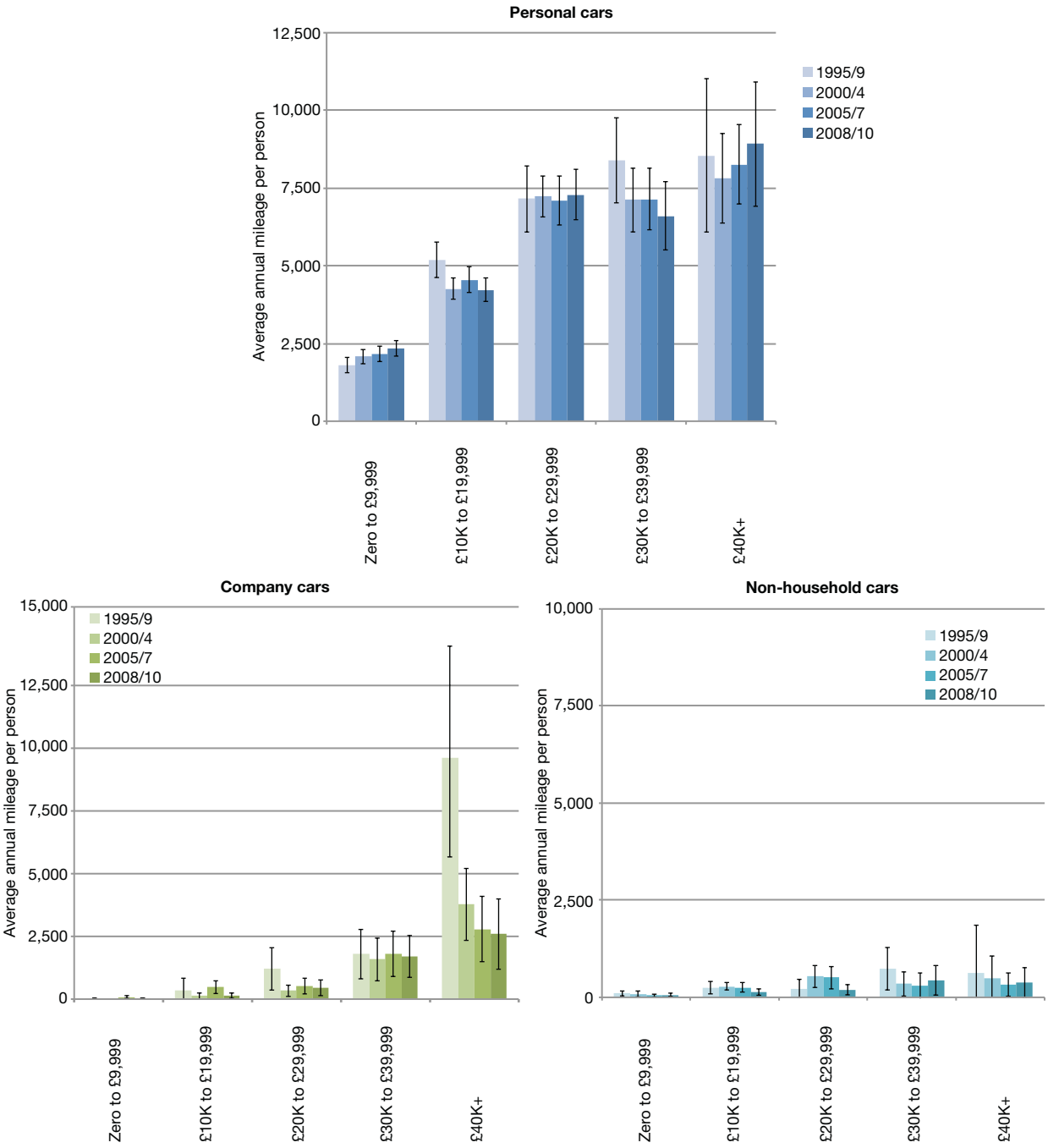


Source: NTS (error bars: 95% confidence interval)

Finally, Figure 2.37 shows how the trend over time in car mileage breaks down when disaggregated by personal income level and type of ownership. (This can be compared with Figure 2.22, which shows overall car mileage by personal income.)

Very little company car mileage is driven now (or indeed has been driven in the earlier periods) by people earning under £30,000 per annum. Mileage has been very stable for those earning between £30,000 and £39,999, at just under 2,000 miles per year. The largest impact has been on people earning £40,000 and over, where there was a very large and statistically significant drop of around 60% in reported mileage between 1995/9 and 2000/4, and a continuing downward trend subsequently; these reductions do not seem to have been offset by increases in personal car mileage. The latter has shown a small but steady increase among people with personal incomes below £10,000, but otherwise there are no consistent trends, except for a possible decline among those earning at least £30,000 but under £40,000. However, in broad terms, personal car mileage increases with income band. The mileages for non-household cars are too small to draw any conclusions.

Figure 2.37: Average annual car-driving mileage per person (personal cars, company cars and non-household cars) by personal income level



Source: NTS (error bars: 95% confidence interval)

3. Monitoring Welsh Travel Trends After the End of National Travel Survey Sampling in Wales

From 1 January 2013, the British National Travel Survey (NTS) has become the *English* NTS, with residents of Wales and Scotland no longer being covered in the sampling protocol. The question that therefore arises for the Welsh Government is how to continue to monitor travel trends in Wales in the absence of coverage by a national survey.

This section proposes a straightforward statistical procedure that would combine information from three data sources:

1. data from the 2009/10[7] British NTS, which contains observations from both England and Wales (as well as Scotland); the data consists of both travel diary records and responses to personal-interview questions regarding people's stated frequency of using various methods of transport;
2. data from the English NTS in years 2013 onwards, which contains observations from England only; and
3. data from a prospective yet-to-be-identified Welsh survey, which would need to include personal-interview questions regarding Welsh residents' stated frequency of using various methods of transport.

The remainder of this section describes the proposed technique. A companion Microsoft Excel spreadsheet is available to download via a link on the *On the Move* web page: www.racfoundation.org/research/mobility/on-the-move-main-research-page. The spreadsheet contains the data shown in Tables B1, B2 and B3 in an easy-to-access format, as well as formulae for calculating per-capita average values of annual mileage and journeys for car driving, local bus and rail.

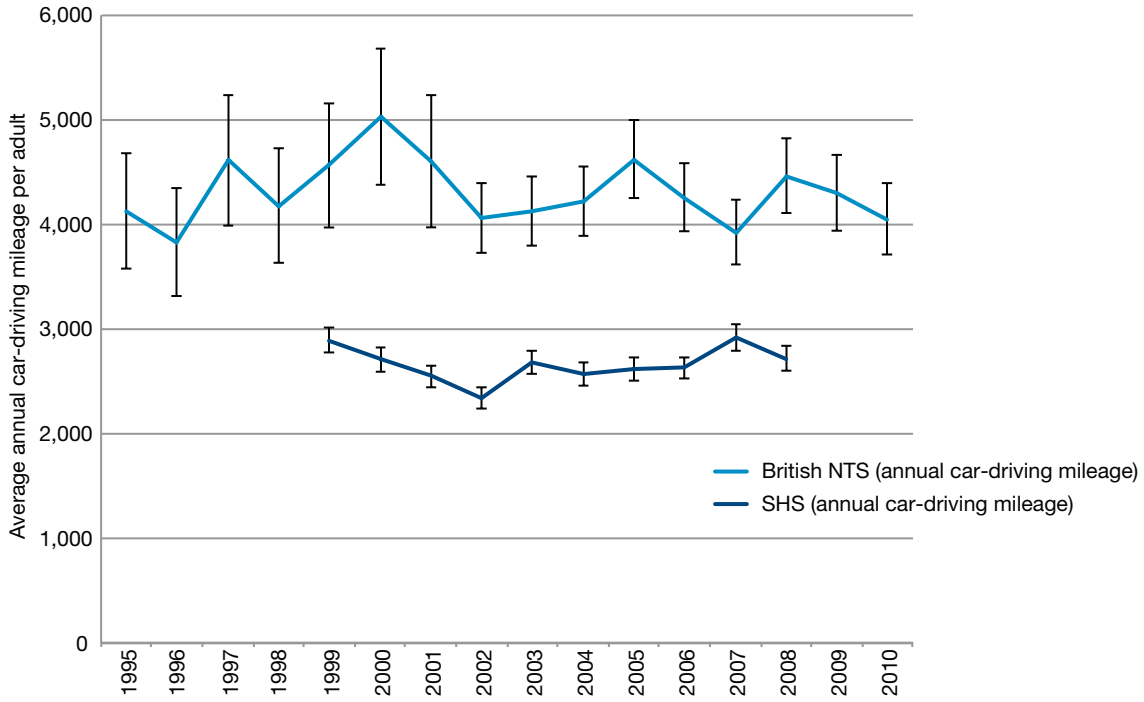
7 The British NTS also collected data from Welsh residents in 2011 and 2012; release of this data to the research community is anticipated in mid-2014.

3.1 Options for monitoring Welsh travel trends

There are a range of options for monitoring travel trends in Wales after the transition of the British NTS to the English NTS.

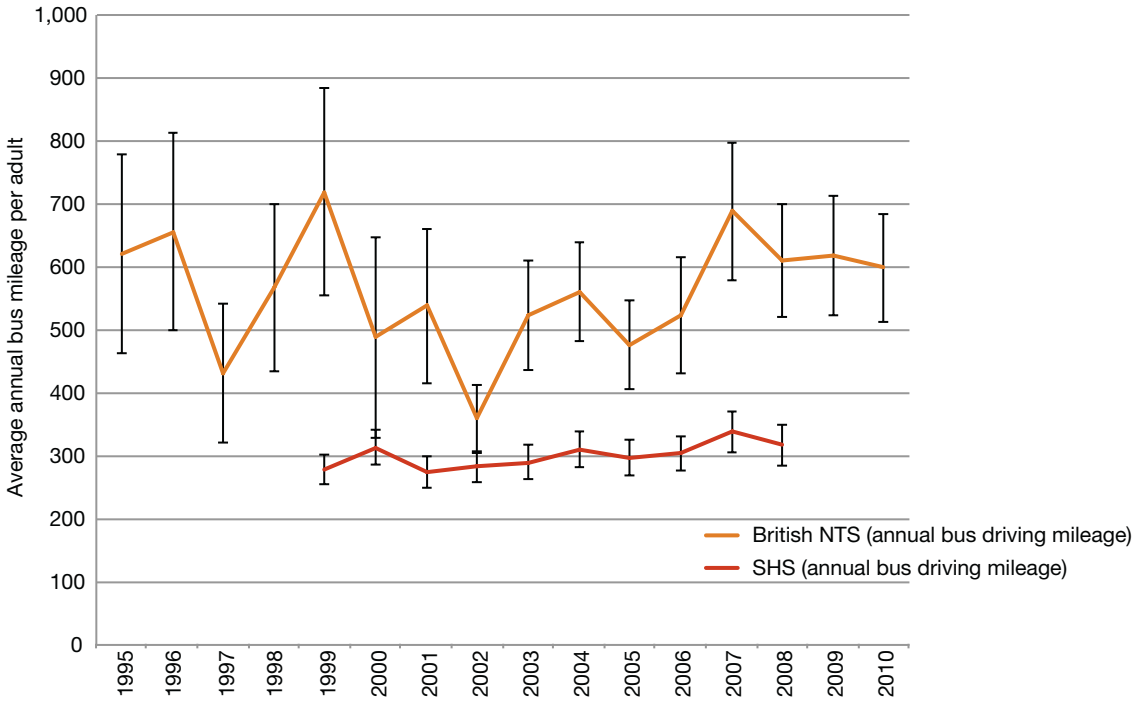
In Scotland, the Scottish Household Survey (SHS) began in 1999 and has been undertaken continuously since (there is no equivalent in Wales). The SHS includes a one-day travel diary instrument whereby the respondent reports the travel they undertook on the day prior to their computer-assisted personal interview; the data from the one-day diary can be used in a similar manner to the way in which the British NTS's seven-day travel diary data is processed. The shorter duration of the diary, however, means that per-capita average annual mileage estimated from the SHS can be sensitive to a small number of outliers. Figures 3.1, 3.2 and 3.3 compare the average annual per-capita estimates of car-driving, bus and rail mileage from the SHS with the Scottish sample of the British NTS. The instability shown in Figure 3.3 in the estimate of per-capita rail mileage is due to a small number of observed very long-distance rail journeys, which skew the overall average in 2007 and 2008. It is also noteworthy that for all three modes of transport the per-capita estimates from the NTS are higher than those from the SHS. It is thought that much of the difference results from the NTS estimate being based on respondents' self-reported distance travelled (i.e. network distance, as would be recorded by a car's odometer) on their journeys, whereas the SHS uses straight-line distance between the postcodes of journey origins and destinations. This is not the only reason for the difference, however: Latinopoulos et al. (2013) show that there are also systematic differences in observed journey frequencies (journeys per day) between the NTS and the SHS.

Figure 3.1: Comparison of estimates of average annual car-driving mileage per Scottish adult from the NTS and the SHS



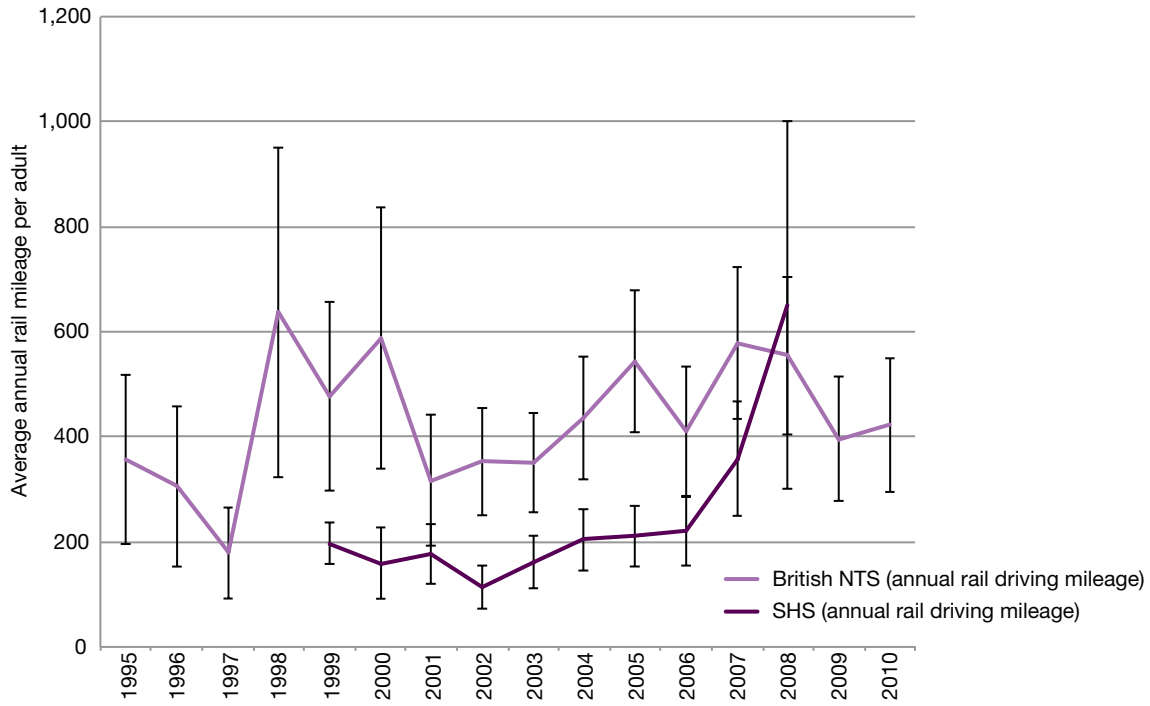
Source: NTS and SHS (error bars: 95% confidence interval)

Figure 3.2: Comparison of estimates of average annual bus mileage per Scottish adult from the NTS and the SHS



Source: NTS and SHS (error bars: 95% confidence interval)

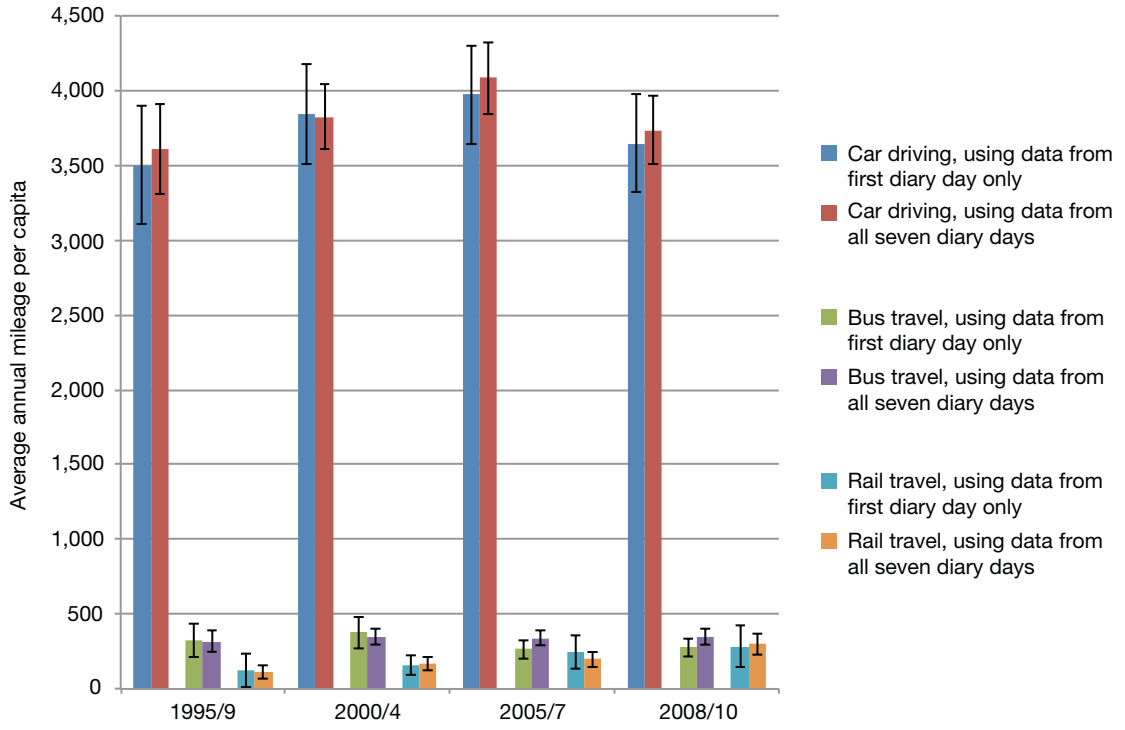
Figure 3.3: Comparison of estimates of average annual rail mileage per Scottish adult from the NTS and the SHS



Source: NTS and SHS (error bars: 95% confidence interval)

Figure 3.4 was prepared in order to demonstrate how the estimate of annual per-capita mileage in Wales would be affected if only one day (arbitrarily chosen to be the first day) of the NTS travel diary were used, rather than the full seven-day diary. It shows that for all three modes – car driving, bus and rail – the confidence intervals are wider, which is to be expected. No systematic differences are seen between the mileage estimates, although this does not necessarily mean that carrying out a one-day travel diary in Wales would yield identical results to those derived from a seven-day diary. As is the case in Scotland, it is likely that there would be major differences between the protocol of the English NTS travel diary and a prospective future Welsh travel diary instrument, which would be manifested as systematic differences in statistical outputs. Further, in Scotland there is a 13-year overlap between the NTS and the SHS (1999 to 2012), whereas in Wales there can be no temporal overlap because the British NTS has already been withdrawn from Wales. It is also worth noting that designing, testing and implementing a new travel diary in Wales is a relatively high-cost option.

Figure 3.4: Comparison of estimated average annual mileage per capita by car driving, bus and rail, using the NTS's full seven-day diary and only the seventh day of the NTS diary



Source: NTS (error bars: 95% confidence interval)

Another possibility that would result in high-quality data on personal mobility in Wales – from a travel diary instrument – is for the Welsh Government to pay for re-including Welsh residents in the NTS sampling protocol. The advantage is that the resulting data would not have the level of uncertainty associated with it that would be inevitable with any fresh untested approach, because it

would be collected by the trained professionals who have delivered the British NTS continually since 2002. The disadvantage is that this, too, is likely to be a relatively high-cost option. One less-expensive variation of this concept might be, in principle, for the Welsh Government to pay for a Welsh NTS sample on an ad hoc or occasional basis rather than a continuous basis. One weakness of this option is that it would be more difficult to identify time trends in the absence of continuous sampling.

The remaining options discussed here do not involve a travel diary instrument.

The Welsh Government has the option of not collecting any new large-scale data on personal mobility in Wales, and could simply use future-year English NTS data to draw statistical inferences regarding future-year personal mobility in Wales. This is attractive, as it would not involve expenditure on future-year data collection; however, it relies entirely on the assumption that trends in England will be mirrored in Wales.

The final option considered here is the one that is developed into a proposed methodology. The strategy would be to collect data regarding people's stated frequency of using various forms of transport. It is envisioned that this could be done either remotely (e.g. via telephone), or via personal interview as part of broader general social surveying undertaken by the Welsh Government. Identical questions are also included in the English NTS protocol; statistical relationships between reported frequency of use and average annual mileage, and also between reported frequency of use and number of journeys, from responses in England would then be applied to the future-year Welsh stated-frequency-of-use data to yield estimated per-capita mileage (journeys) travelled by various modes by Welsh residents. This method would be a hybrid approach; it requires some new data collection, but the data required can be collected via surveys that would take place anyway. Like the previous option, it also relies on using statistical relationships from England, but this option is sensitive to future demographic and spatial shifts in Wales that the previous option would not be.

It must be noted that the proposed method is based on straightforward descriptive statistical methods. The following two more-complex modelling techniques were also considered, though they have drawbacks.

Estimating linear regression parameters from England and then applying them to frequency-of-use data (and sociodemographic data to account for confounding effects) would introduce the possibility of estimating negative mileage (journeys) for a fraction of the Welsh population; remedying this by simply converting all negative estimates of mileage (journeys) to zero would result in inflated averages.

Non-linear regression techniques are available that can produce only non-negative person-level estimates, such as log-linear regression. But log-linear regression does not handle zero-mileage/zero-journey observations (as the natural log of zero is undefined), and adding an arbitrary small amount to the dependent variable introduces bias into the analysis. One workaround is to first estimate a binary logistic regression model of whether a person uses a given mode of transport at all, and only then go on to estimate log-linear models of mileage (journeys) for those people that used the mode during their diary week. However, applying the estimated parameters from such a log-linear estimation to the original estimation sample will result in a biased estimate of the original non-logged dependent variable (i.e. mileage or journeys), which is an unacceptable property.

More-advanced statistical techniques to accommodate the non-negative property of mileage (journeys) exist (e.g. Tobit regression), but these require specialised estimation software and statistical training.

It is the authors' view that the proposed technique, outlined below, represents a reasonable balance between the need for sensitivity to a range of demographic and spatial factors, and adequate but not excessive statistical complexity on the one hand, and comprehensibility on the other – i.e. ensuring that it is not impractical to communicate the method to non-technical policymakers.

3.2 Proposed method for monitoring Welsh travel trends

The proposed technique for estimating average annual future-year mileage (journeys) of a given mode of transport by Welsh residents is as follows:

1. Cross-classify the English NTS sample for a given future year (or group of years) into 112 groups thus:
    a. 2 genders
    b. 4 age groups (up to 16 years old, 17–40, 41–64, 65+)
    c. 2 categories of settlement size (<25,000 population and >25,000 population[8])
    d. 7 possible responses to frequency-of-use questions (see section 3.3)

    … makes 2 × 4 × 2 × 7 = 112 classes.
2. Calculate mileage (journeys) per English-resident group member in each class.
3. Cross-classify the Welsh population sample from a survey that contains the same socio-demographic variables into the same 112 groups.
4. Apply the average mileage (journeys) observed within each class of English residents to the Welsh residents in the same class.
5. Step 4 results in an unadjusted estimate of mileage (journeys) for the entire Welsh population. This mileage estimate then requires adjustment, because applying the England-within-class averages to the 2009/10 Welsh-NTS-sample data required application of an adjustment factor to produce the same annual per-capita mileage (journey) estimates as those estimated from the travel diary data of the 2009/10 Welsh NTS sample.

