# On the Move

## Making sense of car and train travel trends in Britain

Scott Le Vine and Peter Jones

December 2012

ORR OFFICE OF RAIL REGULATION
INDEPENDENT TRANSPORT COMMISSION
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Peter Jones, University College London
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## This Study

This main report summarises the main findings from the study. A series of technical reports describe aspects of the work in more detail, and are available on the sponsors' websites:

- A supporting technical compendium containing figures and tables that were prepared but have not been included in this summary report
- 'Rail Demand Forecasting Using the Passenger Demand Forecasting Handbook'
- 'National Rail Passenger Survey Data Analysis'
- A report on trends in Scotland, using both NTS data and data from the Scottish Household Travel Survey

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## Disclaimer

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# Overview

This research into shifting car and train travel trends was jointly sponsored by the RAC Foundation, the Office of Rail Regulation, the Independent Transport Commission and Transport Scotland. The sponsors have a deep and abiding interest in the topic, and in better understanding the way in which society's use of transport is changing. This is of particular importance given the development of a national roads strategy and ambitious plans for the railways.

The report is the authors' own, but we, as the sponsors, offer this overview to place the results of the study in the wider context of public policy and to indicate what we believe to be its most significant findings.

The brief for this study was to identify, from existing sources of data, recent and current trends in travel behaviour. It was not to make new forecasts of road or rail traffic, or even to challenge existing forecasts.

The Department for Transport (DfT) has been publishing forecasts of road traffic since the 1960s, as the rail industry and the Office of Rail Regulation have done for train passengers. These have been focused on a number of core indicators, principally: the level of economic activity; costs to users (in terms of fares and prices); service levels; and changes in the demographic and socioeconomic structure of the population.

Recently, some commentators have claimed that neither road traffic levels nor rail patronage were behaving as the forecasting models had predicted. Rail passenger numbers were said to have increased more rapidly than envisaged, breaking the historic link between GDP growth and passenger number growth, while the rate of growth in total car traffic had showed signs of slowing some time before the recession and oil price spike of the late 2000s.

For many aspects of road transport policy it is total traffic that matters, of which cars account for the majority (79%); it is on these that the authors have focused their attention. This study leaves aside other aspects of road travel such as that by vans (which has seen a big rise), heavy goods vehicles, and buses and taxis.

Yet for many decisions, it is the local and regional numbers that are important, not the national picture. As an example, there is some indication that travel patterns in (and also to and from) London have become increasingly detached from the situation elsewhere in the country. The danger, then, is that blunt national forecasts and trends hide what is going on at a regional and local level.

This study has demonstrated that there have indeed been significant underlying changes over the past 15 years in several interesting and important areas, some of which point in opposite directions. Notably, licence-holding

amongst young men has declined, while it has grown rapidly for women in most age groups. Significant gender differences are also apparent in mileage figures: all age groups of women over 20 have increased their use of the car, yet in tandem car use has declined strongly amongst men between the ages of 20 and 50. Most of the latter is attributable to dramatic falls in company car usage. And while London has experienced sharp falls in car use, the picture is the opposite in many other areas.

In contrast, the growth in rail travel is remarkably evenly spread across the population of Great Britain. It is striking that it has resulted from a larger proportion of the population using rail services over time, rather than more intensive use among the existing users.

There are gender differences in rail trends too: while male rail usage has increased evenly across all age groups, growth in rail travel by women is particularly strong for the under-30s.

It is difficult without further research to pinpoint how much substitution there has been between road and rail, but there is clear evidence of a switch from company cars to rail for commuting into London, and also some evidence of a switch in business travel from company cars to rail.

Commentators have used the national car traffic figures to explore the hypothesis that mileage per capita has 'peaked'. But the grand total hides quite different experiences from one part of the country to another, ranging from the South West region, where car traffic growth continued systematically until the onset of the recession in 2008, to London, where car traffic levels have been falling since 1998. Crucially, the report concludes that if company car mileage is discounted, then there has been a pattern of continuing strong growth in private car use for those aged 30 and over, outside London, up to the start of the economic downturn. This group represents approximately 70% of the population of driving age in Great Britain.

Therefore the notion that car traffic peaked in the mid-2000s is at best an oversimplification.

Many of the changes noted in the report relate to the rate of car and rail use per person. Yet on top of this transport planners need to account for marked population growth. Over the next 20 years or so the number of people inhabiting the British Isles is predicted to swell, again with large regional variations. Any fall in the rate of travel per head by a particular type of person may be offset by a growing number of people of that type.

We are as yet uncertain about the extent to which conventional forecasting models may need to be adjusted; however, it is now clear that there are many factors at work and that one must be careful not to draw simplistic or misleading conclusions. It may be that only by introducing new information

sources will we be able to plan adequately for a future so unlike the past. This study of Great Britain relied heavily on the DfT's National Travel Survey (NTS), without which none of the understanding of these important phenomena would have been possible. We believe that this illustrates the value returned from the past investment in the NTS, and urge that it be maintained and enhanced.

One of the challenges in interpreting these phenomena and their importance will be to judge the extent to which they manifest long-term behavioural change as against one-off step changes. For example, the steep decline in company car use is hugely important, but obviously not something that can be repeated.

The analysis and conclusions of this report are drawn from travel behaviour data up to the beginning of the current recession, but not beyond. This was to avoid the distorting influence of the decline in economic activity and incomes, and the consequent austerity, when seeking to uncover long-term travel patterns; moreover, it means that we have more confident insights into the travel trends that are likely to emerge as and when economic growth resumes.

That said, this report does not – and cannot – give a definitive assessment of the current forecasts of road traffic or of rail travel. To do that will require careful review of this report's findings and their implications.

The sponsors will be considering the extent to which they can support further work in this area, and will be pleased to open dialogue with others who share their interest and concern to do so. We thank the authors most warmly for their professional and committed approach to this important subject, and for their illuminating report.

**RAC Foundation**
**Office of Rail Regulation**
**Independent Transport Commission**
**Transport Scotland**

# Executive Summary

## Background

1. This study aims to identify the patterns of behaviour which underlie the observed national levelling off in car traffic in Great Britain – after decades of growth – and the continuing strong growth in rail passenger mileage, even during the current recession. It also seeks to establish whether there is any evidence that these contrasting trends are linked.
2. It was not part of the remit of this study to determine what has caused the changes in behaviour that have been identified, nor to make judgements about the appropriateness of current road and rail forecasts, although the report briefly addresses these issues.
3. Most of the analysis has been based on National Travel Survey (NTS) data between the years 1995 and 2007. The NTS annually samples around 20,000 British residents in 8,000 households, capturing their travel over a one-week period, and includes a record of which car is used for each journey. Data for years preceding 1995 is not fully comparable, and the analysis goes only up to 2007, so as to exclude the effects of the current recession.

## Key findings

- Average car driving mileage per head of population has changed little in Britain over the ten-year study period, but this masks large differences in trends between men (whose driving mileage has decreased) and women (whose driving mileage has increased); the largest drop has been for men in their 20s, whose average car mileage fell by about 2,000 miles per year.
- Most of the reduction in mileage by men (except for those in their 20s) can be accounted for by a sharp fall in company car use; this seems to be linked to the large increases in taxation on fuel provided for private use.
- Half of the increase in mileage by women can be accounted for by a rise in adult female licence holding (up from 56% in 1995/7 to 62% in 2005/7).
- London is different from the rest of the country: car travel is lower and rail travel higher among both London residents and those from outside who work in the capital.
- There has been a pattern of continuing growth in non-company car use outside London for those aged 30 and over; for this group, representing around 70% of the British population, there has been no ‘peak car’ effect.
- The substantial, 60% growth in GB rail travel is the result of more people starting to travel by train, rather than existing rail users travelling more.
- Rail mileage has grown most rapidly for business purposes – it has nearly tripled – and there is some evidence of a partial shift of business travel from company car to rail for men.

4. Sample sizes for some of the population groups of interest, and for many journeys by rail, are relatively small; therefore, to ensure a sample size sufficiently large to identify significant trends, the annual data has been grouped into three time periods: 1995/7, 2000/2 and 2005/7.

## The current picture

5. In aggregate, 51% of the distance travelled by British residents is as a car driver, and another 27% as a car passenger (2010 figures). By contrast, rail represents only 8% of mileage, though there are certain markets (such as commuting, particularly into Central London) where it is dominant. Because cars are used much more than rail, relatively small percentage changes in car use could translate into large percentage changes in rail use.
6. Although gender gaps have been shrinking, men still drive about twice as much as women, even though licence holding is only 27% higher among men; men also use rail about 40% more. Moreover, London is structurally different: rail use in the capital is almost twice as high as in the rest of GB, while car use is about half the GB average.

## Trends in car travel

7. The levelling off in average car driver mileage per person in Britain over the past decade hides some sharply contrasting behavioural trends, which vary by age, gender, type of car ownership, and area of the country.
8. Car ownership has increased, from 420 cars per 1,000 people in 1995/7 to 481 in 2005/7. Mileage per car has trended downwards, however, from 8,141 to 7,308 miles per year. This is due in large measure to the changing mix of personal and company cars (see paragraph below titled “Use of company cars”). These contrasting trends largely cancel each other out, so that they only result in a roughly 3% increase in average car mileage per person over this period (excluding non-household cars such as hire cars, company pool cars, etc.).

## Age and gender

**Average changes in car driving mileage according to ownership of the vehicle, by age group and among men and women, 1995/7–2005/7**


9. The average car mileage driven by men has fallen in all age groups up to age 60, with larger decreases seen among progressively younger age groups, down to age 20; this is despite stable and comparable levels of car licence holding among men aged between 30 and 60. This reduction has been offset by a major growth in car mileage among women aged over 20; the size of the growth in women's driving mileage increases with age up to the age of 60, and thereafter decreases.
10. For men as a whole, reductions in driving mileage are generally the result of less mileage per driver, with the proportion of males who are drivers remaining stable (except for a fall among the 20–29 age group). For women, however, growth in driving levels is partly due to an increasing proportion of the female population becoming drivers.

## Young men

11. Car driver mileage among men in their 20s is much lower than was previously the case (mainly due to there being fewer male drivers, rather than a large reduction in average mileage per driver). Whether this change will persist as this group ages, or whether it reflects a delay in adopting more traditional patterns of licence holding and car use is not known.

Similar falls in mileage amongst this age group have been reported in other countries with advanced economies, from Germany to the USA. About a third of the fall in private car mileage among British men in their 20s is in the class of 'visiting friends and relatives at private home'.

12. The following table shows some of the changes in living circumstances for men in their 20s in Britain that seem to have contributed to falling car driver mileages. The proportions of men in groups that have higher than average car mileages have fallen, while the proportions in groups associated with lower than average car mileages have risen.

**Characteristics of men in their 20s which affect annual car driving mileage**

| Description | Percentage of all men in their 20s | | Average annual car driving mileage | |
|---|---|---|---|---|
| | Level in 2005/7 | Change in percentage points from 1995/7 to 2005/7 | Mileage in 2005/7 (Values in bold are above the average for all men in their 20s) | Change in average mileage from 1995/7 to 2005/7 |
| Working full-time | 72% | (-2%) | **5,548** | (-2,118) |
| Working part-time | 8% | (+5%) | 2,611 | (-2,177) |
| Single (not married) | 64% | (+7%) | 4,191 | (-1,634) |
| Living in a household with adult(s) aged over 35 | 47% | (+7%) | 4,067 | (-1,778) |
| Living in London | 17% | (+4) | 1,885 | (-2,246) |
| Holds a full driving licence | 68% | (-11%) | **6,614** | (-1,592) |
| Average mileage for all men in their 20s | – | – | 4,496 | -1,912 |

## Use of company cars

13. Most of the reduction in men's car driver mileage has been the result of reduced mileage in company cars; this effect dominates for men between 30 and 49. The growth in mileage for older men and for women has been in private cars.

14. The largest reductions in company car mileage have been among men classified as 'Professionals' (down by 63%) and 'employer/managers' (down 35%). This results from reductions both in car ownership and in usage per company car; it reflects what is likely to be largely a one-off step change reduction in men's car mileage.

15. There is circumstantial evidence of some mileage having transferred from company cars to private cars among the employer/manager group, where private car mileage increased slightly while company car mileage decreased. This is also the case for 'all non-employer/manager/professional workers', where increases in private mileage largely offset reductions in company car mileage. But amongst the 'Professional' group, which has recorded the largest drop in company car use, mileage in private cars also dropped.
16. About half of the growth in women's private car mileage has been for commuting and work-related travel; for men over the age of 30, the reductions in company car mileage have also been mainly for commuting and work-related purposes.

## Country of birth

17. People born outside the United Kingdom tend to use cars less, an effect which is seen most in the 20–39 age group in which migrants are concentrated (43% of migrants are in this age bracket, compared to 24% of those born in the UK). This is a single-year finding rather than a time trend, due to this data in the NTS only becoming available in 2010.

## Greater London

18. There is a strong 'Greater London' residential and employment effect, with reductions in car use among both London residents and those who live outside the capital and travel in two or more times a week (by any mode) for commuting/business purposes. Most of this drop is accounted for by reduced company car mileage, but further research will be needed to ascertain how this interacts with other changes that have taken place, such as the substantial investment in public transport and walking/cycling infrastructure.

## Does 'peak car' exist?

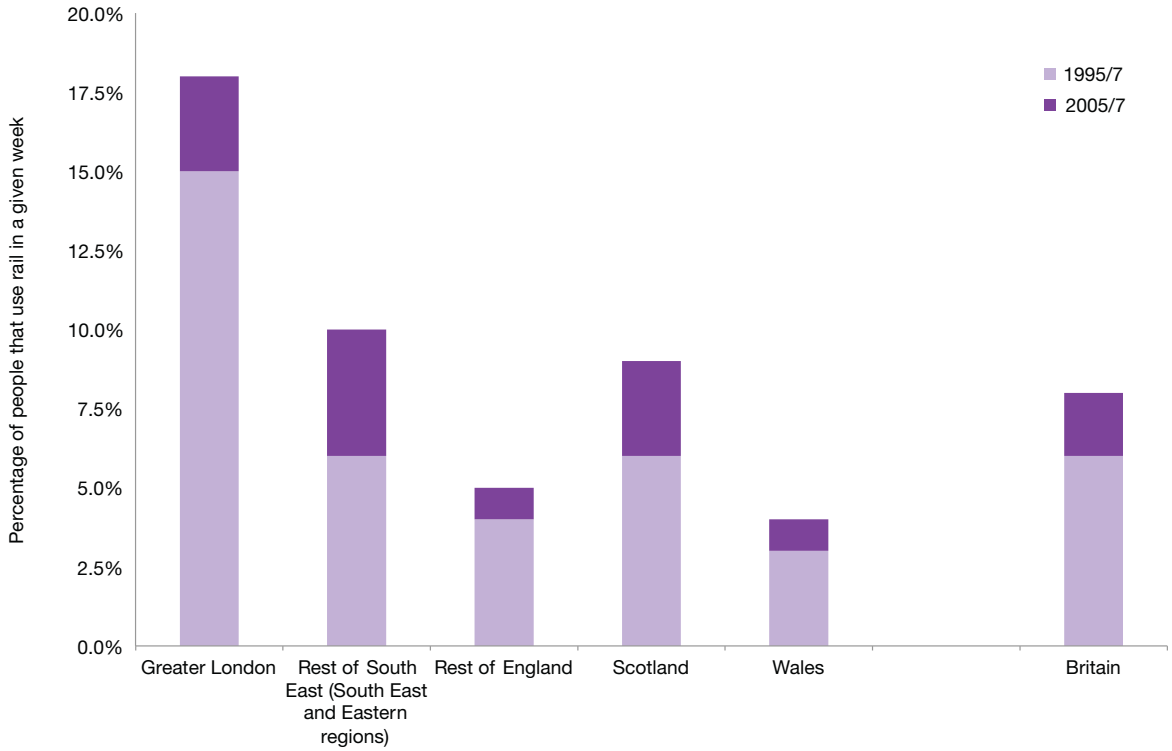
19. The aggregated traffic trends for Britain seem to show a 'peak car' phenomenon (the situation in which there is no increase over a sustained period of time – and in some cases an actual decline – in average car mileage per person, even during periods of economic growth), with car use levelling off per person since the 1990s. But a closer look finds that this is limited to specific groups and areas. It does not apply to women's car travel outside London, which has shown a steady increase between 1995/7 and 2005/7. Indeed, if we look just at private car use (excluding driving in company cars), then overall car travel per person outside London continued to grow up to the start of recession, and for those residents aged over 30 was flat in London rather than showing a steady decline.

## Trends in rail travel

20. The main conclusion concerning the increase in National Rail travel between 1995/7 and 2005/7 is that the growth in passenger kilometres of 50% per person is almost entirely explained by an expanding market base: the growth is due to higher proportions of the population travelling by train, rather than to existing users making more frequent or longer rail trips. The proportion of NTS respondents reporting at least one rail trip in their diary week rose from 6% in 1995/7 to 9% in 2005/7.

21. Rail travel is growing both for men and women, with the largest increases for women in their 20s and men in their 40s without a full car driving licence. Usage is also growing in all parts of Britain, and outside London the proportion of the population travelling by train is increasing more in regions where rail usage was already relatively high in 1995/7.

**Increase in the proportion of the population recording one or more rail trips in their diary week, 1995/7 to 2005/7, by region**

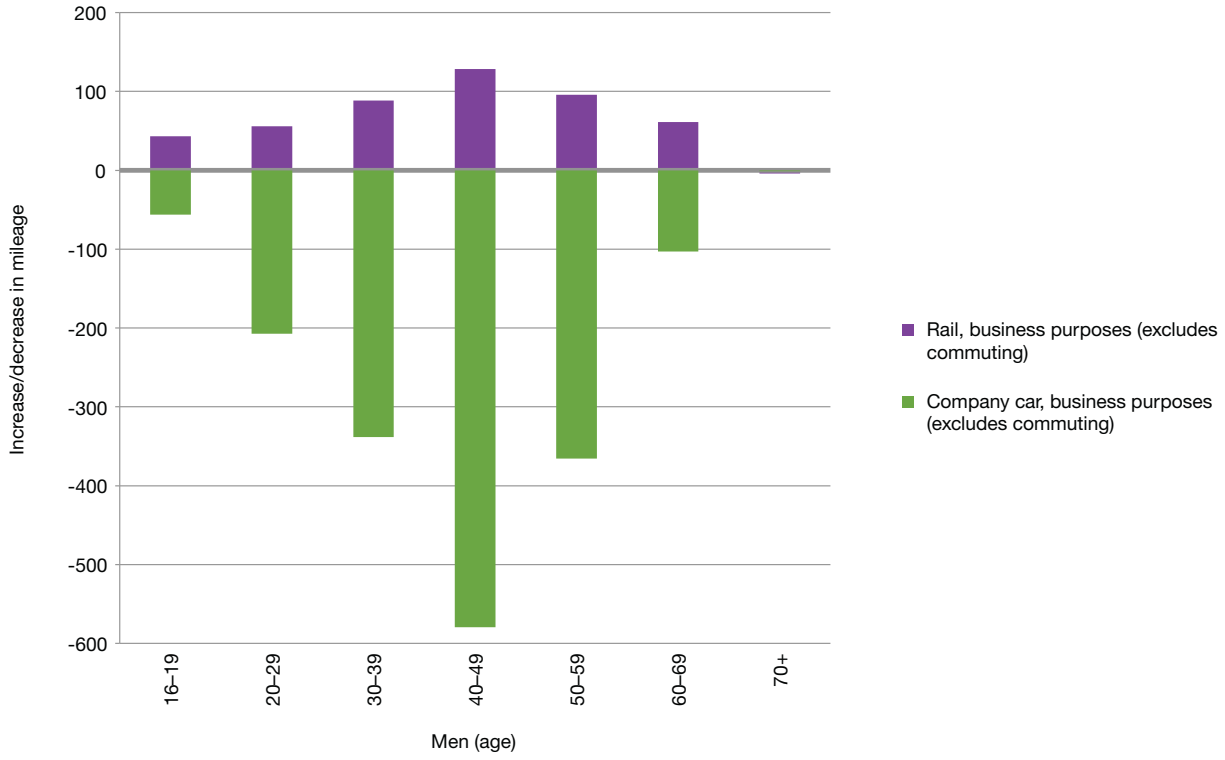



22. The fastest growth in rail travel is for non-commuting business purposes (which rose by nearly 170% between 1995/7 and 2005/7). The strongest 'traditional' rail markets (i.e. commuting trips and travel to/from London) are growing, but not as fast as other rail markets; this means that they are declining in relative importance. In the case of the latter, the proportion of all National Rail journeys that are to/from or within London is down from 63% in 1995/7 to 57% in 2005/7.

## Relationship between rail growth and car stagnation

23. For the specific group of men who live outside London but travel into the capital on two or more days a week for work-related purposes, we observe a switch of commuting mileage (on average around 1,250 miles per year) from company cars to rail.
24. There is evidence of some substitution of business travel by men between road and rail: for every four-mile reduction in company car travel for business purposes, we observe an increase of approximately one mile in business travel by rail.
25. Car drivers who also used rail during their diary week drove around 1,000 miles per year less than those drivers who did not travel by train.

**Reductions in company car business mileage and increases in rail business mileage for men, by age group**




## Possible causes of these behavioural changes

26. Although definitively identifying the causes of the behavioural changes that we have documented in this report is beyond the scope of this study, we suggest a number of possible factors that are likely to be contributing – to varying degrees – to these observed changes in car and rail travel behaviour among the various population subgroups.
27. One instance where there does seem to be a clear link between government policy and a significant change in travel behaviour is in the use of company

cars. Figures from HM Revenue and Customs show that the notional taxable value of an employee being provided with free fuel for private use rose sharply during the late 1990s/early 2000s. This resulted in an 80% drop in the number of people declaring that they have been provided with both a company car and free fuel for private use. There has been a much smaller reduction in company car ownership where the arrangement is that the driver purchases their own fuel for non-business use.

28. Otherwise, there seems to be no single straightforward explanation for the observed changes in car use and increases in rail patronage. Likely influencing factors include:

- increases in car running costs, ranging from higher insurance costs to oil price rises and higher parking charges;
- income and GDP effects;
- reductions in traffic speeds on some roads (due to higher traffic levels or lower speed limits), resulting in lengthening journey times;
- reductions in effective road capacity for general traffic in urban areas (especially in Central and Inner London);
- improvements to rail services and to other public transport services (particularly, though not exclusively, in London);
- spatial planning policies, encouraging the reuse of brownfield sites and the application of the 'sequential test' (i.e. look for development sites in or close to the town centre first) to proposals for new commercial and retail development;
- the impacts of a range of other government policies (e.g. 'Smarter Choices', which encourage behaviour change); and
- improvements in broadband/mobile communications, possibly contributing to:
    - reductions in food shopping by car
    - reductions in visiting friends and relatives at home
    - reductions in business trips by car
    - increasing relative attractiveness of train travel.

## Implications for future travel

29. In general, very little of the observed aggregate change in car and rail travel is accounted for by the ongoing changes in the proportions of the population that fall in each age group, or that live in different types of area; most are due to changes in travel behaviour within groups, caused by external factors.

30. How might the observed changes in behaviour develop in the future? The following scenarios give a broad indication of the likely magnitude and direction of some possible future developments, if they are taken to the extreme – this is certainly not an exhaustive list of possibilities:

- **Scenario 1: company cars**. Company car mileage dropped by nearly 40% between 1995/7 and 2005/7. If company car mileage were to disappear completely, without any corresponding increase in personal car mileage, then this would cut total national car mileage per person by a further 10%.
- **Scenario 2: gender comparability**. If women's car use rose over time to the same levels as men's in 2005/7, right across the age spectrum, then this would add 35% to the average national car mileage per person.
- **Scenario 3: generational change**. If those currently in their 20s (and younger) preserve their lower mobility characteristics as they age, then over time this would eventually imply a decrease in per-person driving mileage of approximately 20%, once it had worked its way through the population as all cohorts aged.
- **Scenario 4: increases in rail market penetration**. How far can the base of the rail market keep increasing? In 2005/7, 18% of Londoners used surface rail during their diary week, up from 15% in 1995/7; outside London, this figure grew from 4% to 7%. If these proportions grew to, say, 20% of Londoners and 10% of those living in the rest of Great Britain, then per-person rail mileage would increase by around 40% from its 2005/7 level.

31. The possible changes illustrated above are from a 2005/7 base and are on a per-person basis. In other words, they do not take account of the effects of the expected national population growth of 18% in the 25 years from 2010, or of other developments such as changes in the age profile – which would tend to magnify the cumulative effects of increases in mileage per head and offset (to some extent) average reductions in mileage per head.

32. Recommendations are made for research to plug the remaining gaps in knowledge (for example, to investigate why 'Professionals' have seen the largest fall in company car mileage, and what is causing lower levels of car use among the migrant population), and to establish the factors causing the behavioural changes that have been identified.

## Further information

33. The study team has produced the following reports:

- 'On the Move: Making sense of car and train travel trends in Britain'
- A supporting technical compendium containing figures and tables that were prepared but have not been included in this summary report
- 'Rail Demand Forecasting Using the Passenger Demand Forecasting Handbook'
- 'National Rail Passenger Survey Data Analysis'
- A report on trends in Scotland, using both NTS data and data from the Scottish Household Travel Survey

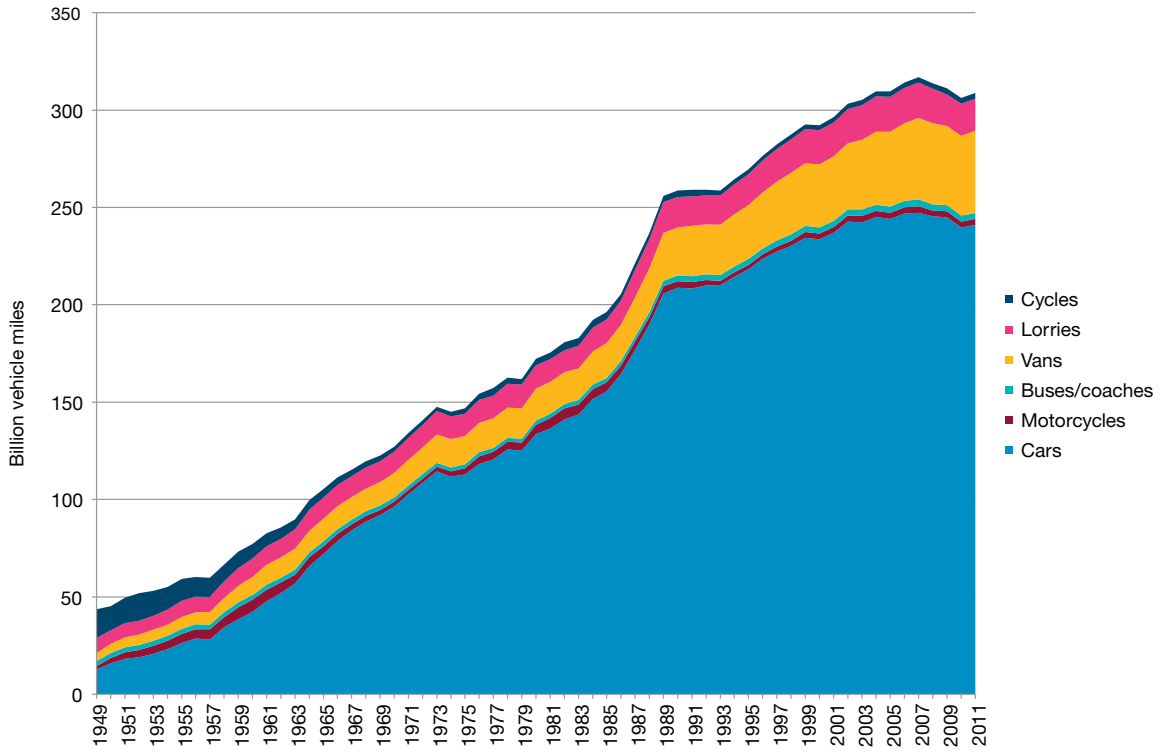
# 1. Introduction

This chapter presents an overview of the broad trends in car and rail traffic in Great Britain (GB) and describes the aims of this study and the data employed. It then briefly outlines some of the literature on recent trends and outlines the structure of the rest of this report.

## 1.1 Historical road and rail traffic patterns

Total road traffic in GB has shown continual growth since 1949, except briefly during periods of recession and high oil prices, with the current recession (2007 onwards) having the greatest impact (Figure 1.1). But, over this period, the composition of road traffic has changed considerably; cycling declined sharply during the 1950s and most of the traffic growth since the 1990s has been due to increases in van traffic. The growth in car traffic has been particularly slow since around 2002.

**Figure 1.1: Growth in road traffic in Great Britain, 1949–2011**



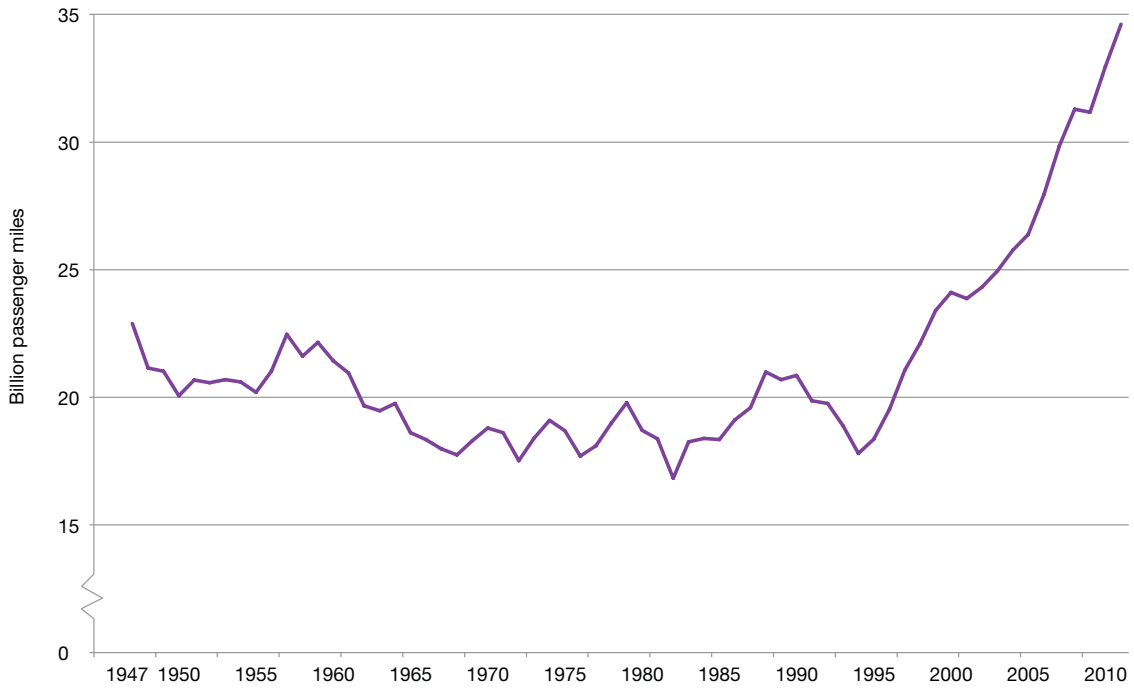

Source: Department for Transport (2012c)

Part of the growth in national car traffic can be attributed to increases in population; when we allow for this, by looking at car driver mileage on a per-person basis, we can see that car use levelled off in the early 2000s – the so-called 'peak car' effect. Similar phenomena have been observed in other countries with high levels of car ownership and use, including Germany, Japan and the USA.

This contrasts strongly with trends in rail traffic in GB (Figure 1.2). Here, following a period of decline in passenger mileage starting in the late 1950s, and flat demand during the 1970s and 1980s, there has been a steady and continual increase in rail traffic since the mid-1990s, right through the recent recession. This is in contrast to most other European countries (except Switzerland), where rail traffic has flattened or declined since 2007 (although in some cases rail usage remains higher than in Great Britain).

This growth in rail demand has been high, even allowing for the growth in Britain's population, with ticket sale data showing a 67% growth in passenger mileage per person between 1995 and 2010.

**Figure 1.2: Growth in GB rail passenger mileage, 1947–2010**




Source: Department for Transport (2012b)

## 1.2 Study aim and objectives

This is an exploratory study, in which the primary aim is to investigate the nature of the changes in personal behaviour which give rise to these observed aggregate trends, namely:

- pre-recession levelling off in car driver use; and
- continuing growth in rail traffic.

A further aim is to investigate whether some of the growth in rail traffic seems to be associated with the levelling off in car driving.

Here we are looking for two possible effects:

- aggregate changes due to differences in the composition of the national population (where each group's behaviour stays the same, but the proportion of each group in the total population changes, there by affecting aggregate trends); and
- changes in patterns of behaviour among a particular population group over time.

In relation to car traffic, the specific objectives are to:

- investigate changes in the car-driving behaviour of various population groups (and residents of a variety of types of places) over time, to see how these contribute to the total picture;
- identify, in qualitative terms, a range of factors that might have stimulated these changes in behaviour; and
- comment on the implications for forecasting.

On the rail side, there are two primary objectives:

- identify factors which might account for the observed patterns of rail demand; and
- review the forecasting methods used in the Passenger Demand Forecasting Handbook (PDFH) and assess to what extent the insights from this study would require changes in the variables and methods that are currently used.

Some of these issues are investigated in more detail in a series of technical reports which accompany this summary report. This study is intended as the first phase of a programme of work which will investigate further and then quantify the findings from this exploratory phase, and, using econometric methods, go on to develop a series of scenarios to examine likely future car and rail demand, under various assumptions about changes in the causal variables.

## 1.3 Data sources

To meet these objectives, it is necessary to move beyond the count data used in Figures 1.1 and 1.2 (traffic counts and ticket sales) and to use the National Travel Survey (NTS) one-week travel diary data; this reports on an annually and goes back to 1995 on a largely consistent basis.

Comparisons of grossed-up NTS data and national car traffic counts show a well-documented shortfall in car mileage of around 20%, due to a variety of factors, including people excluded from the NTS sample (e.g. students living in halls of residence), trips made by overseas visitors, and the fact that some types of travel as part of one's job are not recorded. The NTS also has other known limitations: short trips appear to have been under-reported in 2007, for instance. But, since the aim of this analysis is to decompose aggregate travel patterns among British residents, and in particular to focus on changing trends over a decade-long timescale, the NTS is an appropriate choice as it is the only rich national dataset available. Interestingly, on the rail side, the correspondence between the count data and the NTS data is much closer.

In the 1990s the NTS had an annual sample size of approximately 3,500 respondent households, which increased from 2002 onwards to around 8,000 households. The data comes primarily from two sources: an interview in which demographic and other questions are asked, and a week-long diary of each household member's travel. In this study, about of the 25 demographic variables were used (and combined in various ways), along with about ten variables describing people's travel. A total of 3.6 million journeys were analysed.

Estimates of mileage by each mode of travel are calculated by summing across journey stages, rather than entire journeys. Thus, for instance, a journey which is partly by rail and partly by bus would have some mileage counted as bus and some as rail. This enables the most direct comparison with car and rail mileage as measured by road traffic counts and rail ticket sales data.

When we look at journeys by rail, and at the behaviour of certain population groups, the sample sizes become quite small, and so there can be substantial year-on-year variations in mean values. To reduce the scale of the problem, for most analyses we group the NTS data into three bands five years apart: 1995/7, 2000/2 and 2005/7; in some cases we show confidence intervals. We do not present analyses from 2007 onwards (except in Chapter 2), to avoid the distorting effects of the recession when examining longer-term trends.

Note that the NTS includes van travel in the same category as car travel. Since vans represent a small proportion – about 5% – of the car/van travel recorded in the NTS, for simplicity we refer in the text just to 'car driving'. It is also worth noting that the NTS only covers travel within GB – international aviation, Eurostar, international ferries, etc. are excluded.

While the NTS is the main data employed in this study, as necessary we have drawn from other sources (e.g. the Consumer Price Index, the National Rail Passenger Survey, etc.). These sources are noted at the appropriate locations in the text.

## 1.4 Previous research

The term 'peak car' is sometimes used (Goodwin, 2012) to describe a sustained period of stable or falling per-person car driving, as an analogy to the concept of 'peak oil'. What is surprising is not the fall in car driving associated with the current recession – it is the lack of growth in car driving during the years of steady economic growth since the mid-1990s that is perplexing.

Some national differences aside (Kuhnimhof et al., 2012), this lack of growth in car-driving mileage seems to have been observed in many industrialised countries, among them France, Germany, Japan and the United States (in addition to Britain).

There is as yet no consensus explanation of the stabilisation/fall of per-person traffic levels. Competing, but not mutually exclusive, hypotheses identified by Goodwin include the advent and increasing popularity of telecommunications and the Internet, the ageing of developed societies, the 'end of the love affair with the car' (i.e. changing consumer tastes), as well as the combination of falling traffic speeds with stable travel time budgets.