The above will yield a future-year estimate of annual per-capita mileage (journeys) amongst Welsh residents for one particular form of transport. It would then be repeated as many times as desired, each time for a different method of transport.

8 A threshold value of 25,000 for population was chosen as the breakpoint for settlement size because the NTS sample in 2009/10 indicates that approximately half (51%) of Welsh residents live in settlements of over 25,000 population, and the next-largest breakpoint available in the NTS data is 250,000 population, which characterises only 14% of the Welsh population. In the South East Wales conurbation, 66% of residents live in the greater-than-25,000-population settlement-size category, whereas in the rest of Wales only 28% do.

The variables used to define the 112 classes can be modified in future if desired, providing that there remains the ability to match between classes in Wales and in England. Ensuring that there are sufficiently large within-class sample sizes in the England-resident estimation sample is a consideration to be borne in mind should the class definitions be modified; this is discussed further in section 3.4.

3.3 Frequency-of-use data

The NTS's main personal interview takes place when the NTS interviewer visits a respondent household in person – at this time, the interviewer both performs the main interview and drops off the travel diary instruments (which are then collected in a second face-to-face meeting after the diary week). This main interview currently includes a series of questions regarding the frequency of use of various modes. The following questions address use of private cars, local bus services and rail services:

How frequently [do you/ does name] travel by private car? Do not include taxi.

PLEASE COUNT EACH SINGLE TRIP AS ONE JOURNEY AND EACH RETURN TRIP AS TWO.
NOTE: ONLY INCLUDE TRAVEL WITHIN GREAT BRITAIN, OVER THE LAST YEAR OR SO.

1. 3 or more times a week
2. Once or twice a week
3. Less than that but more than twice a month
4. Once or twice a month
5. Less than that but more than twice a year
6. Once or twice a year
7. Less than that or never

How frequently do you use local buses?

PLEASE COUNT EACH SINGLE TRIP AS ONE JOURNEY AND EACH RETURN TRIP AS TWO.
NOTE: ONLY INCLUDE TRAVEL WITHIN GREAT BRITAIN, OVER THE LAST YEAR OR SO.

1. 3 or more times a week
2. Once or twice a week
3. Less than that but more than twice a month
4. Once or twice a month
5. Less than that but more than twice a year
6. Once or twice a year
7. Less than that or never

(How frequently do you/does name use) a train, not including underground, tram or light rail?

PLEASE COUNT EACH SINGLE TRIP AS ONE JOURNEY AND EACH RETURN TRIP AS TWO.
NOTE: ONLY INCLUDE TRAVEL WITHIN GREAT BRITAIN, OVER THE LAST YEAR OR SO.

1. 3 or more times a week
2. Once or twice a week
3. Less than that but more than twice a month
4. Once or twice a month
5. Less than that but more than twice a year
6. Once or twice a year
7. Less than that or never

The questions asked by the NTS have several important properties that must be noted. First, it is private car *use* that is asked about, which in principle includes both car-driving and car-passenger travel.

Second, the question does not explicitly include light van use – this represents a conceptual difference from the analyses of NTS travel diary data, in which cars and light vans are typically analysed as a single vehicle class. It also excludes use of non-private cars, such as a car from one's employer's fleet of pool cars.

Third, it is possible that respondents could be confused by the distinction between a single trip and a 'time' (i.e. an occasion, in the sense of doing something a certain number of 'times' a week) when reporting using a mode of transport. For instance, a respondent who typically uses a private car for two or more journeys on two days per week might erroneously select the 'once or twice a week' option, whereas in principle they should be responding that they use a car 'three or more times a week'.

Tables 3.1 to 3.3 examine this possibility, as they compare reported journeys in NTS respondents' diaries with the same people's stated frequency of use. Values on the diagonals of the tables – in the highlighted cells – represent people whose stated frequency of use is consistent with their reported use in their travel diary. It is not surprising that there are some off-diagonal observations – these may be people whose diary week was unusual, or whose travel behaviour varies substantially over time. But there is some evidence of people confusing single journeys with 'times' that they use a mode (as explained above). It can be seen that 10% of NTS respondents report using a private car once or twice a week but actually made three or more journeys during their diary week. If this were simply due to week-to-week behavioural variation, we would expect about the same percentage of people to report the equal and opposite mismatch situation: typically making three or more journeys, but actually making only one or two. However, it can be seen from Table 3.1 that only 3% of NTS respondents fall into the latter group, which is less than a third of the 10% who fall into the former group. This imbalance appears to represent evidence that the above confusion in counting uses of a mode in a week is in fact occurring.

Table 3.1: Comparison of stated and NTS diary-observed frequency of private car use, 2009/10

		Diary-observed frequency		
		Three or more journeys during diary week	One or two journeys during diary week	Zero journeys during diary week
Stated frequency of local bus use	Three or more times a week	62%	3%	4%
	Once or twice a week	10%	3%	4%
	Less than weekly	2%	2%	10%

Source: NTS

Table 3.2: Comparison of stated and NTS diary-observed frequency of local bus use, 2009/10

		Diary-observed frequency		
		Three or more journeys during diary week	One or two journeys during diary week	Zero journeys during diary week
Stated frequency of local bus use	Three or more times a week	11%	3%	4%
	Once or twice a week	3%	3%	6%
	Less than weekly	1%	3%	66%

Source: NTS

Table 3.3: Comparison of stated and NTS diary-observed frequency of rail use, 2009/10

		Diary-observed frequency		
		Three or more journeys during diary week	One or two journeys during diary week	Zero journeys during diary week
Stated frequency of local bus use	Three or more times a week	2%	<0.5%	1%
	Once or twice a week	<0.5%	1%	2%
	Less than weekly	1%	4%	89%

Source: NTS

The NTS interview's questions enquiring about frequency of use have several weaknesses if they are to be used as indicators to estimate per-capita mileage and journeys by mode. First, as noted above, is the potential for confusion between the instructions that the respondent should 'count each single trip as one journey' and the possible answers (e.g. 'three or more times a week'). Second, the most-frequent possible response is three or more times per week, whereas a substantial fraction of people may make many more journeys than this, for instance as car drivers (it is not unusual to observe a car driver making 20 car journeys per week). Third, in the aggregate, people's self-report of their 'typical' behaviour may differ from their revealed behaviour (as captured by a travel diary). Fourth, for many purposes (e.g. for comparing with road traffic estimates or carbon-footprint analysis) it is important to distinguish between car-driving and car-passenger travel, whilst they are treated as a single form of travel in the NTS question.

Nevertheless, the NTS's frequency-of-use question design has been consistent throughout the 2000s, and probably will be for the foreseeable future. Given this circumstance, it is very important for the sake of consistency that the relevant questions posed to Welsh residents are worded identically to the NTS's questions.

3.4 Exposition of proposed technique to employ frequency-of-use data to estimate average annual mileage and number of journeys by mode of transport

Given that the proposed technique relies on the calculation and then application of within-group average rates of annual mileage (journeys), it is necessary to verify that the sample sizes within each of the 112 classes are large enough to credibly support this analysis. This refers to the size of the England-sample classes, which are used to calculate the averages. The sample size within each of the Wales-resident classes is not a constraint, as the average rates calculated from the corresponding England-sample classes can be applied to any number of people, no matter how small.

Table 3.4 shows the prevalence of small within-group sample sizes in the England-resident sample. What can be seen is that there are a substantial number of small-sample classes – for instance, 36 of the 112 classes for the private car analysis contain fewer than 50 people, and 16 of those contain fewer than 30 people. But the lower two rows of this table show that whilst there are relatively many classes that have small sample sizes in the England sample, they account for a very small proportion (less than 5% in all cases) of the Welsh population. In other words, for all three modes under study, more than 95% of the Welsh population is within a class for which the corresponding England sample contains at least 50 people.

Table 3.4: Diagnostic statistics identifying the prevalence of classes with small sample sizes

	Private car	Local bus	Rail
Out of the 112 classes, the number of classes with fewer than n = 50 (unweighted) in England NTS sample (2009/10)	36	3	24
Out of the 112 classes, the number of classes with fewer than n = 30 in England NTS sample (2009/10)	16	0	13
Percentage of Welsh population in classes with fewer than n = 50 (unweighted) in England NTS sample (2009/10)	3.1%	0.4%	2.7%
Percentage of Welsh population in classes less than n = 30 (unweighted) in England NTS sample (2009/10)	1.1%	Zero	1.4%

Source: NTS

Table 3.5 shows the degree of correlation (the correlation coefficient, r) at the class level (112 observations) between the Welsh and English NTS samples. For all three modes studied, the correlation is higher for per-capita journeys than per-capita mileage – this reflects the greater variation in the mileage that people travel than in the number of journeys which they undertake, the former including a further source of variation (differences in journey lengths) in comparison to the latter. The smallest correlation coefficient is 0.405 (for

rail mileage); by taking its square (r^2) it can be calculated that for rail mileage 16% of the between-classes variation in the Welsh NTS sample can be accounted for by the between-classes variation in the average rail mileage from the English NTS sample. The fact that there is much variation between the within-class averages for Welsh and English residents is not a cause for great concern; in large measure this reflects fairly small within-class sample sizes of Welsh residents. Of the 112 classes, 99, 101 and 94 classes have an unweighted *Welsh-resident* sample size smaller than 30 people for car-driving, bus and rail travel respectively.

Table 3.5: Correlation coefficients between within-class observed per-capita mileage (journeys) from Welsh NTS respondents and English NTS respondents, 2009/10

	Mileage	Journeys
Car driving	0.935	0.976
Bus	0.758	0.875
Rail	0.405	0.509

Source: NTS (all correlations shown are statistically significant at the 5% level)

Whereas Table 3.5 shows the degree of correlation at the class level, Table 3.6 looks at the results at the person level. It shows the correlation coefficients between each Welsh NTS respondent's mileage (journeys) that they reported in their NTS diary, and their estimated mileage (journeys) based on which of the 112 classes they fall within (the average value of people in the same class that live in England). As would be expected, the correlations are higher for journeys than for mileage (because the former does not contain variation in journey length). The best fit is for rail journeys, where 34% ($0.587^2 = 0.34$) of the person-level variation in Welsh residents' diary-reported rail journeys can be recovered from this technique. The poorest fit is for rail mileage, however, where only 7% ($0.260^2 = 0.07$) of the person-level variation can be recovered.

Table 3.6: Correlation coefficients between observed NTS-diary-week mileage (journeys) from Welsh NTS respondents and the within-class average mileage (journeys) estimated from English NTS respondents of the same classes, 2009/10

	Mileage	Journeys
Car driving	0.493	0.578
Bus	0.458	0.556
Rail	0.260	0.587

Source: NTS (all correlations shown are statistically significant at the 5% level)

When the average within-class mileage (journey) values from the English-NTS-sample respondents are applied to Welsh-NTS-sample respondents in the same classes, and the per-capita mileage (journeys) per Welsh resident are then calculated, the per-capita averages do not match the observed per-capita mileage (journey) values amongst Welsh-NTS-sample people. This is a statistical property of the technique, which arises because the 'estimation' sample (English NTS respondents in 2009/10) is not the same as the 'forecasting' sample (Welsh NTS respondents in 2009/10). To recover the 2009/10 observed per-capita mileage (journey) values amongst Welsh-NTS-sample people, it is therefore necessary to apply the adjustment factors shown in Table 3.7, which range from a low of 0.79 (for rail mileage) to a high of 1.19 (for bus mileage). Without applying these adjustment factors, the estimates of per-capita mileage (journeys) amongst Welsh residents would, to take one example, overestimate rail journeys by 23% (1/0.816 = 1.23).

Table 3.7: Calibration factors for adjusting average estimated mileage and journeys to match observed 2009/10 average mileage and journeys in Wales

	Mileage	Journeys
Car driving	0.975	0.969
Local bus	1.187	0.979
Rail	0.794	0.816

Source: NTS

3.5 Discussion and further considerations

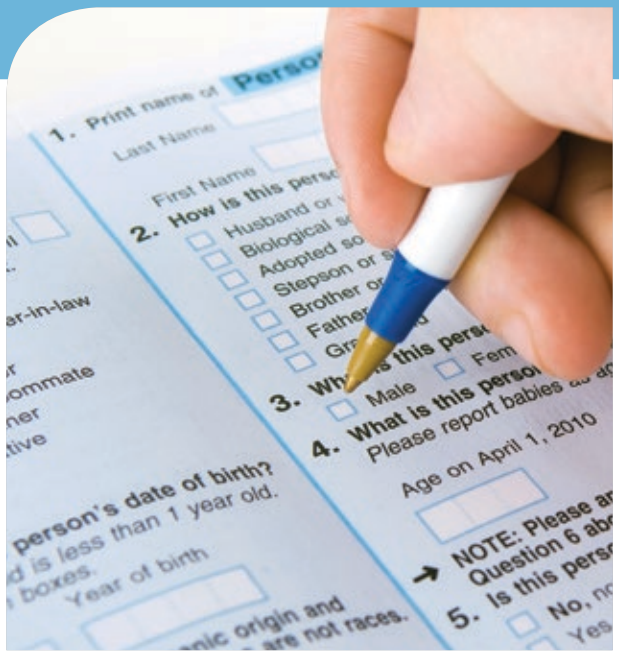
The technique proposed in this section would allow the calculation of per-capita annual mileage and journeys by mode of transport amongst Welsh residents. The principles can be applied to any mode of transport recorded in the NTS travel diary data for which there is also a corresponding frequency-of-use question in the NTS interview;[9] the proof-of-concept analysis undertaken to examine this study resulted in within-group averages for car driving, bus and rail (see Tables B1, B2 and B3 in Appendix B). But it must be noted that whilst it is straightforward to use this technique to estimate mileage (journeys) by certain modes of transport, it would not be as straightforward to calculate aggregate all-modes mileage (journeys) that would be consistent with the NTS' estimates because it would require asking frequency-of-use questions pertaining to a large number of modes of transport (even those used infrequently).

Should the Welsh Government decide to take this method forward for estimating mobility indicators in the absence of the NTS, three important items for further research are:

1. The application of this technique to estimate per-capita mileage (journeys) amongst Welsh residents for other modes of travel (car-passenger travel, walking, cycling, etc.).
2. The application of advanced statistical methods (e.g. jackknifing) to estimate the degree of uncertainty in the mean estimates of per-capita mileage and journeys.
3. Work to establish the degree of stability in the adjustment factors shown in Table 3.7. If these adjustment factors are used with data from future-years editions of the England-only NTS, there is an implicit assumption that they will remain stable over time. The validity of this assumption cannot be known for future years, but it is possible in principle to use NTS data from years prior to 2009/10 to assess where there is a noticeable time trend in the adjustment factors. This cannot be done for car driving, as the frequency-of-use question was added to the NTS interview only in 2009, but it can be done in the case of bus and rail travel (prior to 2009 the local bus frequency-of-use question was asked in 2003 and 2005–8, and the rail frequency-of-use question was asked in 2003, 2005, and 2007).

9 Frequency-of-use questions have been asked in the NTS in various years in the 2000s for the following modes of transport: private car, ordinary (local) bus, train (National Rail), express bus/coach, taxi/minicab, air travel (within GB), walking for 20+ minutes, and cycling.

4. Analysis Using Census Data from Wales



This section investigates what can be learned about changing travel trends from the 2001 and 2011 Censuses in Wales. Whilst Census data contains only a select few indicators of personal mobility, the near-universal coverage (estimated at 93% in Wales in 2011) means that meaningful estimates can be prepared for smaller geographic areas than the NTS. Moreover, person-level Census microdata is not generally available, so researchers must rely on aggregate data tabulations. For instance, in the analyses shown in Figures 4.6 and 4.8, rail is not separable from various forms of urban rail systems: they are combined into a single 'rail' category. As microdata is not generally accessible owing to privacy considerations, researchers are limited to analysing the tabulated data that is released.

Census data contains two basic pieces of information regarding personal mobility:

1. Car ownership per household, collected via the following question: *In total, how many cars or vans are owned, or available for use, by members of this household? Include any company car(s) or van(s) available for private use.*
2. Information about people's place of work (from which commuting distance can be calculated) and the 'main mode' by which they travel there (i.e. the mode of transport they use for the longest part of their commuting journey). The relevant Census questions are:
   a. *In your main job, what is the address of your workplace?*
   b. *How do you usually travel to work? Tick one box only. Tick the box for the longest part, by distance, of your usual journey to work.*[10]

10 Note that the 2001 Census did not allow people who report usually working at home to indicate a usual mode of travel to work, whereas the 2011 Census did. The analysis in Section 4 is based on the 2001 specification.

4.1 Car ownership

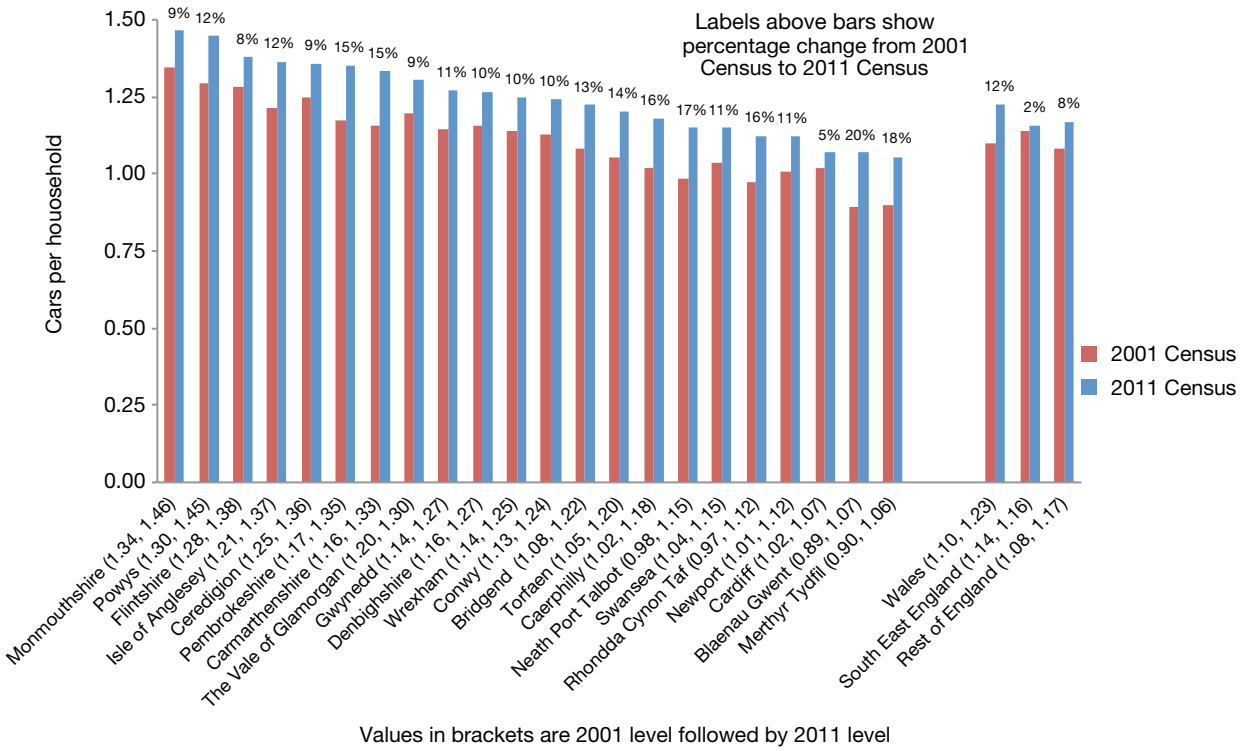
Figure 4.1 shows car ownership for each local authority in Wales in both 2001 and 2011, along with a comparison with the average across all of Wales, South East England[11] and the rest of England. (Figures 4.1 to 4.6 all present data for 2001 and 2011, at local authority level, with all of Wales, South East England and the rest of England also shown for comparison.)

It can be seen that car ownership increased in all Welsh local authority areas in the ten-year period, but that there was variability in the growth rate. The smallest increase was in Cardiff (+5% between 2001 and 2011) and the largest increases were in Blaenau Gwent (+20%) and Merthyr Tydfil (+18%), the two Welsh local authorities with the lowest rate of cars per household (1.07 and 1.06 in 2011 respectively).

The overall increase in Wales (+12%) was much faster than the increase in South East England (+2%), and even when compared with the increase in the whole of the rest of England was half as fast again.

In 2011 the highest rate of cars per household was in Monmouthshire (1.46 cars).

Figure 4.1: Cars per household in Wales by local authority, 2001 and 2011



Values in brackets are 2001 level followed by 2011 level

Source: 2001 and 2011 Censuses of England/Wales

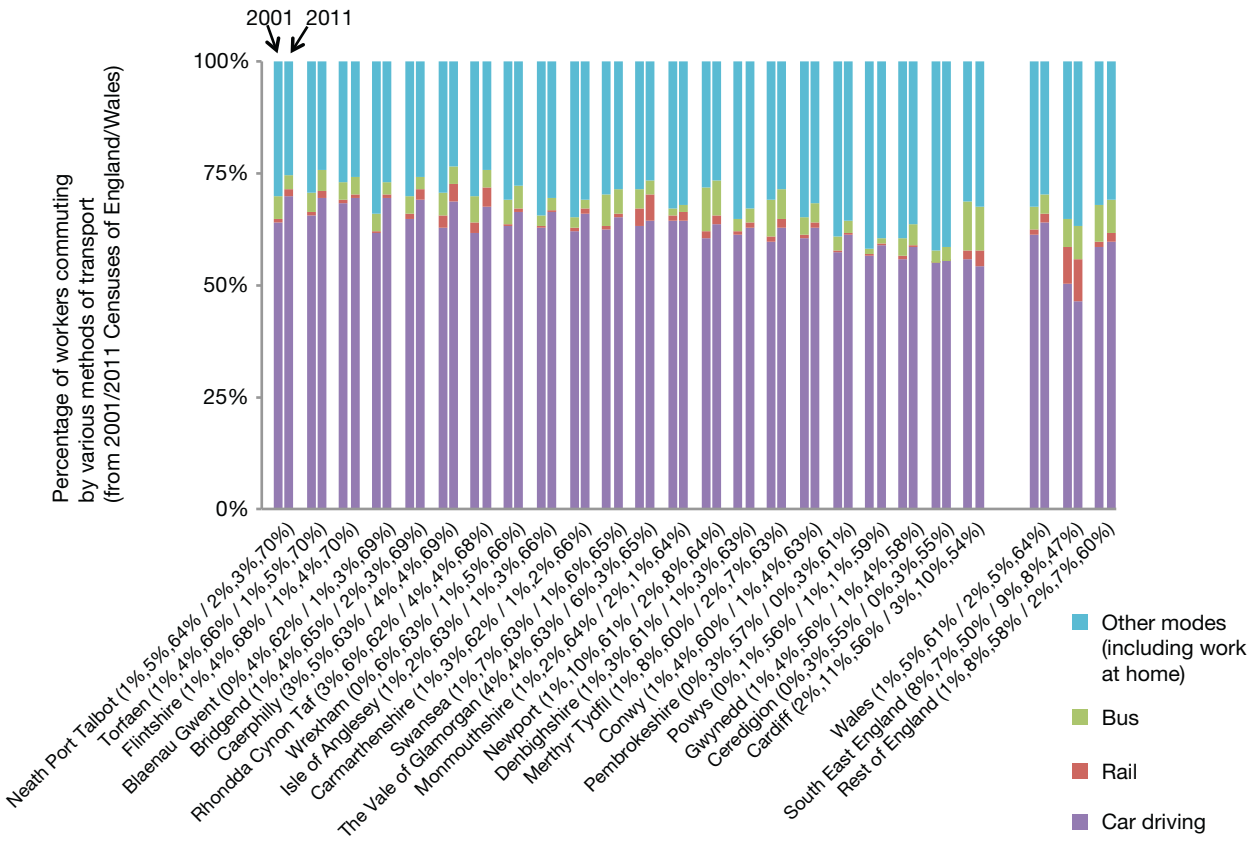
11 Throughout Section 4, 'South East England' is used to refer to the London, South East and East England Government Office Regions (GORs).