Stokes (2012) points out that there are age-cohort effects, as people with car-intensive lifestyles seem to be continuing them later in life. He points out that the opposite is being found for young people, who are driving less than previous generations of young people used to. Headicar (2012) highlights changes in lifestyles and household structures (for example deferred parenthood, more single-parent families), and notes the importance of where people live as a factor in how they travel, suggesting that the location in which flats/homes are built in the future will have a major impact on travel patterns.

Despite the causes remaining unclear – and somewhat contentious – there is general consensus on the need to better understand and learn from what has been observed recently, in order to ensure that traffic forecasting techniques used to inform infrastructure policy are fit for purpose. The implications are also contentious: for instance Metz (2012), formerly Chief Scientist at the Department for Transport (DfT), is a strong advocate of the view that the present stabilisation in car traffic per person implies that future traffic growth will be much lower than currently forecast and will come predominantly from population growth.

Analyses of rail patronage by the industry have focused on the relationship between passenger flows, as recorded in the industry's ticket sales database, and factors that influence demand, such as GDP, employment, fares and the quality of service. The industry's Passenger Demand Forecasting Council (PDFC) is responsible for most of the research, and access is generally restricted to members. Because of the limited NTS rail sample size, and because the industry's requirement is to predict passenger flows on specific routes, there has been relatively little scope for exploiting data on demographic changes that might have affected demand.

## 1.5 Report structure

Chapter 2 provides a broad overview of travel patterns and societal trends over the past 15 to 20 years, as a background to later more detailed analyses. The main systematic analysis is reported in Chapter 3, and looks at trends in patterns of car driving and rail use according to a number of population groups (e.g. male and female), economic circumstances, trip purposes, forms of car ownership and locational considerations. In the main, the effect of each variable is considered separately, while recognising that in practice some may be closely correlated or may interact with other variables in complex ways.

Chapter 4 brings together some of the variables that seem to be more clearly associated with changes in car and rail use over time, and provides some simple exploratory, cross-tabulation analysis. Here the most significant results are to be found, which represent the core findings of the report.

The following chapter speculates on what might be causing these observed changes in behaviour (Chapter 5), and a general assessment and conclusions are provided in Chapter 6.

# 2. Societal Changes and General Travel Trends

This chapter begins with a brief overview of the types of changes that have been seen in British society over the last few decades, and then summarises observed trends in general travel patterns, before looking at car (driver and passenger) and rail travel in more detail.

## 2.1 Societal changes

Britain's population was generally stable during the 1970s, but sustained growth since around 1980 led to an increase of approximately 10% by 2010, and official forecasts are for continued population growth in the coming years (ONS, 2012h).

Along with this growth, the profile of the population and its activities has shifted in important ways in recent years:

- The population is ageing: median age has increased from 35 years in 1985 to 40 in 2010, with the ONS (Office for National Statistics) now projecting this to stabilise until about 2020 before resuming an upward trend, driven by the ageing of the 1960s 'baby boomer' generation (ONS, 2012d). Life expectancy has (using the conservative 'period life expectancy at birth' measure) increased between 1985 and 2010 from 71 to 78 for men and from 77 to 82 for women, and by 2035 these figures are projected to be 83 and 87 for men and women respectively (ONS, 2012a).
- Fertility rates have increased, but childbearing is increasingly being postponed. The number of births in Great Britain has increased year-on-year since 1998, and stood at 781,000 in 2010. Not since 1972 have more babies than this been born. Meanwhile, the average age at which a woman has her first child is now 28, up from 24 in 1970 and 25 in 1980 (ONS, 2012k).
- Net migration has increased: during the 1970s and 1980s, net migration into the UK never exceeded 60,000/year, but from 1994 it has always been above 140,000/year. In 2010 immigration was 591,000 whilst 339,000 people emigrated (representing about 0.95% and 0.55% of the UK's population, respectively). Migrants also have a strikingly different age profile than British-born people, with 43% of migrants in GB in 2010 aged between 20 and 39, compared to only 24% of those that were born in the UK (ONS, 2012g).
- The country is becoming increasingly ethnically diverse: between 2001 and 2009, the White British population was more or less stable at 45.7 million, whilst all other ethnic groups grew from 6.6 million to 9.1 million (ONS, 2012c).

- Family structures are changing: the proportion of people in middle age that have children and grandchildren has fallen, whilst the proportion that have living parents and grandparents has increased. The percentage of people in middle age that are married has dropped, and correspondingly the proportion living alone has grown (Demey et al., 2011).
- The housing stock is also changing: in recent years the strong majority (76% in England 2010) of new residential construction has taken place on brownfield sites (as opposed to greenfield sites) (DCLG, 2011). This represents an increase on the mid-1990s level of about 55%. It has been reported that the average density of new-build in the 2000s was about 70 units/ha, nearly three times the density of the existing housing stock (Bramley et al., 2010). But despite this increasing propensity to build in high densities on previously developed land, the proportion of households living in detached homes increased from the mid-teens in the 1970s to 21% in 2000 and on up to 24% in 2010 (ONS, 2012e).
- The composition of the workforce has shifted: men's rate of economic activity (for ages 16–64) has fallen from 89% in 1985 to 83%; much of this predated the present recession: the rate was already down to 84% in 2007. By contrast, the same rate for women (computed for ages 16–59) has increased from 68% to 74% over the same period, and has continued to trend upwards even during the recession (ONS, 2012l).
- The type of work that Britons do has gradually changed: in 2002, 39% of workers were classified as managerial/professional; this rose to 42% in 2010. Meanwhile, the proportion doing lower supervisory, technical, routine and semi-routine occupations fell from 36% to 33% (ONS, 2012b).
- Income inequality remains at historically high levels, but has not increased in recent years. During the 1980s the Gini coefficient – a measure of household income equality – increased from 0.29 in 1980 to a peak of 0.37 in 1990; it has since stayed within a narrow band ranging from 0.33 to 0.36. In 2005 it was 0.34, the same level as in 2010.
- There has been a shift in the proportion of men working part-time. In 1992 only 7% of employed men were working part-time, with the rest being full-time workers. By 2010 the prevalence of men in part-time work had nearly doubled, to 13%. For women, however, the rate was basically the same in both 1992 and 2010 (at 56% working full time and 44% part time) (ONS, 2012f).

## 2.2 General travel patterns

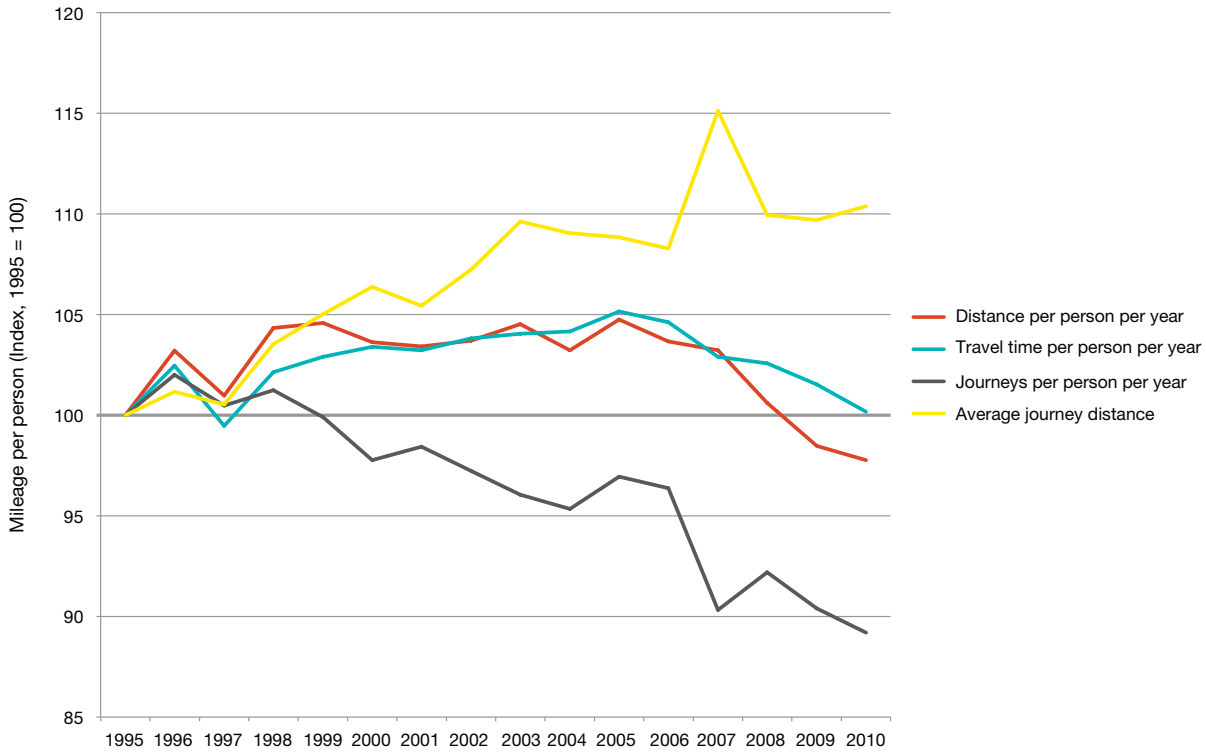
Figure 2.1 looks, at a very general level, at relative changes in some of the characteristics of average personal travel behaviour in Britain, between 1995 (which is used as an index base of 100 in this and three of the following Figures) and 2010, by all modes of travel.

In terms of overall travel, we see that the average total distance travelled per person per year (in red) levelled off in 1998, and stayed more or less constant

up to the start of the recession in 2007, since when it has declined, year-on-year. Total journeys (trips) per person per year (shown in purple) have shown a different trend,[1] with a steady decline since 1998, such that journeys per person are now more than 10% down on their mid-1990s peak.

In order for total travel distance per year to be broadly stable (as it was up to 2007) during a period in which the number of trips has declined, the average length of trips must have increased – which is precisely what we observe (as evidenced by the blue line). This is a long-term trend, taking all domestic modes together; the average trip was under 5 miles long in the 1970s, had increased to 6.5 miles by the mid-1990s, and had lengthened further to 7 miles by 2010.

**Figure 2.1: Overall trends in travel behaviour per person, 1995–2010**




One observation that many researchers have made is that the amount of time people spend travelling seems to be broadly stable, even over the very long term and in very different types of cultures (Schafer, 2012). This broadly holds true in Britain in recent decades, but as the Figure shows (in the blue line), not quite. From the mid-1990s to around 2005, travel time per person increased by around 5%, since when it has come down about 5%, thus returning to its 1995 value. It broadly follows the changes in total distance per person per year.

1 A journey is here defined as a one-way movement from an origin (e.g. home) to a destination (e.g. work), and may involve the use of several modes of transport – and several instances of the same mode (e.g. suburban rail trip followed by an inter-city rail service).

Figure 2.2 shows the trends in total mileage by mode since 1995. As can be seen, the strongest mileage growth rates nationally have been in London bus patronage, and both local and National Rail patronage. All other modes have either remained fairly flat with the exception of domestic air, which has shown a decline.

**Figure 2.2: Growth in personal mileage by mode of transport, 1995–2010**

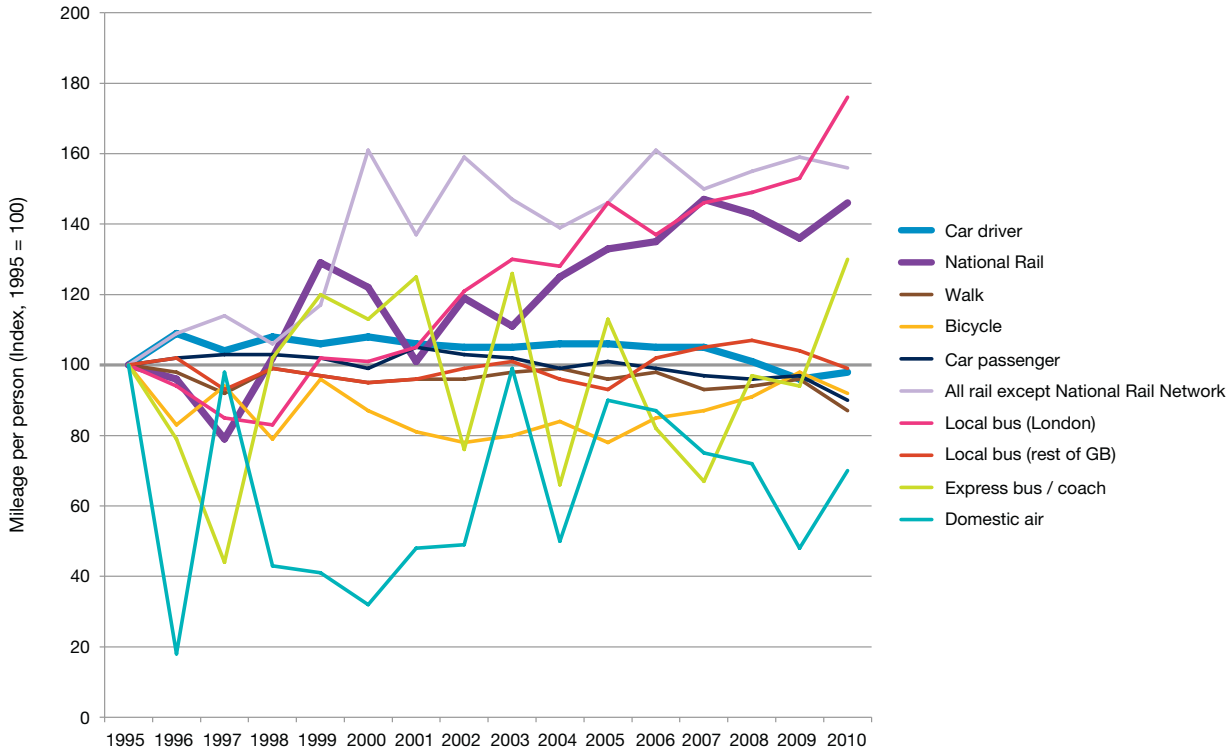
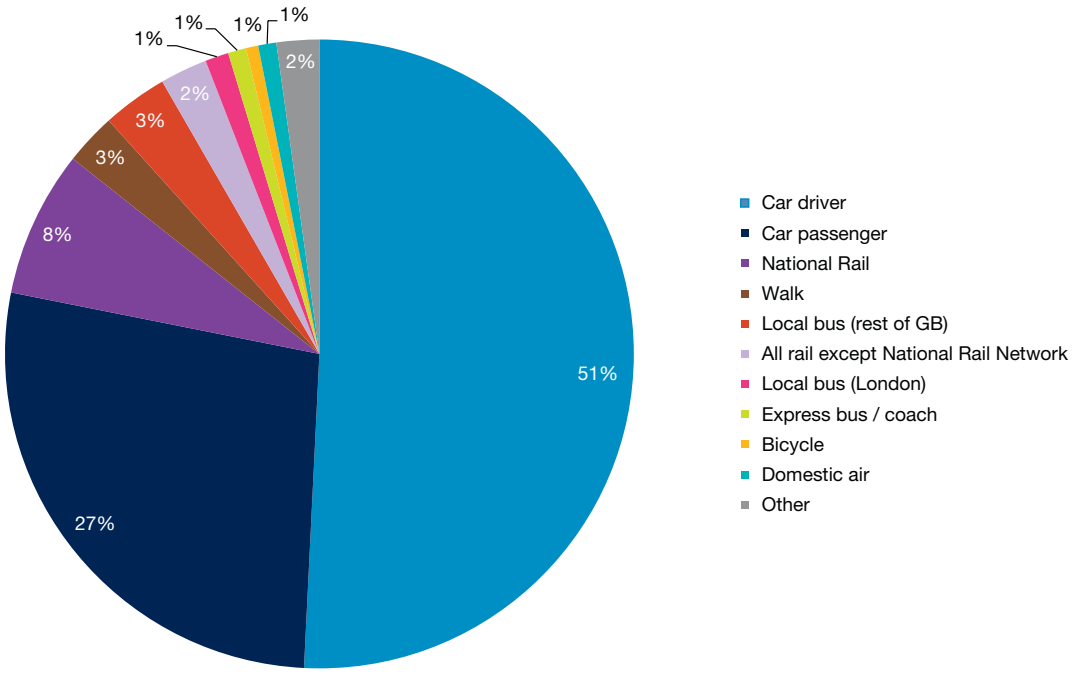



Figure 2.3 shows the proportion of annual mileage carried out on different modes of transport in 2010, for the average person across Great Britain as a whole. Here we see that car driving accounts of 51% of mileage and car

passenger travel for a further 27%; National Rail services account for 8% of annual passenger mileage, on average – but with large regional differences.

**Figure 2.3: Proportion of average annual mileage per person contributed by different modes, in 2010**



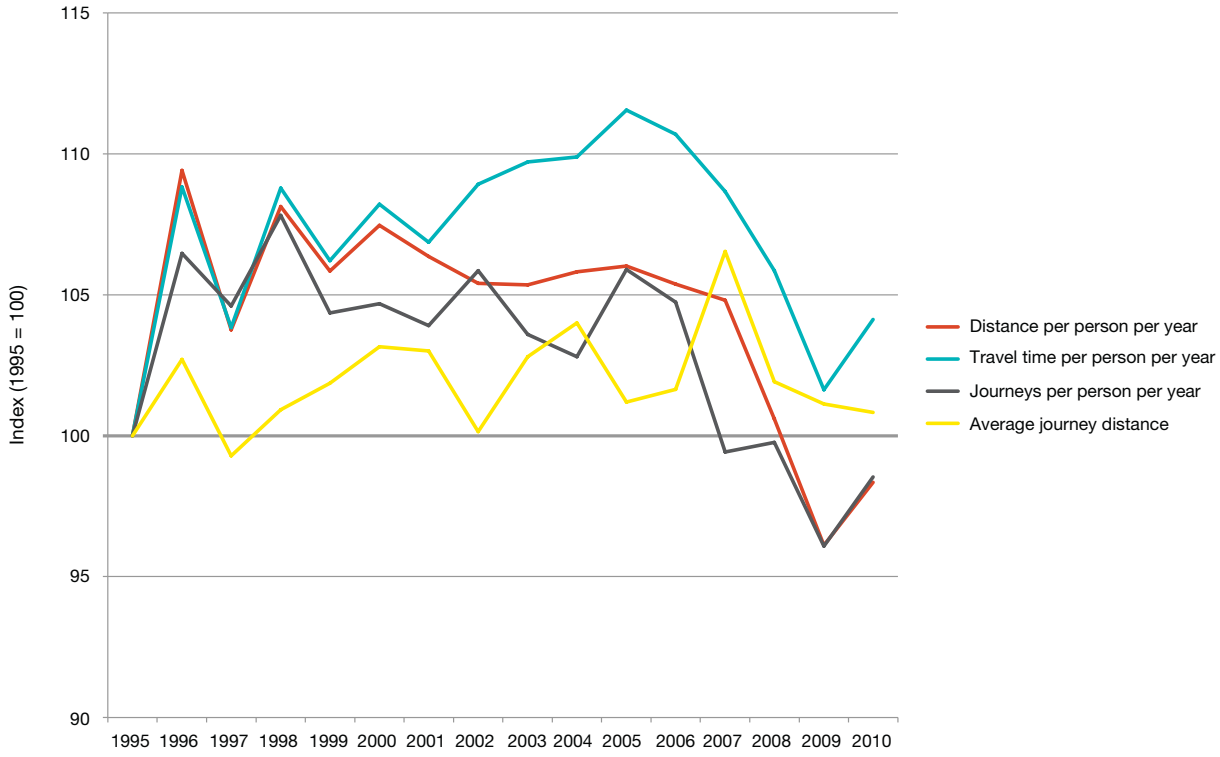

## 2.3 Trends in car driver and rail passenger travel

Using the same indicators as in Figure 2.1 (which showed all transport modes), and looking first at patterns of car driving, in Figure 2.4 we observe a broad stability in the indicators between 1997 and 2007 – after which they all decline.

The picture for rail passenger travel contrasts sharply with that for travel as a car driver (Figure 2.5). The small sample sizes of rail trips in the NTS data mean that year-on-year fluctuations in rail indicators are, unsurprisingly, quite large – but the overall trends are clear.

Average annual distances by rail, and rail trips per person, have both risen by roughly 50% over this time period, and average annual travel time spent on rail journeys shows a very similar trend. There has been no corresponding 'recession effect' as was observed for car driver trips. In contrast, average distance per rail journey has hardly changed. This means that, on average, all the growth in rail travel in this period is due to people making more trips by rail rather than longer ones – and average door-to-door speeds have not changed.

## Figure 2.4: Overall trends in car driver travel per person, 1995–2010

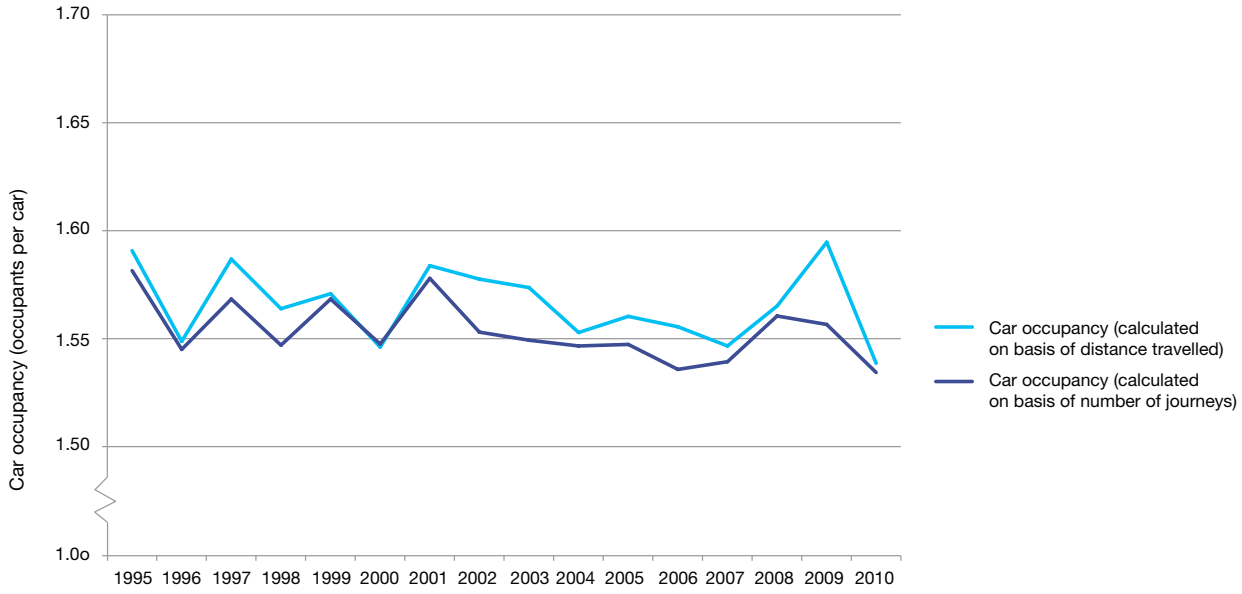



## Figure 2.5: Overall trends in rail passenger travel per person, 1995–2010

## 2.4 Trends in car passenger travel

Car driver mileage was flat for around a decade, so has this been compensated for by an increase in car passenger trips? Figure 2.6 shows that there is no clear time trend overall in the average number of passengers carried. So, in aggregate, there is little to suggest that the 'missing' growth in car driving mileage has shown up as car passenger travel

**Figure 2.6: Trends in car occupancy rates, by mileage and journeys**




In the remainder of this report we have in the main used grouped data – for 1995/7, 2000/2 and 2005/7 – to smooth out year-on-year variations, work with larger sample sizes and avoid the impacts of the recession post-2007.

# 3. Components of the Aggregate Trends

In this chapter we investigate a wide range of behaviours among different population groups and types of areas, which collectively have contributed to the aggregate trends in car and rail travel that were summarised in Chapter 2.

## 3.1 Demographic differences

### 3.1.1 Gender

Looking at average distance travelled per year, we can see in Figure 3.1 that rail travel has increased over time, for both men and women, but from a higher 1995 base and at a faster rate for men. As a result, the gender gap in 1995 was around 30%, but by 2005/7 had grown to 41%.

This contrasts with trends in car driving, where annual mileage for men dropped while that for women rose, although men still drive much more than women. In 1995/7 the average man drove more than two and a half times as many miles as the average woman; by 2005/7 the disparity had decreased, but men were still driving roughly twice as much as women.

**Figure 3.1: Annual car driver and rail passenger mileage per person, 1995–2010**

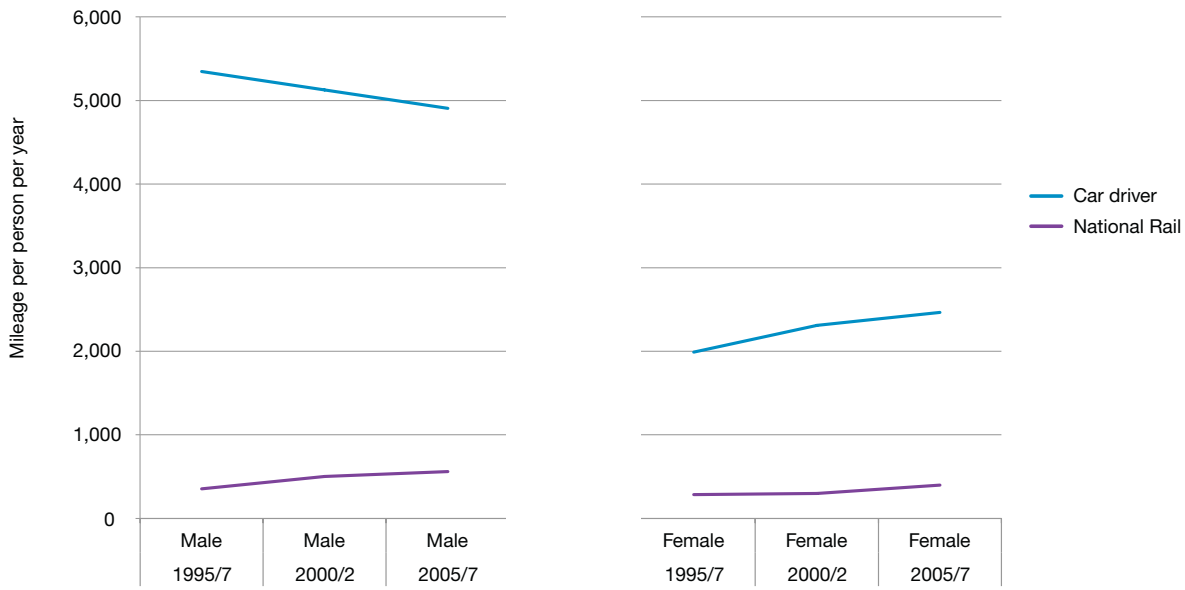


Table 3.1 looks at the penetration of particular modes across the population over time, in terms of the proportions of men and women who record at least one car driver or rail passenger trip in their weekly travel diary. The table shows the percentage of respondents using each mode at least once.

Overall, for men the percentage who drove has remained stable over the ten-year period, at 54%, while for women this rose steadily from 36% in 1995/7 to 42% in 2005/7. Both groups show steady increases in rail market penetration, from around 6% to 9% for males and by slightly less (from 6% to 8%) for females.

This indicates that the reduction in average car driving among men is due to reduced annual mileages among car drivers, while the growth for women is substantially due to increases in the proportion of women driving. For rail, increases in average mileage for both genders seem to be due to a higher proportion of the population becoming rail users.

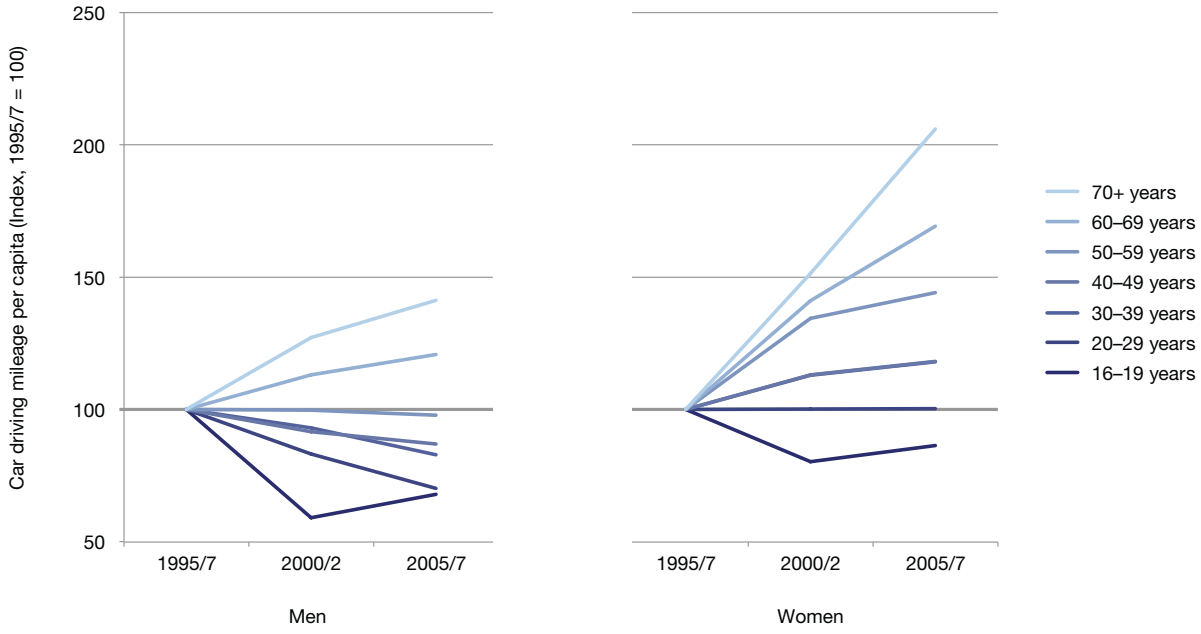
**Table 3.1: Proportion of men and women recording car driver and rail passenger trips in their weekly travel diary, in 1995/7, 2000/2 and 2005/7**

| Years | Gender | % Car drivers | % Rail passengers |
|---|---|---|---|
| 1995/7 | Male | 54% | 6% |
| 2000/2 | Male | 54% | 8% |
| 2005/7 | Male | 54% | 9% |
| | | | |
| 1995/7 | Female | 36% | 6% |
| 2000/2 | Female | 39% | 6% |
| 2005/7 | Female | 42% | 8% |

### 3.1.2 Age

Looking first at changes in car driver mileage per person, and using 1995/7 as an index base of 100, Figure 3.2 shows a clear pattern: there is a strong inverse relationship between age and change in car mileage.

**Figure 3.2: Relative changes in car driver mileage over time, by age and gender**




Younger groups have experienced a decline in annual car driver mileage and older groups an increase – in fact, the older the group in question, the greater the increase. For males, the inflection point is seen among the 50–59 age group, whose car mileage has remained broadly stable over time (with a slight decline in recent years): older age groups have increased their average car driver mileage and younger age groups have decreased theirs. For females, the inflection point is at a much younger age – those in their 20s. For women older than that, car driver mileage has increased over time.

Figure 3.3 displays the equivalent information for rail passenger mileages, also based to an index of 1995/7 as 100. Here it is evident that there is a very different pattern from that of car use. Over the ten-year period as a whole, all age groups (except males and females aged 70+) display increases in average annual rail mileages, but these increases are much less clearly related to age than is the case for car driving.

**Figure 3.3: Relative changes in rail passenger mileage over time, by age and gender**

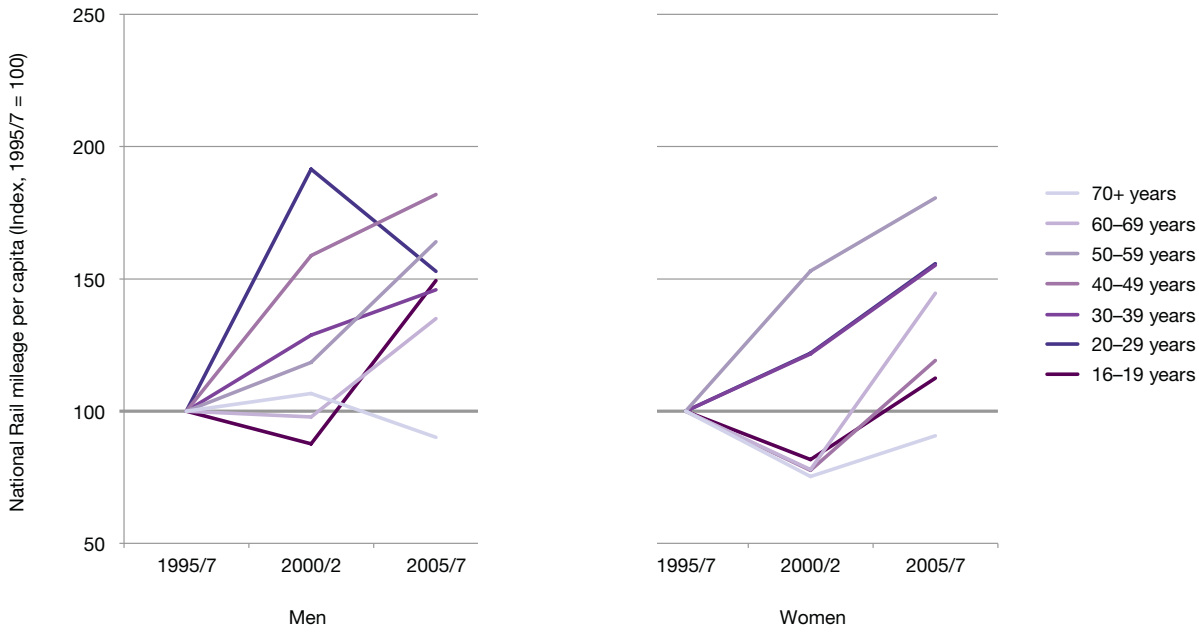
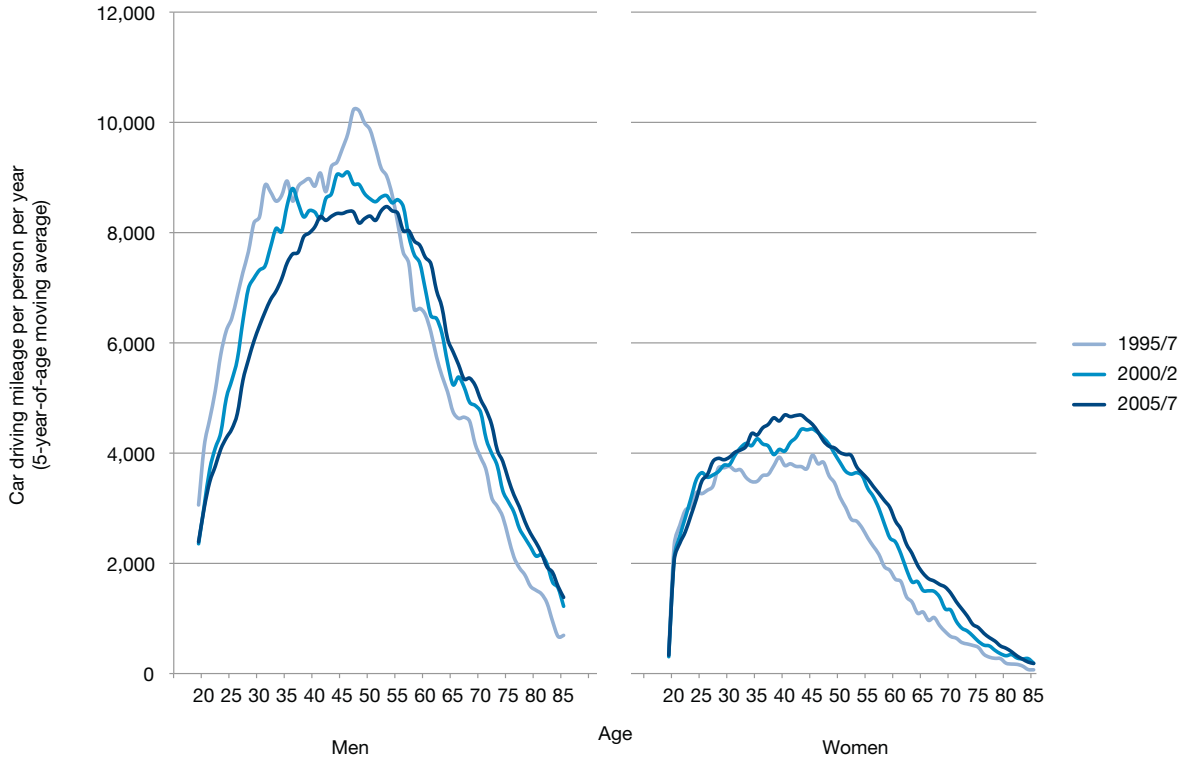


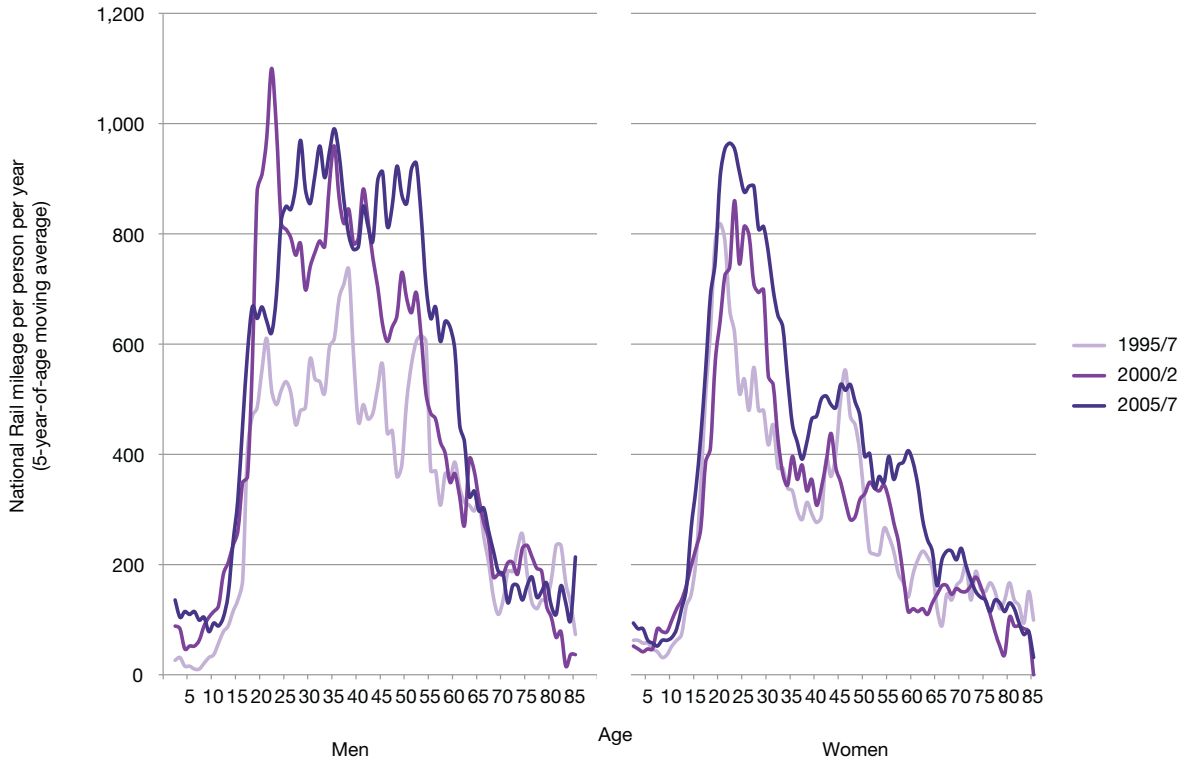

Figure 3.4 plots average annual car driver mileage by age and gender, comparing 1995/7, 2000/2 and 2005/7; this is illustrated using five-year moving averages and shows a strong relationship between age and absolute levels of car driving, for both men and women, in the form of an inverted U-shaped curve. Both genders show strong peak driving mileages in their 40s in each time period, but as we get closer to the present day the peak has fallen for men and increased for women.