4.2 Commuting patterns by Welsh local authority areas

Figure 4.2 graphs mode share by Welsh commuters by local authority area, comparing 2001 with 2011, and shows that more than half of commuters' self-reported usual mode of travel is as a car driver in all Welsh local authorities, without exception. The lowest rate is in Cardiff, at 54% in 2011, and Cardiff was also the only Welsh local authority area where the car-driving mode share decreased between 2001 and 2011. So the fact that the least car-dependent part of Wales (in terms of commuters' mode share) was the only part of Wales that became less car-dependent during the 2000s provides evidence of a divergence in car use for commuting by type of area. This indicates that 'place' seems to be of growing importance in explaining patterns of car use in Wales, a result that is consistent with earlier findings from elsewhere in Britain.

The Vale of Glamorgan has the highest rail mode share (at 6% in 2011, up from 4% in 2001). Cardiff has the highest bus mode share at 10% in 2011, but this represented a decrease from the level in 2001 (11%).

Figure 4.2: Main-mode share of Welsh residents' usual commuting journeys, by local authority



Values in brackets are shares for rail, bus, and car driving respectively (2001/2011)

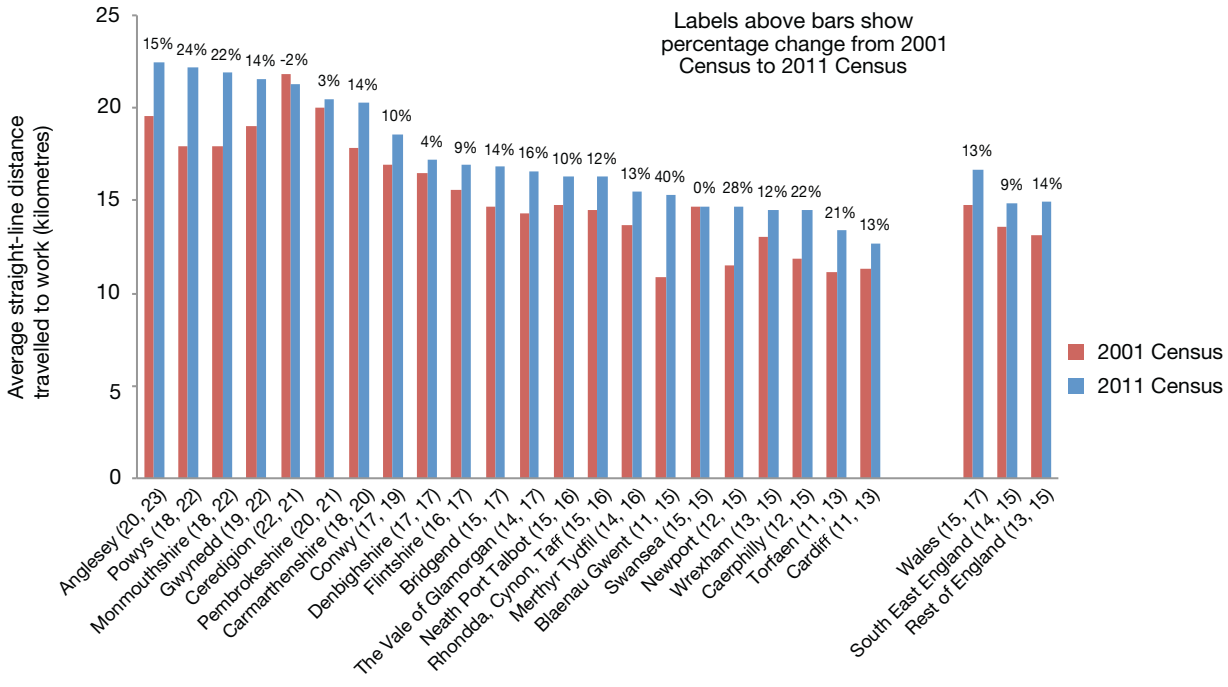
Source: 2001 and 2011 Censuses of England/Wales

Figure 4.3 shows commuting-journey distance (from home to work, measured as a straight-line distance) by local authority, and how this changed between 2001 and 2011. It can be seen that Welsh commuters travel on average further than English commuters.

In general, commuting distances increased in Wales. The exceptions to this were in Swansea, where commuting distances were stable (at an average of 15 km), and Ceredigion, where there was a 2% decrease in average commuting distance.

The fastest rate of increase (at +40%) in commuting distance was in Blaenau Gwent, which was also, as discussed in section 4.1, where car ownership increased most rapidly. Residents of Blaenau Gwent also displayed the shortest average commuting distance in Wales in 2001, but by 2011 the residents of Cardiff held this distinction.

Figure 4.3: Average distance of Welsh residents' commuting journeys to their usual place of work, by local authority



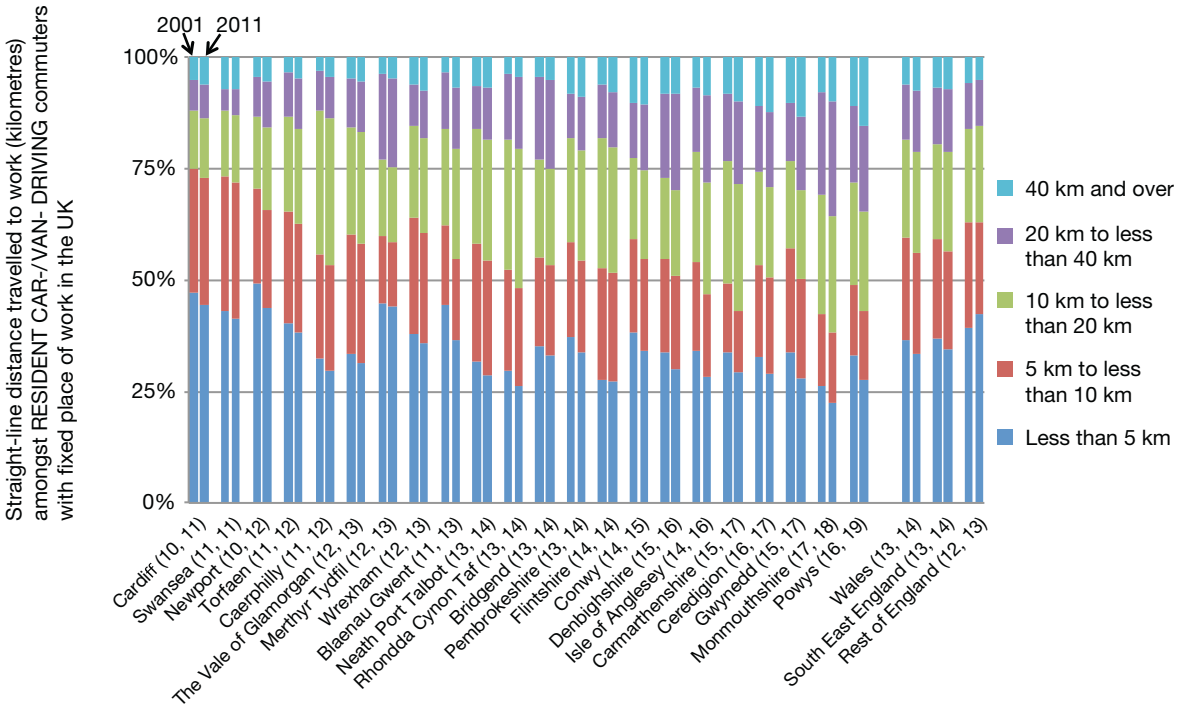
Values in brackets are 2001 level followed by 2011 level

Source: 2001 and 2011 Censuses of England/Wales

Figures 4.4 to 4.6 look at commuting distances for car/van drivers, bus commuters and rail commuters respectively.

In Figure 4.4, it can be seen that the longest average commuting distance amongst car drivers in 2011 is for residents of Powys (at 19 km), whereas Monmouthshire residents had the longest average-distance car-driving commutes in 2001 (at 17 km).

Figure 4.4: Distribution of commuting distances for Welsh car-/van-driving commuters,[12] by local authority



Values in brackets are 2001 and 2011 average distances (kilometres)

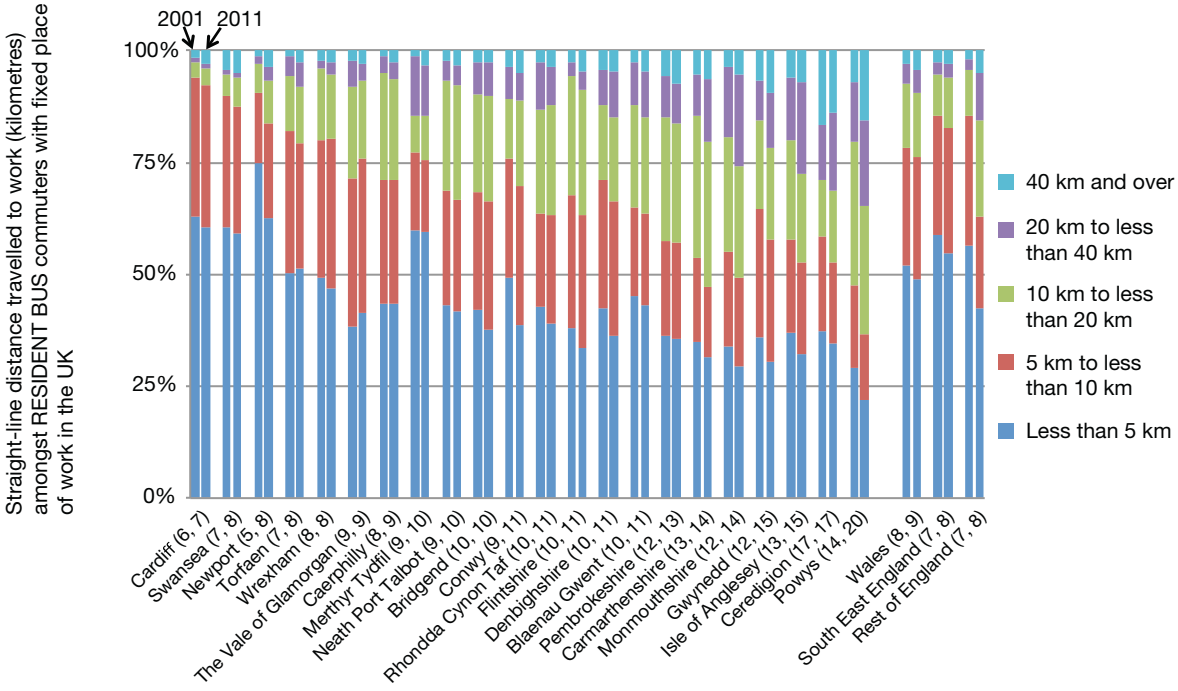
Source: 2001 and 2011 Censuses of England/Wales

Figure 4.5 shows the distance distribution for bus commuters, and again we see that residents of Powys undertake the longest average bus commutes (at 20 km in 2011). Here Merthyr Tydfil presents an interesting case: there is a relatively large share of both short-distance bus commuting (under 5 km) and also long-distance (over 20 km) bus commuting. This is probably due to the valley geography and its proximity to Cardiff.

Short average bus commuting distances (of 8 km and under) can be seen in the relatively built-up areas of Cardiff, Swansea, Newport, Torfaen and Wrexham.

12 Throughout Section 4, where average values are calculated from discrete distributions, the imputed value of items within a discrete class is taken as the mid-point value. For the uppermost band of distance the value is taken to be the bottom of this distance band.

Figure 4.5: Distribution of commuting distances for Welsh bus commuters, by local authority



Values in brackets are 2001 and 2011 average distances (kilometres)

Source: 2001 and 2011 Censuses of England/Wales

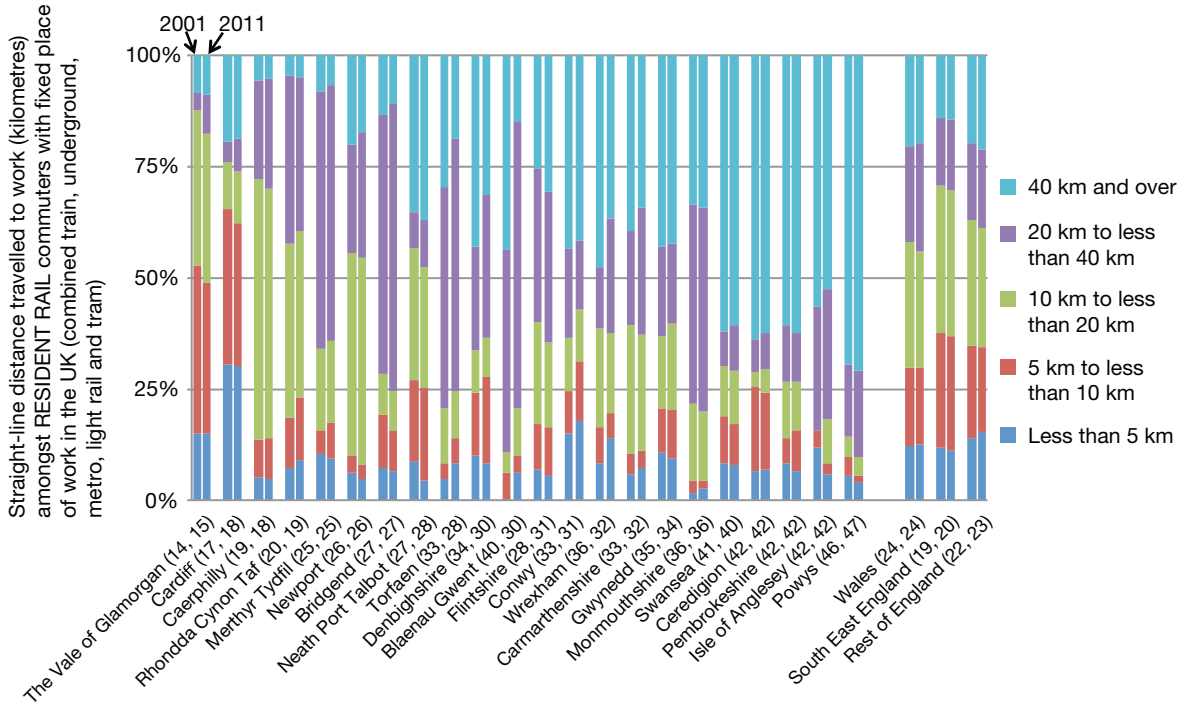
The findings for rail commuters are shown in Figure 4.6, and in comparison with Figures 4.4 and 4.5 it can be clearly seen that rail commuters are much more likely to undertake long commuting distances than those travelling to work by bus or driving a car.

Not surprisingly, the largest proportion of short-distance (under 5 km) rail commuting is seen amongst Cardiff residents. Cardiff and Caerphilly both have the same average rail-commuting distance, but of the two, Cardiff has both more short-distance (under 5 km) and more long-distance (40 km or more) rail commuters.

As with bus and car-driving commuting, Powys residents who commute by rail evidence the longest average commuting distances amongst all Welsh local authority areas.

If one looks at the ratio of the longest average commute to the shortest average commute in terms of local authority areas, it can be seen that this is larger for rail (47 km/15 km in 2011) than for either bus (20 km/7 km) or car driving (19 km/11 km).

Figure 4.6: Distribution of commuting distances for Welsh rail commuters, by local authority



Values in brackets are 2001 and 2011 average distances (kilometres)

Source: 2001 and 2011 Censuses of England/Wales

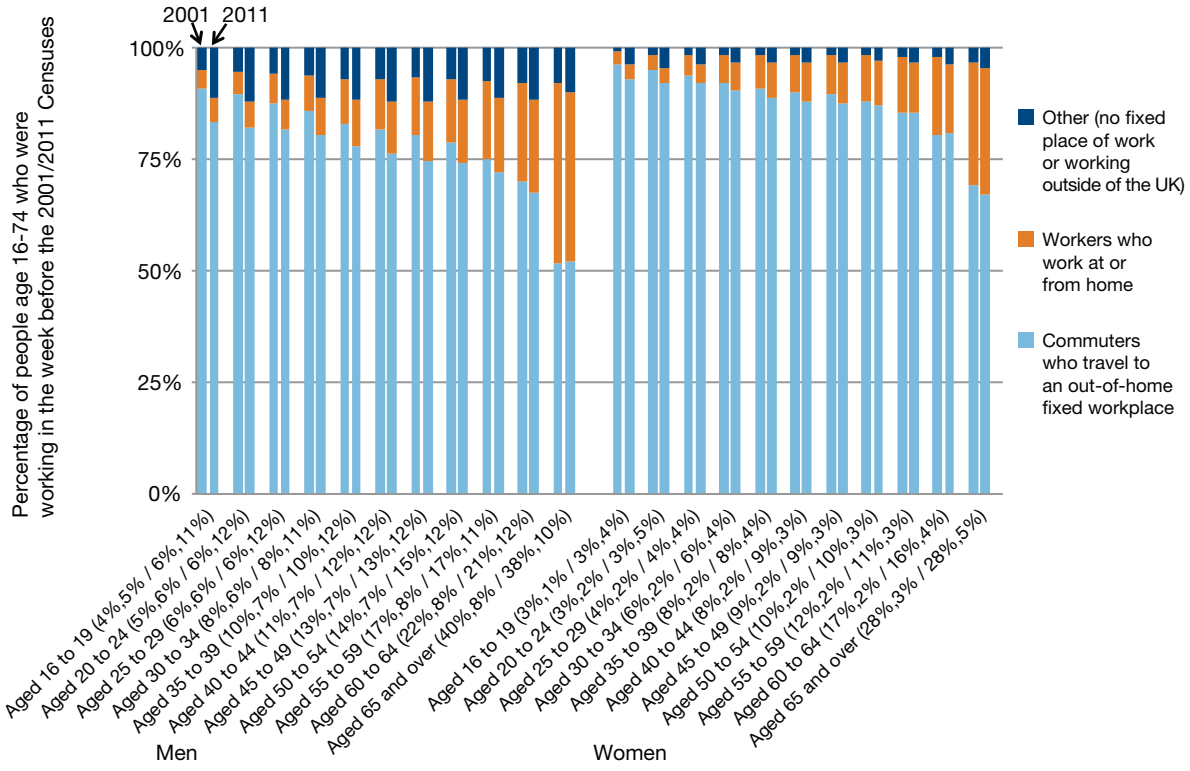
4.3 Commuting patterns by age and gender

This section looks at how commuting patterns in Wales vary by age and gender. Figure 4.7 examines the distribution of the adult working population into 'working at home', 'working out of home at a fixed workplace in the UK', and an 'other' category that included both 'working at non-fixed places' and a 'workplace outside of the UK'.

Amongst both men and women, working at home is most prevalent for older workers, particularly those of pensionable age.

There has been growth in the 'no fixed workplace' category for all age/gender groups.

Figure 4.7: Distribution of working in-home, out-of-home at a fixed workplace, and 'other' (non-fixed place of work or workplace outside of the UK), by local authority



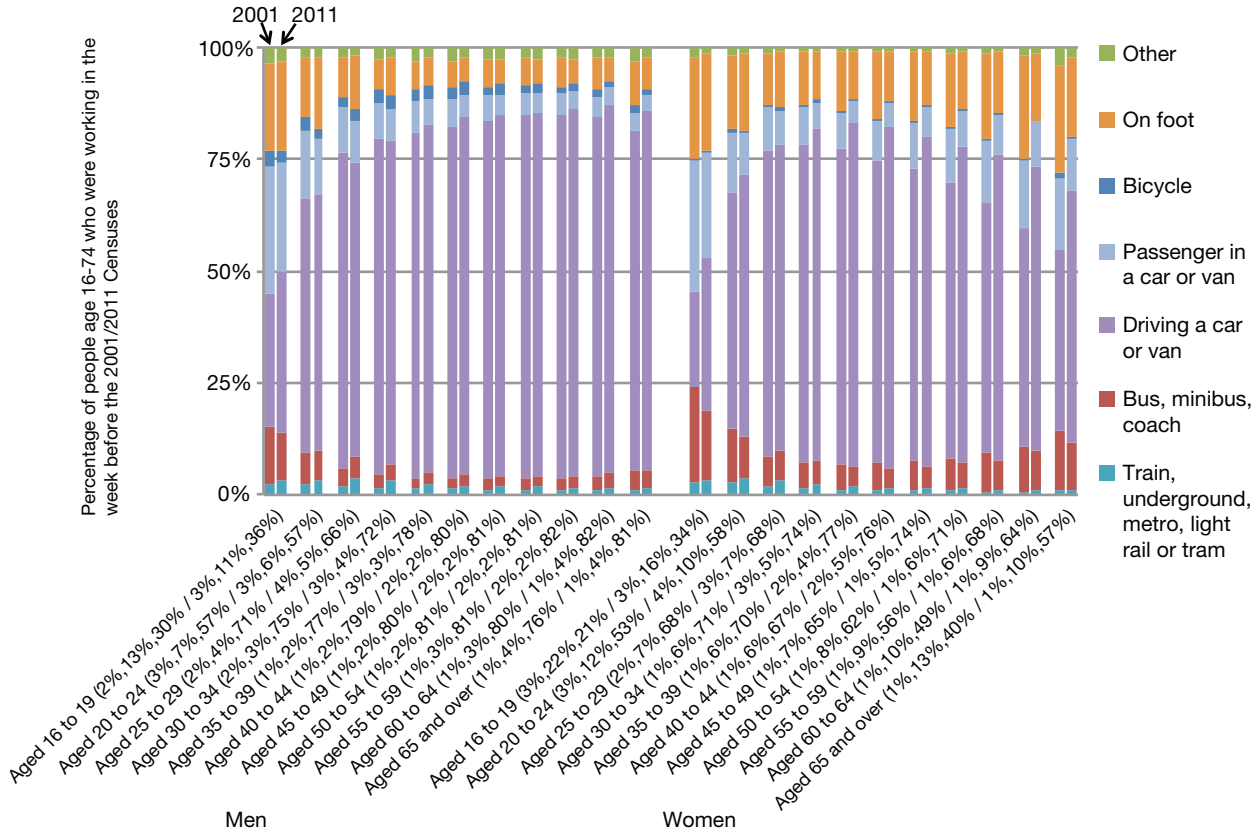
Values in brackets are 'working at home' and 'other' shares respectively (2001/2011)

Source: 2001 and 2011 Censuses of England/Wales

Figure 4.8 illustrates the commuting modal split amongst out-of-home workers with a fixed workplace. Several points are worth remarking on. Car driving increased between 2001 and 2011 for almost all age/gender groups shown, and most rapidly for women in middle age and beyond. If one looks at the time trend for young men, car driving increased its mode share for commuting in the 2000s for men aged 16–19 (from 30% to 36%, largely at the expense of bus and car-passenger travel), whilst it held steady for men aged 20–24 (at 57%) and fell for those age 25–29 (from 71% to 66%).

Commuting by bus became less common for most age/gender groups, whereas the opposite is seen for rail use.

Figure 4.8: Main-mode share of Welsh residents' usual commuting journeys amongst workers with a fixed out-of-home workplace, by age and gender

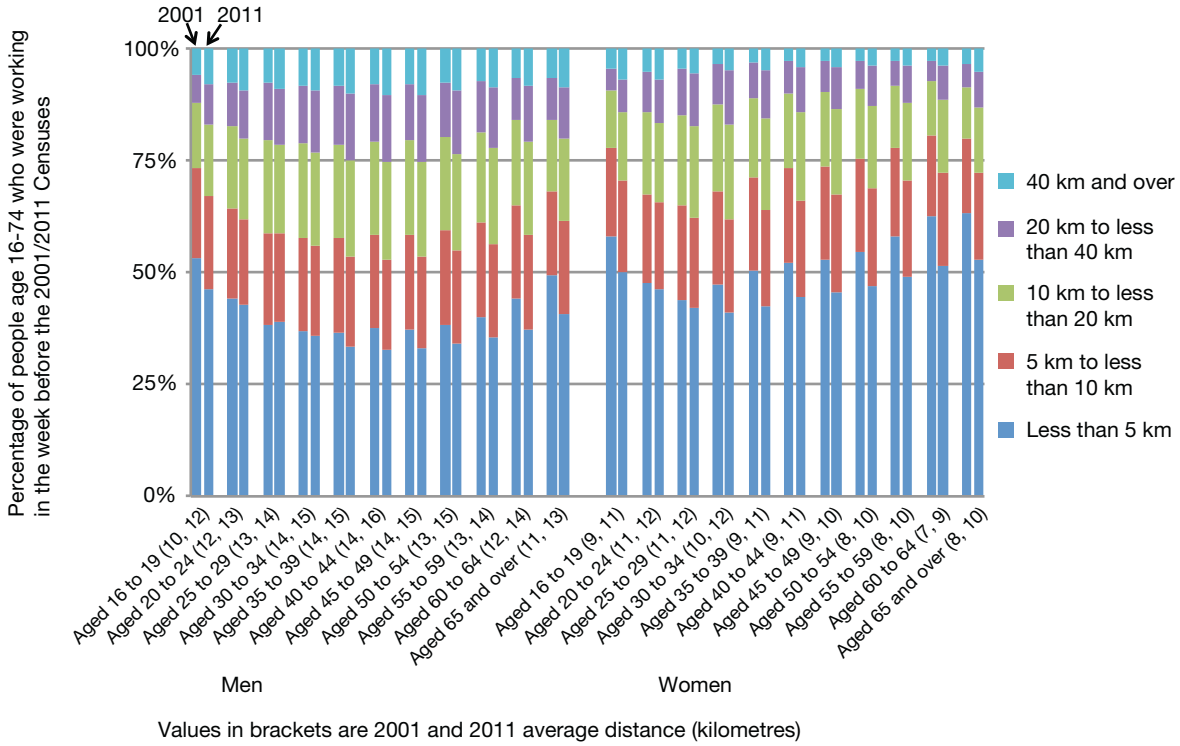


Values in brackets are shares for rail (National Rail + urban rail), bus, and car driving respectively (2001/2011)

Source: 2001 and 2011 Censuses of England/Wales

Figure 4.9 looks at commuting distance by age and gender. For every age group, men exhibit longer average commuting distances than women, and a larger proportion of men make long-distance commutes (of over 40 km). Although the shape of the relationship is not identical for both sexes, it can be seen that there is a minimum in the prevalence of short-distance (under 5 km) commuting in middle age, it being more common to make these short journeys if one is a younger or an older worker.

Figure 4.9: Distribution of commuting distances for Welsh commuters, by age and gender



Values in brackets are 2001 and 2011 average distance (kilometres)

Source: 2001 and 2011 Censuses of England/Wales

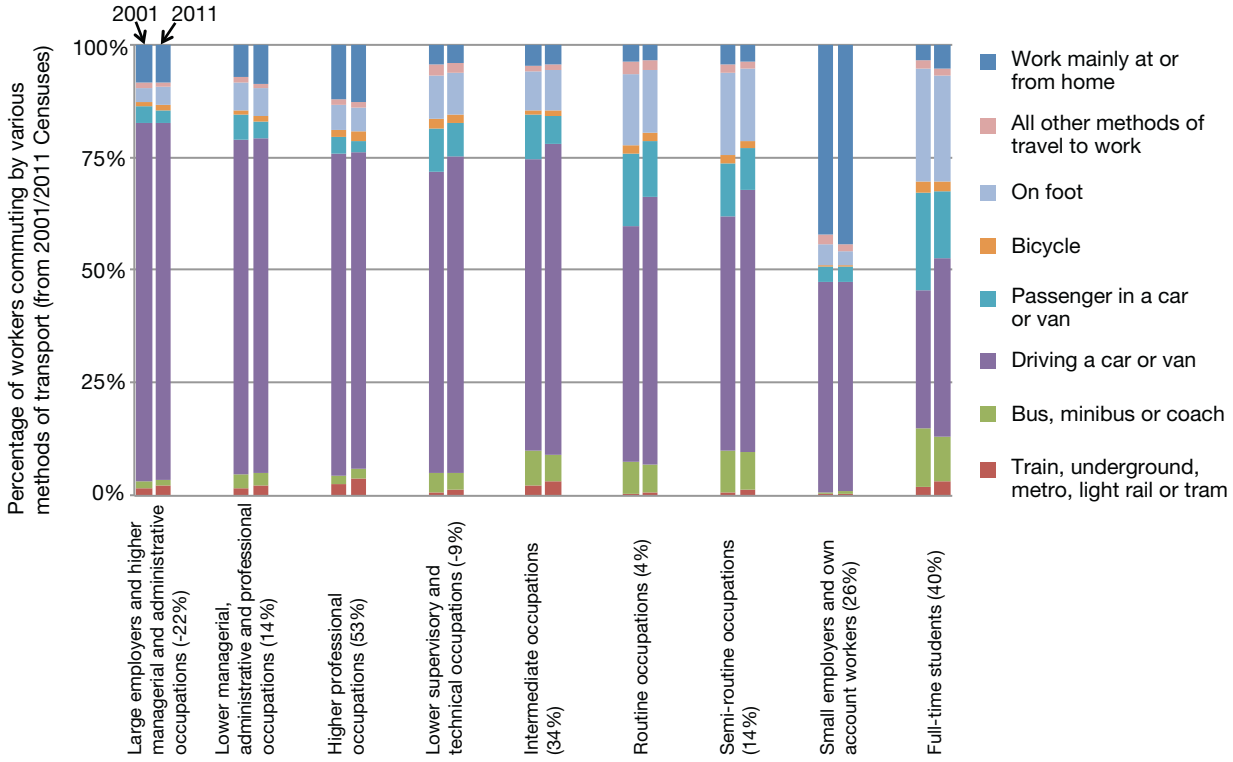
4.4 Commuting mode share by National Statistics Socioeconomic Classification

The final analysis in this section investigates mode share amongst workers who fall into various different National Statistics Socioeconomic Classifications (NS-SECs) – see Figure 4.10.

Unsurprisingly, workers classified as 'Small employers and own-account workers' are by far the most likely to work at their home. Rail's mode share increased amongst all NS-SEC categories, with the highest level being seen amongst 'Higher professional occupations' (which was also the category exhibiting the fastest growth in numbers over the ten-year period, at 53%). Bus mode share, meanwhile, is highest amongst those in 'Semi-routine occupations'.

The category showing the largest proportion of car/van driving was 'Large employers and higher managerial and administrative occupations', although this NS-SEC category shrunk in number of workers by 22% between the 2001 and 2011 Censuses. By contrast, one of the fastest-growing categories is full-time students, and full-time students also display the lowest car-driving mode share of all NS-SEC classes shown (but the largest car-passenger mode share).

Figure 4.10: Main-mode share of Welsh residents' usual commuting journeys, by NS-SEC socioeconomic classification, with percentage growth in NS-SEC categories



Values in brackets are percentage growth in numbers of workers resident in Wales, by NS-SEC, 2001 to 2011

Source: 2001 and 2011 Censuses of England/Wales

5. Rail Satisfaction Levels in Wales

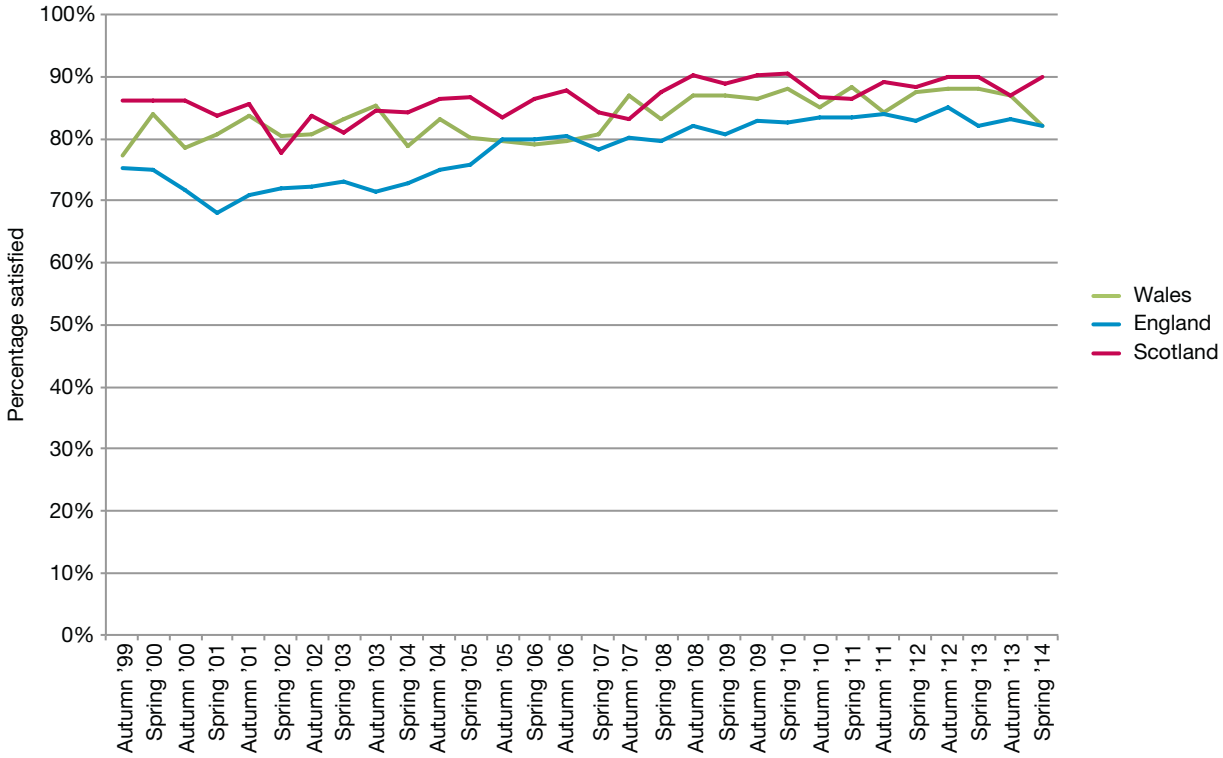
This section reports on an analysis of the NRPS (National Rail Passenger Survey) microdata between the years 1999 and 2012. Building on the GB-wide analysis carried out in a companion report to this study (Preston & Jones, 2012), a brief investigation is made into how trends in customer satisfaction have varied between Wales and England and Scotland.

Methodological details regarding the NRPS can be found in Preston & Jones (2012). One important point to note is that the analyses of the NTS data in this report are based on interviews with Welsh *residents*, whereas the NRPS analysis is based on interviews with rail passengers whose journey originated in Wales, regardless of whether they were Welsh residents or not.

The analysis of NRPS microdata drew on data that were available up to spring 2012 (Wave #26). Where it was possible to update the analyses in this chapter with the time-trend up to spring 2014 (Wave #30) using published data in the NRPS *Stakeholder Reports*, this has been done.

Figure 5.1 shows that in Wales overall passenger satisfaction with their rail journey was more or less flat up to 2007 (at around 80%), at which point it suddenly increased; it has been on average around 85% since then. The rate of satisfaction in England was much lower than in Scotland and Wales in the beginning of the time series (autumn 1999), but since 2001 the gap has narrowed somewhat. Scotland has generally had the highest rate of overall rail passenger satisfaction in Britain, but Wales now has only slightly lower rates than Scotland.

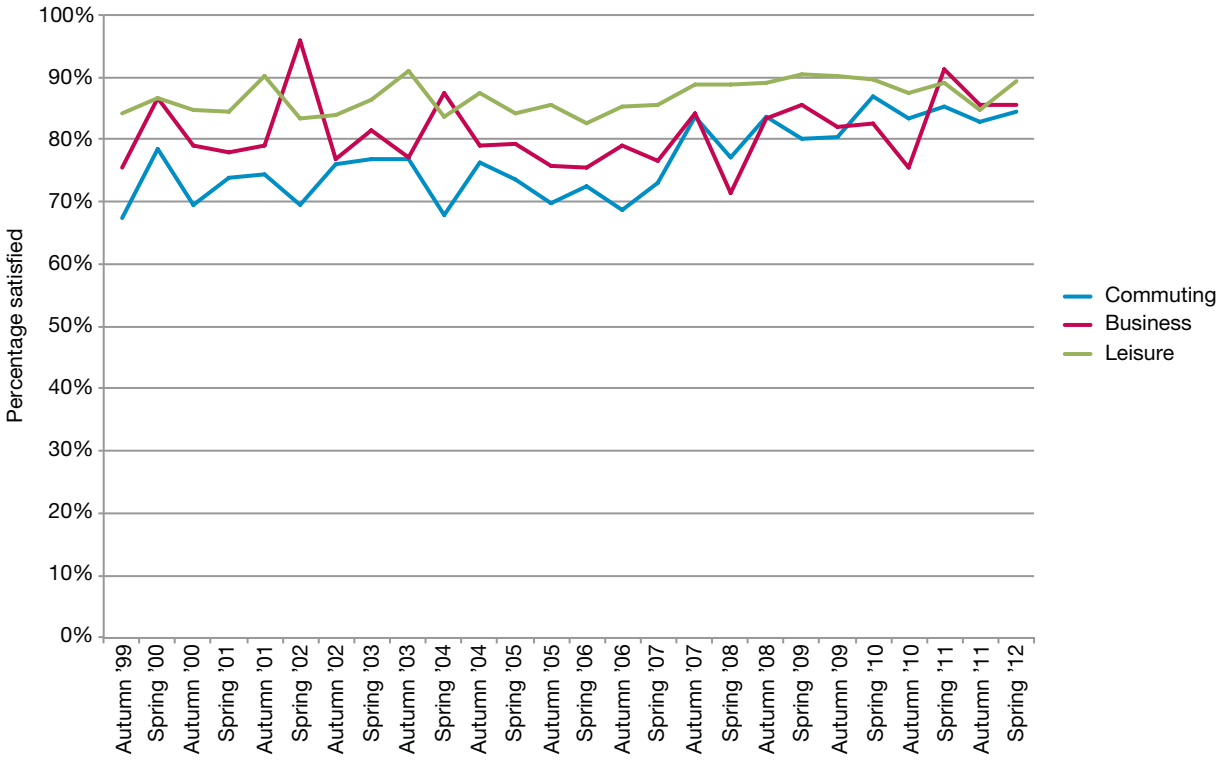
Figure 5.1: Rail passenger rate of satisfaction with their overall journey, by country



Source: NRPS

Figure 5.2 shows how customer satisfaction varies by three journey purposes, for Wales only. Generally, leisure travellers record the highest overall levels of customer satisfaction, followed by business travellers and then commuters – a pattern that is typical of that found in other parts of Great Britain. While satisfaction with rail business travel has fluctuated either side of 80% through most of the survey period, both leisure and commuting satisfaction levels have increased since late 2007; and by 2011 all three journey purposes were showing signs of convergence in terms of customer satisfaction.

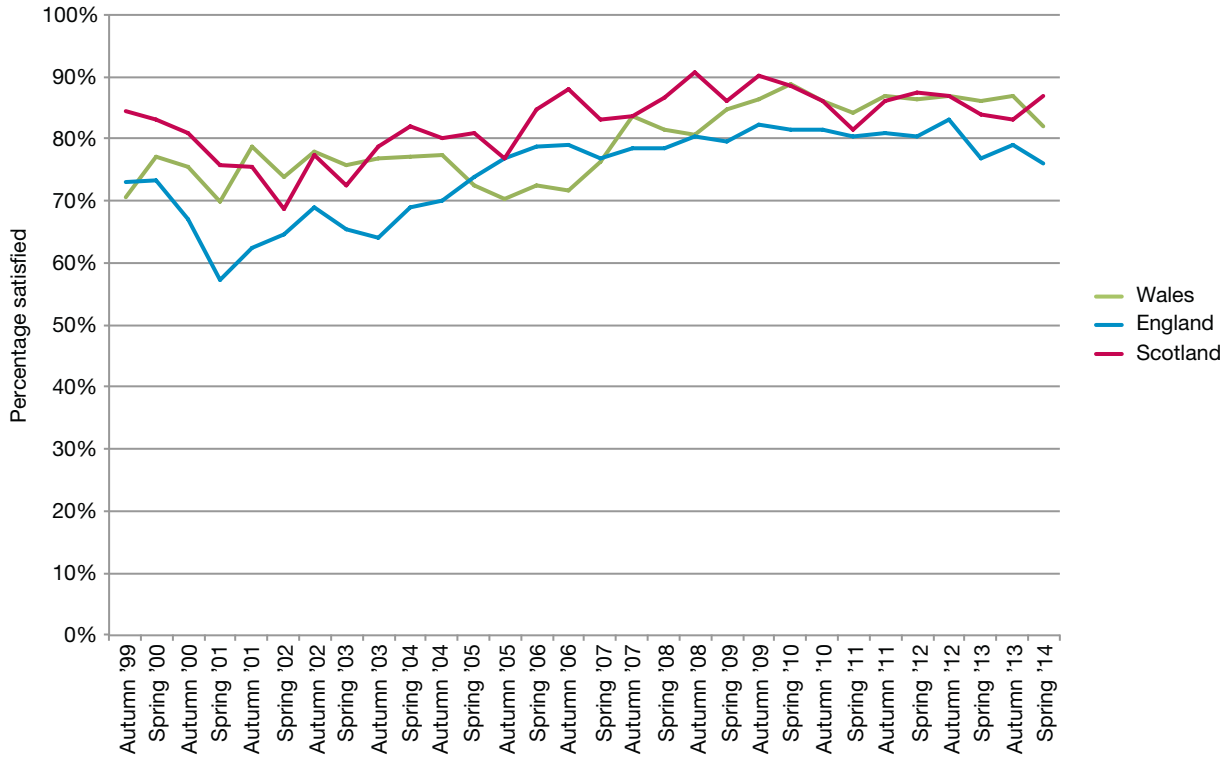
Figure 5.2: Rail passenger rate of satisfaction in Wales with their overall journey, by journey purpose



Source: NRPS

Figure 5.3 shows the rates of reported satisfaction with train service punctuality for Wales, England and Scotland. The trend in all three countries was broadly upwards until the late 2000s, since when it has been flatter (and there appears to have recently been a decline in England). On average, Scotland has had the highest rates of customer satisfaction with punctuality during most of the survey period, and England the lowest rates of satisfaction; since 2010, however, Welsh and Scottish satisfaction levels have been very similar.

Figure 5.3: Rail passenger rate of satisfaction with the punctuality of trains, by country

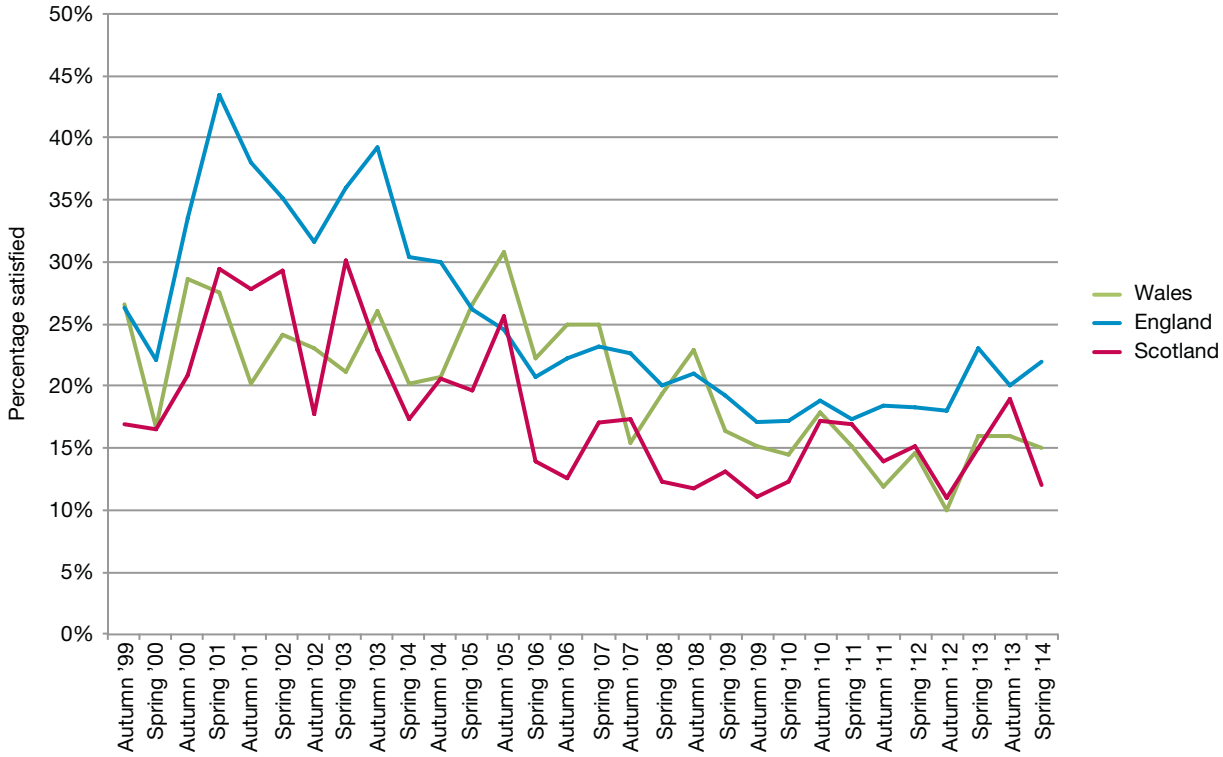


Source: NRPS

Whilst Figure 5.3 looked at satisfaction with rail service punctuality in general, Figure 5.4 is based on the NRPS question which asks respondents specifically whether they have experienced a delay on their surveyed journey.

The trend here is basically the converse of that shown in Figure 5.3: during the early 2000s, reported delays were much more prevalent in England than Wales or Scotland. Over time this has converged somewhat, as while delays have fallen in Scotland and Wales, they have done so at a faster rate in England. Scotland had the lowest frequency of reported delays for much of the time series, but since 2010 the rate in Wales and Scotland have been very similar.