Similar plots for rail mileage are shown in Figure 3.5, and reveal rather different relationships with age.

## Figure 3.4: Car driver mileage per person, by age and gender




## Figure 3.5: Rail passenger mileage per person, by age and gender



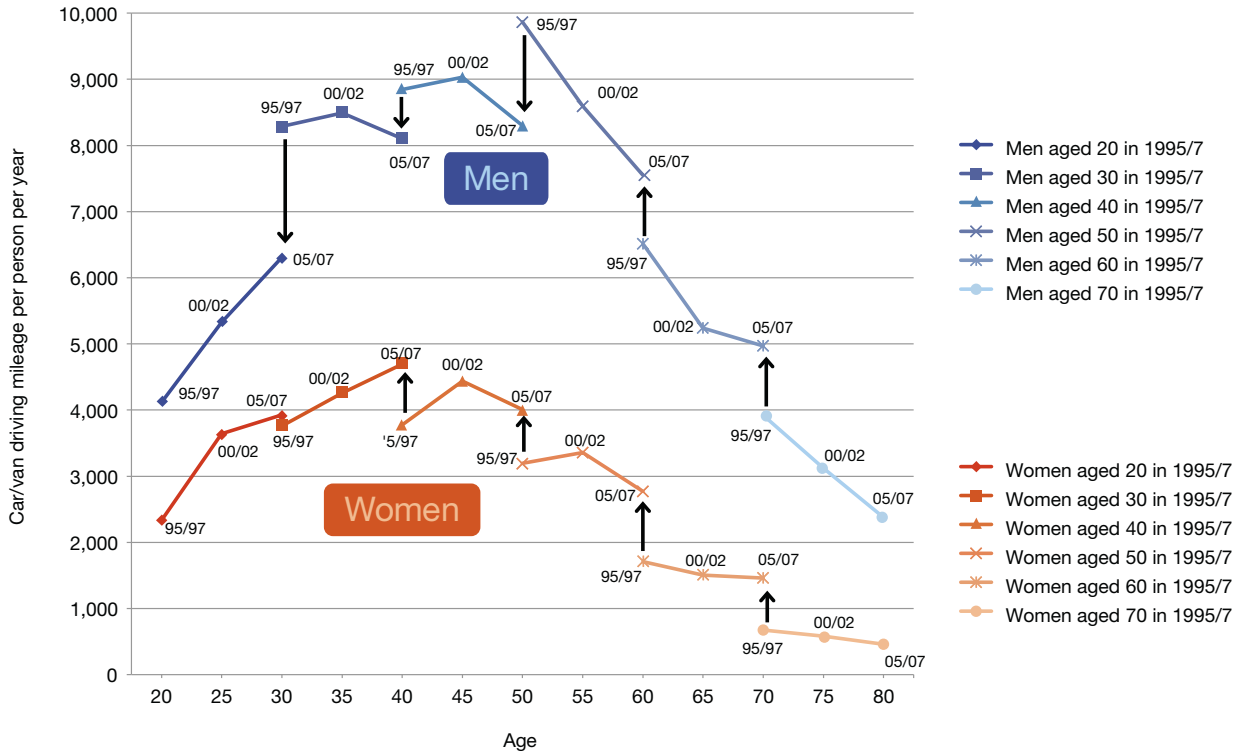
While both gender groups again exhibit inverse U-shaped relationships between age and annual rail mileage, in other respects the patterns are very different to car driver mileages. First, both groups have experienced sharp increases in rail mileage between 1995/7 and 2005/7, but with different peak age groups and patterns: a sharp peak for women at age 20–29, and a much less marked one at the 30–39 age group for men. Second, the level of peak age-related rail mileage is broadly similar for men and women. Also note the different profiles: in 2005/7 men were showing broadly similar annual mileages between ages 30 and about 50, whereas for women their peak is clearly among the 20s group, with a steady decline thereafter – both in 2005/7 and in previous time periods.

The next two Figures show how changes in behaviour of specific age cohort groups contribute to these overall changes in age- and gender-related behaviour.

Each Figure takes six three-year cohorts ten years apart of males, and of females of a particular age, and traces their travel behaviour (as car drivers and rail passengers) as they age over a ten-year period. This means that the last data point for one cohort is at the same age as the first data point for the next age cohort, which started off being ten years older. For example, people who were age 20 between 1995 and 1997 will have become 30 between 2005 and 2007, so we can see whether the travel behaviour of someone who is 30 in the period 2005 to 2007 is showing the same pattern as someone who was 30 between 1995 and 1997. This enables us to observe whether people of similar ages at different points in time have similar behaviour, or whether there is a ‘jump’ or ‘drop’ from one age cohort to the next.

Figure 3.6 displays changes in car driving by men and women as they grow older, on the same Figure.

**Figure 3.6: Car-driving mileage, by age-cohort groups over time**

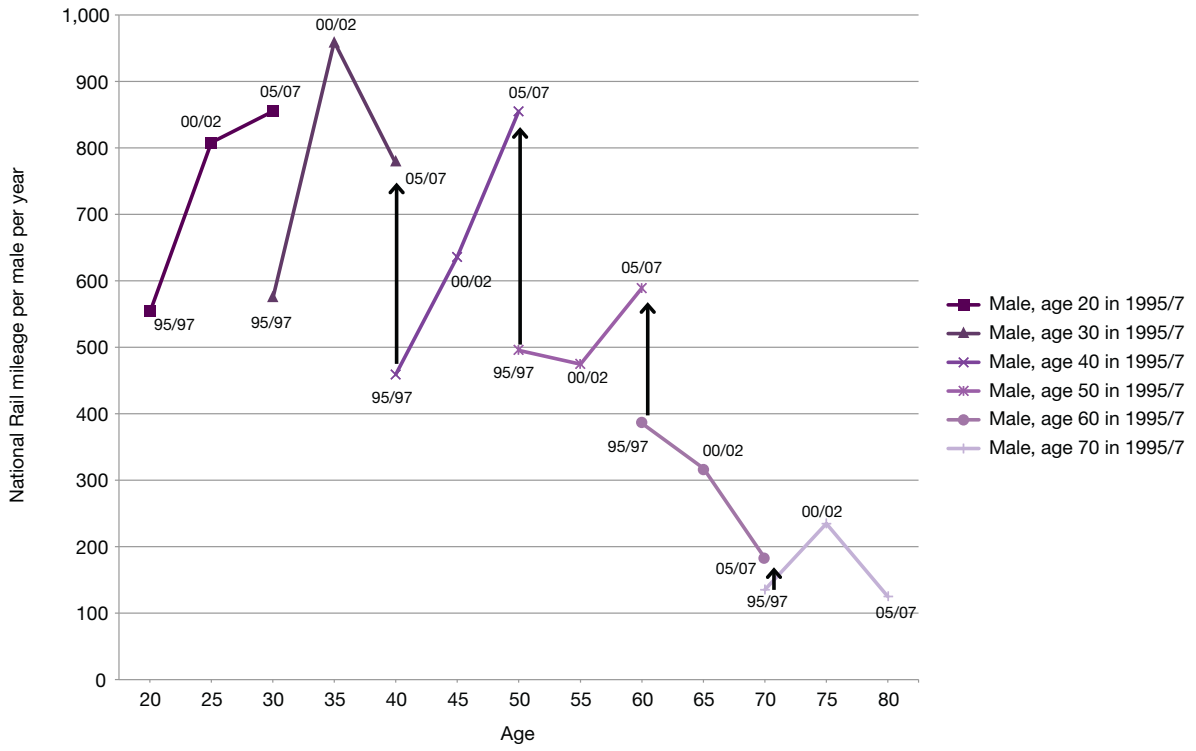



For male car drivers we can see that it is only men who were age 20 between 1995/7 that have increased their car mileage as they aged through the decade; over the same period, travel has dropped slightly for those who were 30 and 40 and much more sharply as they age for those who were 50, 60 and 70. The only age groups which had a higher car mileage than their preceding cohort were men who were age 60 and age 70 in 2005/7; all the younger cohorts display lower car mileages at the cohort overlap points.

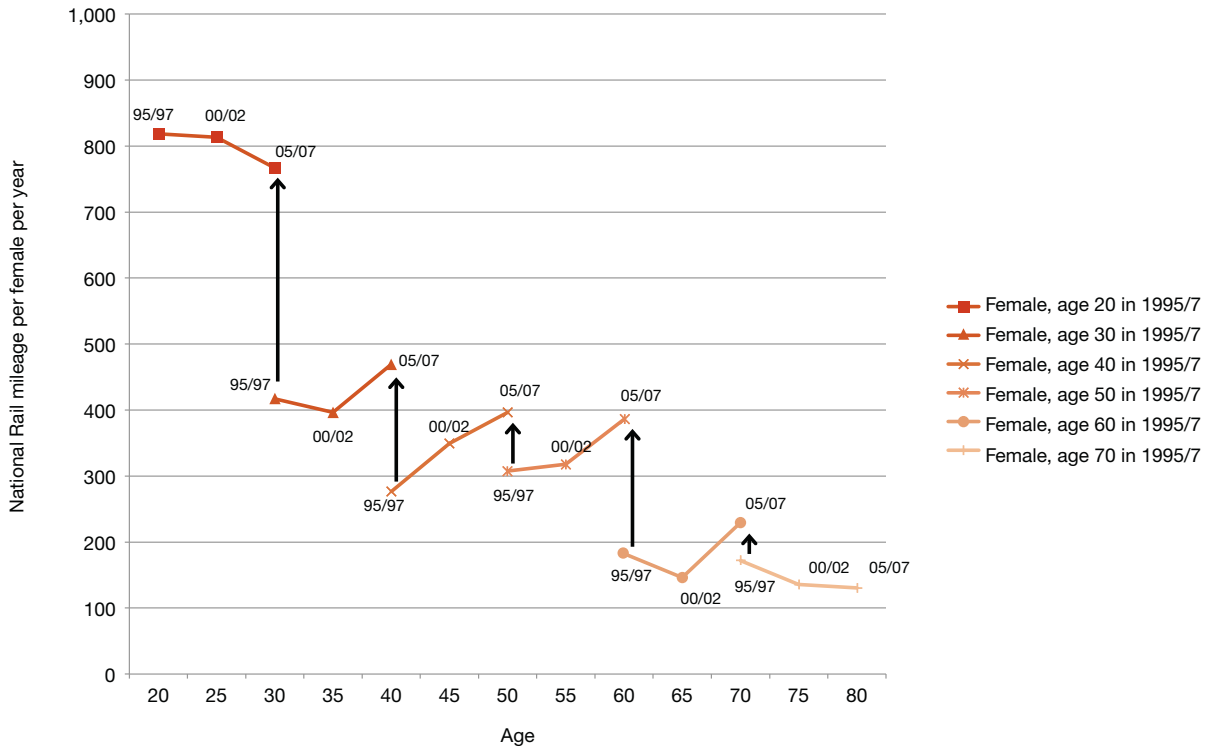
For female car drivers, those who were 20 or 30 in 1995/7 show a substantial increasing mileage as they age, while those who were 40 have experienced a slight increase and older groups a slight decline (50, 60 and 70) – in contrast to the sharp drops in car mileage among of equivalent age. In general, the female cohorts drive more than their predecessors did at the same age.

For rail the picture is different (see Figure 3.7 and Figure 3.8, which show each gender separately). Here each of the cohorts, of both males and females, shows higher levels of rail mileage than its predecessor, and for most groups their rail mileage increases as they age. But there are two contrasting exceptions: younger men who were 20 in 1995/7 are travelling by train more as they age, and men who were 60 less; for women the picture is reversed, with women who were 60 in 1995/7 travelling more as they age, while those who were 20 travel slightly less as they age.

## Figure 3.7: Rail passenger mileage, by male age-cohort groups over time




## Figure 3.8: Rail passenger mileage, by female age-cohort groups over time



### 3.1.3 Migration

The NTS included a question on country of birth from 2010 onwards, and from that year's data at face value it appears that there may be a significant relationship between migration status and travel behaviour. Respondents born in the UK on average have a much higher annual car driver mileage than those born overseas (3,523 vs 2,587 miles), and a slightly lower annual national rail mileage (488 vs 644 miles). Both of these differences are statistically significant.

But these differences become less marked when we look in more detail at the data. Table 3.2 breaks this national data down by gender and for London/non-London residents. Once split in this way we see that much of the difference is due to the fact that a larger proportion of London's residents were born abroad (38% of Londoners vs 9% of those living elsewhere in GB, according to the 2010 NTS sample).

On average, people born in the UK drive more than those born abroad, and this holds for both men and for women, whether they live in London or not – but the differences are only statistically significant for people living in London. It should be borne in mind, however, that some of these differences may be due to other factors (e.g. differences in age and personal income profiles of migrants and those born in the UK, etc.).

In the case of rail travel none of the differences are statistically significant – the higher rate of rail use by migrants seems to be primarily due to the large proportion of migrants who live in London, where rail use is higher than the national average.

In summary, there seem to be some significant links between migration and travel patterns, but further analysis is required to establish how much of this is due to confounding factors.

**Table 3.2: Average car driver and rail mileage, all GB and London/non-London, by gender and migration status, 2010**

| | | | Average mileage by group members born in the UK | Average mileage by group members born abroad | Gap between British-born and those born abroad | Significance level of 'born abroad' gap |
|---|---|---|---|---|---|---|
| Men | Car driving | GB | 4,570 | 3,561 | 1,009 | <0.01 |
| Men | Car driving | London | 2,406 | 1,866 | 539 | 0.05 |
| Men | Car driving | Rest of GB | 4,811 | 4,565 | 246 | 0.41 |
| | | | | | | |
| Men | Rail | GB | 564 | 788 | -225 | 0.02 |
| Men | Rail | London | 876 | 888 | -13 | 0.94 |
| Men | Rail | Rest of GB | 529 | 729 | -200 | 0.11 |
| | | | | | | |
| Women | Car driving | GB | 2,508 | 1,675 | 832 | <0.01 |
| Women | Car driving | London | 1,217 | 510 | 707 | <0.01 |
| Women | Car driving | Rest of GB | 2,646 | 2,405 | 241 | 0.17 |
| | | | | | | |
| Women | Rail | GB | 415 | 509 | -94 | 0.18 |
| Women | Rail | London | 745 | 592 | 152 | 0.3 |
| Women | Rail | Rest of GB | 380 | 456 | -76 | 0.34 |

## 3.2 Economic differences

### 3.2.1 Personal incomes

The relationships between personal income and mileage are shown for car drivers and rail passengers in Figure 3.9 and 3.10, respectively.

**Figure 3.9: Car-driving mileage per adult, by personal income band**

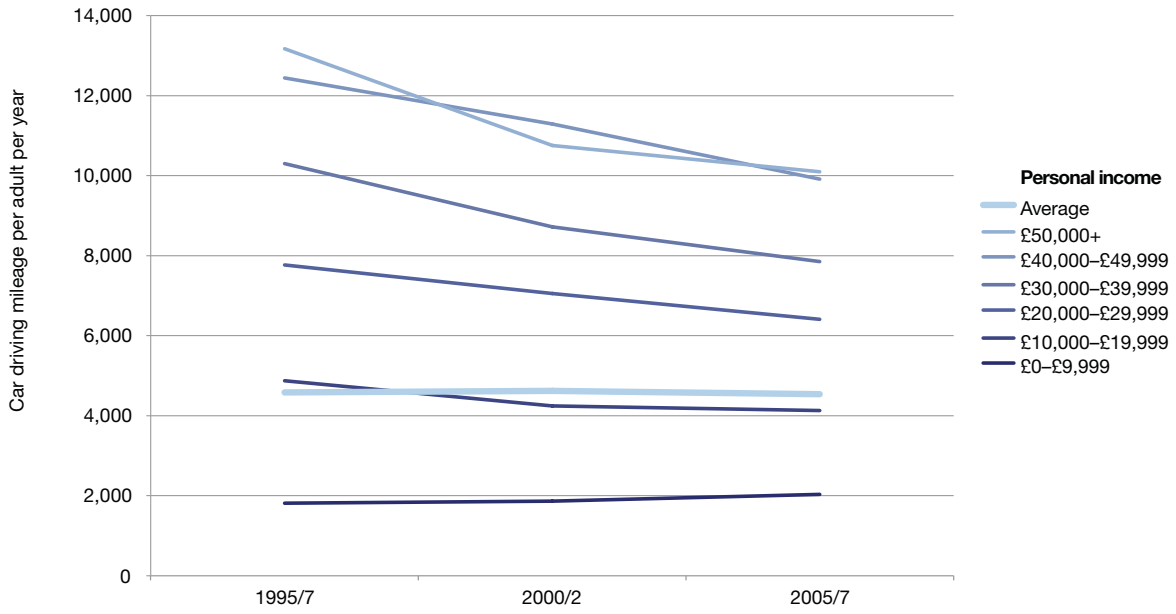
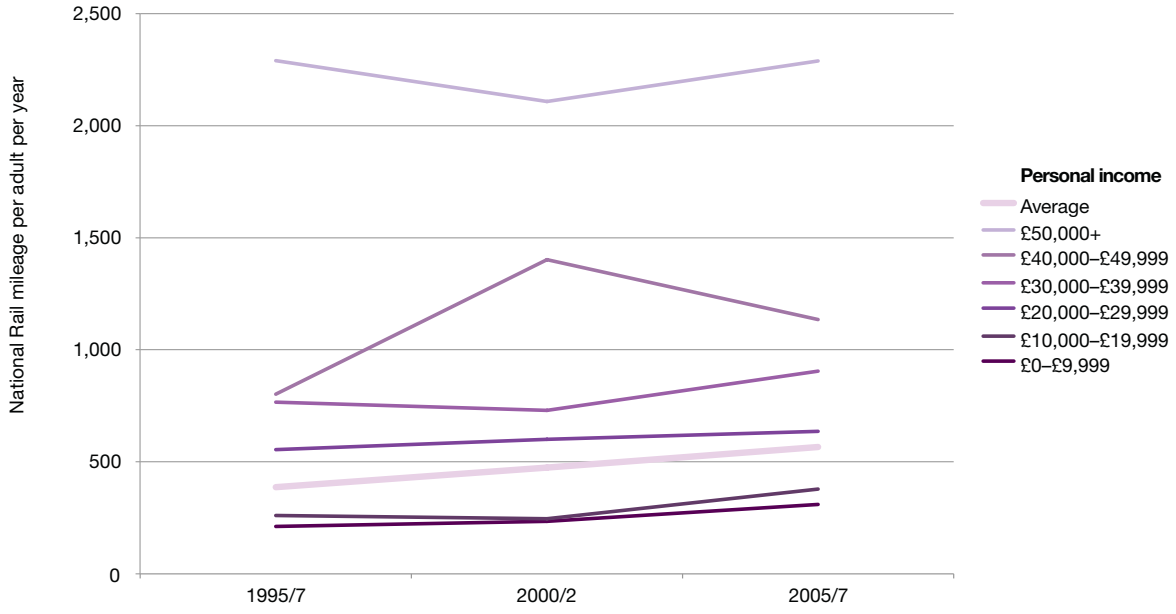



**Figure 3.10: Rail passenger mileage per adult, by personal income band**



As expected, average annual car driver mileage increases with personal income band (Figure 3.9), except for the top two bands (i.e. £40,000+ p.a.), but what is not expected is that car driver mileage has declined over this ten-year period in all income groups except the lowest one (under £10,000 p.a.), and that the ***rate of decline is faster for higher income groups*.** This is investigated further in section 3.4.2, where we look at the type of ownership of the cars involved.

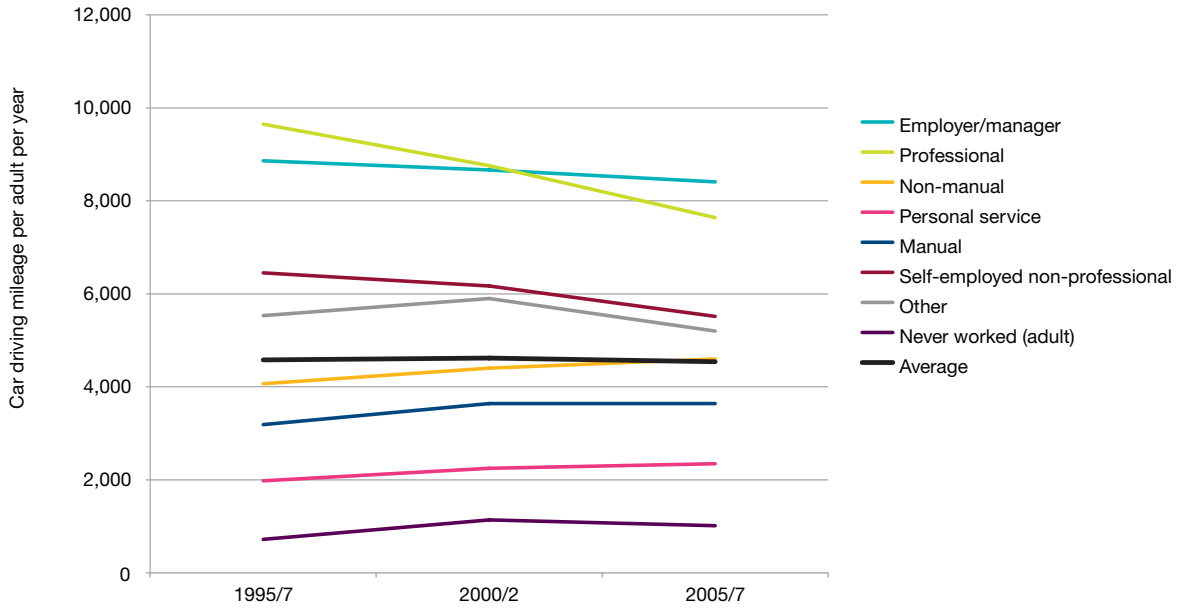
The corresponding figures for annual average mileages by train for differing income bands over the three time periods is in line with expectations (Figure 3.10). There is a non-linear relationship between income band and annual rail mileage, such that higher-income people use rail much more on average than those on lower incomes. However, there is no apparent strong upward trend over time in most income groups. Note that some of the sample sizes are quite small here, which accounts for the fluctuations from one time period to the next.

### 3.2.2 Occupational effects

Trends in car driving per person differ in direction according to the occupation of the respondent and their associated average annual mileages (Figure 3.11).

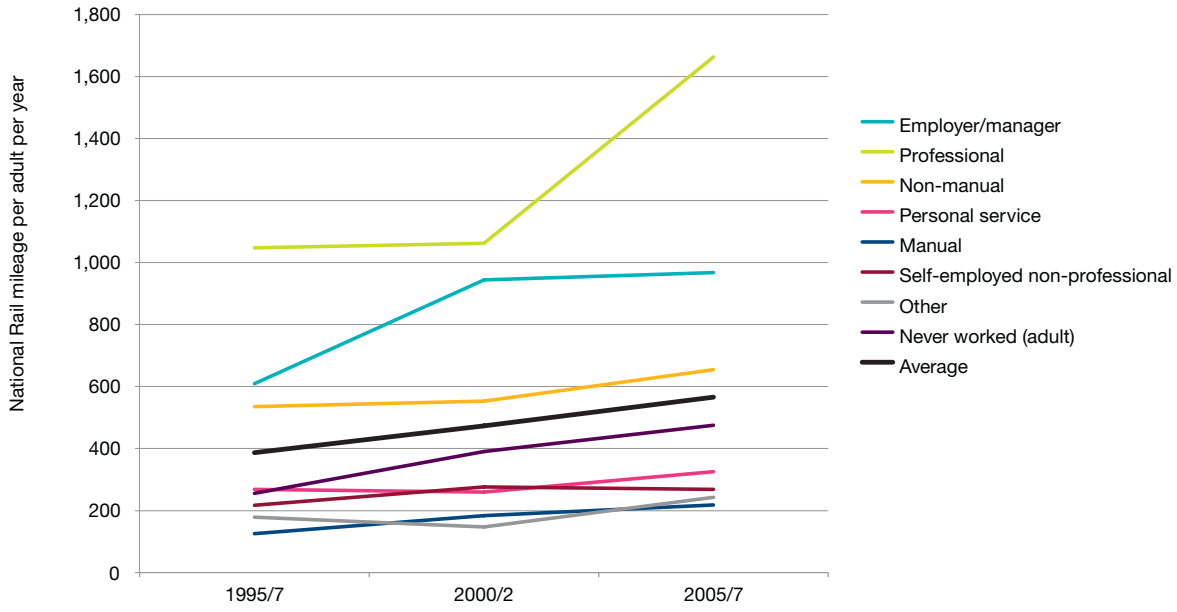
Groups which had average annual mileages below 5,000 in 1995/7 have seen an increase over time, while groups with higher annual mileages have seen a decrease in car mileages. Over the ten-year period, they are most sharply down for ‘Professional’ occupations (over 2,000 miles annually), followed by ‘Self-employed non-professionals’, ‘Employer/managers’ and ‘Other’ groups (categories as defined by the National Travel Survey). Mileage increases have been greatest for ‘Non-manual’ groups and those working in ‘Personal services’.

**Figure 3.11: Car driver mileage, by occupational type over time**



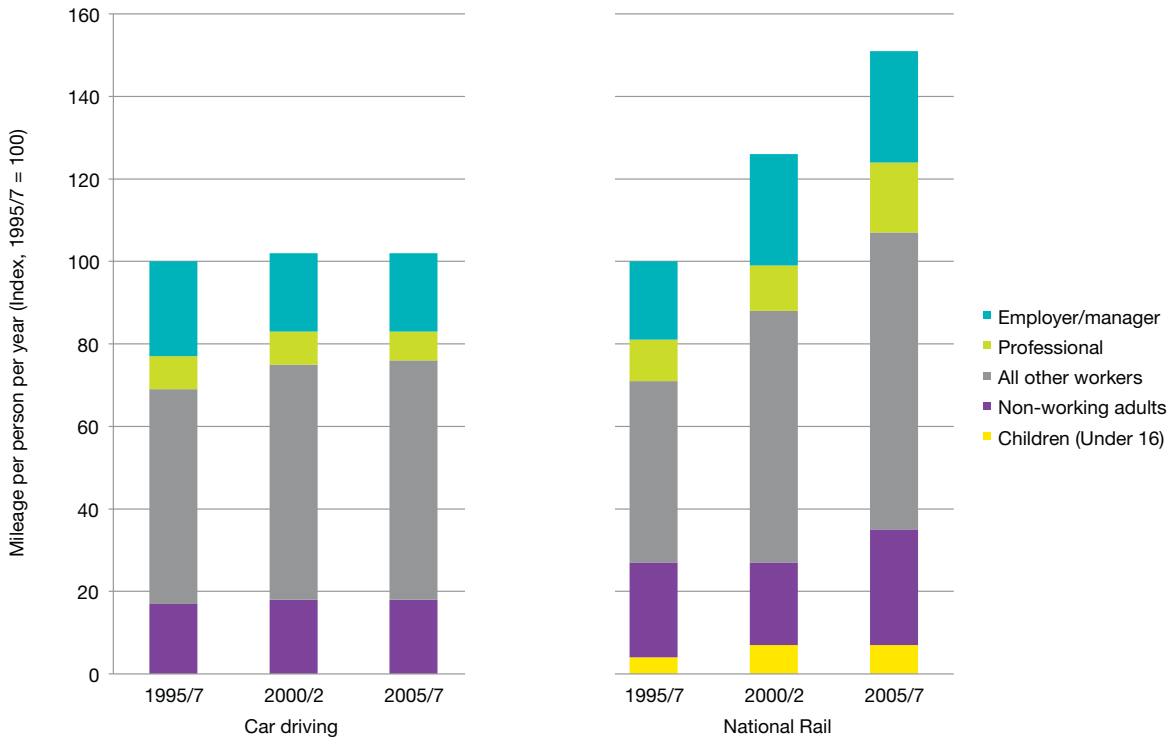

By contrast, in the case of rail, all occupational groups show increased mileages, with the largest increase being seen among the 'Professional' and 'Employer/manager' groups (Figure 3.12).

**Figure 3.12: Rail passenger mileage, by occupational type over time**



The relative size of these employment groups is very different, so that their contributions to the aggregate per-person changes in car driver and rail passenger mileage various considerably. Figure 3.13 summaries these contributions for three employment and two non-employment population groups.

**Figure 3.13: Relative contribution of differing population groups to changes in per-person car driver and rail passenger mileages, 1995/7 to 2005/7**

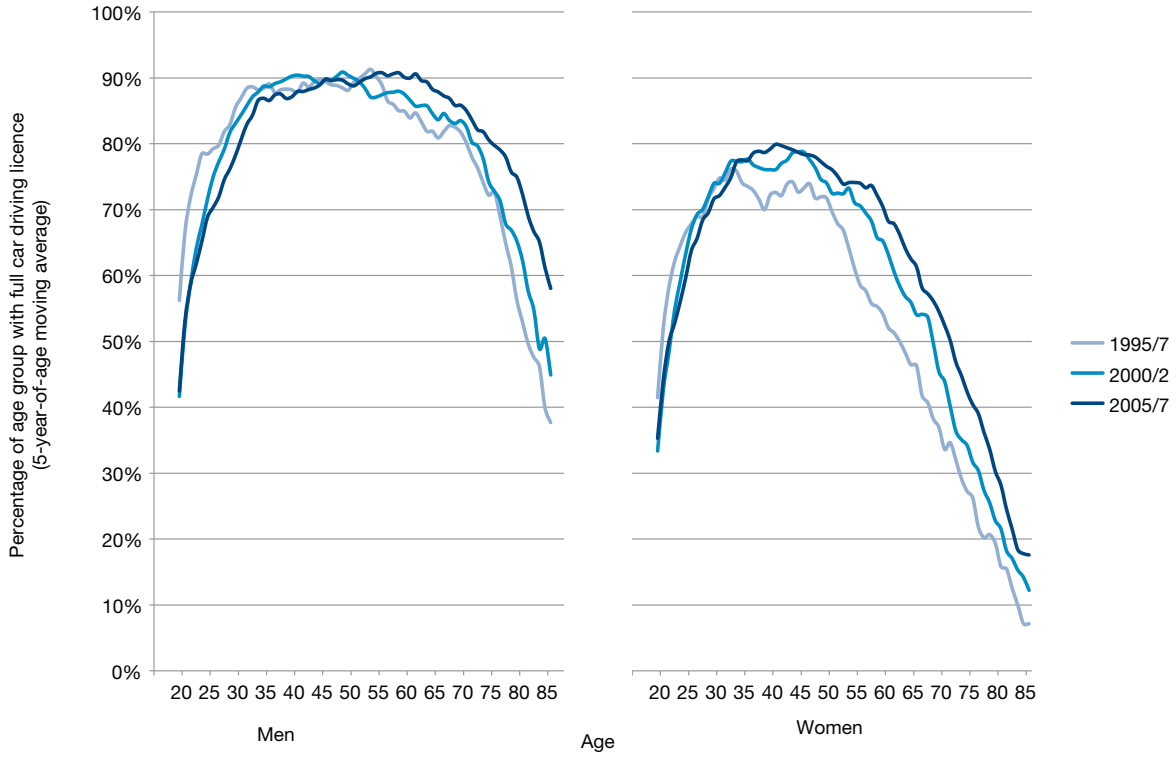



The small increases in per-person car-driving mileage over time have come from the 'All other workers' category, with slight reductions in average per-person mileage among the 'Employer/manager' and 'Professional' groups. In the case of the much larger growth in rail travel per person, this has disproportionately come from the 'Professional', 'All other workers' and the 'Non-working adults' groups. Also, although the effect is small, the fastest rate of growth has actually occurred for children (aged under 16). It is worth noting that, as Figure 3.13 shows, indices of mileage the relative magnitude of car and rail use is not apparent: in 2005/7 cars were driven for more than seven times as many miles as Britons travelled by rail.

### 3.2.3 Driving licence ownership

Figure 3.14 illustrates trends in full car driving licence ownership by age. The findings have been well documented in the literature: a higher proportion of men have a full car driving licence than women, but this gap is reducing over time. Also the age bulge in ownership is shifting to the right (particularly for men); this is because younger people in previous generations have retained their licence as they age, but current young people in their 20s are less likely to hold a licence than their predecessors.

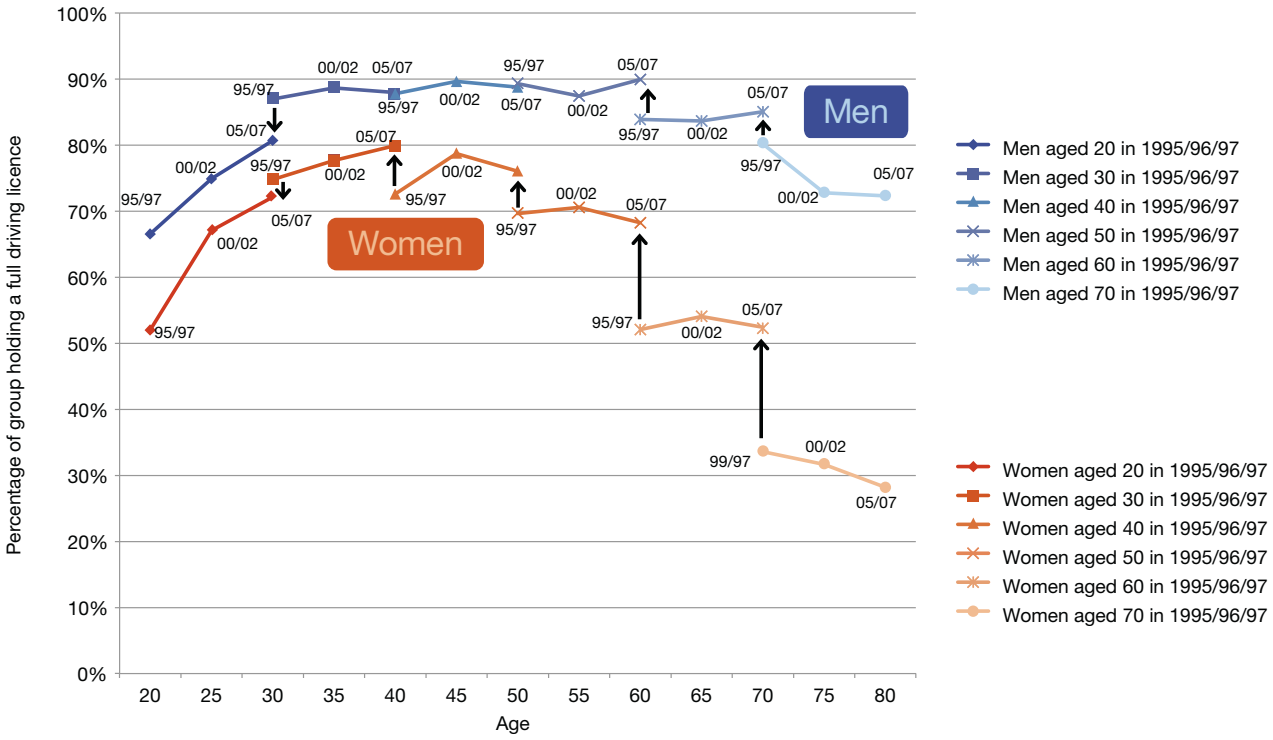
**Figure 3.14: Percentage of male and female respondents with full car-driving licences, 1995/7, 2000/2 and 2005/7**



These cohort effects are shown more clearly in Figure 3.15.

- For men, those aged 30, 40 and 50 in 1995/7 show stable ownership rates of around 90% as they age; men aged 60 also have a stable ownership rate (of around 85%), while it declines for men aged 70 in 1995/7. There is a strong growth for those age 20 as they get older, but by age 30 their ownership rate is lower than the previous cohort.
- For women, each successive cohort has higher car licence ownership rates than its predecessor (i.e. women of a given age in 2005/7 are more likely to own a licence than women of the same age ten years previously), except for those who were 20 in 1995/7, where it is slightly down – but not as much so as for men.
- Ownership rates increase for women age 20, 30 and 40 as they get older, while they are stable for women age 50 and 60, and decline with age for women who were 70 in 1995/7.
- In all cases, female rates are below those of men, and these differences increase with age.

**Figure 3.15: Car licence ownership, by age-cohort groups over time**



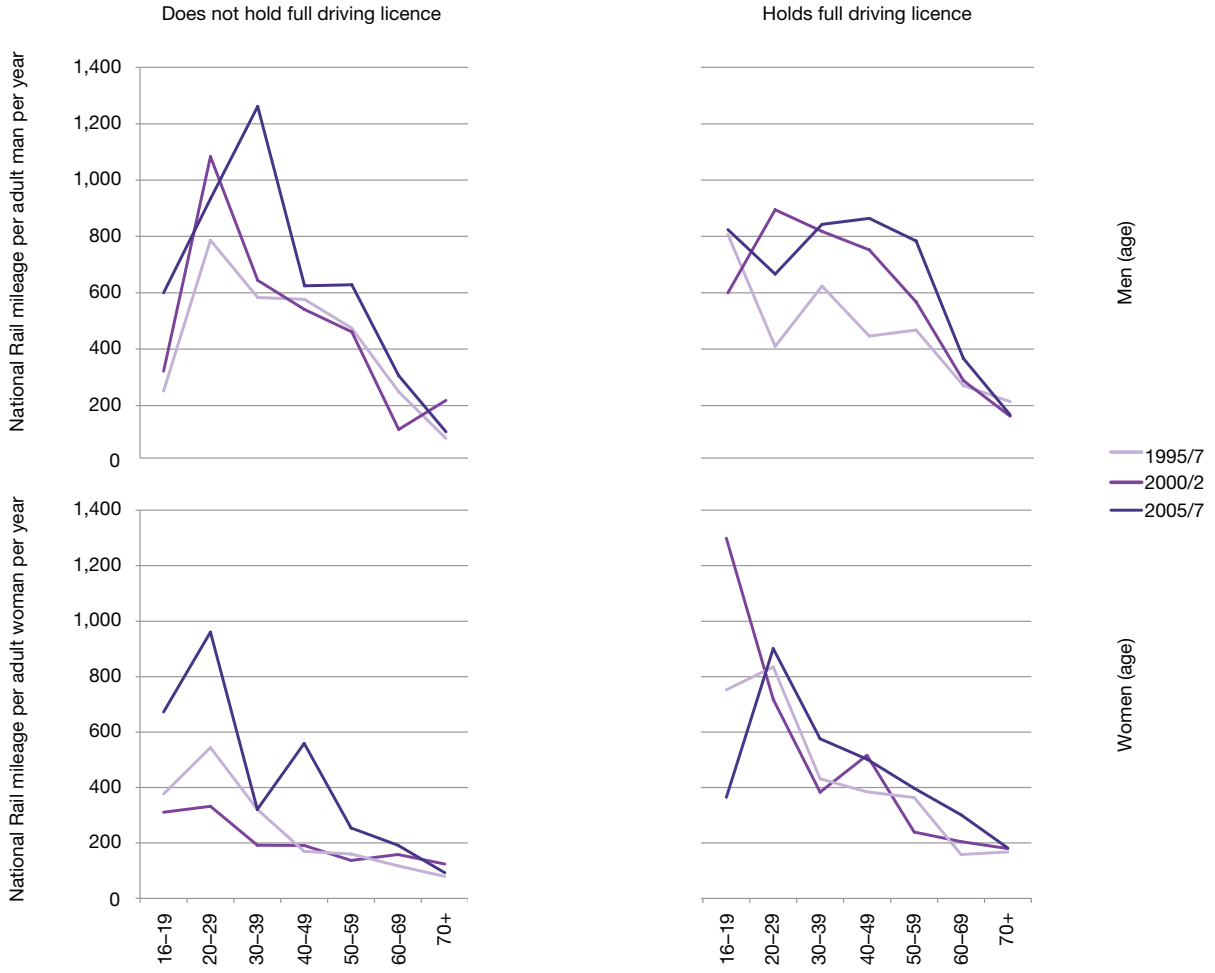

We next examine how licence holding affects car driver and rail passenger trip-making. The NTS shows that in 1995/7, 83% of respondents who had a full car driving licence reported making one or more car trips during their seven-day diary week – and this percentage has changed very little over time. Just 1% or 2% of non-licence holders also report driving a car – these are most likely learner drivers holding a provisional licence. In terms of rail trips, those with a

driving licence are more likely to report making a train trip in their weekly diary than are those without one. In 1995/7, 7% of licence holders and 5% of non-licence holders reported making at least one trip by rail, and both groups had increased by two percentage points (to 7% and 9% respectively) by 2005/7.

Figure 3.16 looks in more detail at differences in rail use over time, by licence holding and gender – but averaged across these population groups as a whole.

Here we can observe that, over the ten-year period 1995/7 to 2005/7, rail use increased sharply among non-licence holders, particularly among women in their 20s and men in their 30s. It also increased quite sharply for men with full driving licences in their 20s to 50s – but much less for licence-holding women.

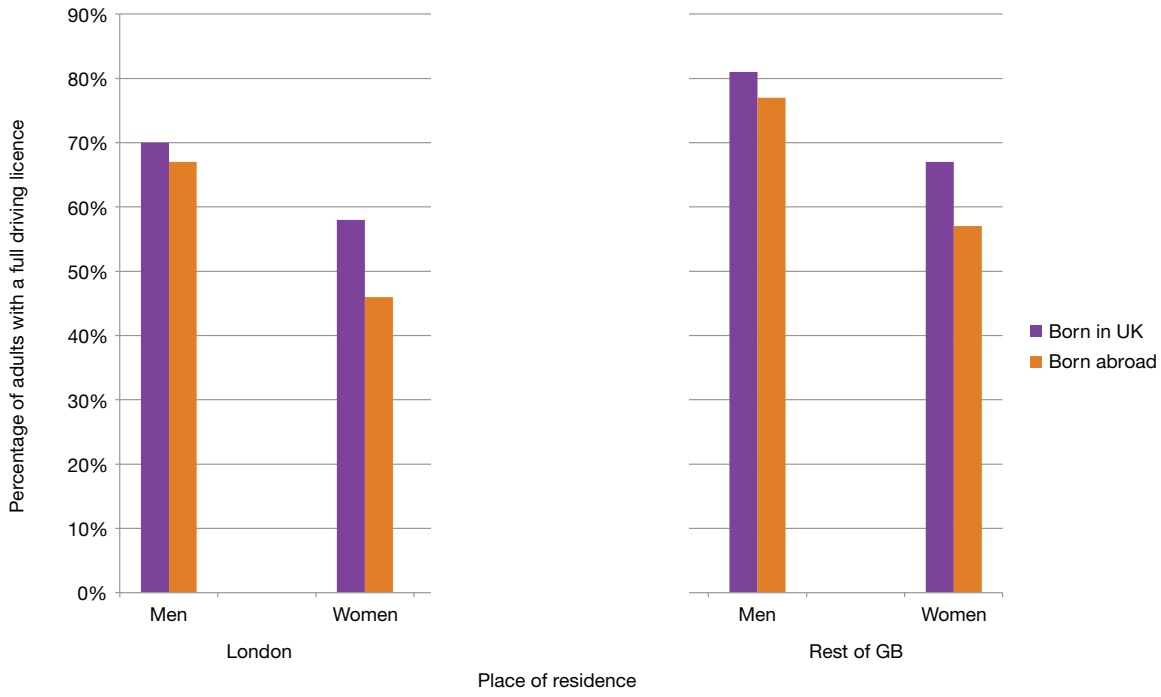
**Figure 3.16: Rail use per person, by gender and licence-holding status**




We then looked at licence-holding among migrant and British-born populations. As with the analysis of car driving and National Rail usage (see section 3.1.3), the analysis distinguished between gender and whether a person lives in London or elsewhere in GB.

Figure 3.17 shows that migrants were less likely to have a driving licence than British-born people, and that this holds for both men and women, even after accounting for whether the respondent lives in London or not. The biggest difference is among women living in London, where there is a 12-percentage-point gap in licence holding between people born in the UK and those born abroad. Again, further multivariate analysis is needed to ensure this result is not simply due to factors such as the differences in age and income profiles between migrants and those born in the UK.

**Figure 3.17: Licence holding by migration status, gender, and place of residence (London/elsewhere in GB), 2010**




## 3.3 Changes in trip purposes

Figure 3.18 shows the trend in average car driver mileage undertaken for different trip purposes. Across the whole population, the highest mileages were for commuting, visiting friends and relatives at private homes, and business-related travel. Some purposes reduced in significance over the ten years (education was down by 30%, business by 12% and visiting friends and

relatives at private homes by 8%), while escorting grew the fastest (+21%) followed by the broad category of trips to/from social and leisure activities not at the private homes of friends or relatives (+14%).

Figure 3.19 shows the equivalent mileage information for rail travel. Here the largest categories in 1995/7 were for commuting, social/leisure purposes other than visits to a private home, and visiting friends/relatives at private homes, in this order. Increases in mileage over the following ten years were recorded for most trip purpose categories except personal business, which was down by 9%. The largest increase was for business travel (+168%) followed by visiting friends and relatives (+84%). Commuting increased by a relatively modest 23%, thus its share of all rail mileage fell over this time period from 38% to 31%.

**Figure 3.18: Average car mileages for differing trip purposes**

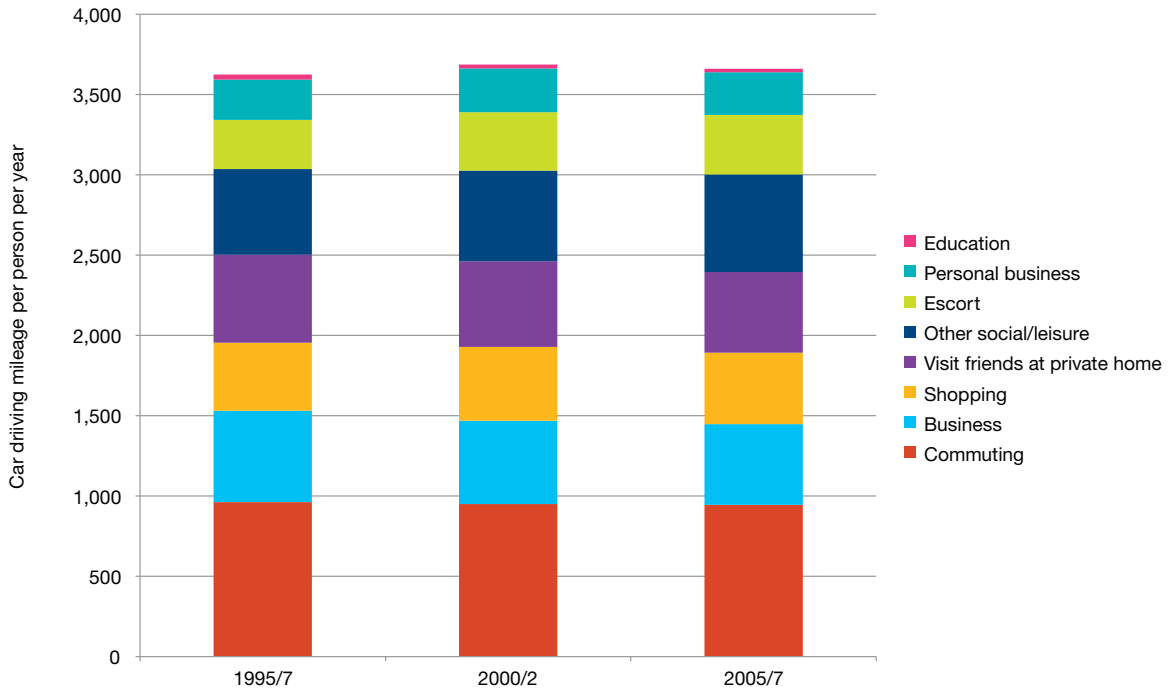
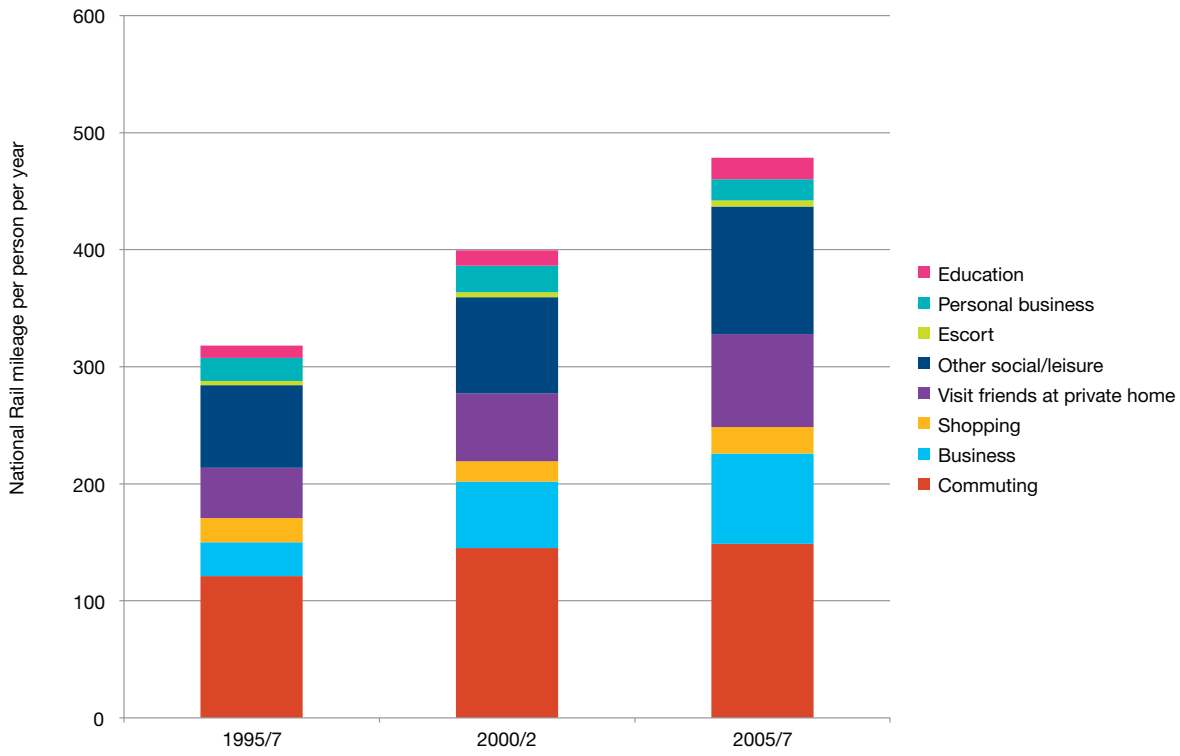


**Figure 3.19: Average rail mileages for differing trip purposes**




Given these large differential changes, it is evident that the composition of the rail market changed quite substantially over a decade: commuting remains the largest category, but now business travel and visiting friends and relatives at private homes stand out from the other categories. The average length of rail trips for visiting friends and relatives at private homes increased by over 30%, but commuting and business trip lengths remained fairly stable – over all purposes, trip lengths have not increased substantially.

## 3.4 Car ownership and company cars

### 3.4.1 Car ownership

Figure 3.20 shows changes in the pattern of household car ownership between 1995/7 and 2005/7. Over this period there was a steady drop in the proportion of non-car-owning households and a growth in two-plus car-owning households, but since then both trends have largely stopped owing to the recession.

**Figure 3.20: Changes in household car ownership, 1995/7 to 2005/7**

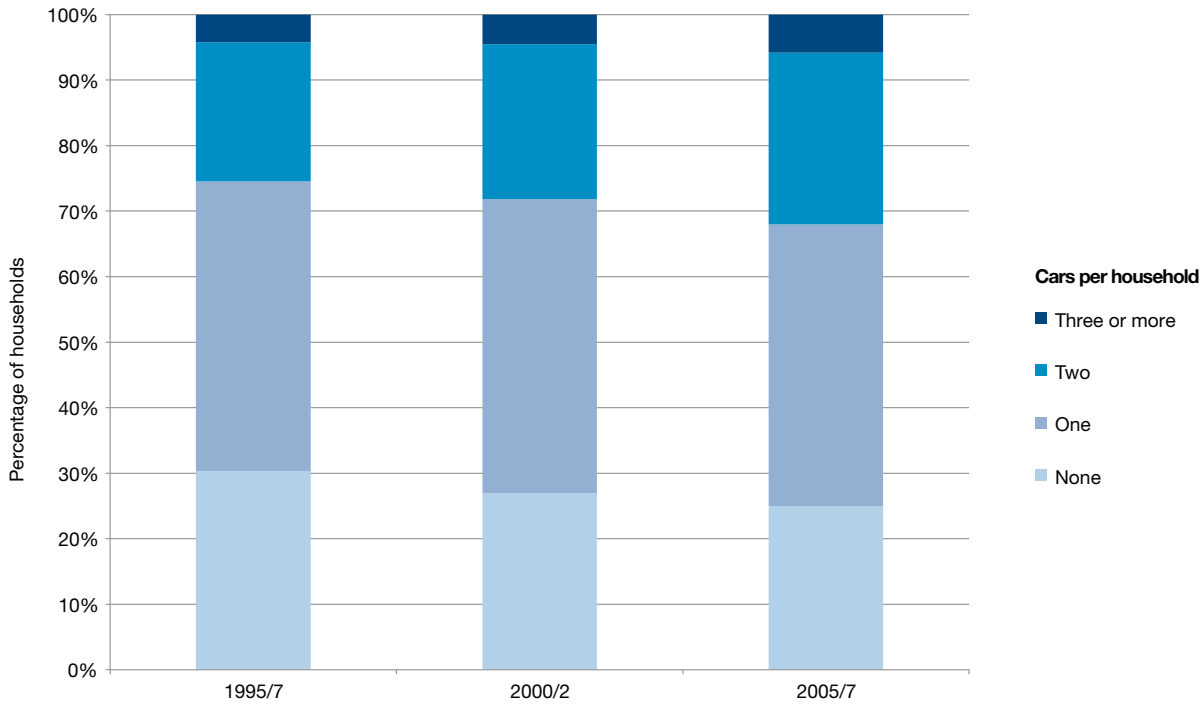



Figure 3.21 shows how annual car driver and rail passenger mileages *per person* are related to the level of *household* car ownership, over time. For car use, mileage has dropped across all levels of household car ownership, but the rate of decrease is higher as the number of cars in the household increases. The rail dataset is much smaller and 'noisier', but it does not show any clear link between annual mileage and level of household car ownership – in recent years there appear to have been no differences.

**Figure 3.21: Car driver and rail passenger mileage per person, by level of household car ownership**

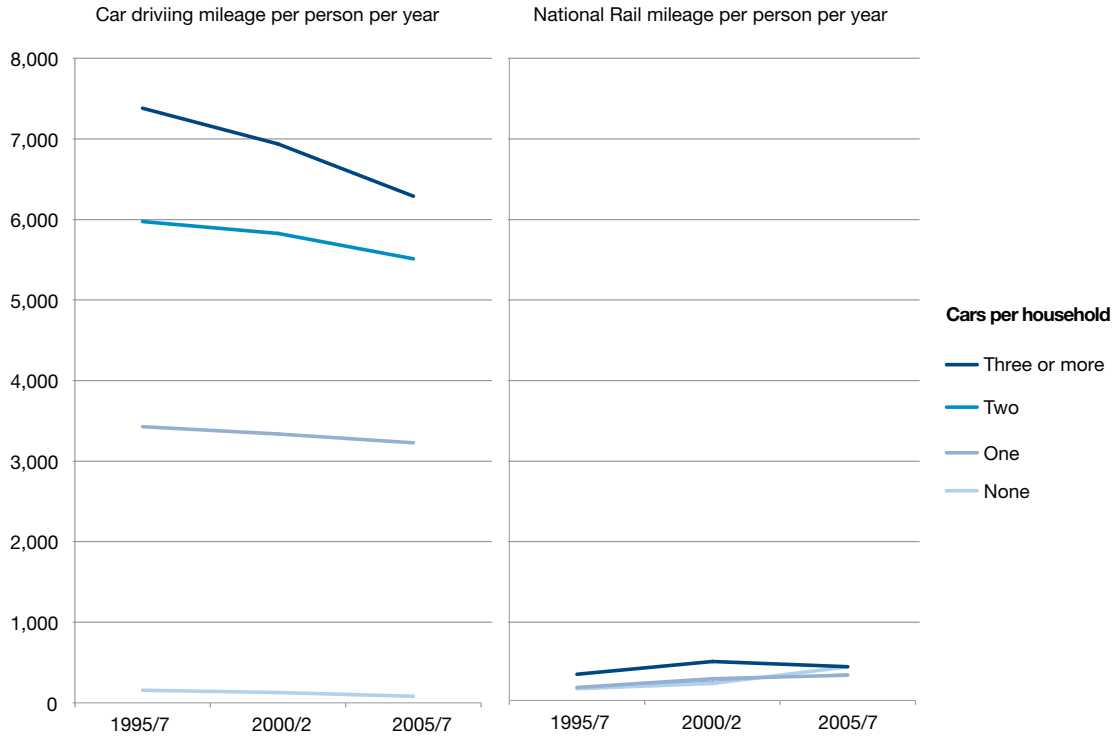



**Table 3.3: Company and privately owned cars per 1,000 people**

| Years | Type of car | Cars per 1,000 people |
|---|---|---|
| 1995/7 | Company | 29 |
| 2002/5 | Company | 29 |
| 2005/7 | Company | 23 |
| | | |
| 1995/7 | Private | 390 |
| 2002/5 | Private | 426 |
| 2005/7 | Private | 458 |

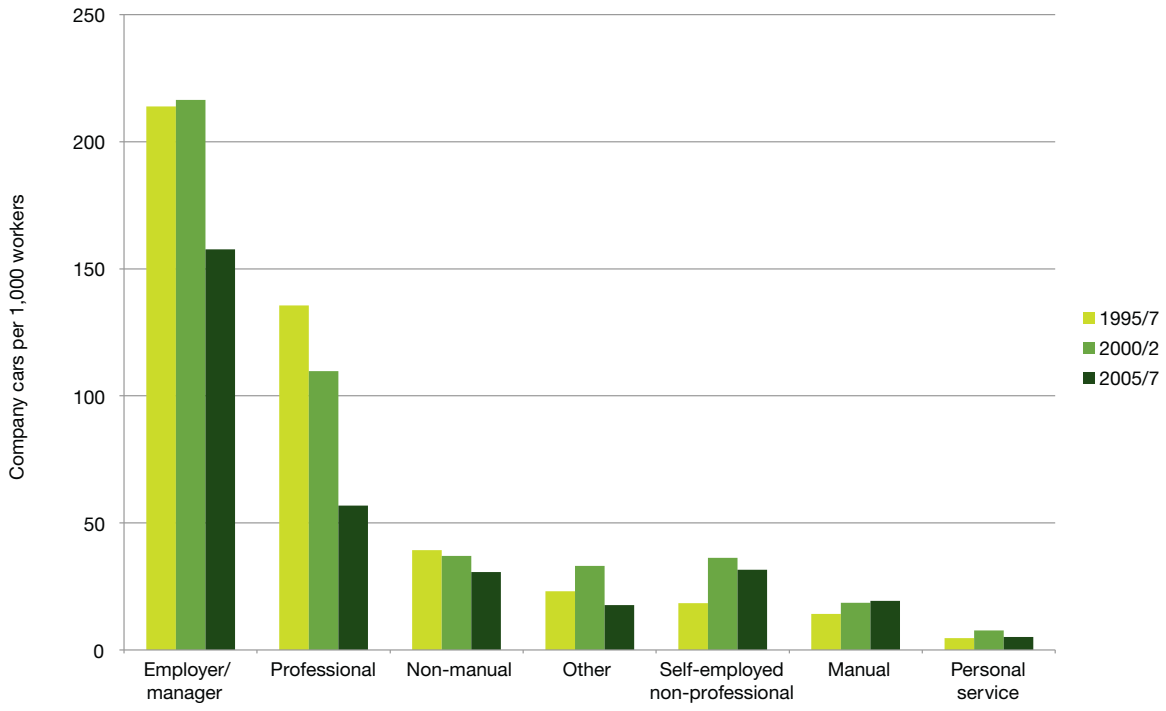
Company car ownership by type of employment is examined in more detail in Figure 3.21, by comparing changes in ownership rates for eight groups over three time periods.

## 3.4.2 Company car drivers

***Patterns of car ownership***

As can be seen in Table 3.3, company car ownership per person fell by 20% between 1995/7 and 2005/7, from an average of 29 cars per 1,000 people to 23 cars per 1,000 people with all of this decline occurring between 2000/2 and 2005/7. Over the same period, private car ownership increased steadily, from 390 to 458 cars per person – a rise of 17%.

**Figure 3.22: Changes in company car ownership, 1995/7 and 2005/7, by type of employment category**

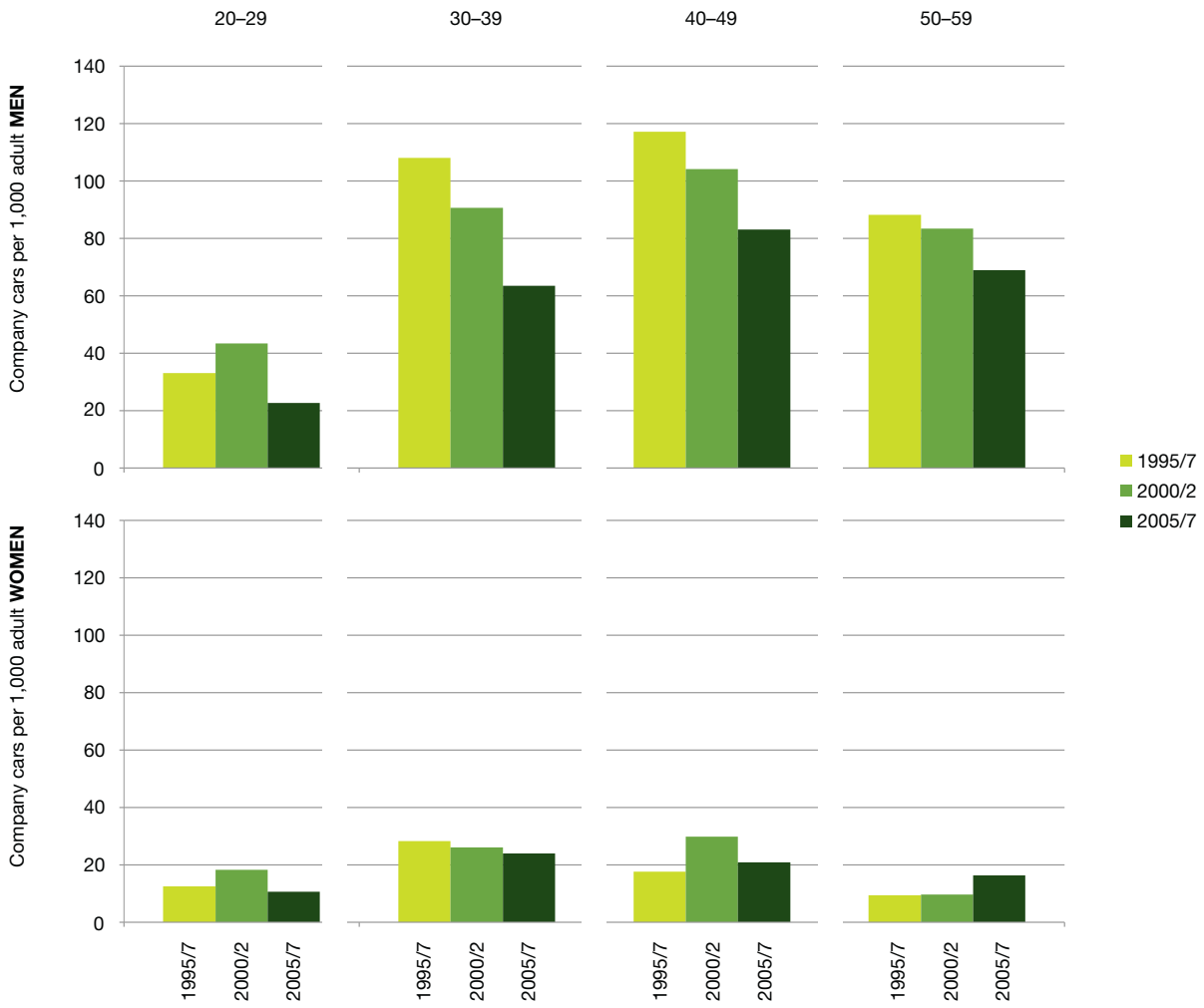



This shows a very sharp reduction of nearly 60% in company car ownership among 'Professionals', and a smaller 25% drop among 'Employer/managers'. There were smaller declines for 'Non-manual' and 'Others'. The remaining groups either retained levels of ownership, or in the case of the 'Manual' and 'Self-employed', increased their rates – but levels among these latter groups remain low.

Figure 3.23 looks at company car ownership rates by age and gender, in four ten-year age bands from 20 to 59. Here we can observe several trends. First, company car ownership rates among women are much lower than those among men, and much less variable with increasing age; they have also been much more stable within age groups over time. So, virtually all the observed

aggregate reduction in company car ownership has been among men. Second, male, peak company car ownership rates are to be found in the 30–59 age ranges, where they are broadly similar. Company car ownership grew in the (lowest) 20–29 age group grew in the late 1990s, but has since declined. The main ownership groups (30–59) have all declined, but with some differences in profile; the fastest rates of decline have been among those aged 30–39, and the slowest among men in their 50s.

**Figure 3.23: Ownership of company cars, by age and gender**




### *Patterns of company and private car use*

Table 3.4 shows changes in ***average mileage per car*** between 1995/7 and 2005/7, according to type of car ownership. Here we can see a significant decline in annual mileage of registered company cars, from 20,460 miles in 1995/7 down to 15,909 by 2005/7 – a decline of 22%; about three-quarters of this decline occurred during the first five-year period. The average annual mileage of private cars has shown a much more limited decline, of the order of 350 miles per year, or 5% (down from 7,228 in 1995/7 to 6,868 in 2005/7).

There is no evidence, therefore, at this aggregate vehicle level, of a switch from company car to private car mileage. As a consequence of this differential rate of decline, in 2005/7 the average mileage of a company car was about 2.3 times that of a privately owned car, compared to 2.8 times in 1995/7.

**Table 3.4: Average annual mileage of company and privately owned cars**

| Years | Type of car | Average annual mileage per car |
|---|---|---|
| 1995/7 | Company | 20,460 |
| 2002/5 | Company | 17,111 |
| 2005/7 | Company | 15,909 |
| | | |
| 1995/7 | Private | 7,228 |
| 2002/5 | Private | 7,103 |
| 2005/7 | Private | 6,868 |

The next two Figures show the combined effect of reduced company car ownership and lower annual mileages on ***average driving mileages per person per year***.

Figure 3.24 shows a fall of nearly 40% in driving mileage in company cars between 1995/7 and 2005/7, averaged over the adult population as a whole – down from 20% of average car mileage to 12%. One feature is particularly striking in this graph: if the mileage of personal cars is considered alone, then this continued to grow – albeit slowly – until 2007 (the start of the recession). ***The aggregate levelling off in average car mileage since the late 1990s appears to be almost entirely due to the reduced contribution of company car mileage.*** The contribution of non-household cars (e.g. rental cars, employer's pool cars, etc.) to average annual mileage is small and fluctuating.

**Figure 3.24: Average driving mileage per person per year, by type of car ownership**

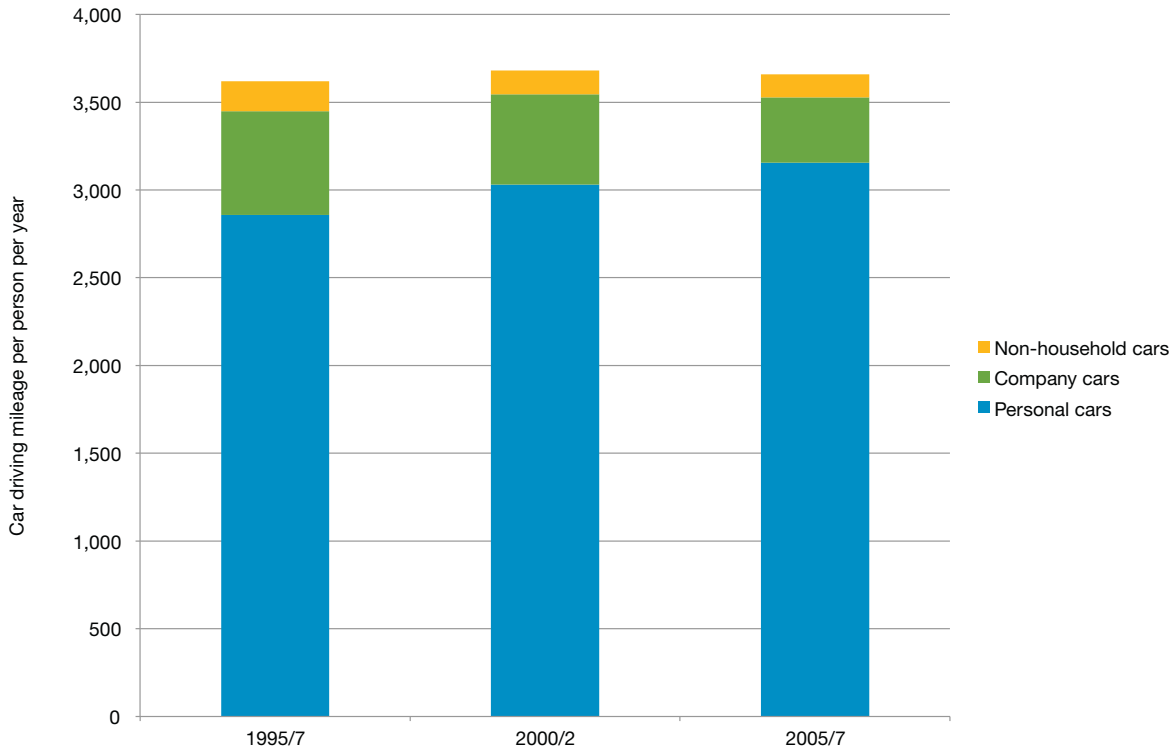



Figure 3.25 provides a similar breakdown of the reductions in car mileage, in this case among different occupational groups. As was the case for vehicle ownership, we observe much sharper reductions in company car use averaged across population groups for 'Professionals' than for the 'Employer/ managers', to the extent that the latter now have a substantially lower average total annual car driver mileage than the former (having started from a higher base in 1995/7), and have shown the sharpest decline in annual car mileage of these groups, particularly since 2000/2. Private car mileage has also fallen among 'Professionals' – indicating no aggregate switch from company to private car mileage – but private mileage has shown a small compensating increase for the 'Employer/manager' group. Note that average car use among the 'All other worker' group has remained broadly stable, while it has risen for non-working adults.