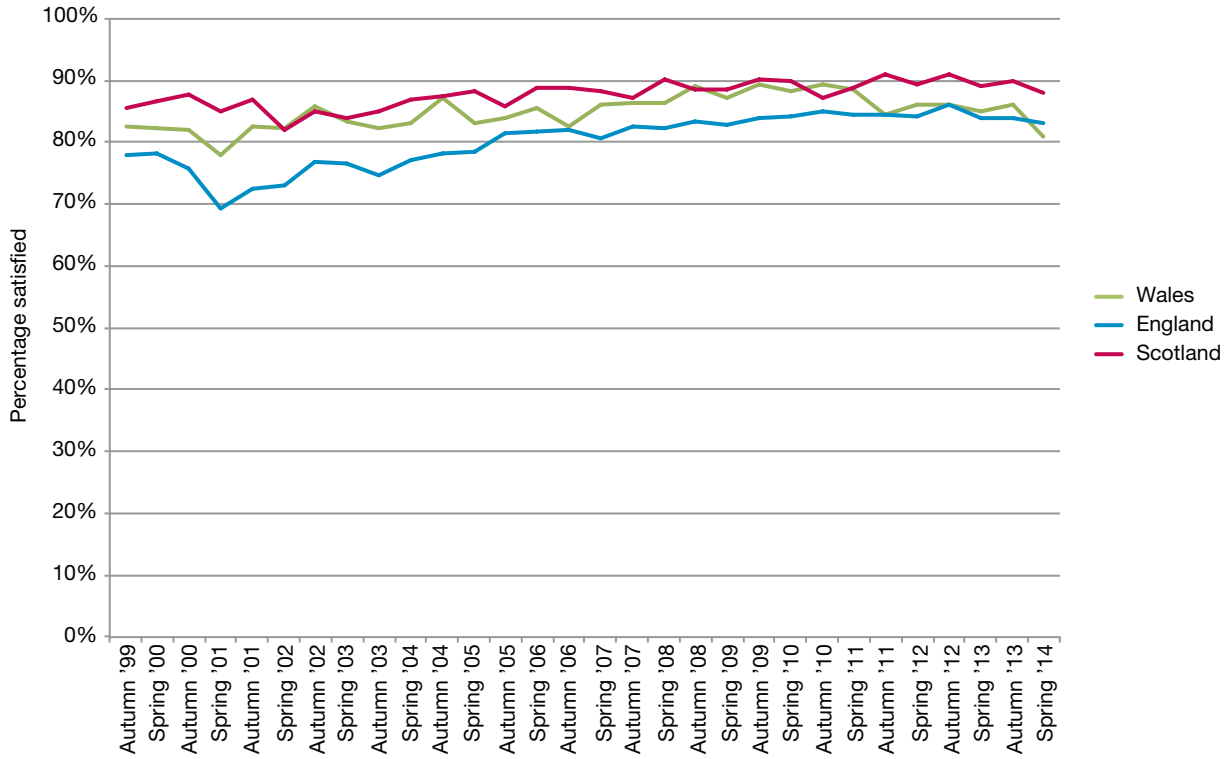
Figure 5.4: Percentage of rail passengers who report experiencing a delay during their journey, by country



Source: NRPS

Next, Figure 5.5 illustrates passengers' assessments of whether they are satisfied with the 'length' (i.e. the duration) of their journey. Here, England has performed consistently worse than Wales or Scotland. In the early periods and also more recently (since 2011), Scotland had the highest satisfaction levels, but between 2008 and 2010 Wales and Scotland recorded similar satisfaction levels. The long-term trend in England has been an increase over time. In Wales, however, satisfaction with journey duration dropped in the early 2010s and has now recovered the peak level of the late 2000s decade.

Figure 5.5: Rail passenger rate of satisfaction with the length (duration) of their journey, by country

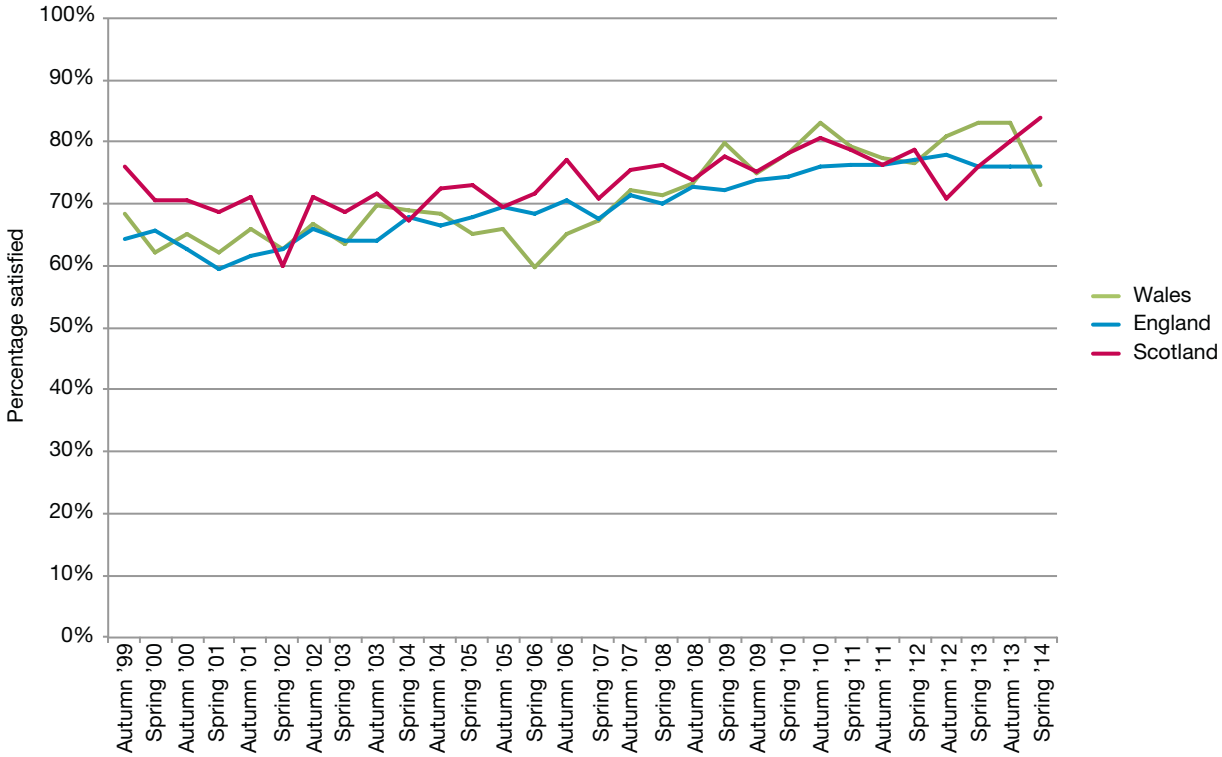


Source: NRPS

Figure 5.6 shows levels of passenger satisfaction with connecting rail services. In all three countries the trend has been upwards.

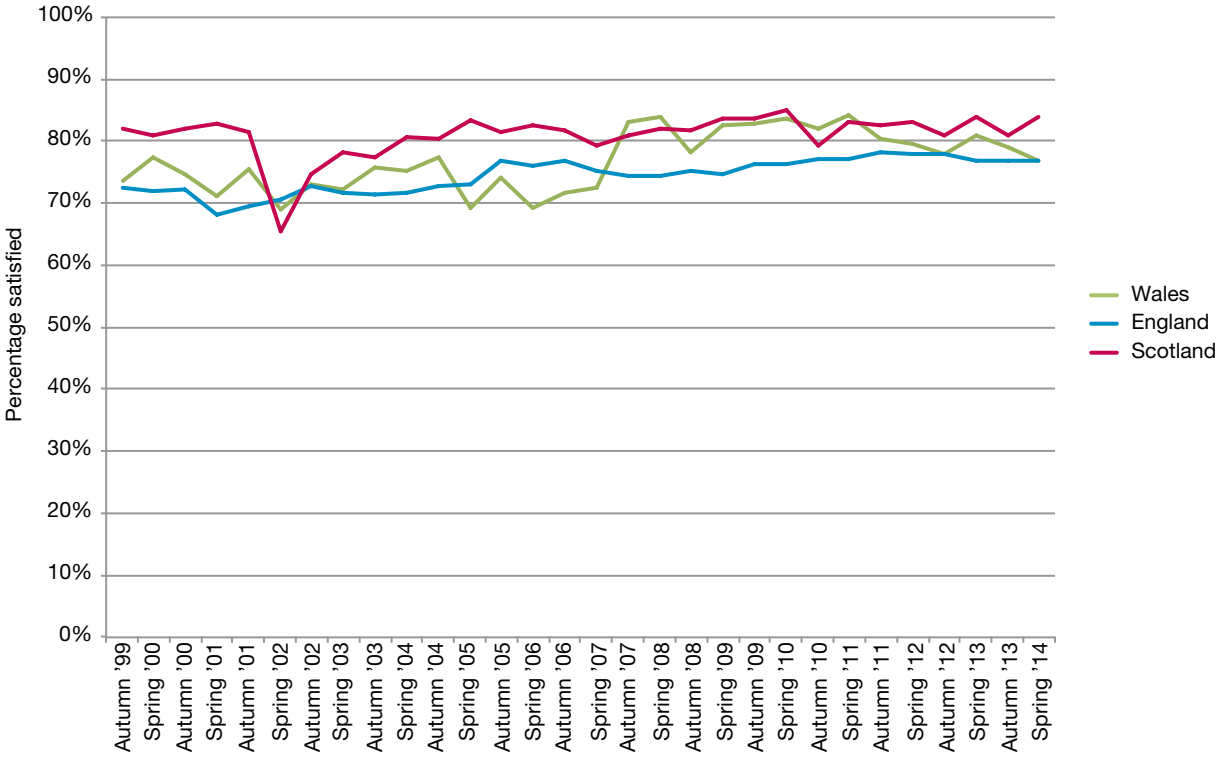
Interestingly, however, the trend in satisfaction with rail service frequency (shown in Figure 5.7) has been much flatter (and seems to have fallen marginally in Wales in the early 2010s). Rail passengers are reporting rising satisfaction with punctuality, but more or less stable levels of satisfaction with the frequency of trains. Since around 2007 the rate of satisfaction with service frequency in Wales has been near to level with the rate in Scotland (owing to a marked improvement in the former in late 2007), both of which tend to be higher than the rate for England.

Figure 5.6: Rail passenger rate of satisfaction with the connections on their journey, by country



Source: NRPS

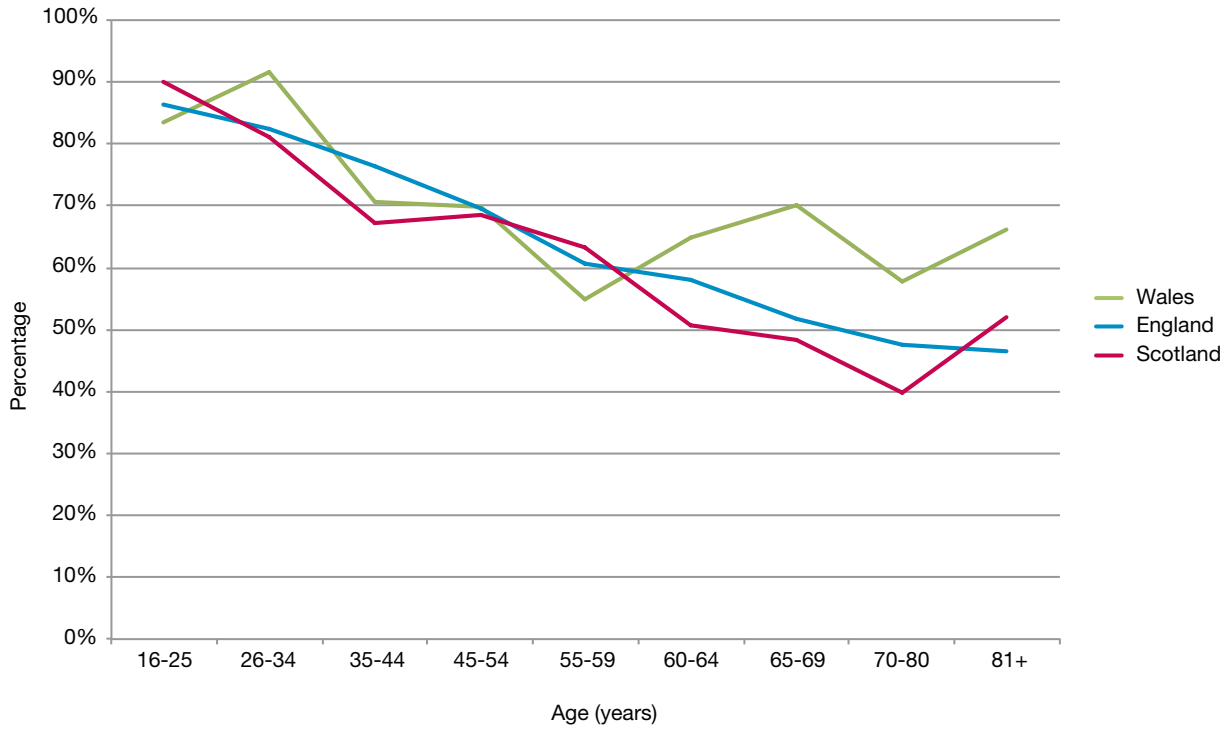
Figure 5.7: Rail passenger rate of satisfaction with the frequency of rail service, by country



Source: NRPS

Figure 5.8 shows (from the autumn 2011 survey) how the percentage of rail travellers who reported making phone calls or sending text messages during their journey generally decreases with age. Rates in all three countries are broadly similar until around age 60, above which the rate for rail passengers in Wales is somewhat higher than that in Scotland or in England.

Figure 5.8: Percentage of rail passengers who made phone calls or sent texts during their journey, by age and country (autumn 2011)

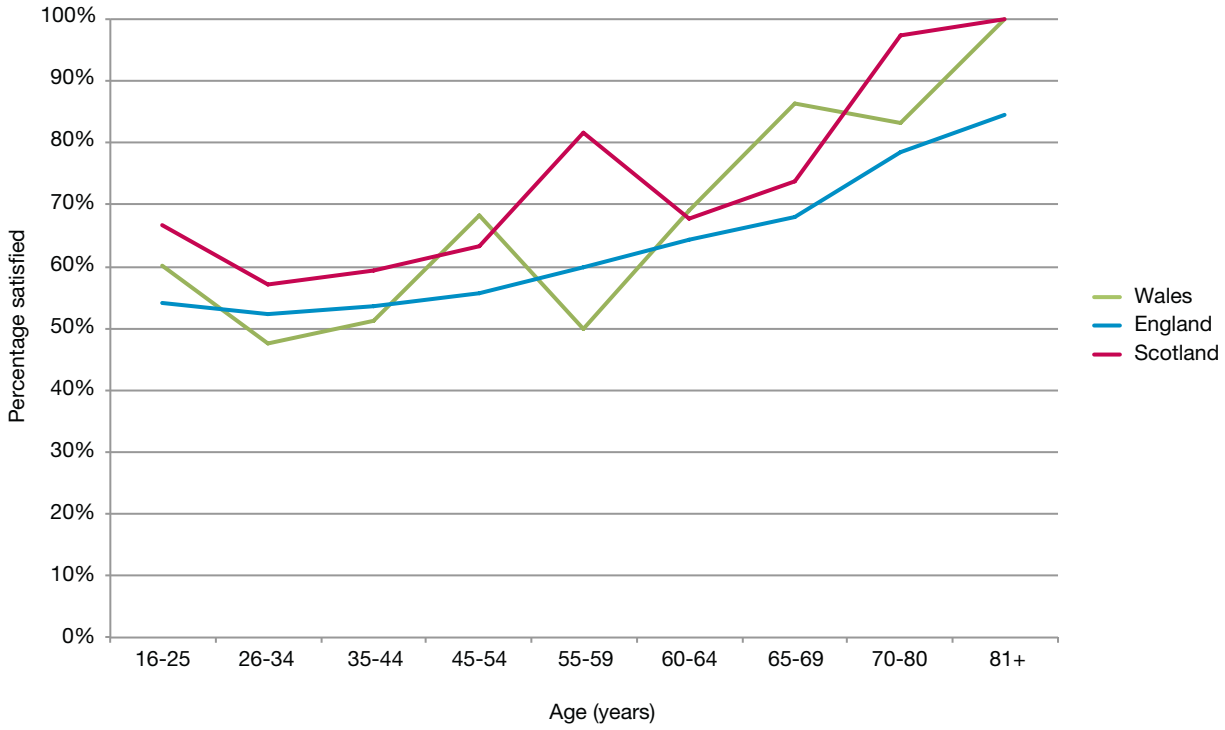


Source: NRPS

Figure 5.9 shows that there is an opposite relationship, i.e. a positive one, between age and satisfaction with mobile phone reception. Satisfaction is generally lowest amongst English respondents (for six of the nine age groups), although Wales has the lowest satisfaction scores for three age groups – and is highest for three of the nine age groups.

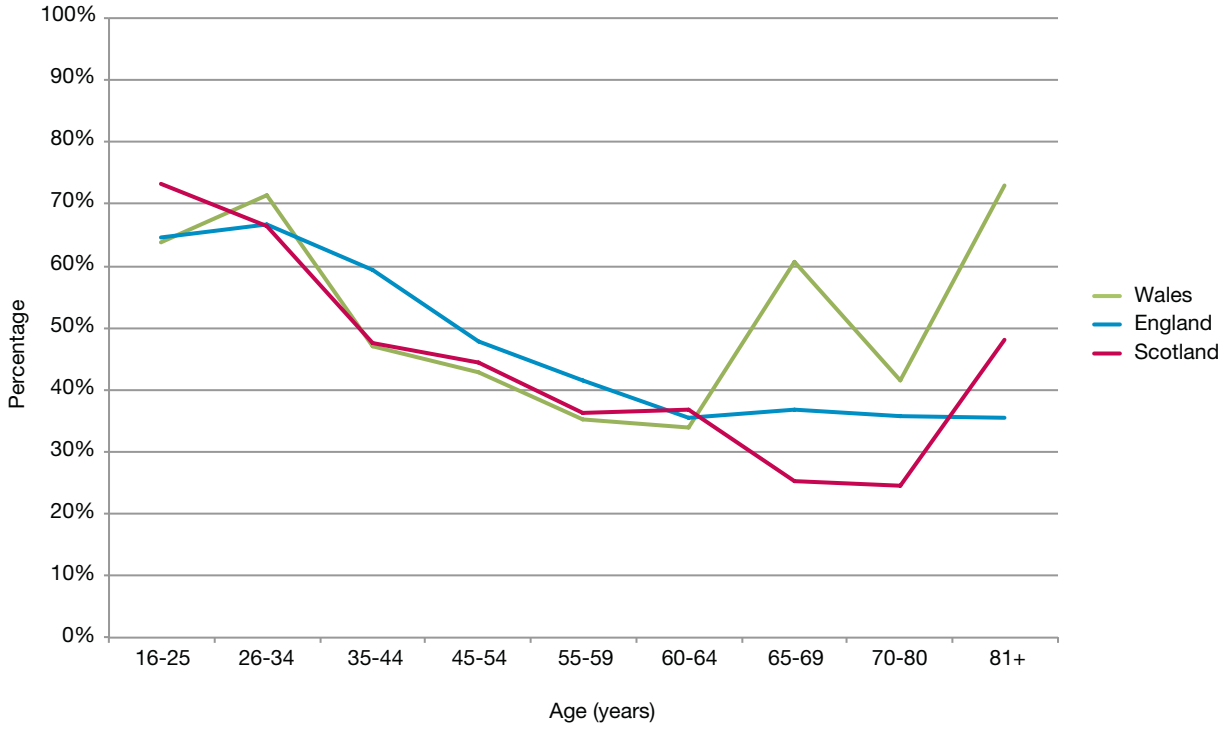
Figure 5.10 shows the extent of use of mobile data services. As with the users of mobile phones for phone calls and text messages, the percentage of travellers using data services is higher amongst young adults. But the rate is lower: up to 90% of 16- to 25-year-olds reported making phone calls or sending text messages, but only around 65–70% of that age group said that they used mobile data services. Interestingly, reported use of mobile data services increases in Wales among those over 65 years old, and for those aged 81+ is slightly higher than for many young adults.

Figure 5.9: Rail passenger rate of satisfaction with mobile phone reception, by age and country (autumn 2011)



Source: NRPS

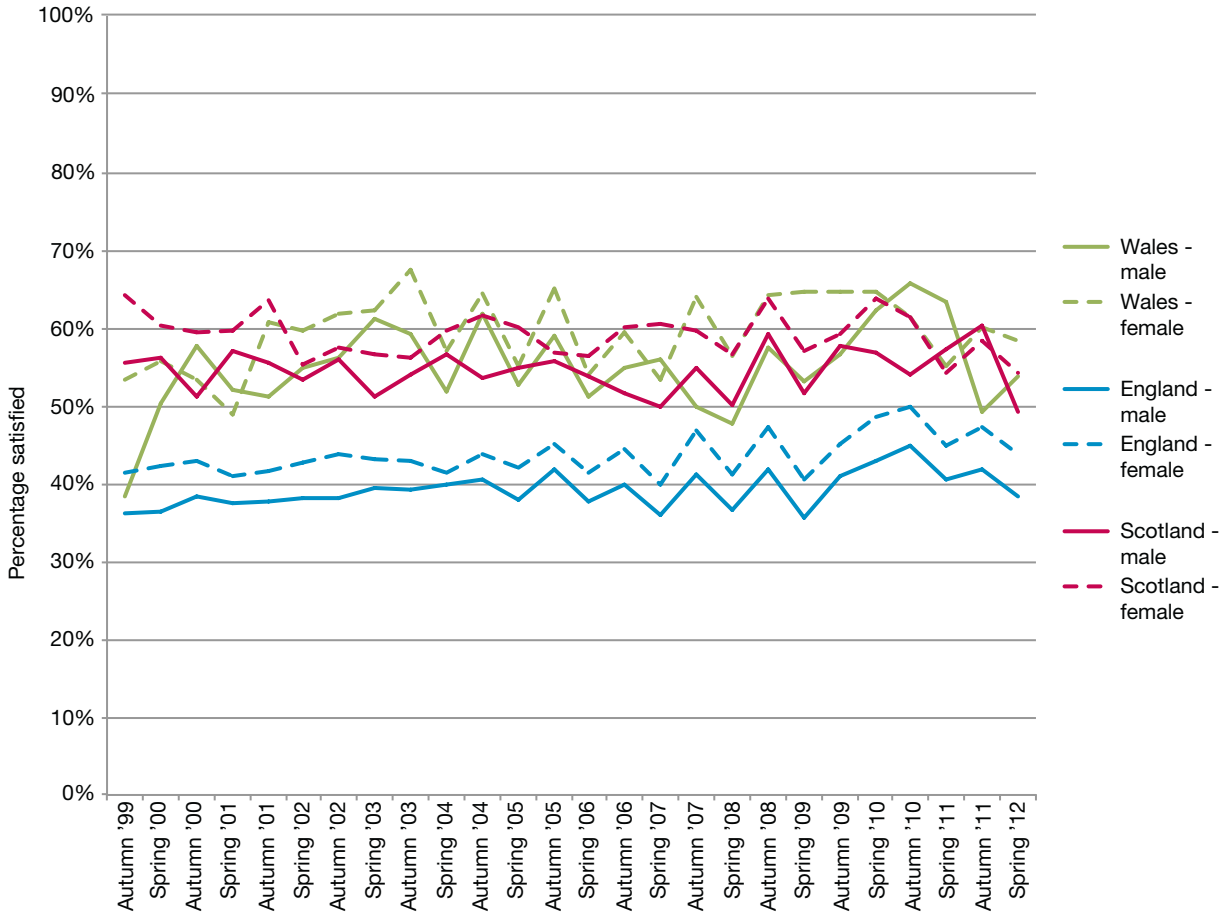
Figure 5.10: Percentage of rail passengers who report using mobile data services during their journey, by country (autumn 2011)



Source: NRPS

Finally, this analysis of NRPS data looks at how satisfaction with rail ticket prices varies over time by gender in each country (see Figure 5.11). There has been relatively little change over time in the rates, but there are noteworthy differences across gender and country. Women tend to report higher rates of satisfaction with price than men, and a larger percentage of rail passengers in Scotland and Wales generally report that they are satisfied with price than in England. This might be associated with differences in the mix of trips by journey purpose.