**Figure 3.25: Car driver mileage per person, by type of ownership and type of employment**

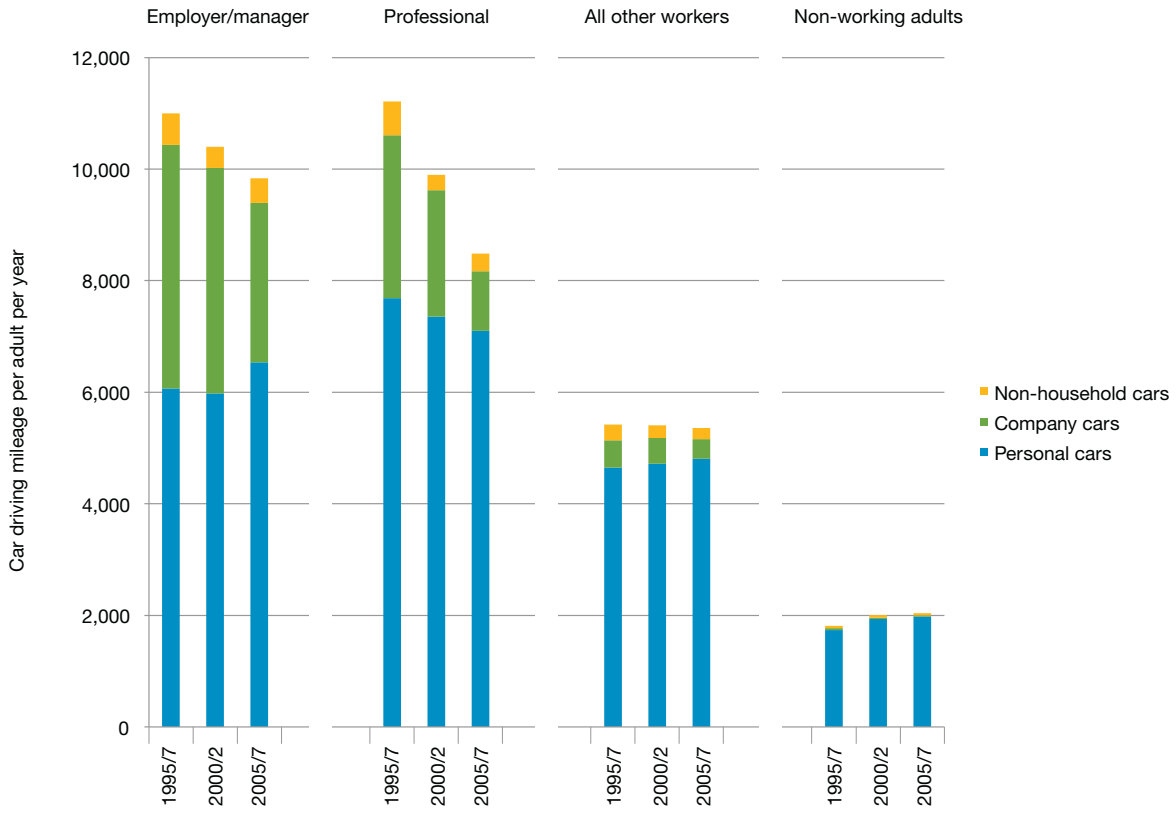
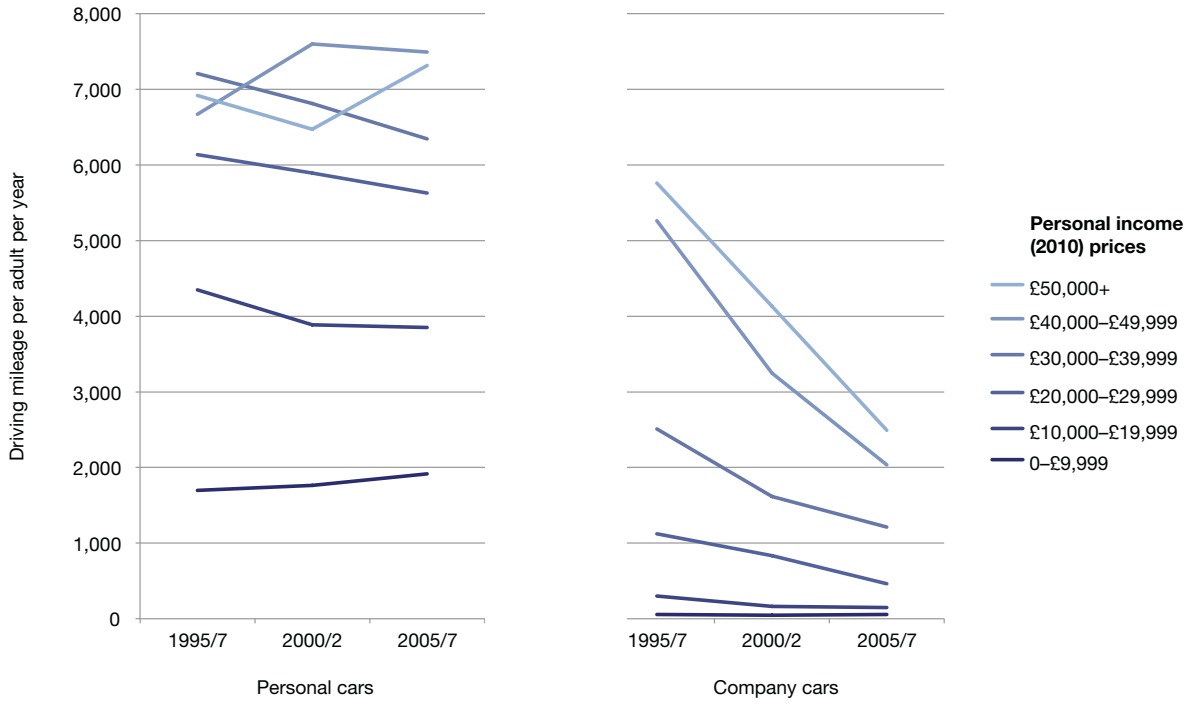



Figure 3.26 looks at changes in average annual mileage by company and privately owned cars for different personal income bands, for three time periods.

**Figure 3.26: Changes in car-driving mileage 1995/7–2005/7, by income group and private and company cars**




Here we find an answer to the anomaly about the changing relationship between car ownership and income identified in section 3.2.1. There is a sharp reduction in company car ownership which is directly related, in terms of the steepness of the decline, to income (i.e. wealthier people have higher levels of their ownership, but have reduced company car ownership at the fastest rates); but the relationship between personal car ownership and income is much more stable, with slight increases in the top two and bottom personal income bands, and a slight decline in the intermediate income bands.

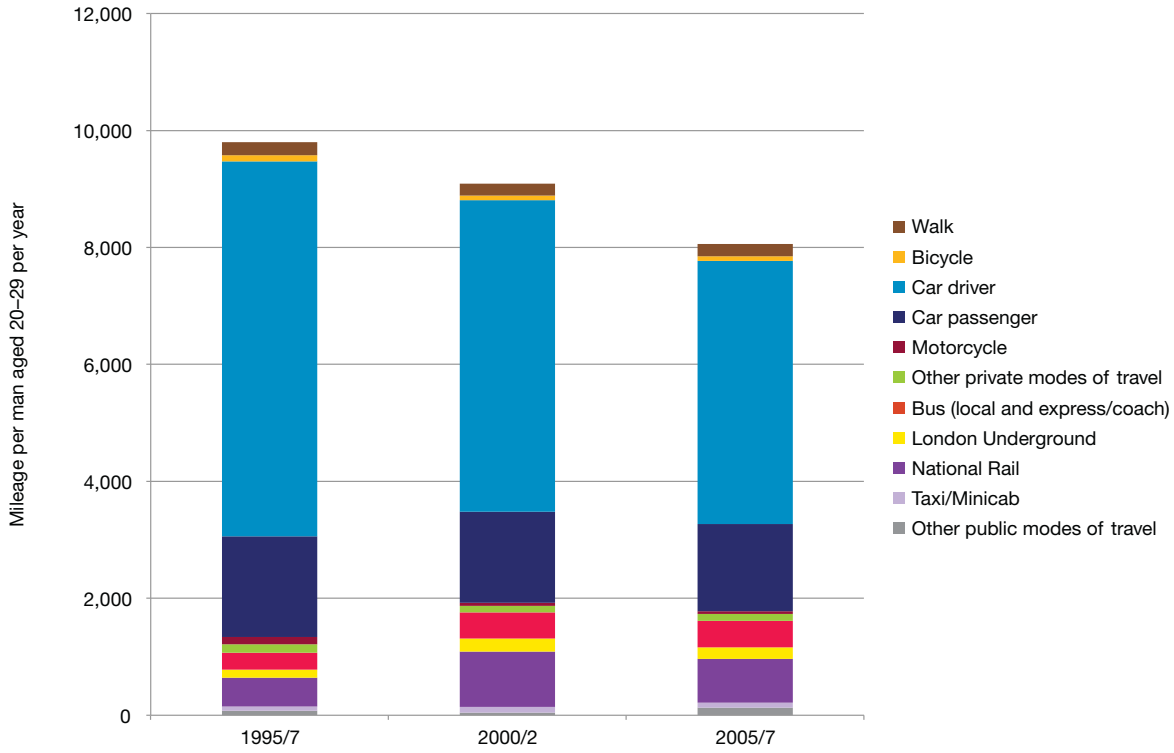
## 3.5 Travel behaviour of men in their 20s

Some of the largest changes in mobility patterns have taken place amongst young men. This section examines the personal mobility trends of men in their 20s in some detail – particularly their large reductions in annual car driving mileage – and how these relate to wider social and economic changes that have occurred. In this section the term 'young men' is used interchangeably with 'men in their 20s'.

Figure 3.27 shows trends in average mileage for young men by various methods of travel. Total mileage (across all modes) dropped by 18% over the ten-year period. Leaving aside the post-2007 years affected by the recession, their car-driving mileage fell by nearly 2,000 miles, or 30%, between 1995/7 and 2005/7, and this accounts for virtually all the drop in total mileage.

Although in the popular press it is often suggested that their decreased car driving is offset by young men being 'chauffeured around' by parents instead, the evidence does not support this: their car passenger mileage has also reduced slightly.

**Figure 3.27: Average mileage by men in their 20s, by various modes of transport**



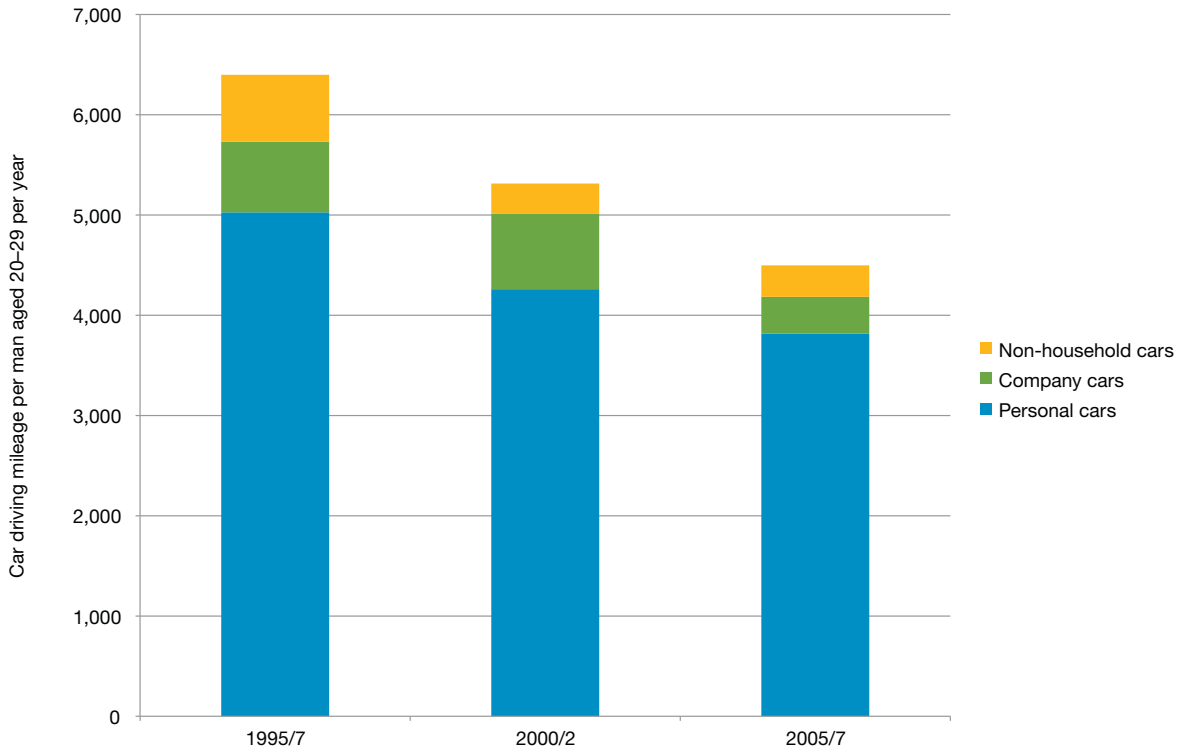

The rail use of this group increased about 50%, from an average of just under 500 miles per year in 1995/7 to about 750 in 2005/7 – but this 250 mile-per-year increase in rail use was dwarfed by the 2,000 mile-per-year fall in driving mileage.

Looking at other travel indicators, it was found that their number of trips (by all modes) fell more sharply, with an average reduction of 30%, the largest changes being a reduction in car driver trips of one third and an increase in National Rail trips of 40%. Interestingly, over the ten-year period, the number of hours spent travelling per year dropped by only around 2%, indicating a general reduction in average travel speeds.

Figure 3.28 examines young men's average driving mileage per person by type of car: personal cars, company cars, and non-household cars. Driving mileage per person by all three have trended downwards. Whilst for older men the fall in driving was primarily focused on company cars, this is not the case for young

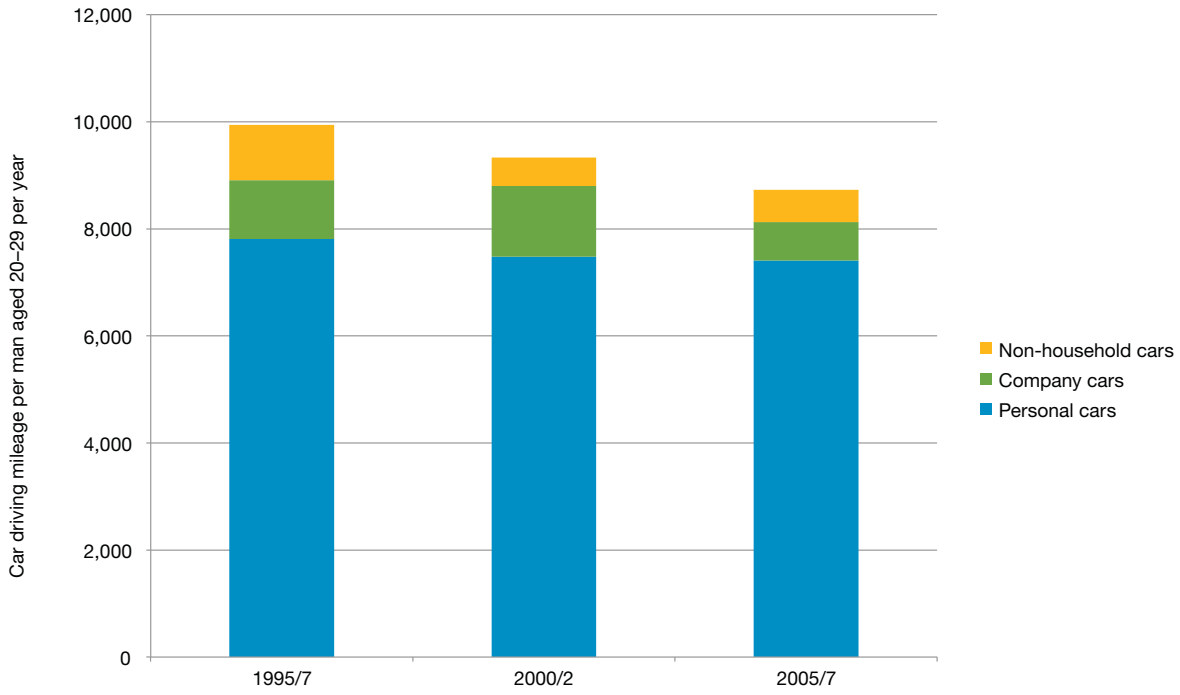
men: their driving of personal cars has fallen quite substantially too, down from 5,027 miles in 1995/7 to 3,817 miles in 2005/7 – a drop of around 25%. The use of company and non-household cars have each dropped by approximately a half, but from much lower mileage levels.

**Figure 3.28: Average driving mileage by men in their 20s, by type of car driven (personal, company, or non-household)**




Average car driving mileage across the whole group of younger men drops from around 6,500 in 1995/7 to 4,500 miles per person in 2005/7. However, when we focus just on the young men who make one or more car driver trips in their diary week, the picture is a little different (Figure 3.29). Here we see a smaller reduction in overall annual mileage over time, from about 10,000 miles to 9,000 miles, indicating that ***around half the average drop in car driving mileage by young men is due to fewer people driving, and half to a reduction in mileage on the part of those who do drive*.**

**Figure 3.29: Average car-driving mileage per driver (people observed to drive at least once during their diary week), men aged 20–29**




One significant social change in recent years has been the increase in the proportion of young people living with their parents. ONS figures from the Labour Force Survey confirm this; whilst family relationships within households are not directly tracked in the NTS, the presence of at least one adult age 35+ was used as a proxy for young people living with their parents: 40% of men in their 20s were living with an adult over age 35 in 1995/7, a proportion that had risen to 47% by 2005/7 (and which grew further to 53% in 2010). Young men living with their parents or older adults in the household tend to drive somewhat less than their peers living without an older adult. But both of these groups of young men saw their driving mileage fall by about the same amount – so whilst this shift in living arrangements can explain some of the fall in driving mileage, it is only a partial explanation, and a small one at that.

In addition to the growing tendency to live with their parents, young men are also increasingly unlikely to be married: 22% were married in 1995/7, and this had fallen to 12% by 2005/7.

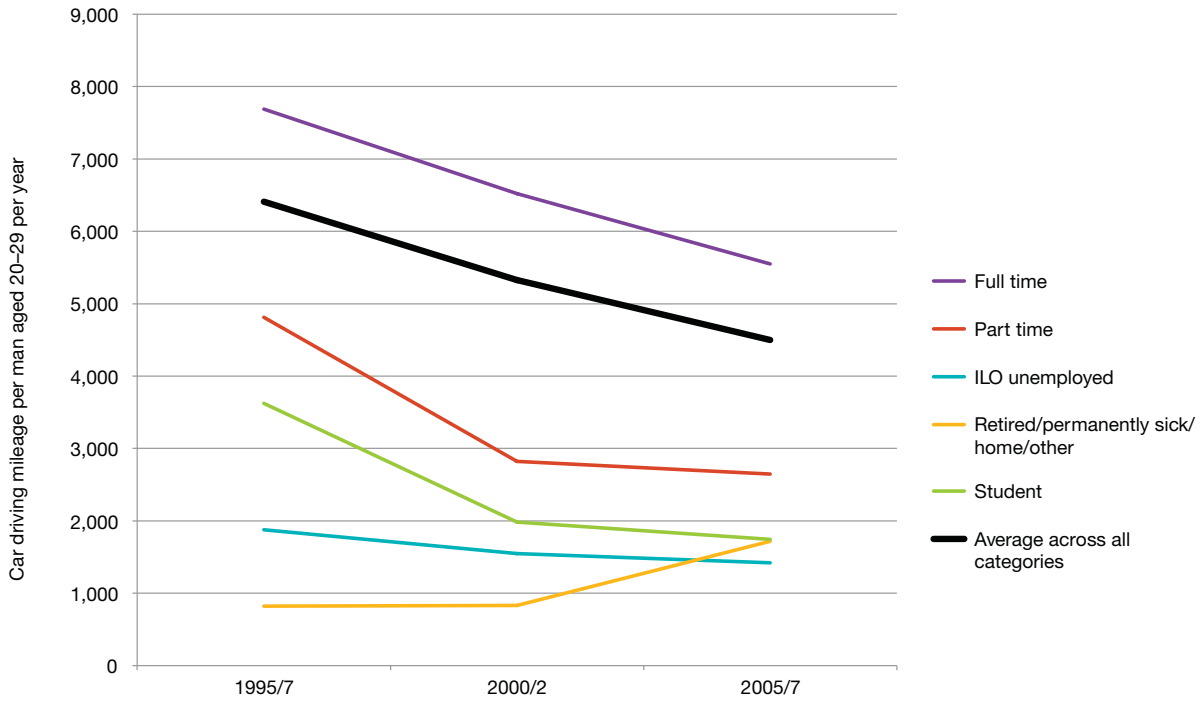
Table 3.5 shows that young men who are married (or are cohabiting) have, since the mid-1990s, tended to drive more than their single counterparts; but the gap in mileage that relates to marriage status has grown over time as single young men have seen their private mileage decrease by 30%, compared to a fall of only 10% for married people. By 2005/7, single adults in their 20s were on average driving personal cars 40% fewer miles annually than their married equivalents.

**Table 3.5: Average annual driving mileage, by type of car ownership and marital status, by men in their 20s**

| Years | Status | Personal cars | Company cars | Non-household cars | Total |
|---|---|---|---|---|---|
| 1995/7 | Married | 5,958 | 1,472 | 1,118 | 8,548 |
| 2000/2 | Married | 5,844 | 1,605 | 133 | 7,582 |
| 2005/7 | Married | 5,371 | 928 | 458 | 6,757 |
| | | | | | |
| 1995/7 | Cohabiting | 5,955 | 455 | 755 | 7,165 |
| 2000/2 | Cohabiting | 5,164 | 1,193 | 425 | 6,782 |
| 2005/7 | Cohabiting | 4,905 | 465 | 507 | 5,877 |
| | | | | | |
| 1995/7 | Single | 4,416 | 514 | 437 | 5,367 |
| 2000/2 | Single | 3,549 | 342 | 296 | 4,187 |
| 2005/7 | Single | 3,127 | 232 | 215 | 3,574 |

Figure 3.30 looks at driving mileage by economic status. Young men who are employed full-time tend to drive more than part-time workers, students, or those who are unemployed but in the labour force. Their mileage has fallen over time – but also over this time period there has been a small shift away from full-time work. In 1995/7, 74% of men in their 20s were employed full-time, and this had declined slightly to 72% by 2005/7.

**Figure 3.30: Average driving mileage by men in their 20s, by economic status**




What is noteworthy is that the NTS provides little evidence of a large-scale shift to student status: the proportion of men in their 20s that were counted as students (at 9%) did not change between 1995/7 and 2005/7. This in part may be due to the NTS' sampling protocol: students living in halls of residence (but not private off-campus housing) are amongst the groups that are not included in the sample frame. The drop in driving mileage for young men is, however, observed *within* the NTS sample frame, so any increased likelihood of young men to be in the out-of-sample group of students cannot explain the drop in driving that has been seen.

By contrast, the economic status that has grown rapidly has been that of the part-time worker: as a proportion of young men, this group more than doubled, from 3% to 8% – and on average their mileage is less than half that of young men who are in full-time work.

Table 3.6 shows how access to cars in the household has trended for young men, together with the average driving mileage by each group (the low mileage by 'non-drivers' includes driving lessons).

**Table 3.6: Changes in car access and average annual driving mileage over time, for men in their 20s**

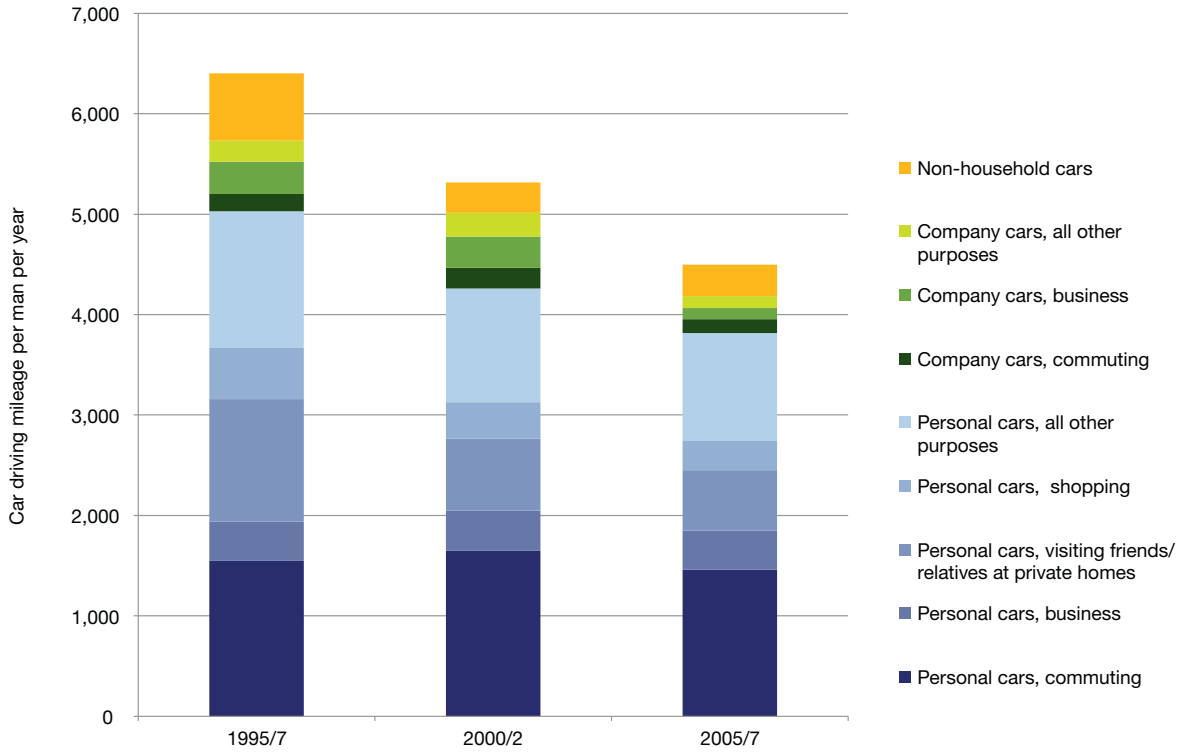
| Category of access to cars in the household | Proportion of young men in 1995/7 | Proportion of young men in 2005/7 | Average driving mileage in 1995/7 | Average driving mileage in 2005/7 |
|---|---|---|---|---|
| Main driver of company car | 3.3% | 2.2% | 22,490 | 15,238 |
| Main driver of personal car | 51.5% | 44.3% | 9,301 | 8,247 |
| Not main driver of household car | 16.1% | 14.1% | 4,627 | 3,351 |
| Household car but non-driver | 8.2% | 17.5% | 298 | 97 |
| Driver but no car | 8.2% | 7.4% | 1,226 | 442 |
| Non-driver (not fully licensed and no car) | 12.7% | 14.6% | 18 | 10 |

An analysis was carried out in an effort understand what has contributed more to average reductions in car driving: is it due to changes in the proportion of young men in each of these car access categories, or to within-category shifts in mileage over time. To examine this, the 2005/7 average driving mileage within each category was applied to the proportions of young men in each category in 1995/7.

This found that changes in access to cars – a broadly defined term that includes vehicle ownership, driving licences required to operate them, and other administrative requirements, such as insurance – seem to be associated with just over one half (56%) of the fall of approximately 30% in driving mileage by men in their 20s (1995/7 to 2005/7), with the remainder linked instead to lower levels of driving by car-owning young men.

The analyses of driving levels by young men thus far have focused on aggregate mileage, irrespective of journey purpose. Figure 3.31 shows an analysis of how their driving has trended by differing types of car ownership and a subset of journey purposes.

**Figure 3.31: Average driving mileage by men in their 20s, by type of car ownership and selected journey purpose**




What is interesting is the complex mix of stability and change that Figure 3.31 shows. Driving personal cars for commuting and (non-commuting) business purposes remained largely unchanged. But, in contrast, the miles that personal cars were driven for other purposes fell, particularly for visiting friends/relatives and food shopping. Use of company cars fell sharply, predominantly due to the reduced ownership of company cars (a 49% drop, but from a small base of only 3% of all young men) and a somewhat smaller drop in mileage driven per company car. In addition, the use of non-household cars by young men dropped by more than half.

A limited statistical analysis of the relationships between personal mobility and home delivery of retail goods/services for young men was inconclusive, failing to explain young men's falling shopping travel as being related to increasing Internet shopping; but the growing prevalence of living with older adults (parents) seems to be associated with some of their drop in miles driven for this purpose. Further research, using datasets that contain richer observations of mobile telephone and Internet behaviour will be needed to more fully establish this relationship physical and virtual mobility.

One theory to explain the observed drop in driving for Visiting friends and relatives at other people's homes (VFRPH) is that young men are tending to live with parents for longer – and therefore need to visit relatives less, or prefer to

meet their friends elsewhere. To investigate this theory, the correlation between living with older adult(s) – aged 35+ – in the household and VFRPH travel was calculated. Table 3.7 shows these results, along with several other correlations for comparison (significance levels are shown in brackets).

**Table 3.7: Correlations with car-driving journeys and mileages (significance levels in brackets)**

| | Driving JOURNEYS for visiting friends/relatives at private homes | Driving MILEAGE for visiting friends/relatives at private homes |
|---|---|---|
| Lives with adult age 35+ in household | -0.029 (0.30) | -0.06 (0.03) |
| Born in GB | 0.089 (<0.01) | 0.051 (0.07) |
| Presence of children in household | 0.058 (0.04) | -0.020 (0.48) |
| Lives in London | -0.055 (0.05) | -0.046 (0.10) |
| Student status | 0.015 (0.60) | 0.045 (0.11) |

The results were mixed. The correlation between living with older adult(s) and VFRPH driving mileage is significant and negative. But the same relationship with driving journeys was not significant.

Several of the other results in Table 3.7 are also of note. Being born in Britain was associated with more driving for VFRPH purposes, which makes sense if it is theorised that migrants have more localised or less-well-developed social networks within Britain if much of the family may remain abroad. Living in London (as opposed to elsewhere in Britain) was associated with less VFRPH driving, though this finding would need to be compared against the generally lower driving levels of Londoners to determine whether it is specific to VFRPH. Finally, being a student was found to be associated with higher VFRPH driving mileage (at the p=0.11 level) but not VFRPH driving journeys. This may be due to a relatively small number of long-distance VFRPH journeys by students who study some distance away from their family and other social networks.

## 3.6 Locational factors

### 3.6.1 Settlement sizes

Figure 3.32 shows average levels of car driving per person among residents in six different categories of settlement sizes. As expected, annual car mileages are highest among rural residents and lowest for Londoners, with the former increasing by 6% over the ten-year period and the latter decreasing by 20%. For areas in between these extremes, the picture is more mixed, but all other areas except settlement sizes of between 3,000 and 25,000 residents have experienced some increases in average mileages.

A clearer picture emerges, however, when we separate out annual mileage driven in private cars from that in company cars (Figure 3.33). Now we see that company car mileage declined in all six areas, while private car mileage steadily increased in all areas except for Greater London.

**Figure 3.32: Car mileage, by settlement size**

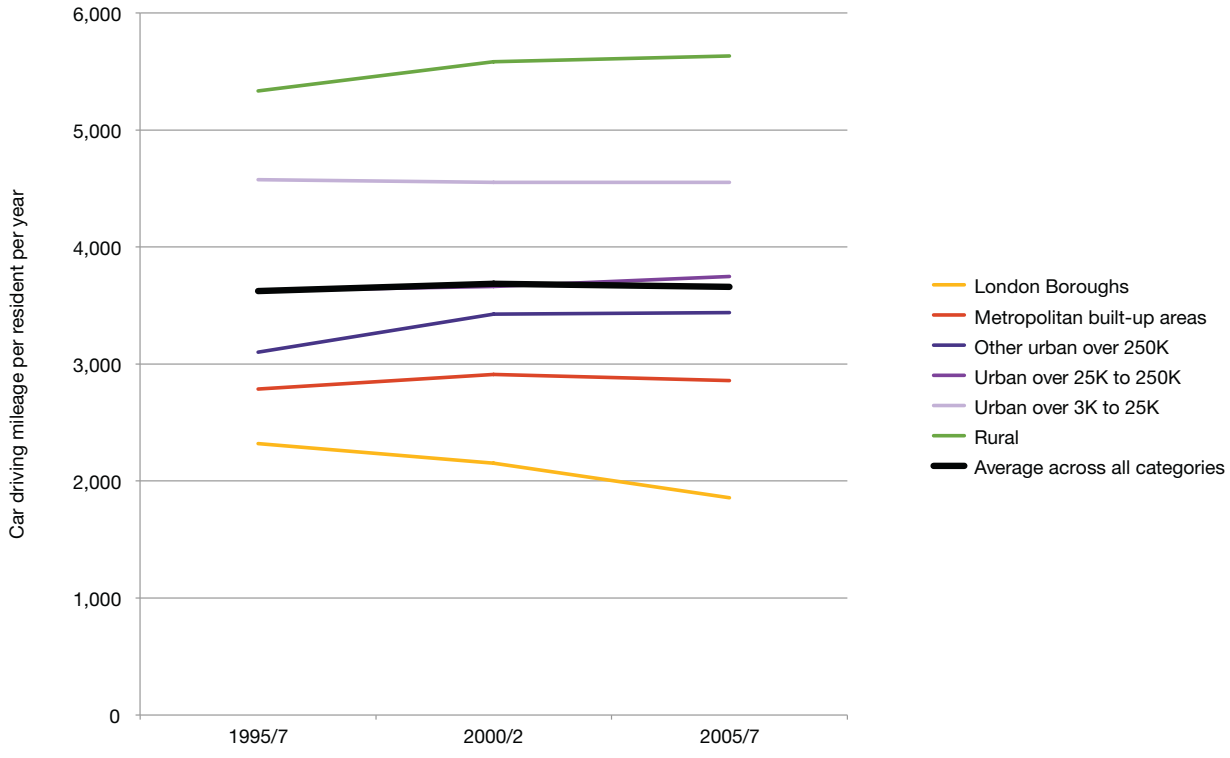
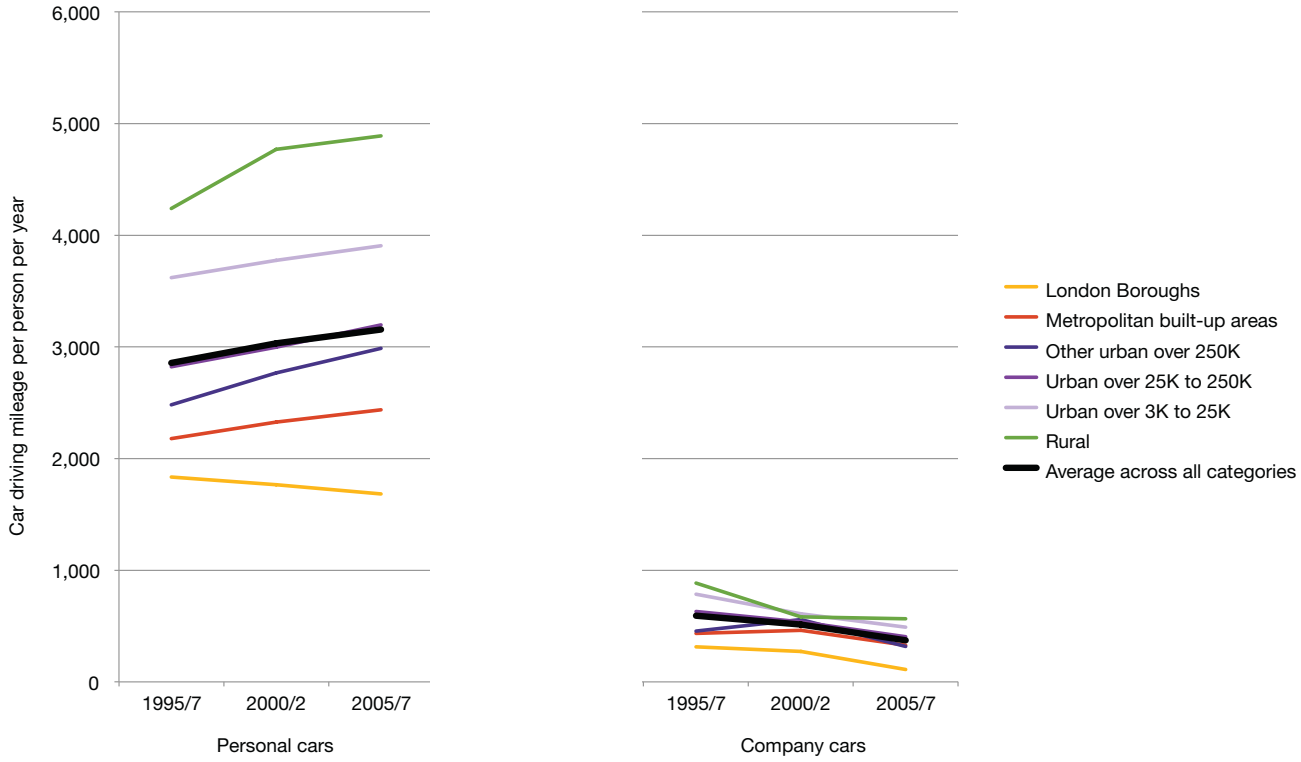
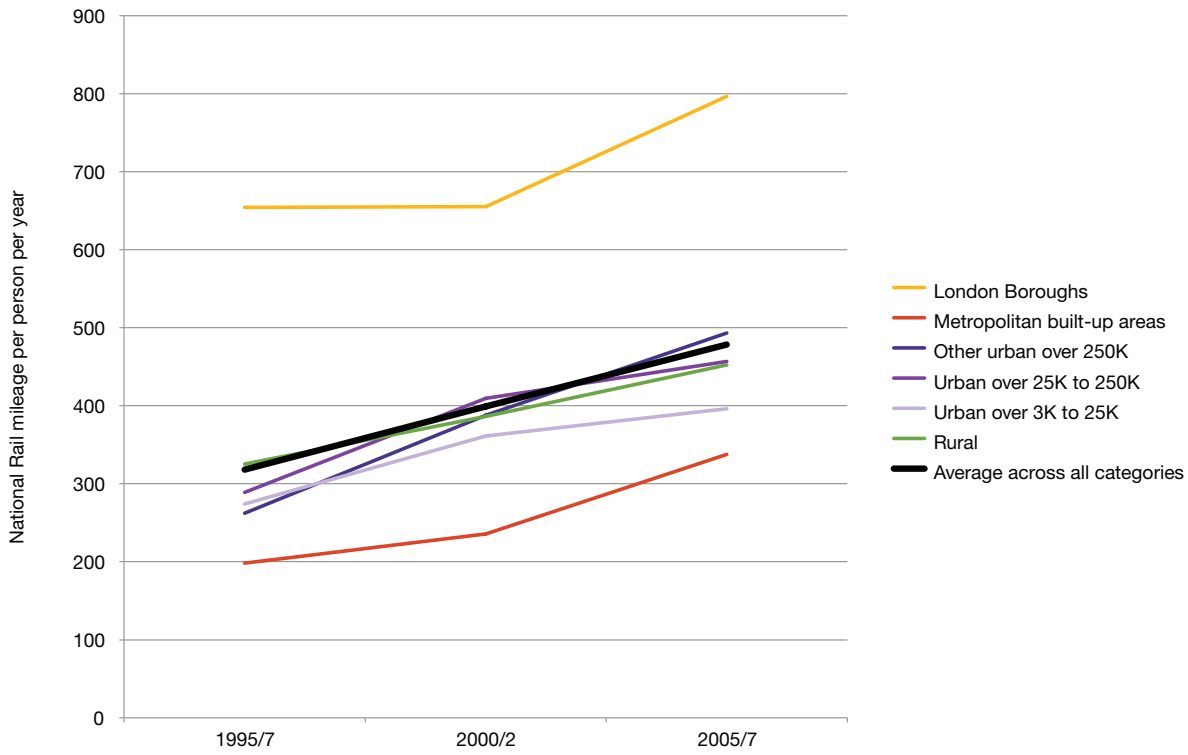



**Figure 3.33: Car mileage, by type of ownership and residential settlement size**




The situation for rail is very different (Figure 3.34). Here, the National Rail mileage per person travelled by Londoners is around double that in other types of area, and lowest of all for residents of the other metropolitan areas; but absolute growth rates have been broadly similar in each area, at around 150 miles per head over the ten years.