Figure 5.11: Rail passenger rate of satisfaction with the price of their journey, by gender and country



Source: NRPS

6. Road Traffic Estimates and Public Transport Patronage Counts in Wales

A further source of information on travel trends in Wales can be found in the data collected by highway authorities and public transport operators, which is subject to brief analysis in this chapter.

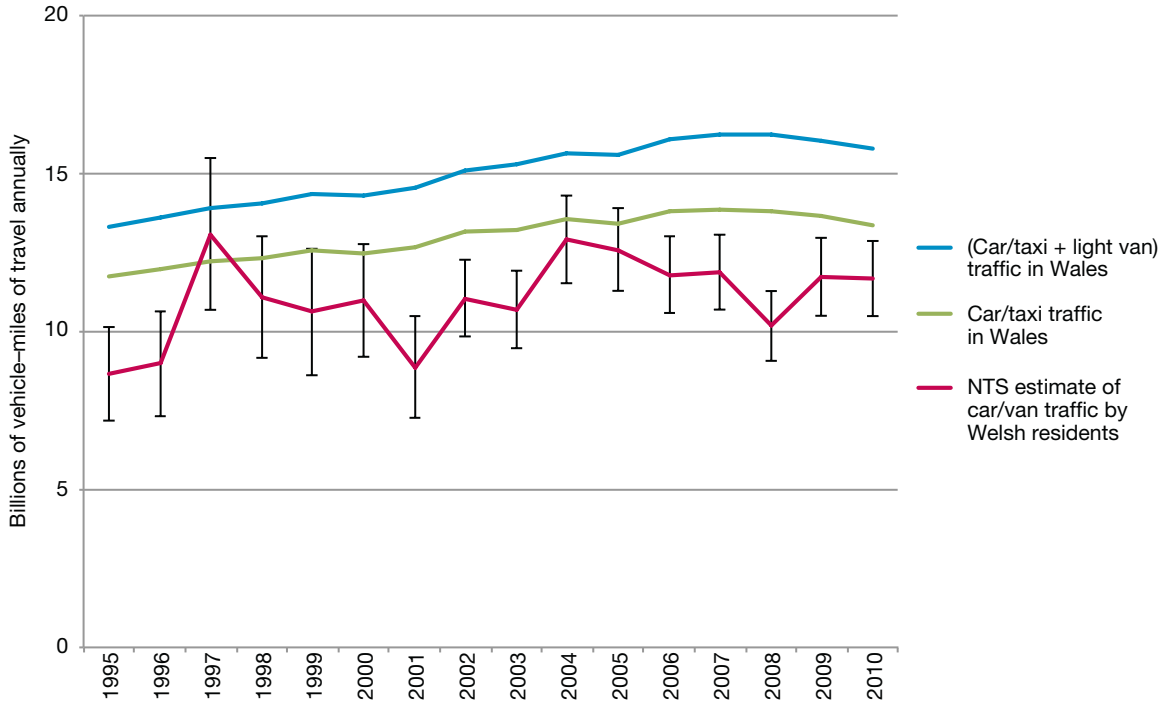
It is worth noting that the various methods of estimating traffic levels and numbers of public transport journeys are subject to known differences in comparison with the NTS. For instance, it is known that ticketless public transport journeys are not tracked as precisely as journeys for which a single-journey ticket was purchased.

6.1 Comparisons between estimates from NTS and count data

First we compare the estimates from this count data with the grossed-up diary data provided by the NTS and used for the detailed analyses presented in Section 2.

Figure 6.1 compares traffic mileage estimates from the NTS with roadside count values. The NTS values include all driving mileage by Welsh residents in cars and vans, with the main exception being when they are used to transport goods. It thus includes mileage by Welsh residents partly or wholly outside Wales, but excludes mileage in Wales by non-Welsh drivers; the NTS values also exclude taxi mileage. Conversely, the road traffic counting technology does not distinguish between private cars and taxis, so they are shown combined, together with an estimate of mileage which includes all light van traffic; further, the technology cannot distinguish between Welsh and non-Welsh drivers.

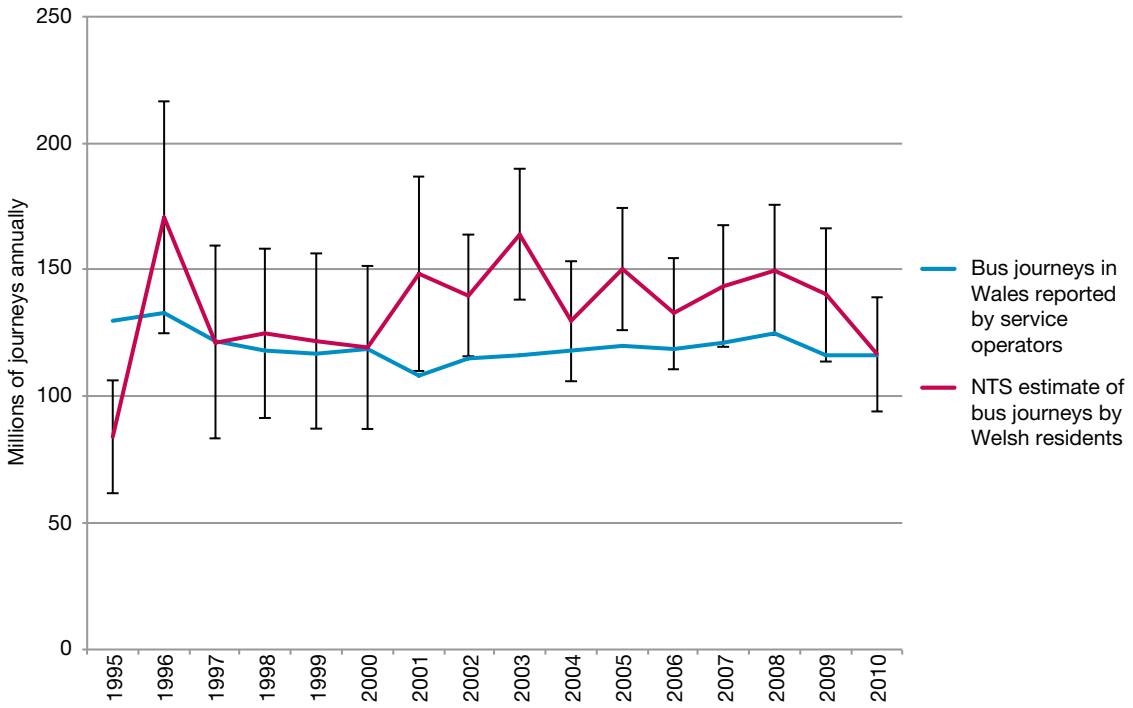
Figure 6.1: Comparison of vehicle mileage estimates from NTS and roadside counts in Wales



Source: NTS, DfT (2014) (error bars: 95% confidence interval)

While the trends are similar, the NTS estimates of driving mileage are systematically lower than the road traffic counts (with one minor exception in 1997), which is a typical finding when comparing these two datasets in Britain. It is thought that this is because the NTS excludes most types of commercial travel, whereas the traffic-counting methodology used to estimate road traffic captures both personal and commercial travel. In line with wider experience across Great Britain, road traffic mileage has levelled off since the mid-2000s, but van traffic has been growing throughout.

Figure 6.2: Comparison of bus ticket sales in Wales and bus trips in NTS

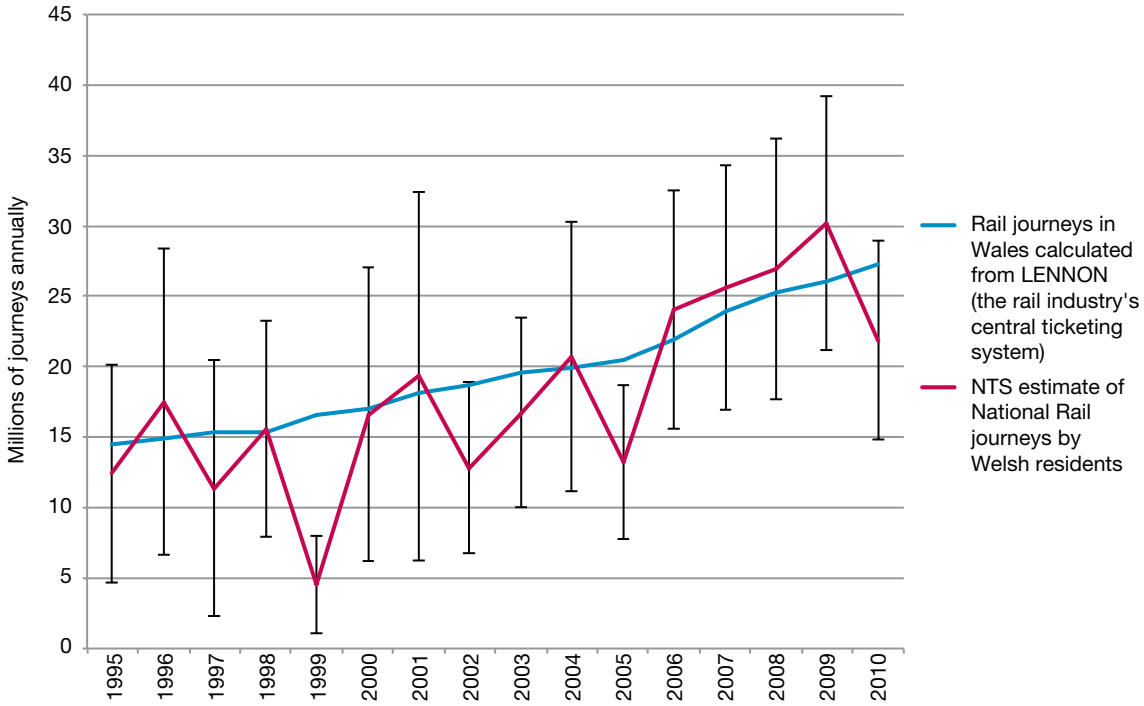


Source: NTS, DfT (2012) (error bars: 95% confidence interval)

Figure 6.2 compares reported bus ticket sales in Wales and bus trips reported by NTS Welsh residents in their seven-day diaries. Here we generally see a good agreement between the two data sources, but with the NTS generally reporting higher trip rates since 2001. In the period since 2001, however, neither time series shows any strong upward or downward trend. The Department for Transport compiles the estimates of bus journeys from individual local bus service operators, and it is known that under-reporting of journeys by the operators occurs, particularly for ticketless passengers or passengers with multi-journey tickets.

Finally, looking at rail, Figure 6.3 compares estimates of reported Welsh rail ticket sales and estimated trip rates from the NTS Welsh residents' diaries. It is in this mode that we can see the closest agreement between the two data sources in terms of the overall level of journeys made. There are, however, very wide confidence intervals for the NTS data owing to the small sample size, and the combination of the spatially clustered nature of the NTS sample and the relatively small number of railway stations in Wales.

Figure 6.3: Comparison of rail ticket sales in Wales and train trips in NTS

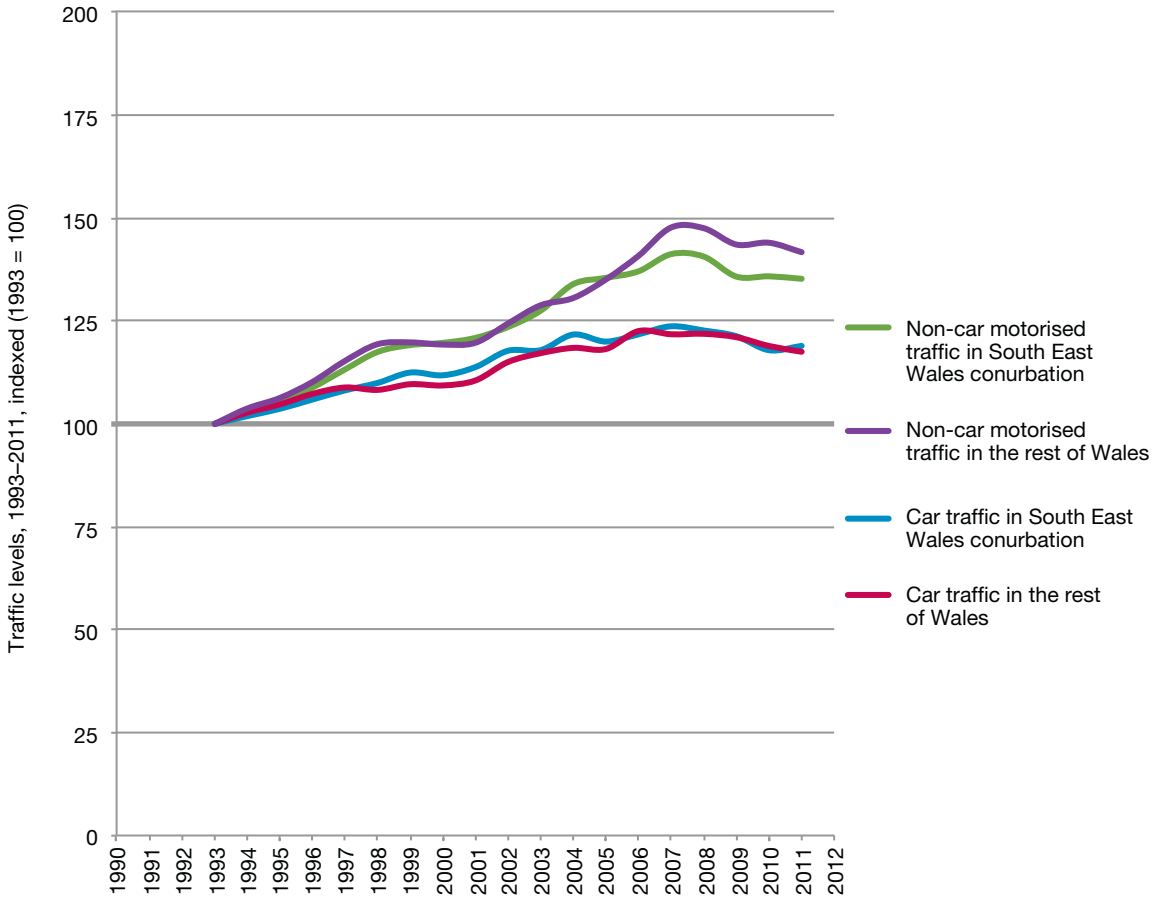


Source: NTS, ORR (2012) (error bars: 95% confidence interval)

6.2 Trends in road traffic by area of Wales

Figure 6.4 shows trends in car/taxi and other road traffic in Wales, indexed to 1993, distinguishing between the South East Wales conurbation and the rest of Wales.

Figure 6.4: Trends in road traffic mileage in the South East Wales conurbation and elsewhere in Wales



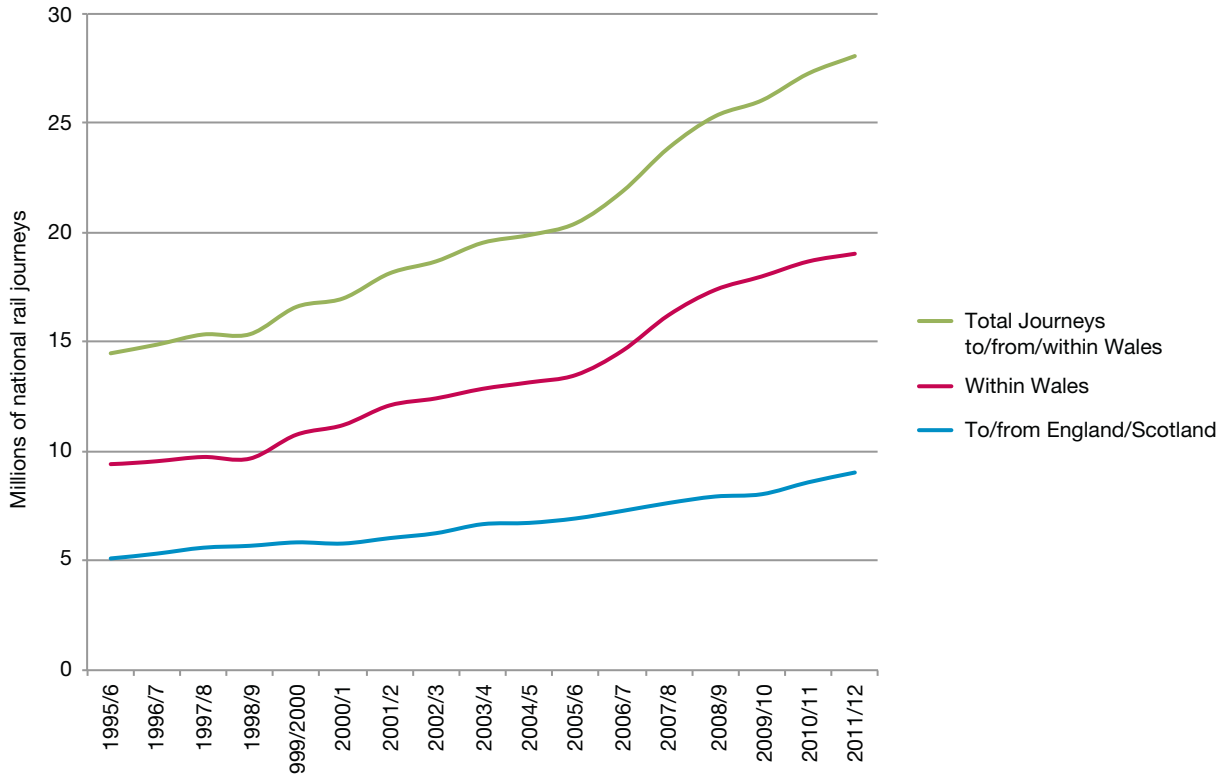
Source: DfT (2014)

The trend in car/taxi traffic is the same in both regions of Wales and has levelled off since the mid-2000s, as was observed in Figure 6.1. Non-car traffic has generally grown at a faster rate, although also subject to a levelling off since the recession of 2007. In recent years it seems that non-car traffic has declined more in the South East Wales conurbation than in the rest of the country.

6.3 Trends in rail traffic in Wales

Figure 6.5 shows the growth in rail journeys in Wales since 1995/6, distinguishing between those with both an origin and destination in Wales and those to/from England or Scotland.

Figure 6.5: Trends in rail journeys within and to/from Wales



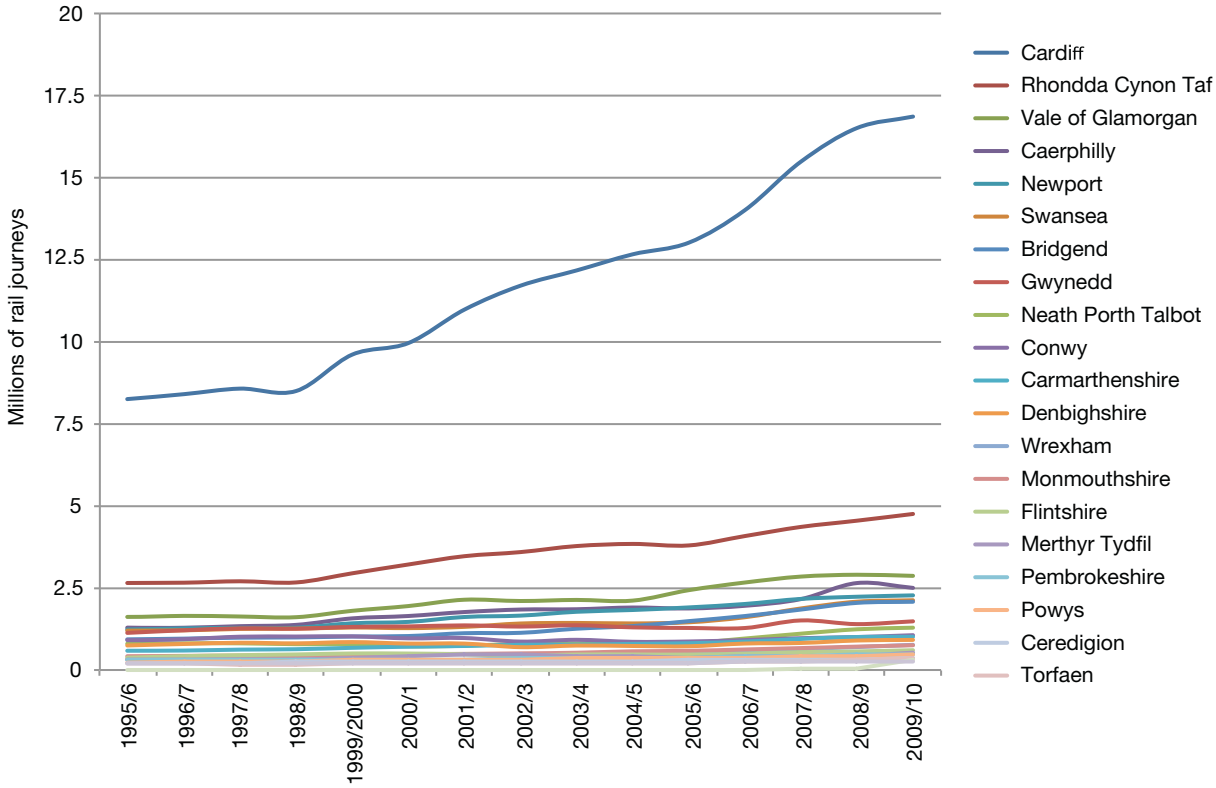
Source: ORR (2012)

Overall, there has been a doubling of rail journey numbers since 1995/6, up from 14 million to 28 million. Slightly more than half this growth is attributed to trips wholly within Wales, and just under half to the growth in rail trips to/from Wales.

A more detailed geographical breakdown is provided in Figure 6.6, which shows rail journey numbers by Wales' local authorities. Here we can see that the highest traffic levels and rates of growth are to be found in Rhondda Cynon Taf, with the sharp demand increases in 1998/9 and 2005/6 associated with increases in supply – both capacity and coverage. The next most rapid increase has been in the Vale of Glamorgan, and high growth rates can also be observed in other local authorities in the South of Wales, in particular.

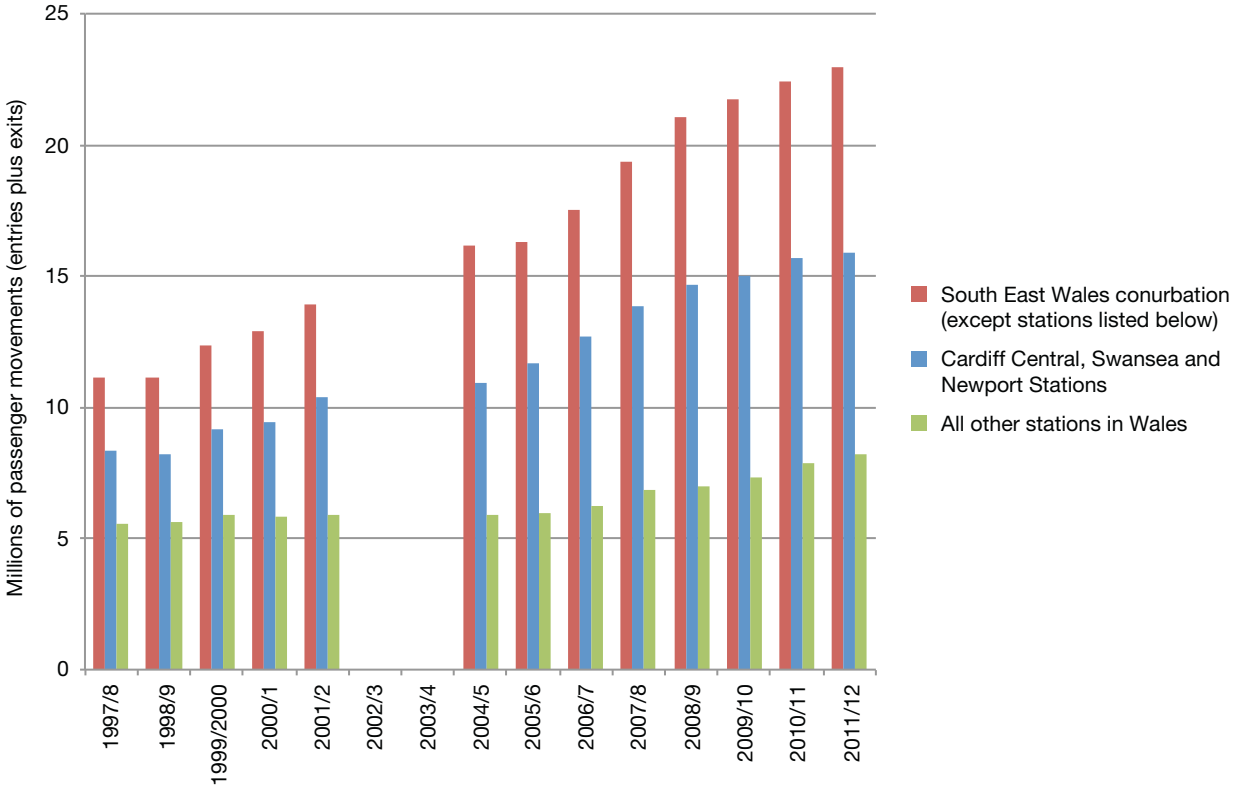
The major growth areas can be seen more clearly in Figure 6.7, which groups rail trips in Wales into three categories: Cardiff Central, Swansea and Newport mainline stations, other stations in the South East Wales conurbation, and other rail stations in Wales.