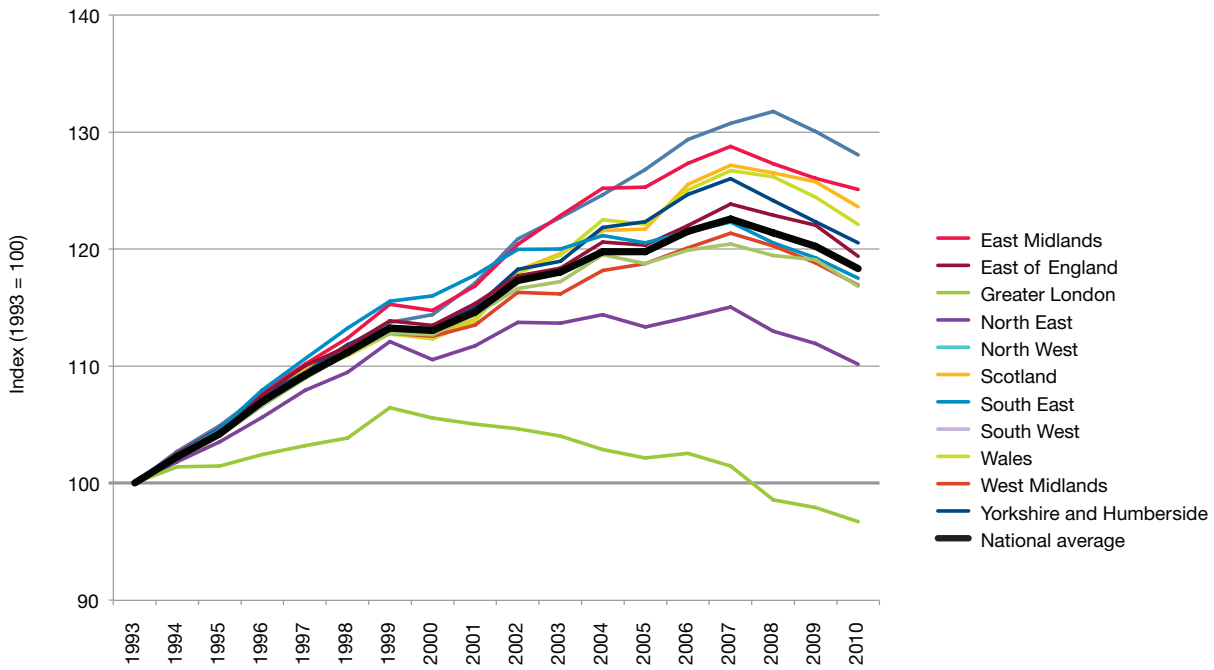
**Figure 3.34: Rail mileage, by settlement size**




## 3.6.2 Regional differences

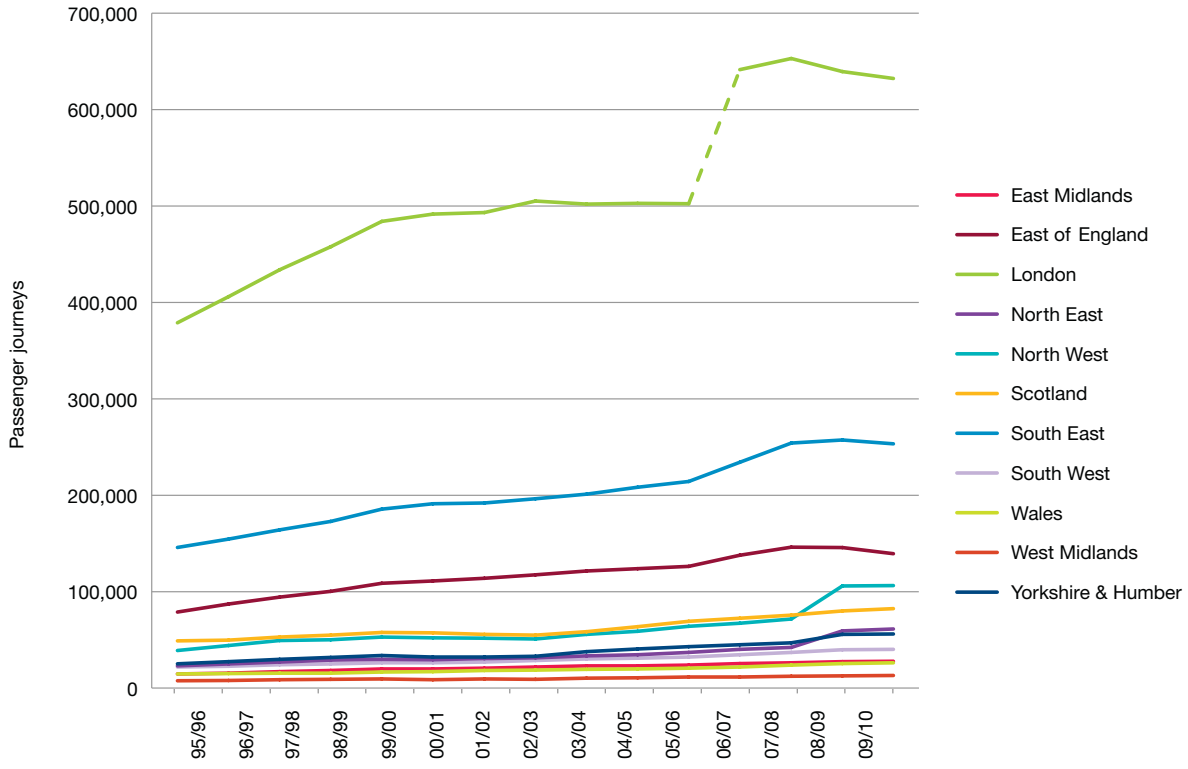
Relative rates of increases in car traffic between 1993 and 2011, taken from traffic counts, are shown in Figure 3.35 for various regions of Britain, using 1993 as an index base of 100. All regions have shown a decline since the recession in 2008, but in several regions this decline set in much earlier. In Greater London it began in 2000 and in the North East in 2003; other regions peaked in or around 2007. Overall, the highest growth rates over the 18 years have been in the South West and the East Midlands. As previously noted, most of the growth during the 2000s was due to population increases rather than increases in car driving per person.

**Figure 3.35: Index of growth rates in car traffic, by region, since 1993**



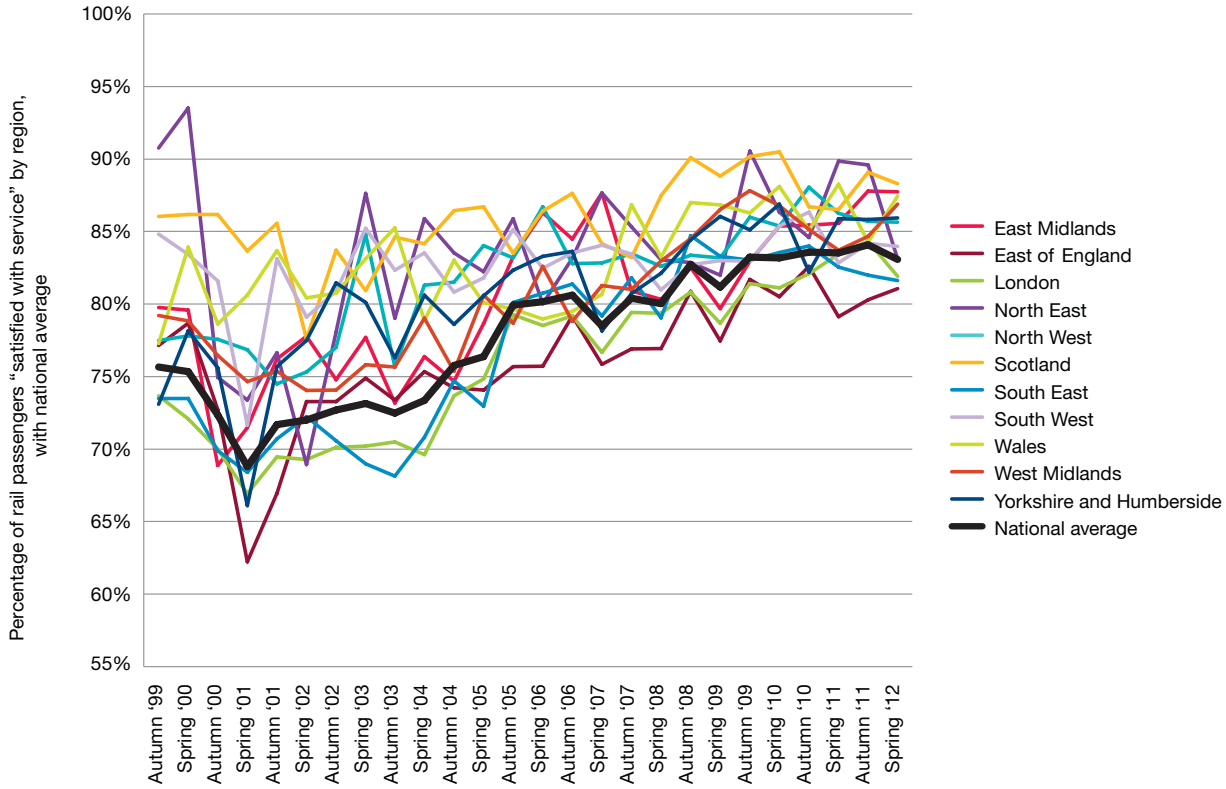

Trends in rail traffic and in passenger satisfaction by region are shown in Figure 3.36 and 3.37 respectively. These show rises in all cases, but from different bases.

**Figure 3.36: Numbers of rail passenger boardings, by region, since 1995/6[2]**




2 The marked increase in passenger boardings in London in 2006/7 is due to estimates of rail journeys associated with Travelcards sold by Transport for London being included in the data for the first time.

**Figure 3.37: Reported passenger satisfaction, by region since autumn 1999**




### *Company car ownership*

Figure 3.38 shows some clear regional differences in levels of company car ownership per person. There have been very sharp declines in the South East, in particular, between 1995/7 and 2005/7, and also in Greater London. All other regions have experienced some decline over this period, except for the North East and Wales, which have experienced some growth, and Scotland, where there has been very little change.

**Figure 3.38: Company car ownership rates per 1,000 population, by region**

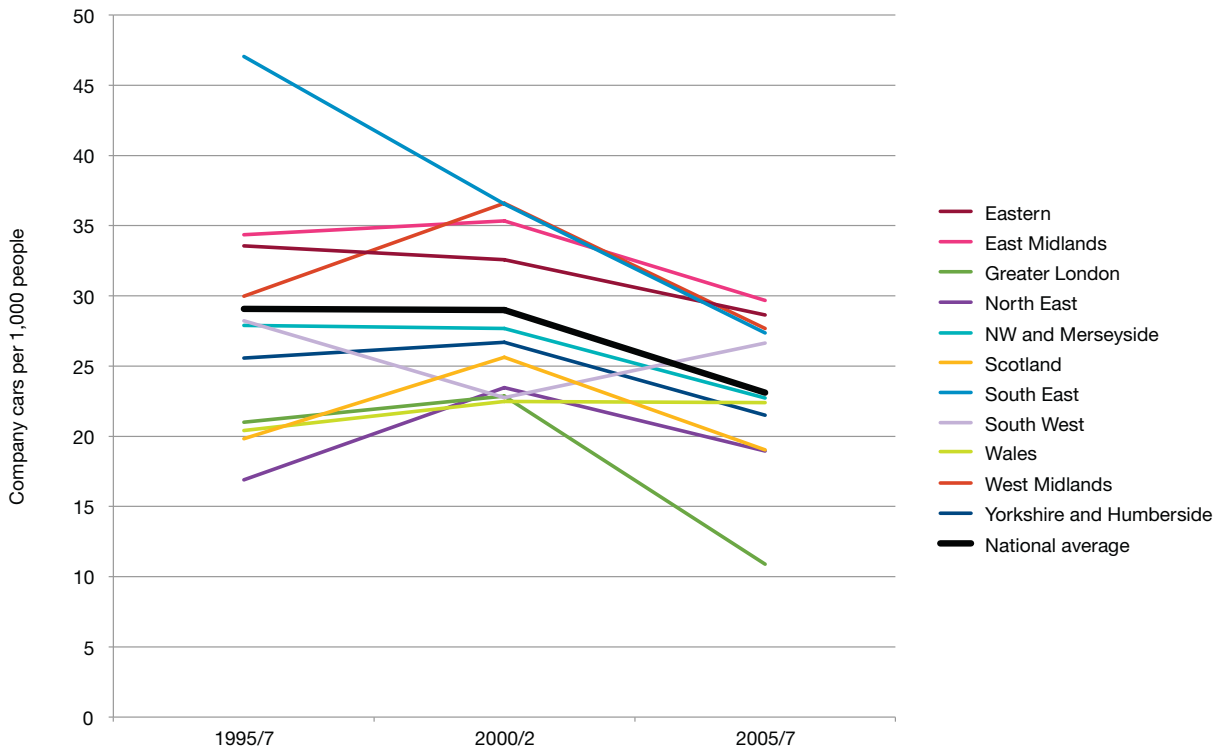
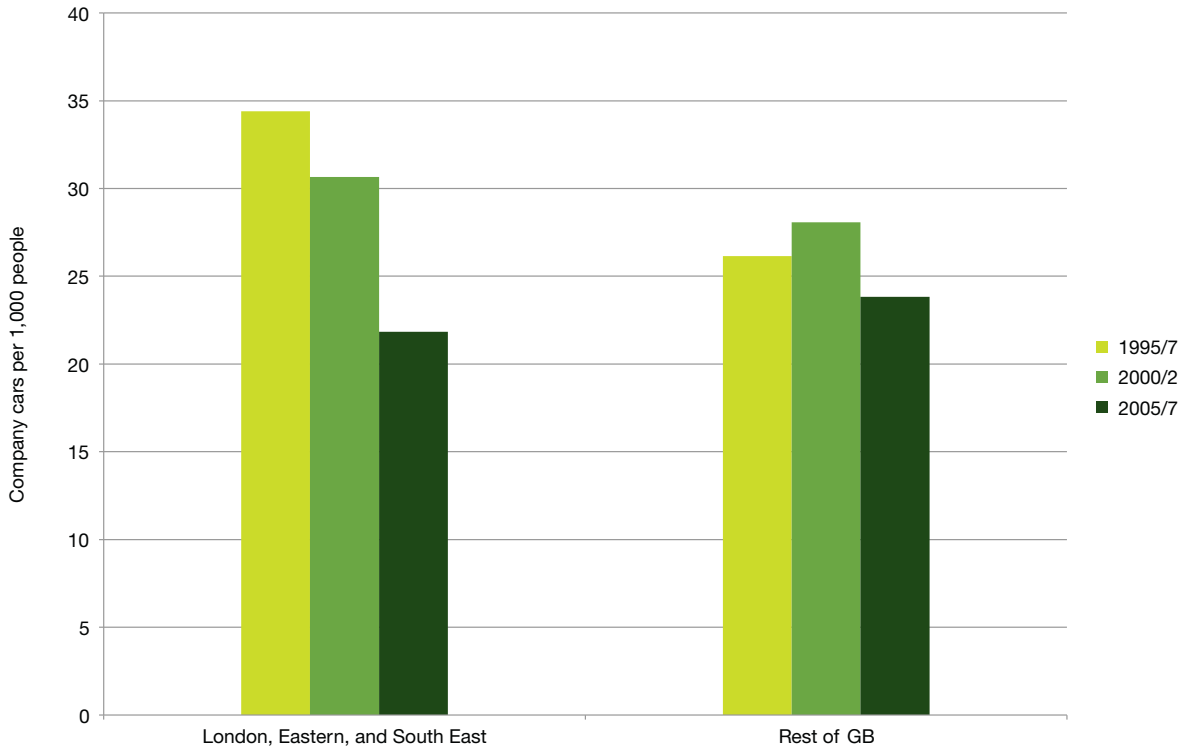



Figure 3.39 groups results for London, the South East and Eastern regions, and compares changes in company car ownership per person in this group with that in the rest of Great Britain.

**Figure 3.39: Comparison of company car ownership rates per person in the London, Eastern and South East regions grouped together, versus the rest of Great Britain**

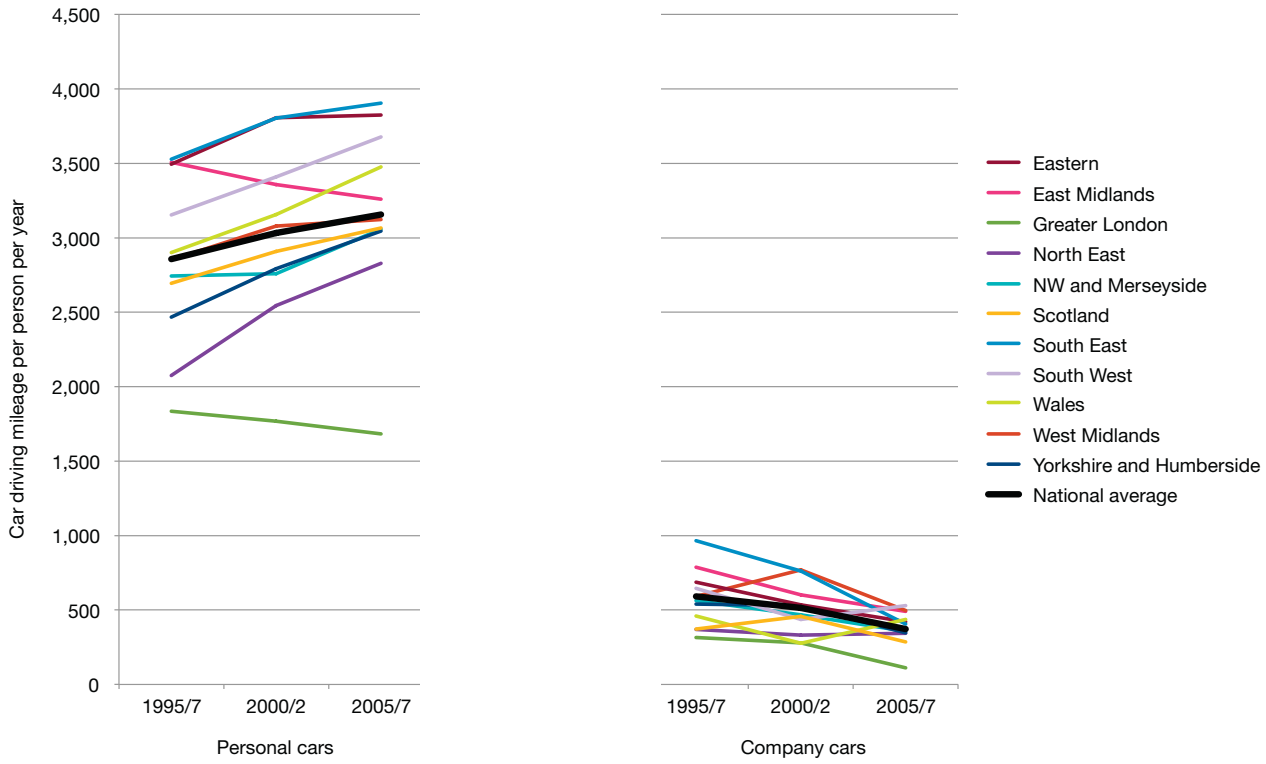



Here we can see a much higher rate of company car ownership in the former area in 1995/7, but ten years later this had fallen below the rates seen in the rest of Britain. The differences in ownership rates between these two areas were significant in 1995/7, but not in 2005/7.

### *Trends in car driving by region*

Figure 3.40 looks separately at trends in car mileage per person in a company car, and in a personally owned car, by region.

**Figure 3.40: Car mileage per person, by ownership type and region**

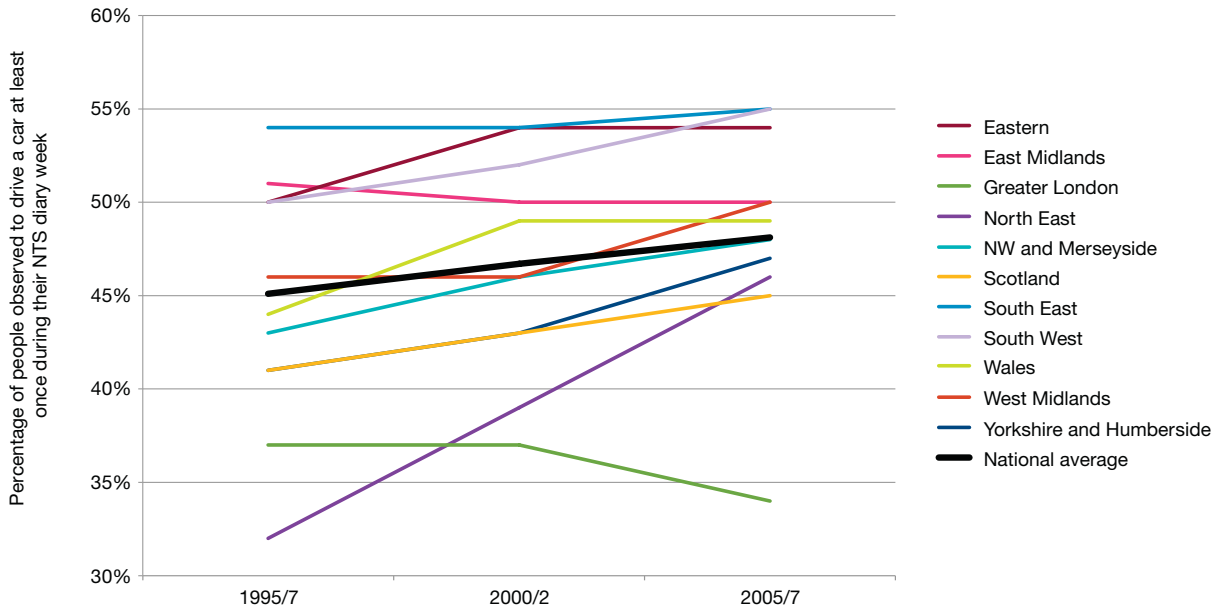



Company car mileage per person has decreased in every region – most rapidly in London, the South East and Eastern regions – but only marginally in Wales and Scotland. In contrast, private car mileage per person has increased in every region except Greater London and the East Midlands.

### *Trends in market penetration by region*

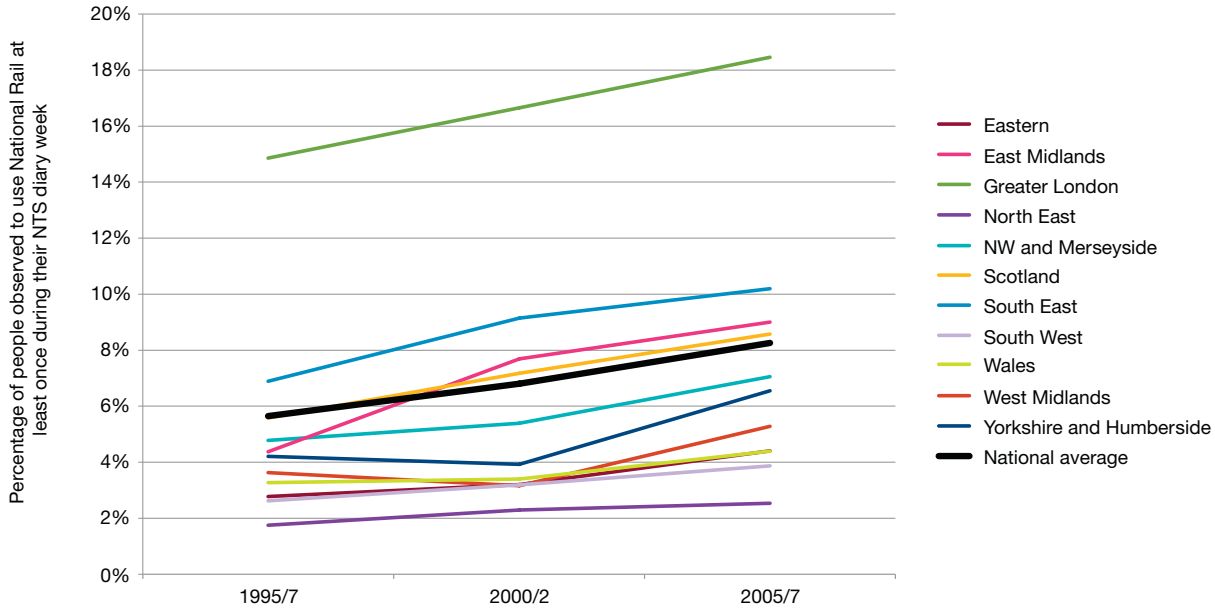
Figure 3.41 shows the proportion of the total population in each region who reported driving a car during their diary week. In 1995/7 this varied from a low of 32% in the North East region to a high of 54% in the South East. Over the next ten years the proportion of car drivers increased in every region except Greater London and the East Midlands. The fastest growth in the proportion of car drivers was in the North East (up by 41%), Yorkshire & Humberside (14%), Wales (11%), the North West & Merseyside (10%), the South West (10%) and Scotland (9%).

**Figure 3.41: Proportion of the population making at least one car driver trip in their diary week**




The equivalent figures for National Rail are shown in Figure 3.42. Market penetration in 1995/7 ranged from a low of 2% in the North East, to a high of 15% in Greater London. Ten years later the range was 3% to 18%.

**Figure 3.42: Proportion of the population making at least one rail passenger trip in their diary week**



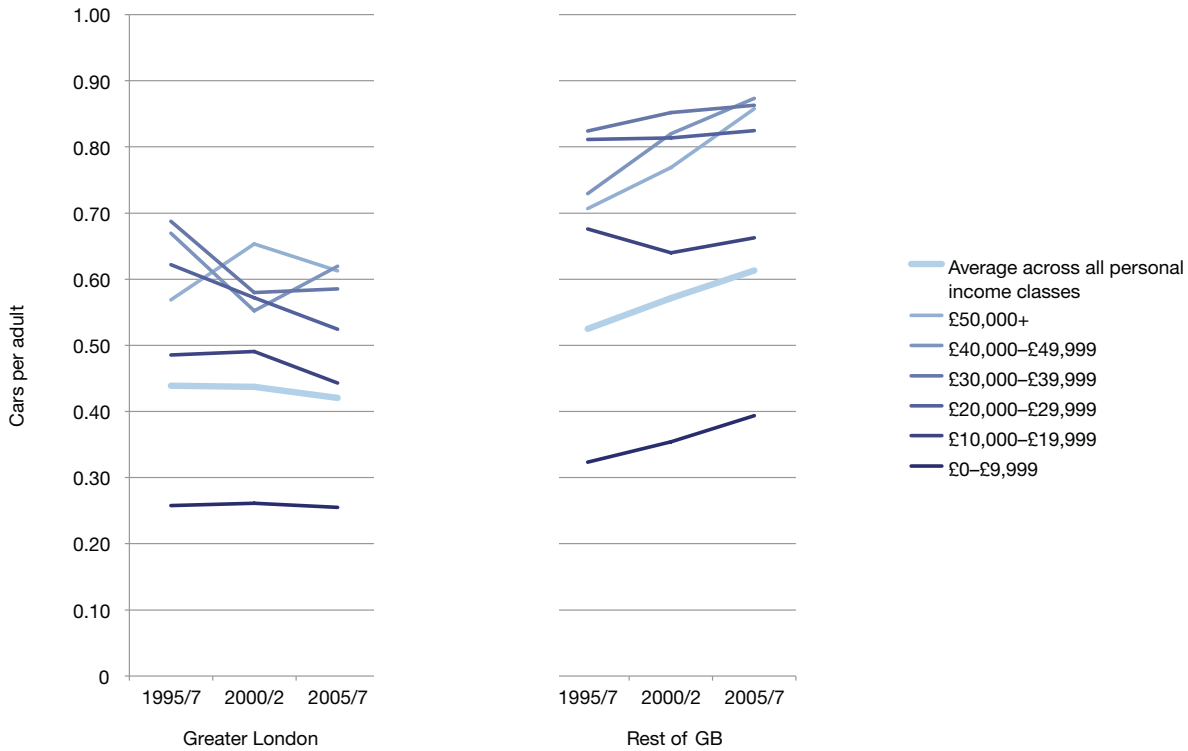
The fastest rates of growth between 1995/7 and 2005/7 for the proportion of residents that were rail passengers were in the Eastern region (up 106%), the East Midlands (59%), Yorkshire & Humberside (56%) and Scotland (54%). All other regions grew their passenger base by between 34% and 49%, except for London, which grew its market by 24% – but from a much higher initial base.

In absolute terms, the largest increase was in the Eastern region, where market share went up by 5% (up from 4% to 9%); four regions increased their market share by three percentage points: Greater London, Scotland, the South East, and Yorkshire & Humberside. In general, those regions with the highest rail market shares in 1995/7 were most successful in increasing their market share (correlation coefficient of 0.594).

### *Comparisons between London and the rest of Great Britain*

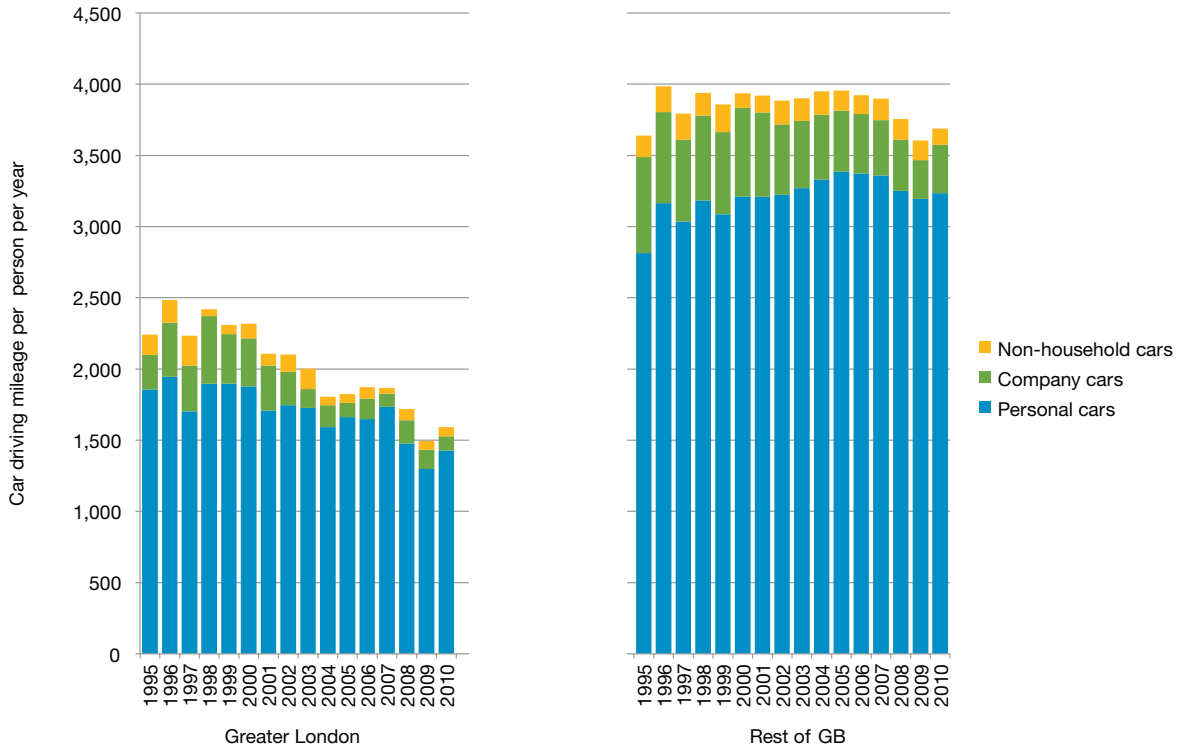
Figure 3.43 compares car ownership per person, by personal income bands, in Greater London with that of the rest of Great Britain. Here we see that between 1995/7 and 2005/7, car ownership rates declined in London for all income groups, with generally larger drops higher up the income distribution. Changes were generally much less marked in the rest of Britain, although car ownership rates in the lowest personal income band showed a more substantial increase.

**Figure 3.43: Car ownership per person, by personal income and London/ non-London residents**



Finally, the contrast between trends in car mileage per person by type of car ownership in London and the rest of Great Britain is shown in Figure 3.44. Here, car mileage in London shows a long-term downward trend for all types of vehicle ownership, whereas in the rest of the country private car mileage increases up to the start of the recession in 2007, while company car mileage steadily declines.