Figure 6.6: Trends in rail journeys, by Welsh local authority



Source: ORR (2012)

Figure 6.7: Trends in rail journeys in Wales in three categories[13]



Source: ORR (2012)

Here we can see that most of the growth has been in South East Wales, with rail traffic at the three main urban stations doubling between 1997/8 and 2011/12, and increasing at a slightly higher rate at the other stations in the South East Wales conurbation. In the rest of Wales, rail traffic levels were relatively stagnant between 1997/8 and 2005/6, since when they have grown steadily, by around 40% in six years.

Overall, in contrast to road, there is no evidence of any impact of the 2007 recession on the growth in rail travel in Wales.

13 The data format of station-level passenger count data varies; data years 2002/3 and 2003/4 were not processed in this analysis.

7. Conclusions

This report has examined trends in personal travel in Wales between 1995 and 2010, using a variety of sources:

1. the British National Travel Survey (NTS), in Section 2, to look at trends in car driving, bus and rail use in Wales;
2. evidence on trends in Welsh commuting patterns from the 2001 and 2011 Census of Population, in Section 4;
3. trends in passenger satisfaction with rail journeys on the Welsh network, in Section 5; and
4. a comparison of travel trends from the NTS survey with traffic counts and bus and rail operator statistics, in Section 6.

Many of the trends are similar to those found in the *On the Move* report (Le Vine & Jones, 2012), which examined travel patterns in Great Britain (GB) as a whole. In particular, the levelling off in car driving since the 2000s, and the steady growth in rail travel since the 1990s, have been seemingly unaffected by the recession in 2007.

Where differences have been found between the Welsh data and the GB averages, the effect has been mainly to reduce disparities over time between personal travel in Wales and in the rest of Great Britain. For example, journeys per year in Wales have remained stable over time, while the GB rates have steadily dropped to currently match the Wales average; and average annual travel times in Wales have increased over time, to values that are now close to those seen across GB.

The main causes of reductions in car-driving mileage among certain population groups in GB were the trend-breaking reduction in car driving among men in their twenties, and a sharp fall in company car mileage among older groups of male drivers. In contrast to the situation in Great Britain as a whole, where car driving by males in their twenties dropped by about 1,900 miles per year between 1995/9 and 2005/7, in Wales the reduction was of only around 300 miles; there has, however, been a steep drop in Wales since the start of the recession – of 1,300 miles between 2005/7 and 2008/10 (albeit with a

wide confidence interval). Reductions in company car mileage are observed in Wales, but are less marked in Wales than in Great Britain as a whole, which seems to be attributable to the smaller proportion of 'Employer/manager' and 'Professional' workers in the country than across all GB, whose mileage fell just as sharply within Wales as in Great Britain as a whole.

When it comes to rail travel, we find the strongest growth taking place in business mileage and for the purpose of visiting friends and relatives in private homes – the latter seems to be associated with a large increase in rail travel by students. The strongest growth rates overall are to be found in the South East Wales conurbation, although there have been sharp increases in passenger numbers in the rest of Wales since the mid-2000s. Rates of satisfaction with rail services in Wales are generally higher than in England, and have increased since the mid/late-2000s.

The authors hope that this report will be of interest to transport policymakers in Wales and the wider community of interested parties. It is hoped that a better understanding of recent trends in personal mobility will form useful input to future transport policy and investment decisions.

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Appendix A

Definitions of Journey Purposes in the National Travel Survey

The following are the detailed definitions of journey purposes used to classify journeys in the *National Travel Survey* datasets.[14]

The purpose of a trip is normally taken to be the activity at the destination, unless that destination is 'home' in which case the purpose is defined by the origin of the trip. The classification of trips to 'work' is also dependent on the origin of the trip. Purposes include:

Commuting – trips to a usual place of work from home, or from work to home.

Business – personal trips in course of work, including a trip in course of work back to work. This includes all work trips by people with no usual place of work (e.g. site workers) and those who work at or from home.

Other work – trips to work from a place other than home or in course of work, e.g. coming back to work from going to the shops during a lunch break. In most tables this is included with 'personal business'.

Education – trips to school or college, etc. by full-time students, students on day release and part-time students following vocational courses.

Shopping – all trips to shops or from shops to home, even if there was no intention to buy.

Personal business – visits to services, e.g. hairdressers, launderettes, dry-cleaners, betting shops, solicitors, banks, estate agents, libraries, churches; or for medical consultations or treatment; or for eating and drinking, unless the main purpose was entertainment or social.

Social or entertainment – visits to meet friends, relatives, or acquaintances, both at someone's home or at a pub, restaurant, etc.; all types of entertainment or sport, clubs, and voluntary work, non-vocational evening classes, political meetings, etc.

Holidays or day trips – trips (within GB) to or from any holiday (including stays of 4 or more nights with friends or relatives), or trips for pleasure (not otherwise classified as social or entertainment) within a single day.

14 Department for Transport (2013)

Just walk – walking trips for pleasure or exercise along public highways, including taking the dog for a walk and jogging.

Escort trips – used when the traveller has no purpose of his or her own, other than to escort or accompany another person; for example, taking a child to school. 'Escort commuting' is escorting or accompanying someone from home to work or from work to home. Similarly, other escort purposes are related to the purpose of the person being escorted. Note that the purpose of a trip for a small child accompanying older children to school would be 'escort education'.

Appendix B

Tables for Proof-of-Concept Analysis for Proposed Method of Monitoring Welsh Travel Trends

Table B1: Average NTS-diary car-driving mileage (journeys) for each of 112 classes of people as observed in England in 2009/10 NTS (columns 'F' and 'H') and to be applied to Welsh residents to estimate future-year car-driving mileage using a stated frequency-of-car-use question (columns 'G' and 'I')

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Sex	Age group	Settlement size	Stated frequency of private car use	Percentage of Welsh residents in NTS sample	Average **weekly** car-driving mileage by residents of England (std. error in brackets)	Estimate of **annual** car-driving mileage to be used to predict mileage by residents of Wales (Column F multiplied by 0.975 adjustment factor, and grossed up to annual level with a factor of 52.14)	Average number of **weekly** car-driving journeys by residents of England (std. error in brackets)	Estimate of **annual** car-driving journeys to be used to predict journeys by residents of Wales (Column H multiplied by 0.969 adjustment factor, and grossed up to annual level with a factor of 52.14)
Male	16 and under	Up to 25K population	Three or more times a week	6.1%	0 (0)	7	0 (0)	1
Male	16 and under	Up to 25K population	Once or twice a week	1.7%	0 (0)	1	0 (0)	0
Male	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.2%	0 (0)	0	0 (0)	0
Male	16 and under	Up to 25K population	Once or twice a month	0.4%	0 (0)	0	0 (0)	0

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Male	16 and under	Up to 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0
Male	16 and under	Up to 25K population	Less than once a year or never	0.3%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Three or more times a week	1.1%	0 (0)	2	0 (0)	0
Male	16 and under	Over 25K population	Once or twice a week	0.2%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Less than once per week, more than twice a month	0.0%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Once or twice a month	0.0%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Less than once a month, more than twice a year	0.1%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0
Male	16 and under	Over 25K population	Less than once a year or never	0.0%	0 (0)	0	0 (0)	0
Male	17 to 40	Up to 25K population	Three or more times a week	10.2%	148 (4)	7,526	13 (0)	651
Male	17 to 40	Up to 25K population	Once or twice a week	1.0%	33 (4)	1,681	3 (0)	158

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.6%	20 (10)	1,034	1 (0)	65
Male	17 to 40	Up to 25K population	Once or twice a month	0.5%	5 (3)	242	1 (0)	28
Male	17 to 40	Up to 25K population	Less than once a month, more than twice a year	0.1%	0 (0)	0	0 (0)	0
Male	17 to 40	Up to 25K population	Once or twice a year	0.1%	5 (4)	271	1 (0)	34
Male	17 to 40	Up to 25K population	Less than once a year or never	0.2%	4 (4)	196	1 (1)	34
Male	17 to 40	Over 25K population	Three or more times a week	1.4%	109 (4)	5,562	11 (0)	584
Male	17 to 40	Over 25K population	Once or twice a week	0.8%	22 (3)	1,104	2 (0)	110
Male	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.3%	13 (4)	647	1 (0)	52
Male	17 to 40	Over 25K population	Once or twice a month	0.4%	4 (2)	218	0 (0)	24
Male	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.1%	3 (2)	150	0 (0)	10
Male	17 to 40	Over 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	17 to 40	Over 25K population	Less than once a year or never	0.1%	4 (3)	193	0 (0)	15
Male	41 to 64	Up to 25K population	Three or more times a week	11.6%	181 (4)	9,196	16 (0)	810
Male	41 to 64	Up to 25K population	Once or twice a week	1.3%	66 (7)	3,348	6 (0)	284
Male	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.3%	33 (11)	1,658	3 (1)	147
Male	41 to 64	Up to 25K population	Once or twice a month	0.3%	5 (4)	253	0 (0)	11
Male	41 to 64	Up to 25K population	Less than once a month, more than twice a year	0.1%	3 (3)	156	0 (0)	17
Male	41 to 64	Up to 25K population	Once or twice a year	0.0%	12 (10)	607	1 (1)	65
Male	41 to 64	Up to 25K population	Less than once a year or never	0.3%	7 (4)	373	2 (1)	85
Male	41 to 64	Over 25K population	Three or more times a week	1.9%	141 (4)	7,187	16 (0)	816
Male	41 to 64	Over 25K population	Once or twice a week	0.1%	60 (7)	3,049	5 (0)	244
Male	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.0%	34 (11)	1,739	2 (0)	85
Male	41 to 64	Over 25K population	Once or twice a month	0.0%	16 (10)	791	1 (0)	32

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Male	41 to 64	Over 25K population	Once or twice a year	0.1%	0 (0)	0	0 (0)	0
Male	41 to 64	Over 25K population	Less than once a year or never	0.1%	3 (2)	155	1 (0)	32
Male	65+	Up to 25K population	Three or more times a week	5.3%	106 (3)	5,406	14 (0)	699
Male	65+	Up to 25K population	Once or twice a week	0.8%	46 (7)	2,328	4 (0)	200
Male	65+	Up to 25K population	Less than once per week, more than twice a month	0.2%	20 (13)	1,008	2 (1)	89
Male	65+	Up to 25K population	Once or twice a month	0.2%	4 (3)	202	0 (0)	16
Male	65+	Up to 25K population	Less than once a month, more than twice a year	0.1%	10 (9)	486	0 (0)	2
Male	65+	Up to 25K population	Once or twice a year	0.0%	10 (9)	500	1 (1)	67
Male	65+	Up to 25K population	Less than once a year or never	0.3%	2 (2)	118	1 (0)	28
Male	65+	Over 25K population	Three or more times a week	0.5%	80 (4)	4,082	13 (0)	678
Male	65+	Over 25K population	Once or twice a week	0.1%	16 (3)	838	3 (0)	154

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	65+	Over 25K population	Less than once per week, more than twice a month	0.0%	8 (4)	384	1 (0)	28
Male	65+	Over 25K population	Once or twice a month	0.0%	2 (1)	82	0 (0)	16
Male	65+	Over 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	19	0 (0)	7
Male	65+	Over 25K population	Once or twice a year	0.0%	9 (9)	466	0 (0)	3
Male	65+	Over 25K population	Less than once a year or never	0.0%	1 (0)	34	0 (0)	16
Female	16 and under	Up to 25K population	Three or more times a week	6.7%	0 (0)	1	0 (0)	0
Female	16 and under	Up to 25K population	Once or twice a week	1.3%	0 (0)	0	0 (0)	0
Female	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.2%	0 (0)	0	0 (0)	0
Female	16 and under	Up to 25K population	Once or twice a month	0.2%	0 (0)	0	0 (0)	0
Female	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Female	16 and under	Up to 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	16 and under	Up to 25K population	Less than once a year or never	0.3%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Three or more times a week	0.8%	0 (0)	1	0 (0)	0
Female	16 and under	Over 25K population	Once or twice a week	0.3%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Less than once per week, more than twice a month	0.0%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Once or twice a month	0.0%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Less than once a month, more than twice a year	0.1%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0
Female	16 and under	Over 25K population	Less than once a year or never	0.0%	0 (0)	0	0 (0)	0
Female	17 to 40	Up to 25K population	Three or more times a week	10.3%	103 (3)	5,257	14 (0)	712
Female	17 to 40	Up to 25K population	Once or twice a week	1.1%	14 (2)	723	2 (0)	89
Female	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.1%	5 (4)	277	0 (0)	21
Female	17 to 40	Up to 25K population	Once or twice a month	0.2%	2 (1)	106	0 (0)	10

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	17 to 40	Up to 25K population	Less than once a month, more than twice a year	0.1%	0 (0)	0	0 (0)	0
Female	17 to 40	Up to 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0
Female	17 to 40	Up to 25K population	Less than once a year or never	0.3%	6 (7)	293	1 (1)	29
Female	17 to 40	Over 25K population	Three or more times a week	1.9%	69 (2)	3,492	12 (0)	586
Female	17 to 40	Over 25K population	Once or twice a week	1.1%	14 (2)	708	2 (0)	76
Female	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.0%	10 (4)	514	1 (0)	40
Female	17 to 40	Over 25K population	Once or twice a month	0.1%	1 (1)	48	0 (0)	9
Female	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.0%	1 (0)	41	0 (0)	11
Female	17 to 40	Over 25K population	Once or twice a year	0.1%	0 (0)	12	0 (0)	2
Female	17 to 40	Over 25K population	Less than once a year or never	0.1%	1 (0)	31	0 (0)	5
Female	41 to 64	Up to 25K population	Three or more times a week	11.4%	103 (2)	5,231	15 (0)	744
Female	41 to 64	Up to 25K population	Once or twice a week	1.5%	19 (3)	965	2 (0)	121

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.2%	9 (4)	449	2 (1)	117
Female	41 to 64	Up to 25K population	Once or twice a month	0.3%	8 (5)	410	0 (0)	22
Female	41 to 64	Up to 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Female	41 to 64	Up to 25K population	Once or twice a year	0.1%	0 (0)	0	0 (0)	0
Female	41 to 64	Up to 25K population	Less than once a year or never	0.2%	0 (0)	0	0 (0)	0
Female	41 to 64	Over 25K population	Three or more times a week	2.0%	71 (2)	3,628	13 (0)	676
Female	41 to 64	Over 25K population	Once or twice a week	0.2%	7 (2)	379	1 (0)	69
Female	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.0%	1 (1)	75	0 (0)	15
Female	41 to 64	Over 25K population	Once or twice a month	0.1%	1 (1)	70	0 (0)	5
Female	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Female	41 to 64	Over 25K population	Once or twice a year	0.0%	0 (0)	0	0 (0)	0

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	41 to 64	Over 25K population	Less than once a year or never	0.0%	5 (2)	278	1 (1)	65
Female	65+	Up to 25K population	Three or more times a week	5.0%	40 (2)	2,018	7 (0)	343
Female	65+	Up to 25K population	Once or twice a week	1.8%	6 (1)	325	1 (0)	56
Female	65+	Up to 25K population	Less than once per week, more than twice a month	0.4%	2 (1)	117	1 (0)	28
Female	65+	Up to 25K population	Once or twice a month	0.5%	0 (0)	19	0 (0)	2
Female	65+	Up to 25K population	Less than once a month, more than twice a year	0.1%	0 (0)	0	0 (0)	0
Female	65+	Up to 25K population	Once or twice a year	0.1%	0 (0)	0	0 (0)	0
Female	65+	Up to 25K population	Less than once a year or never	0.3%	0 (0)	18	0 (0)	5
Female	65+	Over 25K population	Three or more times a week	0.5%	29 (2)	1,476	6 (0)	317
Female	65+	Over 25K population	Once or twice a week	0.2%	4 (1)	203	1 (0)	31
Female	65+	Over 25K population	Less than once per week, more than twice a month	0.1%	2 (1)	91	0 (0)	20
Female	65+	Over 25K population	Once or twice a month	0.1%	0 (0)	0	0 (0)	0

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	65+	Over 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	0	0 (0)	0
Female	65+	Over 25K population	Once or twice a year	0.0%	0 (0)	23	0 (0)	9
Female	65+	Over 25K population	Less than once a year or never	0.0%	0 (0)	0	0 (0)	0

Table B2: Average NTS-diary local bus mileage (journeys) for each of 112 classes of people as observed in England in 2009/10 NTS (columns 'F' and 'H') and to be applied to Welsh residents to estimate future-year local bus mileage using a stated frequency-of-local-bus-use question (columns 'G' and 'I')

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Sex	Age group	Settlement size	Stated frequency of local bus use	Percentage of Welsh residents in NTS sample	Average **weekly** local bus mileage by residents of England (std. error in brackets)	Estimate of **annual** local bus mileage to be used to predict mileage by residents of Wales (Column E multiplied by 1.187 adjustment factor, and grossed up to annual level with a factor of 52.14)	Average number of **weekly** local bus journeys by residents of England (std. error in brackets)	Estimate of **annual** local bus journeys to be used to predict journeys by residents of Wales (Column G multiplied by 0.979 adjustment factor, and grossed up to annual level with a factor of 52.14)
Male	16 and under	Up to 25K population	Three or more times a week	1.6%	19 (2)	966	4 (0)	208
Male	16 and under	Up to 25K population	Once or twice a week	0.7%	7 (1)	333	1 (0)	67
Male	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.3%	3 (1)	157	1 (0)	38
Male	16 and under	Up to 25K population	Once or twice a month	0.7%	2 (1)	110	0 (0)	25
Male	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.5%	2 (1)	111	0 (0)	22
Male	16 and under	Up to 25K population	Once or twice a year	0.7%	2 (1)	103	0 (0)	17

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	16 and under	Up to 25K population	Less than once a year or never	4.8%	1 (0)	62	0 (0)	12
Male	16 and under	Over 25K population	Three or more times a week	0.2%	19 (1)	956	5 (0)	270
Male	16 and under	Over 25K population	Once or twice a week	0.1%	6 (1)	291	1 (0)	69
Male	16 and under	Over 25K population	Less than once per week, more than twice a month	0.2%	5 (1)	256	1 (0)	59
Male	16 and under	Over 25K population	Once or twice a month	0.2%	2 (1)	100	1 (0)	29
Male	16 and under	Over 25K population	Less than once a month, more than twice a year	0.1%	1 (0)	69	0 (0)	22
Male	16 and under	Over 25K population	Once or twice a year	0.1%	1 (0)	27	0 (0)	8
Male	16 and under	Over 25K population	Less than once a year or never	0.6%	1 (0)	65	0 (0)	13
Male	17 to 40	Up to 25K population	Three or more times a week	1.3%	29 (3)	1,472	5 (0)	234
Male	17 to 40	Up to 25K population	Once or twice a week	1.2%	8 (1)	405	2 (0)	82
Male	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.2%	3 (1)	161	1 (0)	31
Male	17 to 40	Up to 25K population	Once or twice a month	0.8%	3 (1)	165	0 (0)	21

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	17 to 40	Up to 25K population	Less than once a month, more than twice a year	0.5%	1 (0)	28	0 (0)	4
Male	17 to 40	Up to 25K population	Once or twice a year	1.6%	0 (0)	22	0 (0)	4
Male	17 to 40	Up to 25K population	Less than once a year or never	7.3%	0 (0)	25	0 (0)	3
Male	17 to 40	Over 25K population	Three or more times a week	0.4%	26 (1)	1,306	6 (0)	287
Male	17 to 40	Over 25K population	Once or twice a week	0.3%	7 (1)	380	2 (0)	82
Male	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.1%	4 (1)	206	1 (0)	47
Male	17 to 40	Over 25K population	Once or twice a month	0.7%	2 (0)	89	0 (0)	22
Male	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.2%	0 (0)	25	0 (0)	7
Male	17 to 40	Over 25K population	Once or twice a year	0.1%	1 (0)	64	0 (0)	13
Male	17 to 40	Over 25K population	Less than once a year or never	1.4%	0 (0)	22	0 (0)	4
Male	41 to 64	Up to 25K population	Three or more times a week	0.7%	25 (3)	1,263	5 (0)	262
Male	41 to 64	Up to 25K population	Once or twice a week	0.6%	8 (2)	404	1 (0)	69

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.5%	5 (2)	240	1 (0)	28
Male	41 to 64	Up to 25K population	Once or twice a month	0.5%	2 (0)	85	0 (0)	13
Male	41 to 64	Up to 25K population	Less than once a month, more than twice a year	0.7%	1 (0)	30	0 (0)	2
Male	41 to 64	Up to 25K population	Once or twice a year	2.1%	0 (0)	11	0 (0)	2
Male	41 to 64	Up to 25K population	Less than once a year or never	8.8%	0 (0)	14	0 (0)	2
Male	41 to 64	Over 25K population	Three or more times a week	0.0%	28 (2)	1,399	6 (0)	322
Male	41 to 64	Over 25K population	Once or twice a week	0.1%	7 (1)	348	2 (0)	83
Male	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.1%	6 (1)	288	1 (0)	56
Male	41 to 64	Over 25K population	Once or twice a month	0.0%	2 (1)	116	1 (0)	32
Male	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.1%	1 (0)	48	0 (0)	13
Male	41 to 64	Over 25K population	Once or twice a year	0.5%	1 (0)	26	0 (0)	5

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	41 to 64	Over 25K population	Less than once a year or never	1.2%	0 (0)	13	0 (0)	2
Male	65+	Up to 25K population	Three or more times a week	0.7%	21 (2)	1,056	5 (0)	244
Male	65+	Up to 25K population	Once or twice a week	0.9%	8 (1)	396	2 (0)	78
Male	65+	Up to 25K population	Less than once per week, more than twice a month	0.2%	5 (1)	238	1 (0)	43
Male	65+	Up to 25K population	Once or twice a month	0.9%	2 (0)	110	0 (0)	18
Male	65+	Up to 25K population	Less than once a month, more than twice a year	0.4%	1 (1)	63	0 (0)	6
Male	65+	Up to 25K population	Once or twice a year	0.7%	4 (2)	188	0 (0)	21
Male	65+	Up to 25K population	Less than once a year or never	2.6%	1 (0)	25	0 (0)	2
Male	65+	Over 25K population	Three or more times a week	0.1%	19 (1)	963	6 (0)	284
Male	65+	Over 25K population	Once or twice a week	0.2%	7 (1)	366	2 (0)	93
Male	65+	Over 25K population	Less than once per week, more than twice a month	0.0%	2 (1)	111	1 (0)	35
Male	65+	Over 25K population	Once or twice a month	0.2%	2 (0)	98	1 (0)	31