**Figure 3.44: Car mileage, by type of ownership and London vs non-London residents**



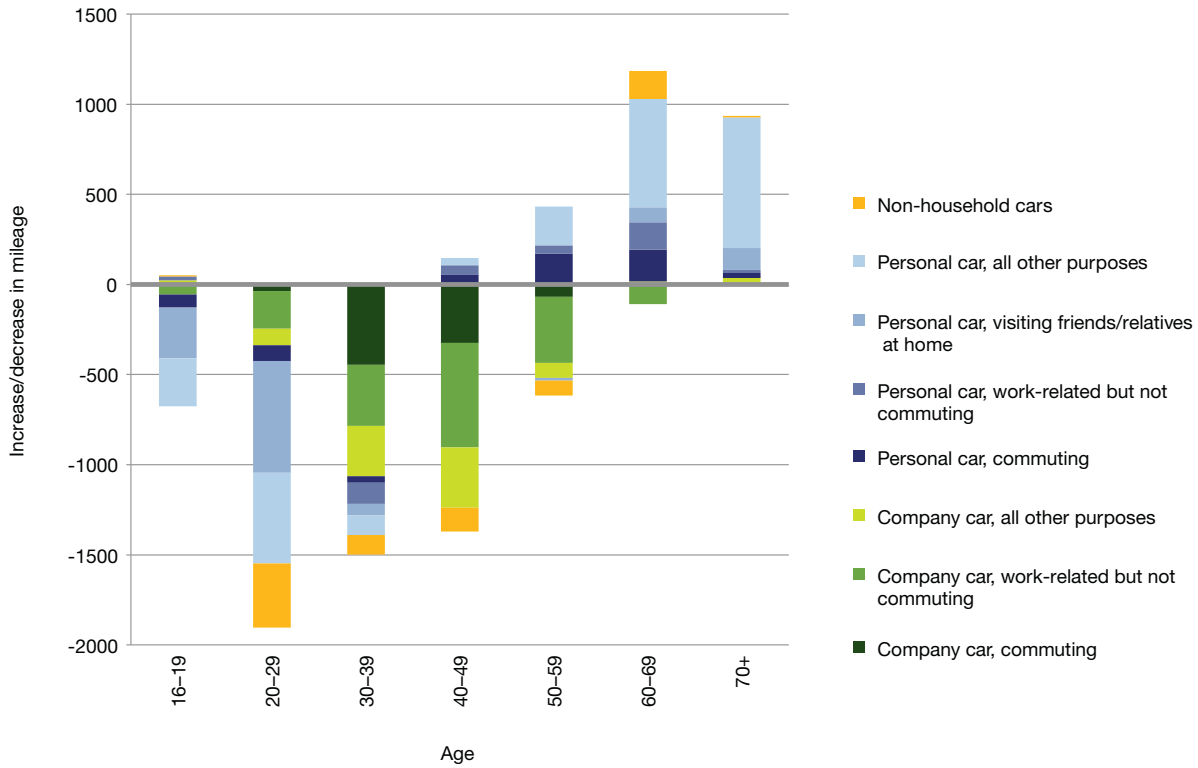

# 4. The Overall Picture

So far, we have set out to investigate what changing patterns of behaviour among different population groups have contributed to the aggregate trends noted at the start of this report – namely, the levelling off in car use per person since the late 1990s/early 2000s, and the strong growth in rail demand, a growth which has continued through the current recession. Chapter 3 looked at changes in car and rail use for each of a number of distinct population subgroupings based on a variety of characteristics. This chapter brings this analysis together, by looking at the significant changes which have occurred among broader groupings which combine some of these characteristics.

## 4.1 Changing car driving by type of ownership, age and gender

Figure 4.1 summarises the average changes in car use and its component parts for differing age groups of men, between 1995/7 and 2005/7. Overall in this ten-year period, ***average car driver mileage per adult male decreased by 705 miles to 6,147***.

**Figure 4.1: Contributions to net changes in average car driver mileage among men, 1995/7–2005/7, by age group**



The Figure shows that men aged between 16 and 39 reduced their average car use in all categories of travel (with the exception of insignificant rises in a few categories of car mileage by teenagers) and there was a net reduction for men in their 40s and 50s. The highest growth has been among men in their 60s (at around 1,000 miles/year).

All age groups saw a reduction in average mileage in a company car, most of which was work-related; for men in their 30s and 40s, in aggregate this accounted for most of their reduction in car use. For 50–59-year-olds, car travel would have increased but for the drop in company car mileage.

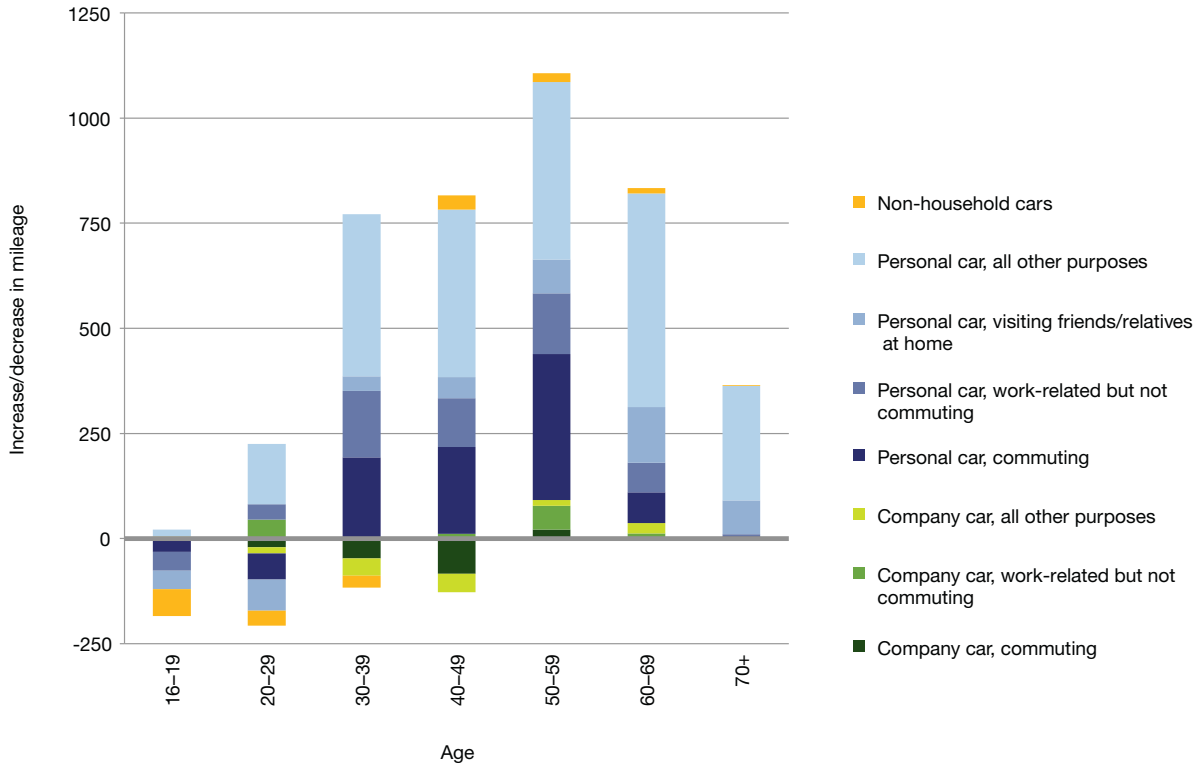
The greatest reduction in average car mileage was among men in their 20s; the large majority of this reduction was in private cars, and the largest component was due to the drop in 'visiting friends/relatives at home'.

Conversely, for men in their 60s and 70s, most of the growth was in trips for non-work purposes (but not 'visiting friends/relatives at home'), although there was an increase in work-related mileage among men in their 60s.

Figure 4.2 shows the equivalent data for women; here, the patterns are very different. Overall in this ten-year period, 1995/7–2005/7, ***average car driver mileage per adult female increased by 544 miles to 3,025***.[3]

3 The growth in female car mileage per adult is less than the drop in male mileage; what is preventing this from leading to an overall drop in car mileage per capita is the increase in the proportion of adults in the population (up from 79% in 1995/7 to 81% in 2005/7), which pushes up average mileage values on a per-capita basis.

**Figure 4.2: Contributions to net changes in average car driver mileage among women, 1995/7–2005/7, by age group**




This Figure shows that average car driving increased for all female age groups, except those aged between 16 and 19, where there was a small drop in personal car use. For women between 20 and 29, there was a small net average increase in car driver mileage, with reductions in private car mileage for work-related travel offset by increases in non-work trips in private cars, plus a small increase in the company car component.

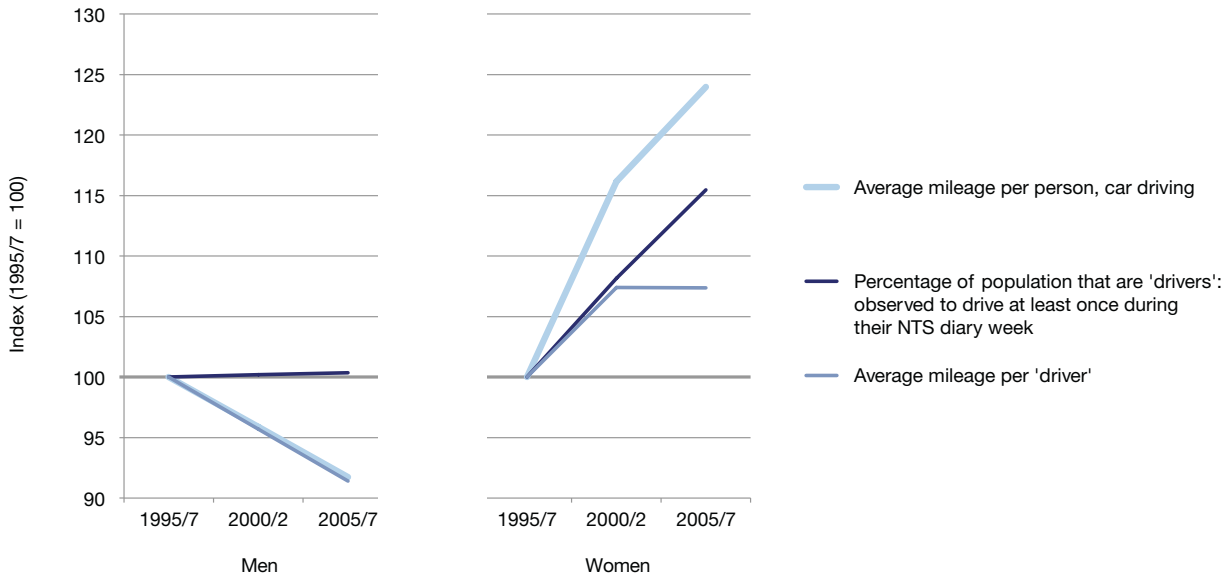
Women aged between 30 and 49 saw some small reductions in company car work-related travel, but had large increases in private car use, split almost equally between work-related and personal travel; women aged 60–69 saw similar-size increases in average distance travelled by private car. The largest increases in car distances over the ten-year period were among women aged 50–59; a greater proportion of this was work-related than in the case of the younger women.

Figure 4.3 summarises the overall rates of change in car driver mileage per person between the periods 1995/7, 2000/2 and 2005/7 (using 1995/7 as an index base of 100), and identifies the relative contribution of changes in: (1) the *proportion of users* (defined in this case as people reported to drive a car at least once during their NTS diary week) and (2) *the average mileage per user*, to this overall figure. In the case of male drivers, the overall per-person reduction

of 8% is entirely due to a reduction in the average annual mileage *per user*, as the percentage of users is unchanged.

For women, on the other hand, there has been overall growth per person over the ten-year period of 24%, of which about two thirds (15%) was due to an increasing proportion of the female population who are users (i.e. drivers), and one third (7%) to an increase in average mileage per user. This increased proportion of women that are 'drivers' comes from both an increase in licence-holding and an increased tendency for licenced women to be observed to drive during their NTS diary week. If we look at just increases in women's licence-holding, only half (50%) of the growth in women's mileage can be attributed to it.

**Figure 4.3: Factors contributing to changes in average car-driving mileage per person, 1995/7 to 2005/7**




## 4.2 Driving behaviour among men in their 20s

Table 4.1 summarises a number of the analyses that have investigated demographic shifts and behaviour changes amongst men in their 20s, between 1995/7, 2000/2 and 2005/7.

**Table 4.1: Characteristics of men in their 20s, and average annual car driving mileage of group members**

| Description | Percentage of all men in their 20s | | Average annual car driving mileage | |
|---|---|---|---|---|
| | Level in 2005/7 | Change in percentage points from 1995/7 to 2005/7 | Mileage in 2005/7 (Values in bold are above the average for all men in their 20s) | Change in average mileage from 1995/7 to 2005/7 |
| Household owns car(s) | 78% | (-1%) | **5,748** | (-2,216) |
| Working full-time | 72% | (-2%) | **5,548** | (-2,118) |
| Holds a full driving licence | 68% | (-11%) | **6,614** | (-1,592) |
| Owns personal car | 49% | (-7%) | **7,977** | (-1,209) |
| Living in a household with adult(s) aged over 35 | 47% | (+7%) | 4,067 | (-1,778) |
| Child(ren) under age 16 in household | 22% | (-3%) | 4,231 | (-2,153) |
| Living in London | 17% | (+4) | 1,885 | (-2,246) |
| Single (not married) | 64% | (+7%) | 4,191 | (-1,634) |
| Student | 9% | (+0%) | 1,737 | (-2,660) |
| Working part-time | 8% | (+5%) | 2,611 | (-2,177) |
| Holds rail season ticket | 5% | (+1%) | 1,326 | (-2,598) |
| Holds railcard | 3% | (+1%) | 3,058 | (-1,483) |
| Owns company car | 2% | (-1%) | **14,707** | (-7,995) |
| Works at home | 1% | (-1%) | 3,606 | (-2,880) |
| Average for all men in their 20s | - | - | 4,496 | (-1,912) |

Table 4.1 shows the percentages of 20–29-year-old men with particular characteristics, and the driving mileage of men in each of these groups. The change in the size of each group between 1995/7 and 2005/7. is also shown,

as is the difference in driving mileage from the average for all men aged 20, and the change in average mileage per group member over the time period.

We see that there have been sizable downward trends in the percentage with a driving licence, in those owning their own car, and in those who are married. The most marked increase has been in the percentage of 20–29-year-old men living at home (the presence of at least one adult age 35+ is used as a proxy for young people living with their parents) and those in part-time work; a higher percentage also now lives in London. There has been little change in the percentage living in a household with at least one car (at 77-78%), nor in the relatively small percentage that are students (not all of whom are picked up in the NTS sample), nor in the other indicators.

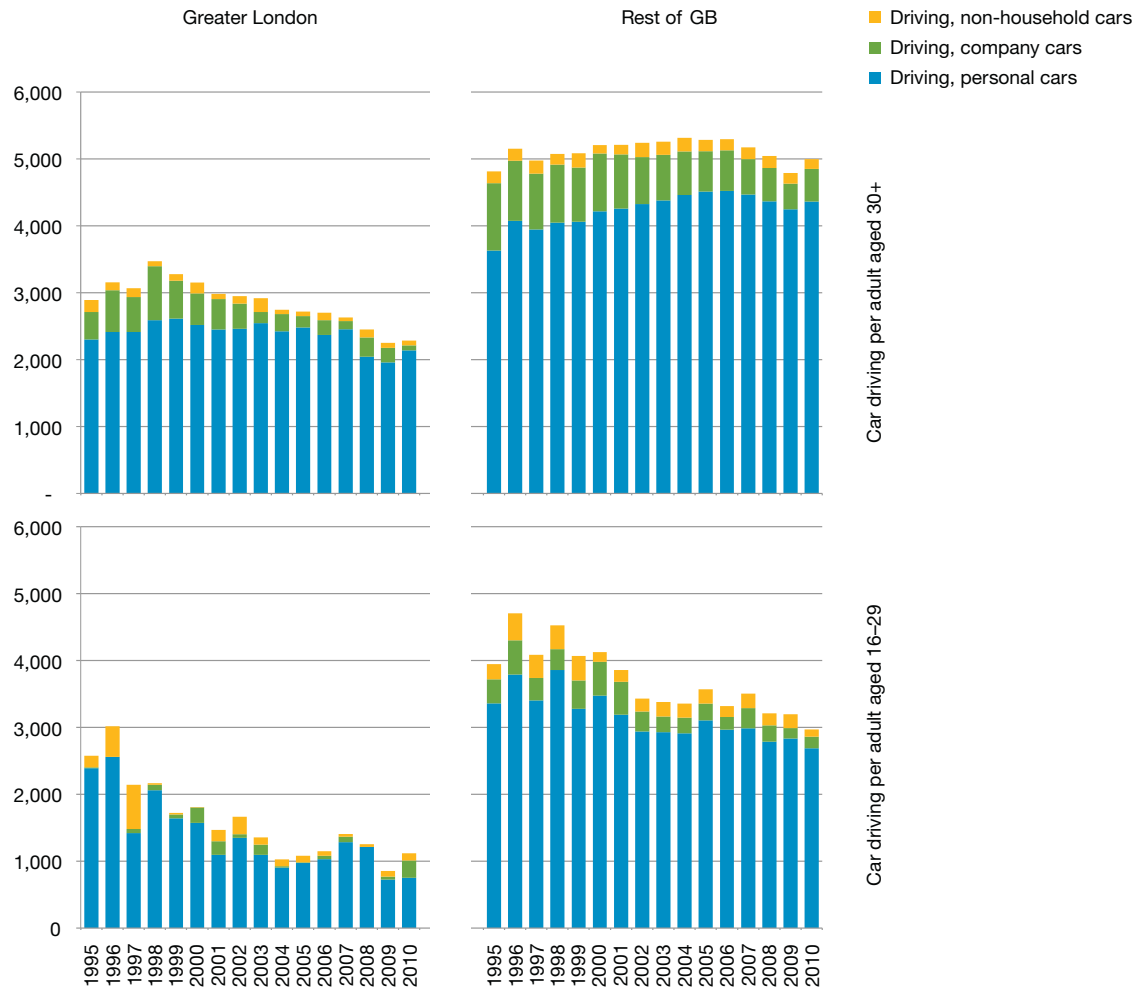
As can be seen, all of these groups show a reduction in car-driving mileage over the ten-year period, with all except company car owners seeing their driving fall between 1,000 and 3,000 miles per year. Among those who have a company car driving mileage is down from around 23,000 to 15,000 miles per year), although as a percentage of all men in their 20s this is a small group. Apart from this outlier, the highest average car mileages are among those who own their own car and those who are married; the lowest for those who have a rail season ticket, are students or live in London.

## 4.3 Car ownership, demographics and the London effect

### 4.3.1 The age effect in London and elsewhere

Figure 4.4 further investigates the combined effect of being an adult London/ non-London resident, and being above or below the age of 30 – both being factors which previous analysis has shown to influence car-driving patterns. It distinguishes between car-driving mileage in differing types of car ownership: company-owned, personally (i.e. household) owned cars, and having the use of non-household-owned cars.

**Figure 4.4: Car driver mileage per person per year, by type of car ownership and London vs non-London – drivers aged 16–29 and 30+**




What this Figure shows is that, for both age groupings, average total car-driving mileage is significantly higher for those living outside London. For those aged 16 to 29, car-driving mileage has dropped over time in both areas, although at a much greater rate for London residents: they experienced around a 50% drop (from a peak of 3,000 to 1,500 miles per year in 2010) compared to only a drop of one-third (4,500 at the peak to 3,000 miles per year in 2010) for younger residents in the rest of the country.

Among the 30+ age group living in London, the observed reduction in annual average car driver mileage per person from around 1997 is almost entirely due to reductions in company car use. ***Without the company car effect, private car use per head among this group of London residents would have been broadly stable since the late 1990s until the start of the recession in 2007.***

In the rest of Britain, for people aged 30 and over, there has been a slight increase per person in annual car driver mileage, up to 2006 But, take out

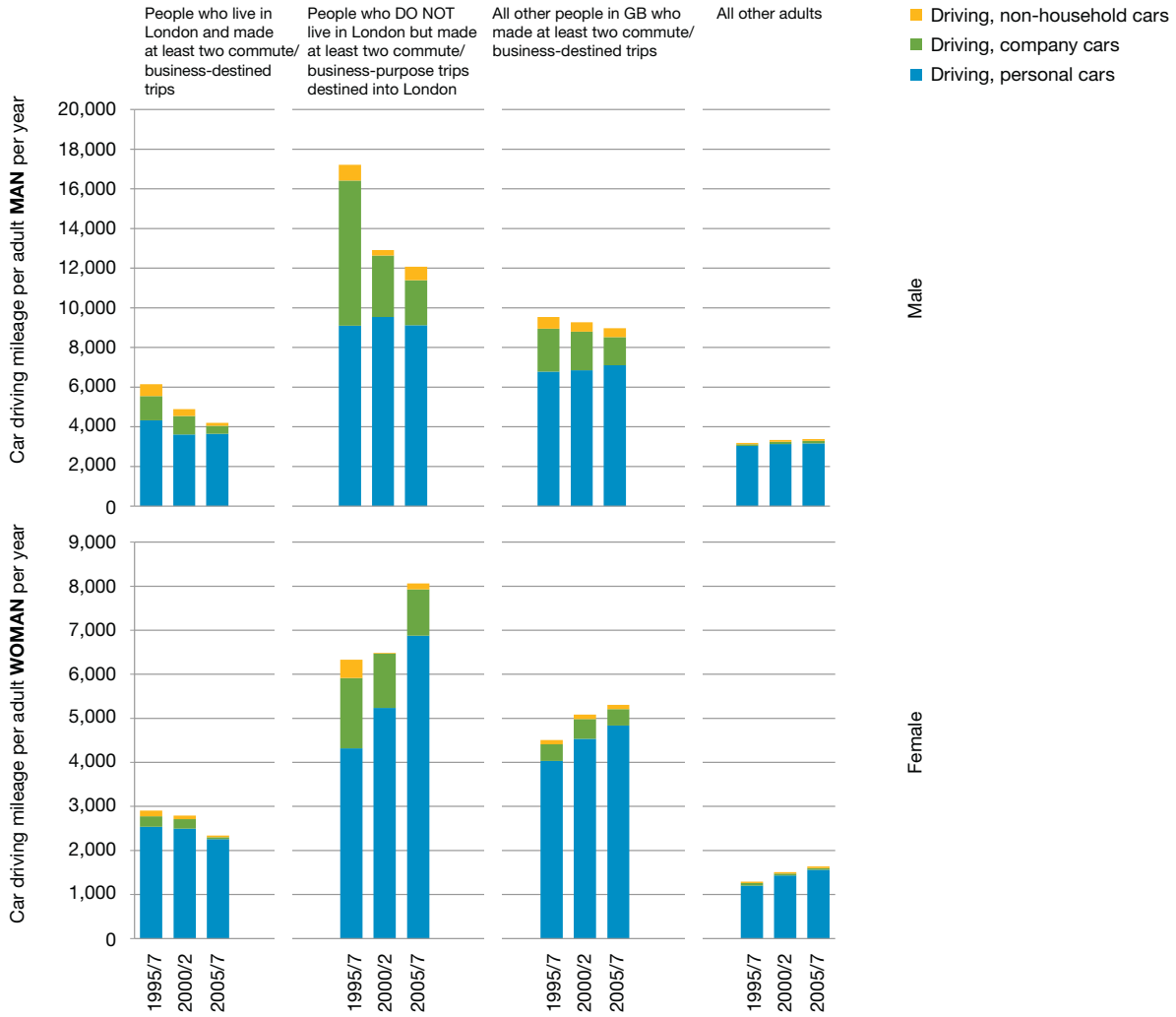
the component of the reducing year-on-year mileage by company cars, and there is a marked annual increase in car driver mileage in personal cars – from around 4,000 to 4,500 miles in under ten years. If we look just at female car driving, the growth over the period has been around 1,000 miles.

So, there has been a pattern of continuing growth in private car use pre-recession, for those aged 30 and over outside London. Here, in terms of private car mileage, there has evidently been no 'peak car' effect. ***This group represents approximately 70% of the driving-age population in Britain*.**

### 4.3.2 The London employment market effect

The earlier analysis has shown marked differences in travel behaviour between residents of London and those who are economically linked to London, on the one hand, and the rest of the country on the other. Figure 4.5 looks at total annual car-driving mileage (by type of car ownership) for various categories of respondents who record at least two trips with destination purpose 'commute/ business' *by any mode of transport* in their diary week. Results are shown separately for males and females.

**Figure 4.5: Differences in car-driving mileage, by type of car ownership and home- and work-related locations, for males and females**



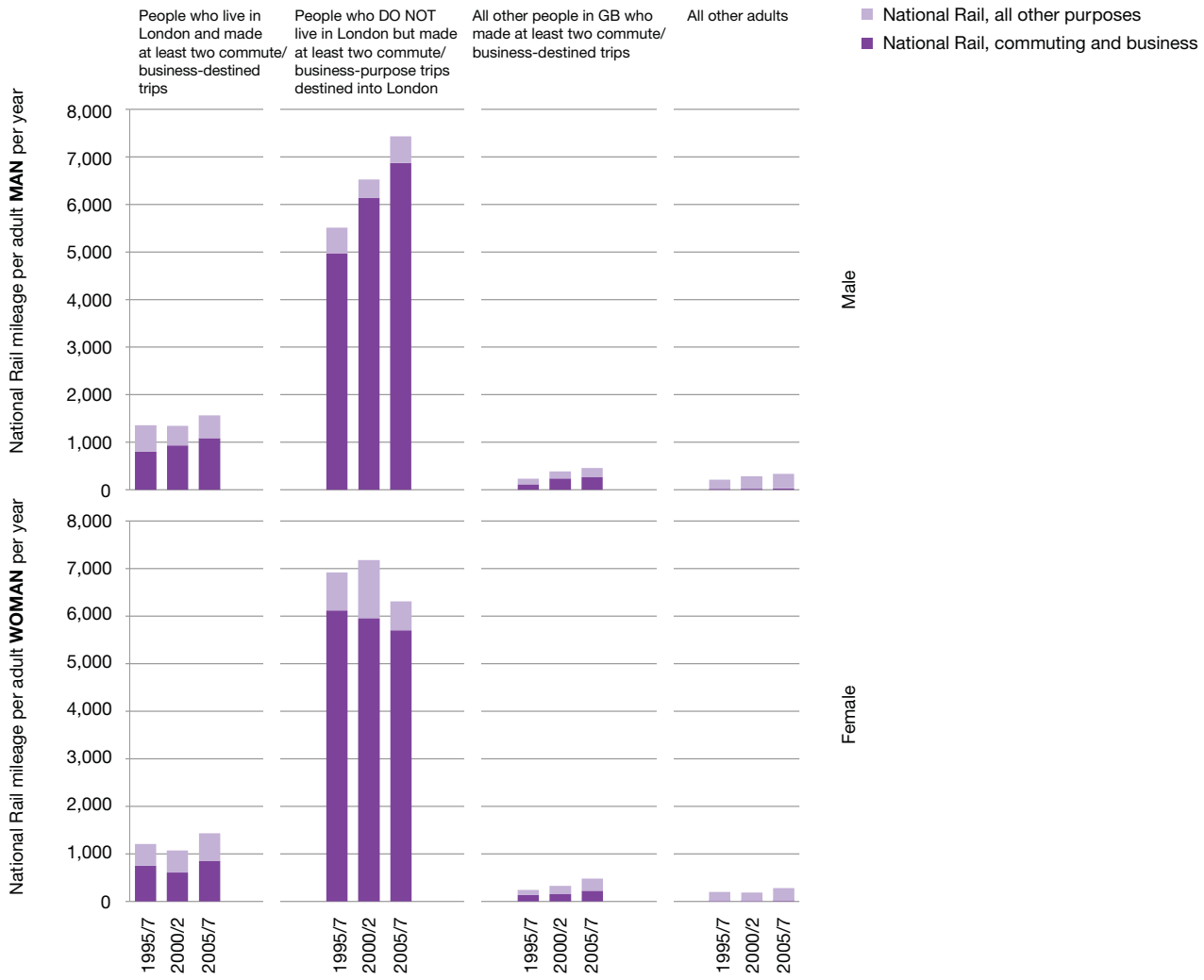

In all four population groups, males have higher average annual car driver mileages than females, but in some cases the time trends are different. The lowest annual car-driving mileages are among adults who do not make at least two commuting or business trips per week (by any mode); this group of males and females shows a slight increasing mileage trend over time, but virtually none of this is in a company car. The next lowest annual mileage is by employed London residents; here, men show a reduction over time that is largely due to reduced mileage in company cars and non-household cars; the reduction for females is much smaller.

In aggregate, the annual car mileage by employed people who do not visit London has remained steady over the ten-year period, but this is made up of a slight decline over time among males offset by a slight increase among females. For males, a reducing mileage in company cars is largely offset by a growth in mileage in private cars.

The highest annual car mileages are to be found among adults living outside London who visit it on two or more occasions in their diary week for commuting/business-related purposes. Here we observe a large reduction in car mileage by males – down from around 17,000 to 12,000 miles; most of this reduction is due to less company car mileage and occurred between 1995/7 and 2000/2, before the introduction of congestion charging in Central London. Females, on the other hand, saw an increase in their average mileage (up from 6,000 to 8,000 miles per year), despite reductions in company car mileage; most of this increase occurred between 2000/2 and 2005/7.

The next Figure looks at how total rail use (for commuting/business and all other trip purposes) has changed among these four categories of adults between 1995/7 and 2005/7, separately for males and females (Figure 4.6). Here we see that by far the highest annual rail mileages per person (by a factor of between 5 and 10) are among those who live outside London and travel in for work-related purposes; but with contrasting trends for males and females. Male rail mileage within this group has increased by around 1,900 miles per year over the ten-year period (largely for commuting/business trips), while female rail mileage has fallen by around 600 miles annually over the same period (much due to reductions in commuting/business mileage). The fastest rates of growth (from a very low base) for both genders are for working people not regularly travelling to London for work.

**Figure 4.6: Differences in rail passenger mileage, by type of car ownership and home and work-related locations, for males and females**

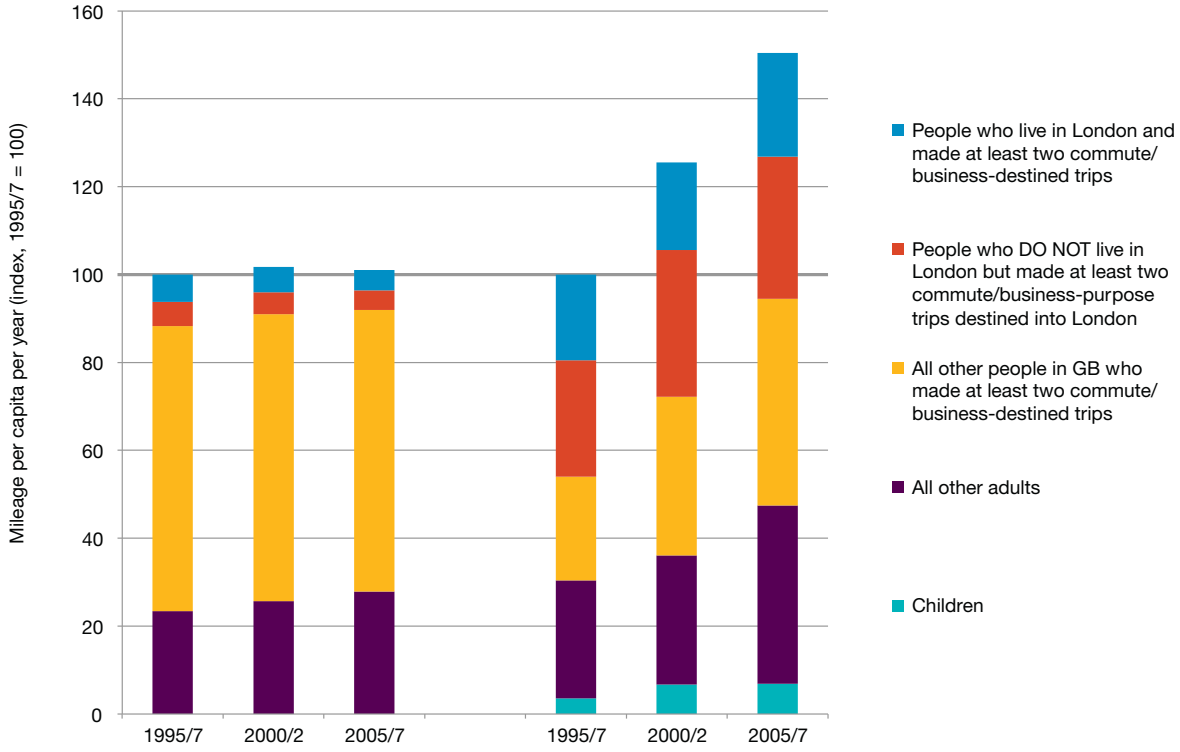



These four categories vary greatly in their size; the two London-linked groups account for less than 10% of the total British adult population, while the 'all other adults' category makes up over 50%; these percentages have hardly changed between 1995/7 and 2005/7.

Thus the overall contributions (mileage within the groups combined with group size) of these four groups to total car-driving and rail passenger mileage between 1995/7 and 2005/7 are different to that implied in Figure 4.5 and 4.6, and are shown in Figure 4.7, in the form of an index. Around two thirds of annual car mileage is contributed by the non-London-linked workers, who account for about 40% of the British adult population The average mileage contributed by 'all other adults' has been slowly increasing, partly offset by small reductions in mileages contributed by London residents and those who travel regularly to London for work-related purposes.

The picture for rail is rather different. In 1995/7, 'all other adults' contributed a broadly similar share of mileage to rail as they did to road (about 25%), but their rate of growth in rail mileage (around 50% growth) has been faster than for their car mileage (around 10% growth). The two London-related groups contribute much more to rail mileage than to car mileage, at nearly 50% of rail mileage in 1995/7 as contrasted with 10% of mileage for car. But while in absolute terms their average rail mileage grew by around 35%, in proportionate terms their contribution to the total rail market dropped from 46% to 37% in 2005/7. The fastest growth in the contribution to the rail travel mileage has come from the non-London-related working population, where use has more than doubled between 1995/7 and 2005/7.

**Figure 4.7: Contribution of differing population groups to changes in car and rail mileages over time**




## 4.3.3 Overall London influence

The next two Figures look at the origin and destination of all car driver and rail trips recorded in the diary week; in particular, they look at the allocation of mileage to the different types of trips, distinguishing between an origin or destination in Greater London or elsewhere, and according to whether the trip is for work-related purposes or not. The contrast between car drivers and rail users is very marked.

For car driver mileages, Figure 4.8 shows that not much over 10% of total mileage is London-related, whereas for rail (Figure 4.9) the percentage is around 60%. In both cases, the proportion of mileage that is London-related has declined over time, but this drop is greater in the case of rail (down from 63% in 1995/7 to 57% in 2005/7).