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	65+	Over 25K population	Less than once a month, more than twice a year	0.0%	0 (0)	22	0 (0)	3
Male	65+	Over 25K population	Once or twice a year	0.0%	1 (1)	73	0 (0)	12
Male	65+	Over 25K population	Less than once a year or never	0.1%	0 (0)	22	0 (0)	6
Female	16 and under	Up to 25K population	Three or more times a week	1.4%	21 (2)	1,072	5 (0)	247
Female	16 and under	Up to 25K population	Once or twice a week	1.6%	6 (1)	321	1 (0)	64
Female	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.6%	5 (2)	271	1 (0)	45
Female	16 and under	Up to 25K population	Once or twice a month	1.1%	4 (1)	207	1 (0)	35
Female	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.3%	1 (1)	68	0 (0)	14
Female	16 and under	Up to 25K population	Once or twice a year	0.5%	1 (0)	45	0 (0)	9
Female	16 and under	Up to 25K population	Less than once a year or never	3.6%	1 (0)	59	0 (0)	9
Female	16 and under	Over 25K population	Three or more times a week	0.2%	19 (1)	947	6 (0)	284
Female	16 and under	Over 25K population	Once or twice a week	0.2%	5 (1)	274	1 (0)	68

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	16 and under	Over 25K population	Less than once per week, more than twice a month	0.1%	4 (1)	192	1 (0)	55
Female	16 and under	Over 25K population	Once or twice a month	0.2%	1 (0)	59	0 (0)	16
Female	16 and under	Over 25K population	Less than once a month, more than twice a year	0.0%	1 (0)	38	0 (0)	13
Female	16 and under	Over 25K population	Once or twice a year	0.1%	1 (1)	62	0 (0)	13
Female	16 and under	Over 25K population	Less than once a year or never	0.6%	1 (0)	56	0 (0)	14
Female	17 to 40	Up to 25K population	Three or more times a week	1.6%	28 (2)	1,440	5 (0)	267
Female	17 to 40	Up to 25K population	Once or twice a week	1.3%	8 (1)	394	2 (0)	77
Female	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.5%	4 (1)	220	1 (0)	43
Female	17 to 40	Up to 25K population	Once or twice a month	1.0%	2 (1)	110	0 (0)	14
Female	17 to 40	Up to 25K population	Less than once a month, more than twice a year	0.9%	2 (0)	78	0 (0)	12
Female	17 to 40	Up to 25K population	Once or twice a year	1.5%	0 (0)	23	0 (0)	3

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	17 to 40	Up to 25K population	Less than once a year or never	5.5%	0 (0)	22	0 (0)	3
Female	17 to 40	Over 25K population	Three or more times a week	0.4%	24 (1)	1,222	6 (0)	301
Female	17 to 40	Over 25K population	Once or twice a week	0.8%	8 (1)	404	2 (0)	108
Female	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.1%	4 (1)	207	1 (0)	44
Female	17 to 40	Over 25K population	Once or twice a month	0.6%	2 (0)	77	0 (0)	19
Female	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.2%	1 (0)	61	0 (0)	18
Female	17 to 40	Over 25K population	Once or twice a year	0.4%	1 (0)	37	0 (0)	5
Female	17 to 40	Over 25K population	Less than once a year or never	0.9%	1 (0)	34	0 (0)	7
Female	41 to 64	Up to 25K population	Three or more times a week	0.8%	24 (2)	1,227	5 (0)	256
Female	41 to 64	Up to 25K population	Once or twice a week	1.3%	7 (1)	379	1 (0)	71
Female	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.7%	3 (1)	139	1 (0)	31
Female	41 to 64	Up to 25K population	Once or twice a month	1.2%	2 (0)	113	0 (0)	14

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	41 to 64	Up to 25K population	Less than once a month, more than twice a year	1.4%	1 (0)	51	0 (0)	7
Female	41 to 64	Up to 25K population	Once or twice a year	1.6%	0 (0)	18	0 (0)	3
Female	41 to 64	Up to 25K population	Less than once a year or never	7.0%	0 (0)	12	0 (0)	1
Female	41 to 64	Over 25K population	Three or more times a week	0.3%	23 (1)	1,169	6 (0)	309
Female	41 to 64	Over 25K population	Once or twice a week	0.1%	8 (1)	413	2 (0)	120
Female	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.2%	3 (1)	145	1 (0)	46
Female	41 to 64	Over 25K population	Once or twice a month	0.3%	3 (1)	154	1 (0)	35
Female	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.2%	1 (0)	74	0 (0)	18
Female	41 to 64	Over 25K population	Once or twice a year	0.3%	1 (0)	26	0 (0)	5
Female	41 to 64	Over 25K population	Less than once a year or never	0.7%	0 (0)	13	0 (0)	3
Female	65+	Up to 25K population	Three or more times a week	1.4%	24 (1)	1,197	5 (0)	260
Female	65+	Up to 25K population	Once or twice a week	1.4%	11 (1)	579	2 (0)	106

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	65+	Up to 25K population	Less than once per week, more than twice a month	0.4%	6 (2)	300	1 (0)	39
Female	65+	Up to 25K population	Once or twice a month	0.9%	3 (1)	173	0 (0)	24
Female	65+	Up to 25K population	Less than once a month, more than twice a year	0.4%	2 (1)	84	0 (0)	11
Female	65+	Up to 25K population	Once or twice a year	0.4%	0 (0)	23	0 (0)	6
Female	65+	Up to 25K population	Less than once a year or never	2.4%	1 (0)	26	0 (0)	3
Female	65+	Over 25K population	Three or more times a week	0.1%	23 (1)	1,188	6 (0)	317
Female	65+	Over 25K population	Once or twice a week	0.0%	9 (1)	466	3 (0)	127
Female	65+	Over 25K population	Less than once per week, more than twice a month	0.3%	2 (1)	112	1 (0)	37
Female	65+	Over 25K population	Once or twice a month	0.2%	3 (1)	132	1 (0)	30
Female	65+	Over 25K population	Less than once a month, more than twice a year	0.0%	1 (0)	32	0 (0)	4
Female	65+	Over 25K population	Once or twice a year	0.1%	1 (0)	40	0 (0)	12
Female	65+	Over 25K population	Less than once a year or never	0.1%	1 (1)	69	0 (0)	6

Table B3: Average NTS-diary rail mileage (journeys) for each of 112 classes of people as observed in England in 2009/10 NTS (columns 'F' and 'H') and to be applied to Welsh residents to estimate future-year rail mileage using a stated frequency-of-rail-use question (columns 'G' and 'I')

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Sex	Age group	Settlement size	Stated frequency of rail use	Percentage of Welsh residents in NTS sample	Average **weekly** rail mileage by residents of England (std. error in brackets)	Estimate of **annual** rail mileage to be used to predict mileage by residents of Wales (Column E multiplied by 0.794 adjustment factor, and grossed up to annual level with a factor of 52.14)	Average number of **weekly** rail journeys by residents of England (std. error in brackets)	Estimate of **annual** rail journeys to be used to predict journeys by residents of Wales (Column G multiplied by 0.816 adjustment factor, and grossed up to annual level with a factor of 52.14)
Male	16 and under	Up to 25K population	Three or more times a week	0.2%	38 (13)	1,949	4 (1)	197
Male	16 and under	Up to 25K population	Once or twice a week	0.3%	14 (6)	713	1 (0)	35
Male	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.1%	12 (8)	635	0 (0)	14
Male	16 and under	Up to 25K population	Once or twice a month	0.6%	7 (2)	351	0 (0)	10
Male	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.7%	2 (1)	95	0 (0)	5
Male	16 and under	Up to 25K population	Once or twice a year	1.3%	1 (0)	37	0 (0)	2

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	16 and under	Up to 25K population	Less than once a year or never	5.5%	1 (0)	58	0 (0)	1
Male	16 and under	Over 25K population	Three or more times a week	0.0%	26 (6)	1,309	3 (1)	175
Male	16 and under	Over 25K population	Once or twice a week	0.0%	6 (2)	307	1 (0)	34
Male	16 and under	Over 25K population	Less than once per week, more than twice a month	0.0%	5 (3)	273	0 (0)	15
Male	16 and under	Over 25K population	Once or twice a month	0.1%	5 (1)	273	0 (0)	14
Male	16 and under	Over 25K population	Less than once a month, more than twice a year	0.1%	3 (1)	134	0 (0)	5
Male	16 and under	Over 25K population	Once or twice a year	0.3%	1 (0)	66	0 (0)	4
Male	16 and under	Over 25K population	Less than once a year or never	0.9%	1 (0)	42	0 (0)	2
Male	17 to 40	Up to 25K population	Three or more times a week	0.2%	169 (16)	8,607	6 (0)	315
Male	17 to 40	Up to 25K population	Once or twice a week	0.3%	45 (10)	2,306	1 (0)	65
Male	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.7%	37 (12)	1,879	1 (0)	59
Male	17 to 40	Up to 25K population	Once or twice a month	1.4%	17 (3)	845	0 (0)	13

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	17 to 40	Up to 25K population	Less than once a month, more than twice a year	1.6%	4 (1)	224	0 (0)	5
Male	17 to 40	Up to 25K population	Once or twice a year	2.3%	4 (1)	203	0 (0)	4
Male	17 to 40	Up to 25K population	Less than once a year or never	6.1%	2 (1)	107	0 (0)	2
Male	17 to 40	Over 25K population	Three or more times a week	0.1%	99 (9)	5,014	5 (0)	279
Male	17 to 40	Over 25K population	Once or twice a week	0.0%	37 (6)	1,889	2 (0)	77
Male	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.1%	36 (9)	1,853	1 (0)	45
Male	17 to 40	Over 25K population	Once or twice a month	0.7%	14 (3)	692	0 (0)	25
Male	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.5%	16 (3)	800	0 (0)	16
Male	17 to 40	Over 25K population	Once or twice a year	0.8%	4 (1)	195	0 (0)	8
Male	17 to 40	Over 25K population	Less than once a year or never	0.9%	3 (1)	134	0 (0)	5
Male	41 to 64	Up to 25K population	Three or more times a week	0.3%	241 (22)	12,242	7 (0)	341
Male	41 to 64	Up to 25K population	Once or twice a week	0.3%	78 (13)	3,966	1 (0)	68

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.1%	23 (7)	1,175	0 (0)	18
Male	41 to 64	Up to 25K population	Once or twice a month	0.6%	13 (3)	649	0 (0)	13
Male	41 to 64	Up to 25K population	Less than once a month, more than twice a year	2.4%	7 (2)	352	0 (0)	7
Male	41 to 64	Up to 25K population	Once or twice a year	3.5%	3 (1)	133	0 (0)	2
Male	41 to 64	Up to 25K population	Less than once a year or never	6.7%	1 (0)	38	0 (0)	1
Male	41 to 64	Over 25K population	Three or more times a week	0.0%	109 (11)	5,538	5 (0)	259
Male	41 to 64	Over 25K population	Once or twice a week	0.1%	32 (7)	1,611	1 (0)	72
Male	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.1%	28 (7)	1,407	1 (0)	60
Male	41 to 64	Over 25K population	Once or twice a month	0.1%	13 (3)	681	0 (0)	17
Male	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.2%	7 (2)	337	0 (0)	8
Male	41 to 64	Over 25K population	Once or twice a year	0.6%	2 (1)	105	0 (0)	4

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	41 to 64	Over 25K population	Less than once a year or never	1.2%	1 (1)	72	0 (0)	3
Male	65+	Up to 25K population	Three or more times a week	0.0%	188 (81)	9,578	6 (2)	301
Male	65+	Up to 25K population	Once or twice a week	0.2%	55 (20)	2,796	2 (1)	88
Male	65+	Up to 25K population	Less than once per week, more than twice a month	0.0%	81 (64)	4,101	1 (0)	43
Male	65+	Up to 25K population	Once or twice a month	0.2%	16 (6)	813	0 (0)	14
Male	65+	Up to 25K population	Less than once a month, more than twice a year	0.5%	11 (4)	546	0 (0)	7
Male	65+	Up to 25K population	Once or twice a year	0.8%	6 (3)	325	0 (0)	3
Male	65+	Up to 25K population	Less than once a year or never	5.1%	0 (0)	15	0 (0)	1
Male	65+	Over 25K population	Three or more times a week	0.0%	37 (11)	1,875	3 (1)	174
Male	65+	Over 25K population	Once or twice a week	0.0%	27 (9)	1,388	1 (0)	57
Male	65+	Over 25K population	Less than once per week, more than twice a month	0.0%	22 (13)	1,103	1 (0)	58
Male	65+	Over 25K population	Once or twice a month	0.0%	13 (8)	683	0 (0)	23

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Male	65+	Over 25K population	Less than once a month, more than twice a year	0.1%	5 (2)	241	0 (0)	8
Male	65+	Over 25K population	Once or twice a year	0.1%	2 (1)	110	0 (0)	6
Male	65+	Over 25K population	Less than once a year or never	0.4%	0 (0)	13	0 (0)	1
Female	16 and under	Up to 25K population	Three or more times a week	0.1%	80 (32)	4,090	5 (1)	240
Female	16 and under	Up to 25K population	Once or twice a week	0.3%	20 (7)	1,004	1 (0)	51
Female	16 and under	Up to 25K population	Less than once per week, more than twice a month	0.7%	11 (5)	571	0 (0)	16
Female	16 and under	Up to 25K population	Once or twice a month	1.2%	11 (4)	554	0 (0)	14
Female	16 and under	Up to 25K population	Less than once a month, more than twice a year	0.3%	4 (1)	192	0 (0)	7
Female	16 and under	Up to 25K population	Once or twice a year	1.5%	4 (1)	180	0 (0)	5
Female	16 and under	Up to 25K population	Less than once a year or never	4.6%	1 (0)	40	0 (0)	2
Female	16 and under	Over 25K population	Three or more times a week	0.0%	23 (7)	1,170	4 (1)	224
Female	16 and under	Over 25K population	Once or twice a week	0.0%	23 (11)	1,144	1 (0)	51

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	16 and under	Over 25K population	Less than once per week, more than twice a month	0.1%	3 (1)	135	0 (0)	14
Female	16 and under	Over 25K population	Once or twice a month	0.0%	5 (1)	246	0 (0)	13
Female	16 and under	Over 25K population	Less than once a month, more than twice a year	0.0%	6 (2)	315	0 (0)	9
Female	16 and under	Over 25K population	Once or twice a year	0.3%	1 (0)	34	0 (0)	5
Female	16 and under	Over 25K population	Less than once a year or never	0.9%	1 (0)	71	0 (0)	3
Female	17 to 40	Up to 25K population	Three or more times a week	0.2%	129 (15)	6,541	5 (0)	276
Female	17 to 40	Up to 25K population	Once or twice a week	0.5%	43 (12)	2,204	1 (0)	71
Female	17 to 40	Up to 25K population	Less than once per week, more than twice a month	0.7%	38 (8)	1,947	1 (0)	35
Female	17 to 40	Up to 25K population	Once or twice a month	1.9%	22 (4)	1,139	0 (0)	21
Female	17 to 40	Up to 25K population	Less than once a month, more than twice a year	1.8%	7 (2)	359	0 (0)	7
Female	17 to 40	Up to 25K population	Once or twice a year	2.9%	5 (1)	238	0 (0)	6

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	17 to 40	Up to 25K population	Less than once a year or never	4.3%	1 (1)	74	0 (0)	2
Female	17 to 40	Over 25K population	Three or more times a week	0.1%	83 (8)	4,202	5 (0)	279
Female	17 to 40	Over 25K population	Once or twice a week	0.2%	28 (6)	1,445	1 (0)	56
Female	17 to 40	Over 25K population	Less than once per week, more than twice a month	0.1%	19 (4)	969	1 (0)	44
Female	17 to 40	Over 25K population	Once or twice a month	0.5%	16 (3)	791	0 (0)	21
Female	17 to 40	Over 25K population	Less than once a month, more than twice a year	0.6%	8 (2)	381	0 (0)	11
Female	17 to 40	Over 25K population	Once or twice a year	0.8%	6 (2)	321	0 (0)	9
Female	17 to 40	Over 25K population	Less than once a year or never	1.0%	3 (1)	148	0 (0)	6
Female	41 to 64	Up to 25K population	Three or more times a week	0.0%	154 (20)	7,806	6 (1)	310
Female	41 to 64	Up to 25K population	Once or twice a week	0.5%	60 (15)	3,046	1 (0)	67
Female	41 to 64	Up to 25K population	Less than once per week, more than twice a month	0.0%	58 (24)	2,939	1 (0)	38
Female	41 to 64	Up to 25K population	Once or twice a month	1.2%	13 (3)	685	0 (0)	13

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	41 to 64	Up to 25K population	Less than once a month, more than twice a year	2.4%	5 (1)	264	0 (0)	5
Female	41 to 64	Up to 25K population	Once or twice a year	3.3%	3 (1)	165	0 (0)	3
Female	41 to 64	Up to 25K population	Less than once a year or never	6.2%	1 (0)	35	0 (0)	1
Female	41 to 64	Over 25K population	Three or more times a week	0.0%	95 (15)	4,850	5 (0)	269
Female	41 to 64	Over 25K population	Once or twice a week	0.1%	21 (7)	1,085	1 (0)	74
Female	41 to 64	Over 25K population	Less than once per week, more than twice a month	0.1%	28 (9)	1,425	1 (0)	32
Female	41 to 64	Over 25K population	Once or twice a month	0.2%	7 (2)	352	0 (0)	14
Female	41 to 64	Over 25K population	Less than once a month, more than twice a year	0.3%	8 (2)	384	0 (0)	11
Female	41 to 64	Over 25K population	Once or twice a year	0.5%	3 (1)	169	0 (0)	4
Female	41 to 64	Over 25K population	Less than once a year or never	1.2%	1 (1)	70	0 (0)	3
Female	65+	Up to 25K population	Three or more times a week	0.0%	42 (20)	2,136	4 (1)	188
Female	65+	Up to 25K population	Once or twice a week	0.1%	47 (24)	2,374	1 (0)	71

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I
Female	65+	Up to 25K population	Less than once per week, more than twice a month	0.1%	20 (7)	991	1 (0)	37
Female	65+	Up to 25K population	Once or twice a month	0.2%	19 (5)	955	0 (0)	22
Female	65+	Up to 25K population	Less than once a month, more than twice a year	0.6%	4 (2)	214	0 (0)	3
Female	65+	Up to 25K population	Once or twice a year	1.6%	2 (1)	99	0 (0)	3
Female	65+	Up to 25K population	Less than once a year or never	5.6%	0 (0)	16	0 (0)	0
Female	65+	Over 25K population	Three or more times a week	0.0%	65 (37)	3,300	3 (1)	173
Female	65+	Over 25K population	Once or twice a week	0.0%	27 (11)	1,356	1 (0)	75
Female	65+	Over 25K population	Less than once per week, more than twice a month	0.0%	15 (5)	758	1 (0)	37
Female	65+	Over 25K population	Once or twice a month	0.0%	15 (6)	778	1 (0)	27
Female	65+	Over 25K population	Less than once a month, more than twice a year	0.0%	11 (4)	577	0 (0)	12
Female	65+	Over 25K population	Once or twice a year	0.2%	2 (1)	113	0 (0)	4
Female	65+	Over 25K population	Less than once a year or never	0.8%	0 (0)	14	0 (0)	1

RAC Foundation

The Royal Automobile Club Foundation for Motoring Ltd is a transport policy and research organisation which explores the economic, mobility, safety and environmental issues relating to roads and their users. The Foundation publishes independent and authoritative research with which it promotes informed debate and advocates policy in the interest of the responsible motorist.

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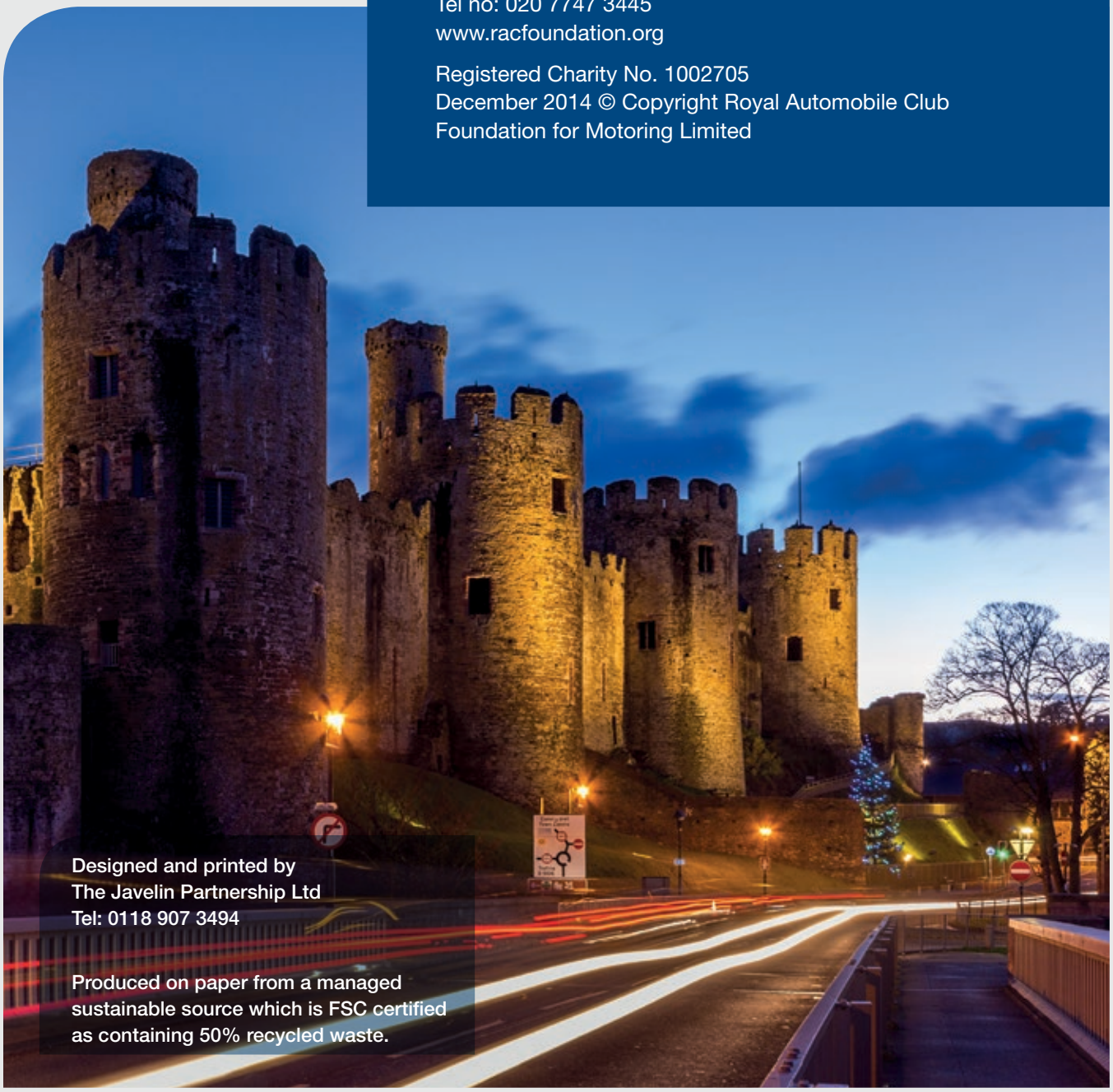

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