**Figure 4.8: Proportion of car driver mileage, by London/non-London origin or destination, and work/non-work-related**

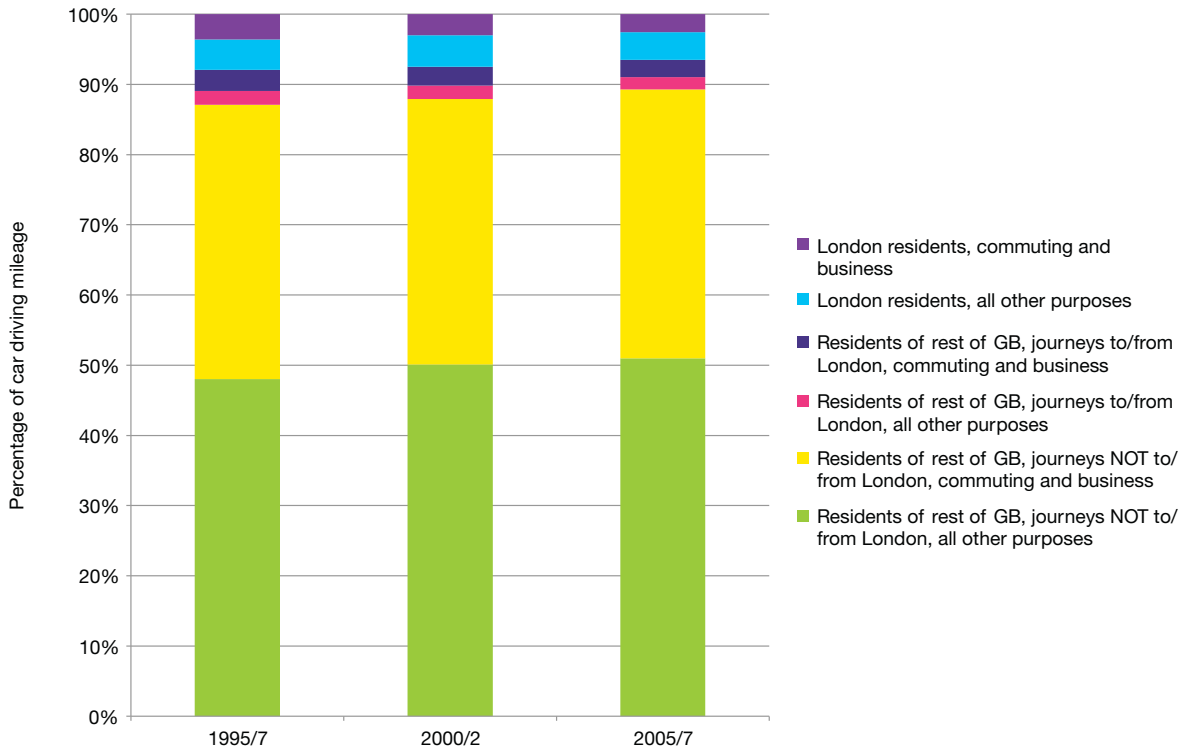
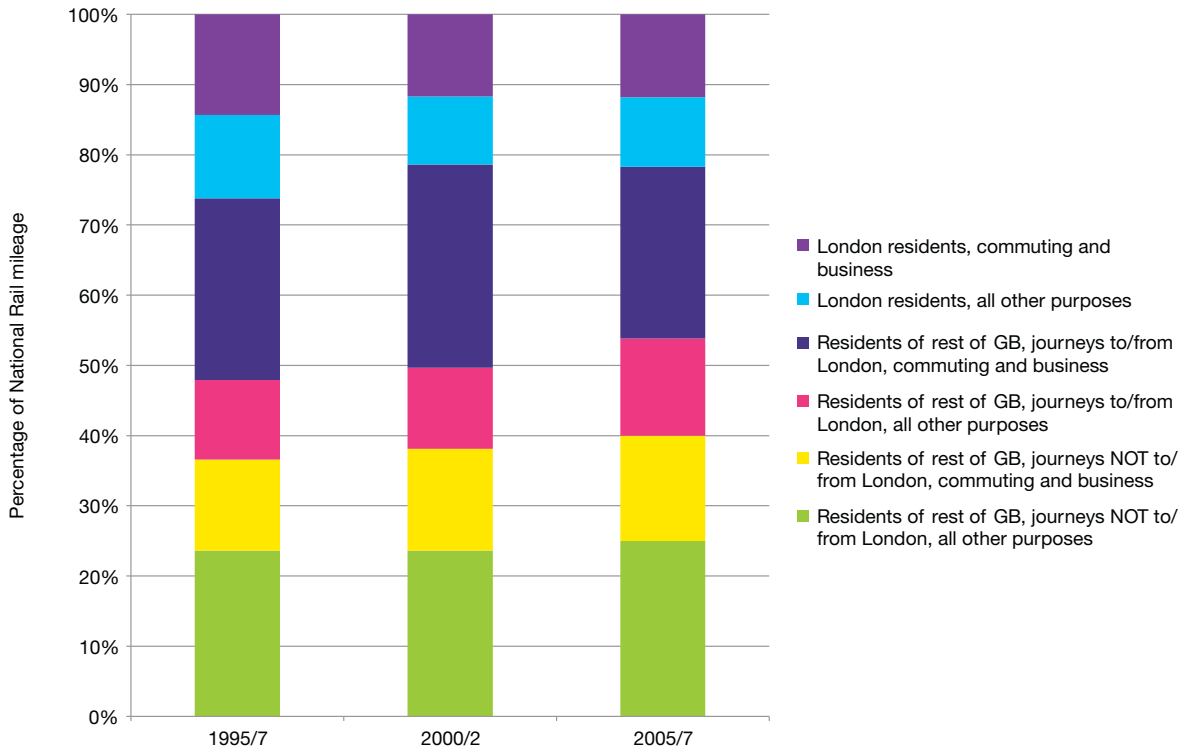



**Figure 4.9: Proportion of rail passenger mileage, by London/non-London origin or destination, and work/non-work-related**




## 4.4 Contributors to the continuing growth in rail mileage

When it comes to rail travel, the earlier analysis identified several factors:

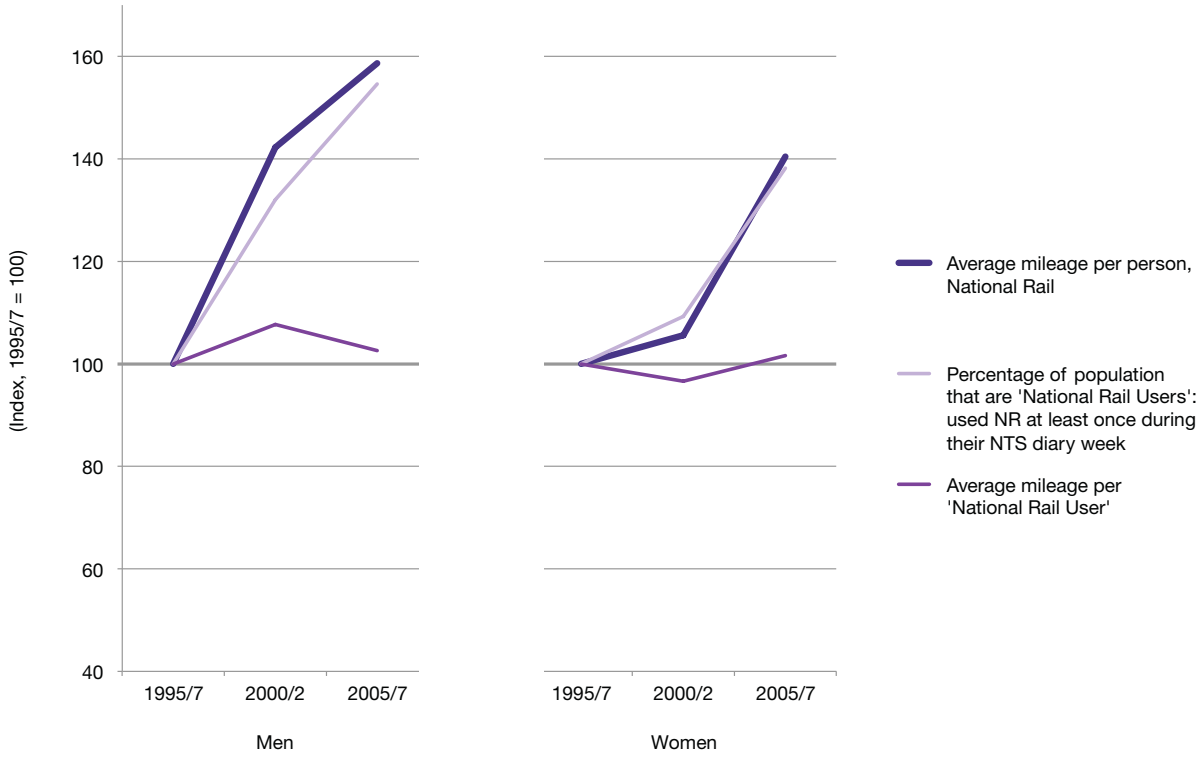
- Average annual rail mileage by men is around 40% higher than that of women.
- Virtually all the growth in passenger mileage has been as a result of additional rail trips, not an increase in average journey length.
- Rail mileage growth rates have been relatively low for commuting (+23%), and highest of all for business travel (+168%). They have been virtually flat for shopping and personal business, but high for most other purposes, especially visiting friends and relatives, education, and day trips (each up around 75–85%).
- There have been strong increases in rail travel for both men and women – with the exception of women with a car driving licence – but this growth is more broadly based across the age range for men than for women.
- The highest mileage rail users per head are those who live outside London, but regularly travel in for work/business purposes.
- The fastest growth rates are among employed people who work outside the London area – they now contribute the highest proportion of annual mileage.

In this section we look more closely at who are the rail users, by focusing on people who report travelling by train in their diary week – rather than averaging

findings across whole population group, as has done in most of the analysis so far.

We know that the growth is in the number of rail trips and not in increased mileage per existing rail trip, so the question which arises is what the source is of these additional trips. Figure 4.10 summarises the overall rates of growth in rail passenger mileage per person between 1995/7, 2000/2 and 2005/7 (using 1995/7 as an index base of 100), and identifies the relative contribution to this overall growth of changes in the proportion of the total population who are rail users (i.e. those observed to use rail at least once in their NTS diary week) and in the average mileage per rail user.

**Figure 4.10: Factors contributing to changes in average rail passenger mileage per person, 1995/7 to 2005/7**

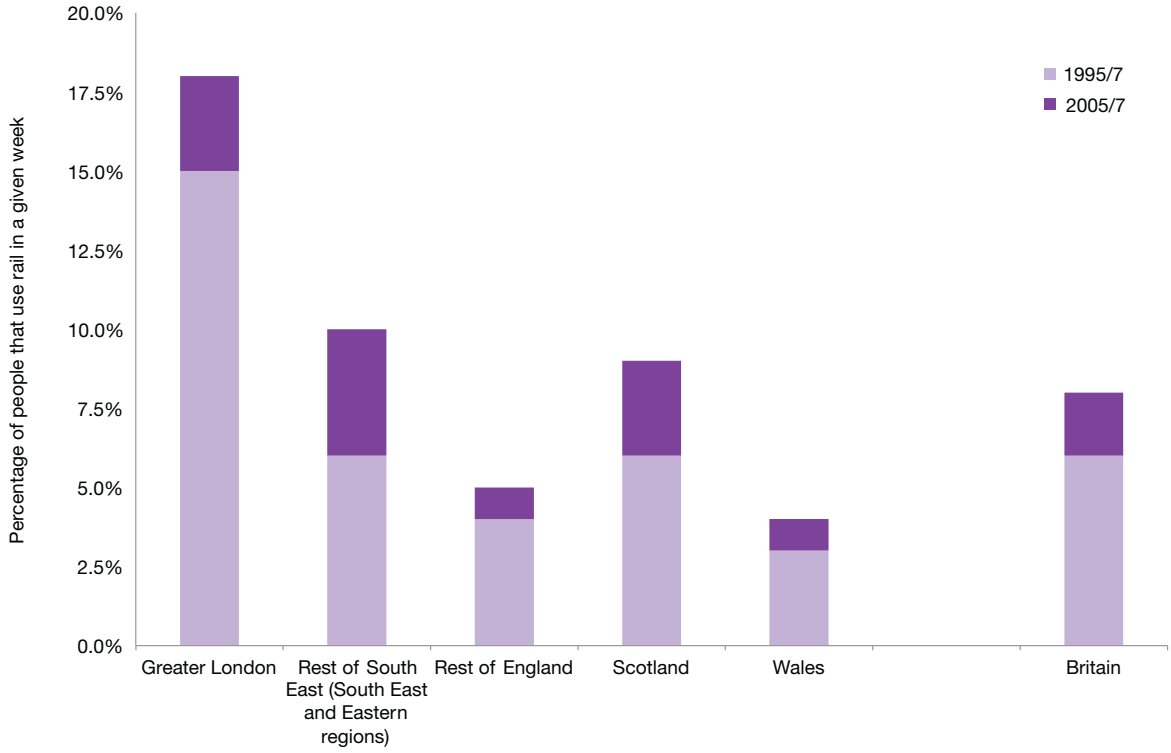



As can be seen, overall growth rates for men have been higher (at 59%) than for women (40%), but in both cases the average mileage per user has changed very little, whereas the index of the increase in users closely follows that for the average growth in rail traffic per person. ***Thus, the growth in rail travel has resulted from a larger proportion of the population using rail services over time, not more intensive use of rail among the same number of users*.**

Figure 4.11 looks at the different levels of rail use among the population in different regions. Here we can see the highest market penetration among

London residents and the lowest in Wales. Increases in penetration between 1995/7 and 2005/7 have been greatest in the South East and Eastern regions,and in Scotland.

**Figure 4.11: Changes in the proportion of the population recording one or more rail trips in their diary week, 1995/7 to 2005/7, by region**




Who are these 'new' rail users? Table 4.2 shows the profile of rail passengers, first on a 'rail user' basis (defined as people that made at least one rail trip in their diary week), and then weighted by their recorded mileage. While there are some intuitive patterns (e.g. season ticket holders make up 20–25% of weekly users, but represent about one third of rail mileage), what is interesting is that there are few systematic time trends between 1995/7 and 2005/7, confirming that the growth in rail users is being fairly evenly drawn from across the population of Britain – at least on the indicators being analysed here. The only small consistent decline is in the proportions being contributed by London residents and season ticket holders.

**Table 4.2: Profile of rail passengers, 1995/7, 2000/2, 2005/7**

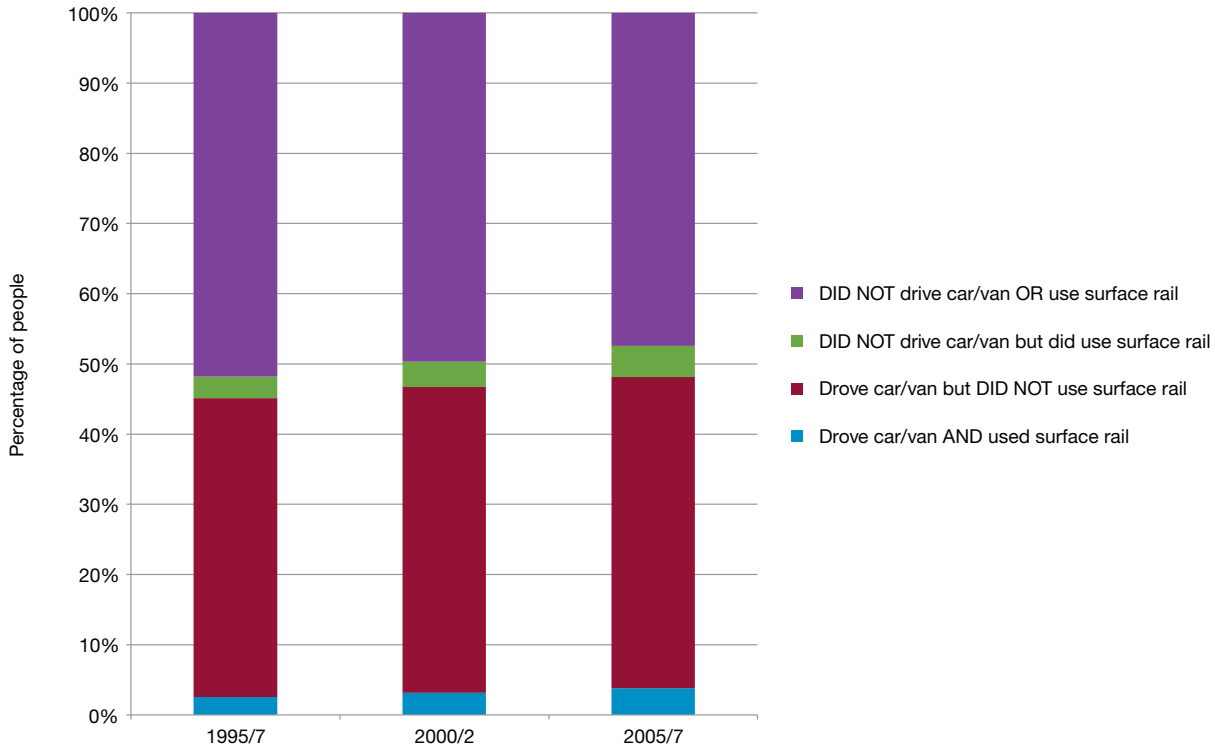
| | Profile of rail passengers, where all users weighted equally | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Average age | % female | % that have car(s) in house-hold | % that work full-time | % that have Railcard | % that have a season ticket | % living in a house-hold with children | % living in London | % living in London, Eastern, or South East Government Office Regions | % that are 'main drivers' of a car |
| 1995/7 | 36.9 | 51% | 72% | 51% | 7% | 25% | 32% | 33% | 56% | 34% |
| 2000/2 | 35.7 | 46% | 76% | 55% | 4% | 25% | 34% | 31% | 61% | 39% |
| 2005/7 | 36.4 | 48% | 75% | 53% | 6% | 19% | 34% | 29% | 56% | 38% |
| | Profile of rail passengers, where users are weighted by their rail mileage during week | | | | | | | | | |
| 1995/7 | 38.5 | 46% | 79% | 65% | 7% | 36% | 27% | 25% | 59% | 43% |
| 2000/2 | 36.9 | 38% | 82% | 68% | 5% | 37% | 30% | 21% | 60% | 48% |
| 2005/7 | 38.0 | 42% | 79% | 67% | 8% | 31% | 29% | 21% | 55% | 47% |

This question of where the growth has come from is examined further in Figure 4.12, which distinguishes four groups of respondents:

1. people who drove a car in their diary week, but did not make a National Rail trip;
2. those who recorded car driver and National Rail trip(s);
3. those who recorded National Rail trip(s), but not car driver trips; and
4. people who recorded neither car driver nor National Rail in their travel diary.

Groups 2 and 3, shown in the centre of the bars, are therefore the rail users.

**Figure 4.12: Percentage of people who were car drivers and/or rail passengers in their diary week**




The proportion of all respondents who drove a car and travelled by train rose from 2.7% in 1995 to 4.3% in 2010 (i.e. up around 60%), while the proportion which used rail but did not drive a car rose over the same period from 3.2% to 4.9% (just over 50%). The total percentage of the population recording at least one train trip in their diary week increased from 5.9% to 9.2% – approximately a 55% increase. So the 'new' rail travellers have been drawn almost equally from regular car and regular non-car users.

Table 4.3 shows that, on average, the rail users who also drove a car in their diary week had a much higher rail mileage (around 50% to 60% more) than those who did not drive in their diary week. Conversely, those who drove and did not use rail had a higher car mileage (by around 1,000 miles a year) than car drivers who used rail, but the differences reduce over time.

Note that rail mileage per user does not increase systematically over time, again supporting the view that the additional annual rail mileage comes from new rail users, not more intensive use of rail by existing users.

**Table 4.3: Average car and rail annual mileages by people who recorded using car and/or rail during their diary week**

| | | Car driving mileage per person per year | National Rail mileage per person per year |
|---|---|---|---|
| 1995/7 | Drove car AND used National Rail | 6,484 | 7,091 |
| | Drove car but DID NOT use National Rail | 8,127 | - |
| | DID NOT drive car but did use National Rail | - | 4,436 |
| | DID NOT drive car OR use National Rail | - | - |
| 2000/2 | Drove car AND used National Rail | 6,786 | 7,174 |
| | Drove car but DID NOT use National Rail | 7,973 | - |
| | DID NOT drive car but did use National Rail | - | 4,730 |
| | DID NOT drive car OR use National Rail | - | - |
| 2005/7 | Drove car AND used National Rail | 6,761 | 7,024 |
| | Drove car but DID NOT use National Rail | 7,680 | - |
| | DID NOT drive car but did use National Rail | - | 4,735 |
| | DID NOT drive car OR use National Rail | - | - |

## 4.5 Is growth in rail patronage linked to declining car use?

This report has already identified some groups where decreases in car use are found alongside increases in rail use. In particular, men living outside London but travelling into London regularly for work-related purposes show the highest levels and rates of growth in rail use and corresponding reductions in car use (see Figure 4.6 and 4.5, respectively).

More specifically for this specific group of males between 1995/7 and 2005/7:

- Average mileage in private cars remained unchanged overall (although there was a small reduction in commuting mileage offset by an increase in non-work mileage);
- Company car mileage for commuting purposes dropped on average by 1,208 miles (67%), while rail commuting mileage increased by 1,285 miles – suggesting a complete substitution between the two modes;
- Company car mileage for business purposes fell by 2,833 miles (a drop of over 70%), and increased on average on rail by only 614 miles, indicating only a partial transfer; and
- Company car mileage for 'all other' purposes fell by 931 miles (61%), but did not correspond with any substantial increase in rail mileage.

In the rest of this section we look in more detail at two other factors: age and gender groupings, and business trips.

### 4.5.1 Age and gender effects

The next two Figures show the observed changes in average rail distances travelled between 1995/7 and 2005/7 by age group and gender, alongside the car driver data from Figure 4.1 and 4.2.

**Figure 4.13: Contributions to net changes in average car driver and rail mileage among men, 1995/7–2005/7, by age group**

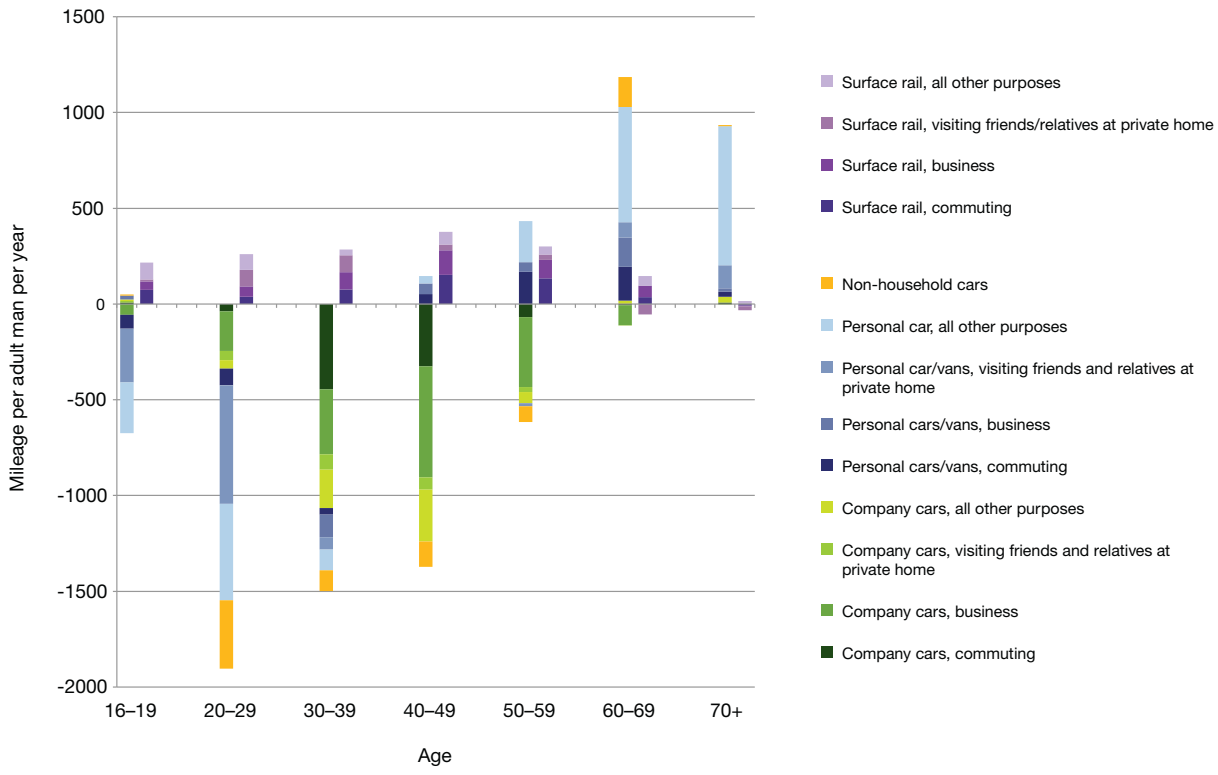
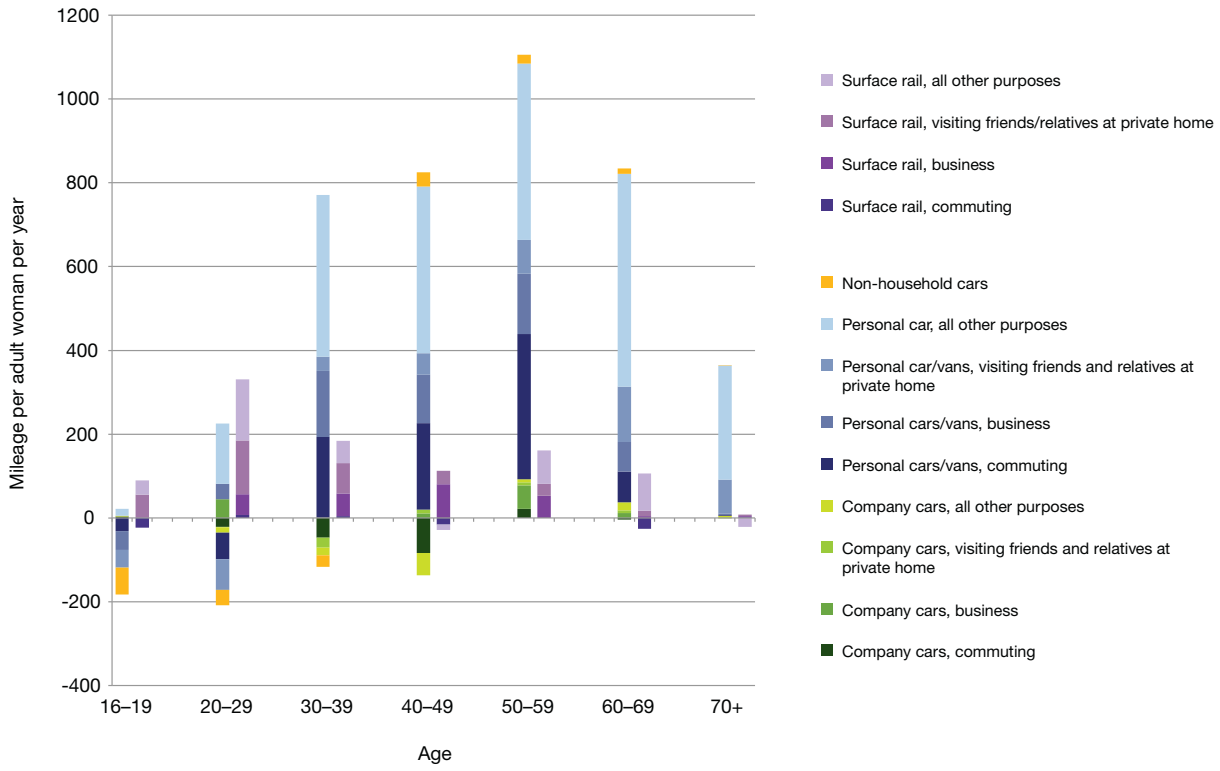


Figure 4.13 shows that average rail use has increased for men in all the age groups, but that this increase has been least in the age ranges 60+, where car-driving use has continued to grow over the period 1995/7 to 2005/7 – despite the availability of the discount Senior Railcard.

The equivalent figures for women are shown in Figure 4.14. Here we see that rail use again grows for all age groups – as does car driver mileage except for those in their teens – with some suggestion that there are broadly similar rates of growth between 30 and 69, where car use has also grown strongly. The use of rail among the 20s age group has grown at around twice this rate, but here there has been a correspondingly much lower growth in car use.

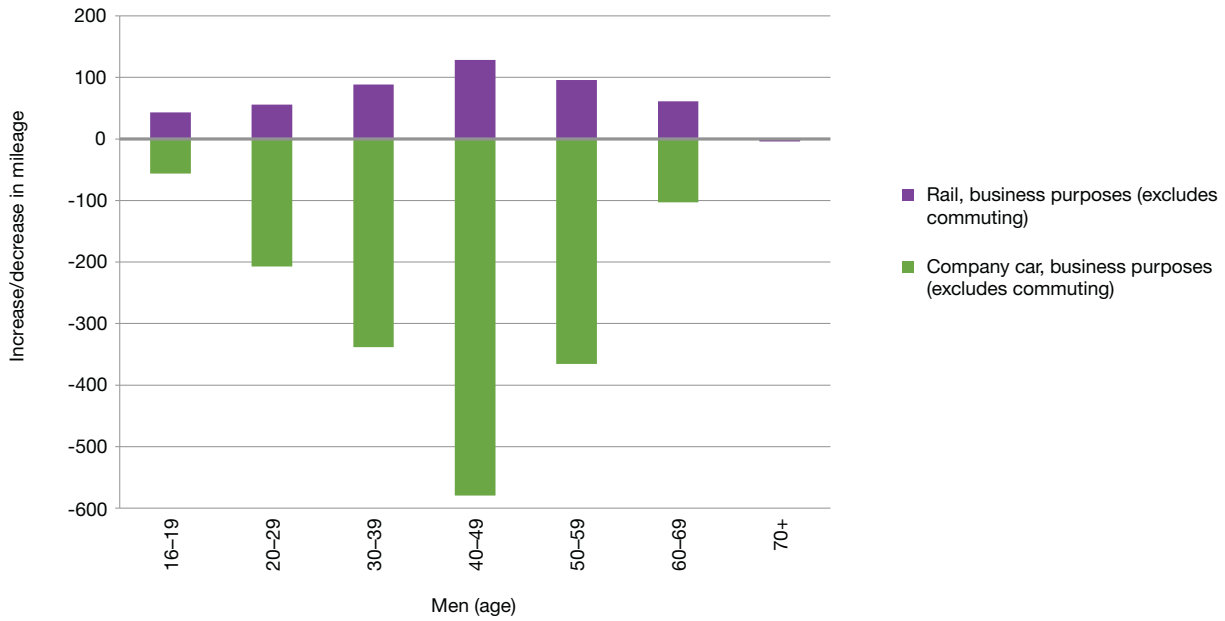
**Figure 4.14: Contributions to net changes in average car driver and rail mileage among women, 1995/7–2005/7, by age group**




## 4.5.2 Evidence of shifts in business travel from company cars to rail

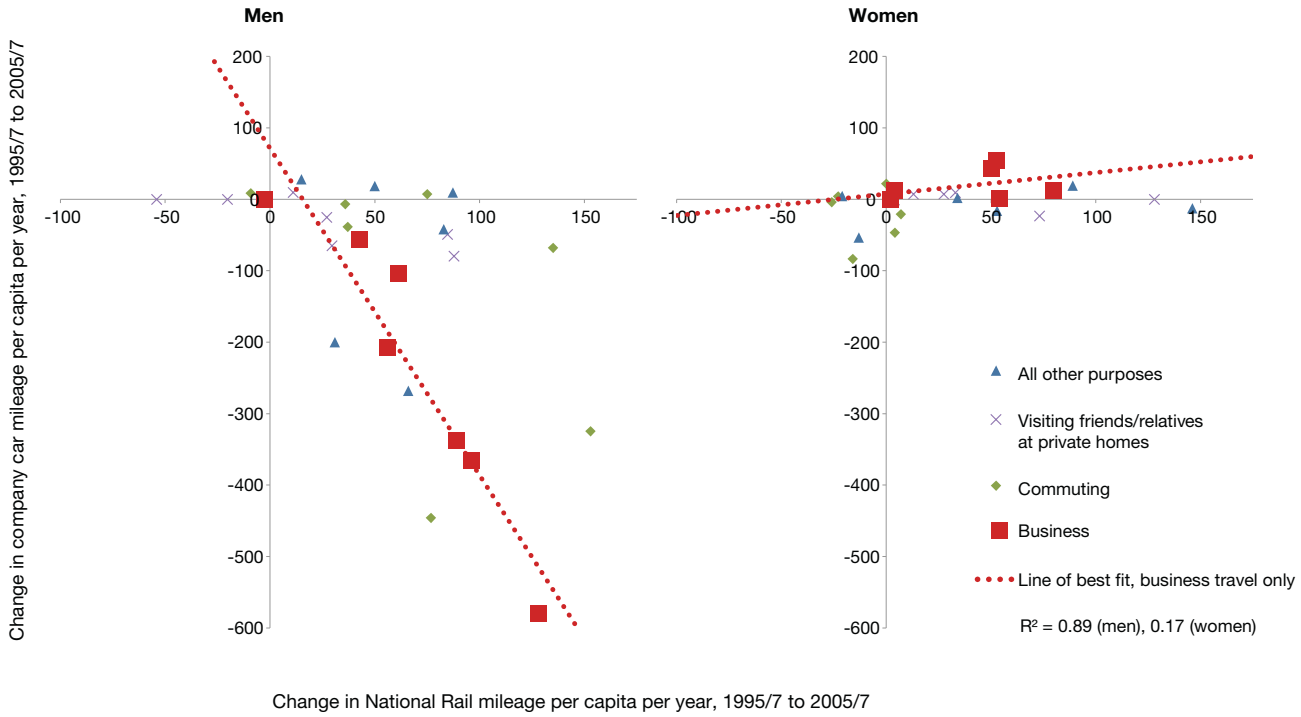
One interesting apparent association is between the average drop in business mileage in company cars among men, by age group, and a corresponding increase in business mileage by rail (Figure 4.15).

**Figure 4.15: Association between reductions in company car business mileage and increases in rail business mileage for men, by age group**




This apparent relationship can be seen more clearly in Figure 4.16, which plots, for each gender, changes in company car mileage on one axis against the growth in business mileage by rail on the other axis. Here we see a very strong relationship for men (with an $R^2$ value of over 90%), but for women on average a small growth in business mileage, both in company cars and by rail.

**Figure 4.16: Changes in company car business mileage plotted against changes in rail business mileage, by age and gender groups**



# 5. Possible Causes of these Changes in Behaviour

The primary objective of this exploratory research has been to identify various changes in travel behaviour which collectively account for the observed aggregate trends in car and rail use over the last ten to fifteen years.

It was not the intention of this study to go further and seek to uncover the causes of these behavioural changes – that is intended to form the basis of a future programme of qualitative and quantitative research. This chapter briefly speculates on what some of these influences are likely to have been.

## 5.1 Changing demographic, labour market and land-use patterns

As noted in Chapter 2, there have been changes in population, labour market and land-use patterns over this period. For example, the British population is ageing and living longer, women are having their first child later in life, and more people in their 20s are now living with their parents; there are increasing levels of part-time employment and shifts in occupational types; and there is some shift in residential population between differing types of settlement.

### 5.1.1 Effects of changes in population composition

Here we tentatively explore how much some of the observed changes in travel behaviour could be explained by shifts in the proportions of the population found in different categories, and how much of it seems to be due to changes in behaviour within the categories themselves. It is important to note that these analyses consider only a small number of variables. Multivariate econometric methods will be needed to better understand these apparent effects in the next phase of research.

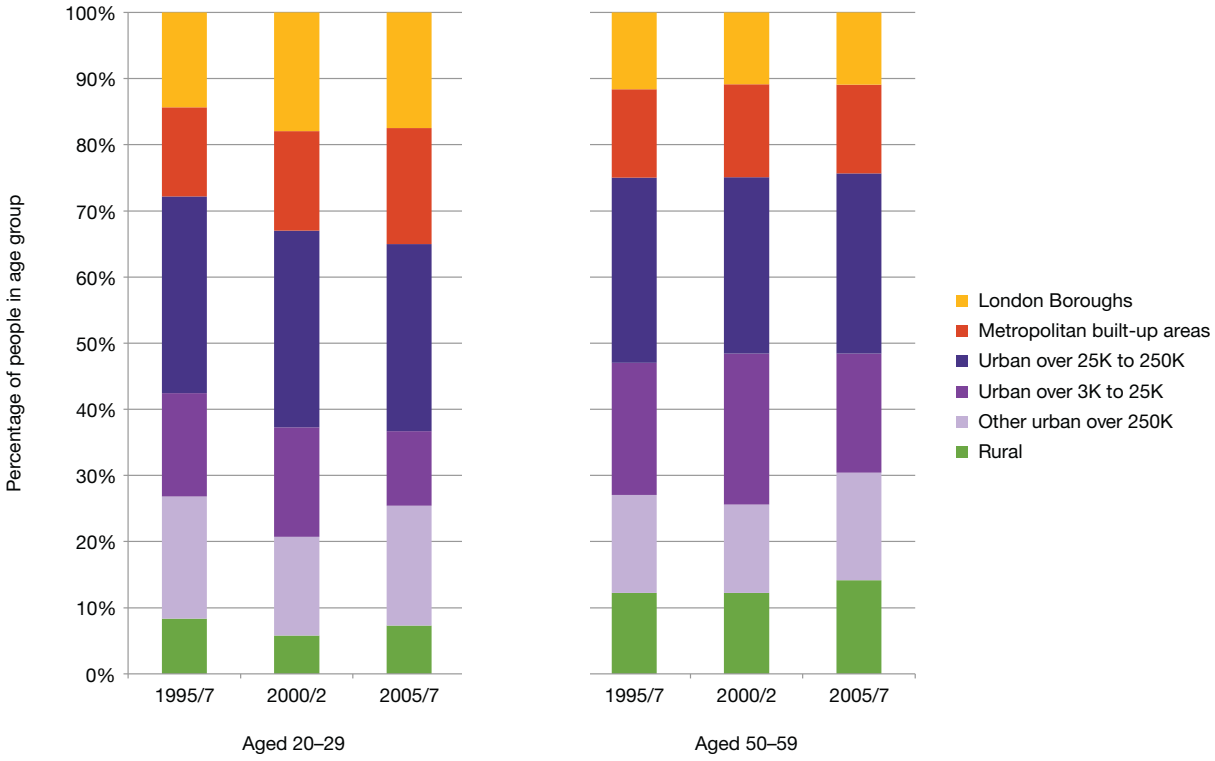
The analyses have involved multiplying the proportions of the total population in particular subgroups in 2005/7 by the average driving mileage of that group member in 1995/7, and seeing how this weighted average matches the observed average mileage.

#### *Shifts in residential locations*

Figure 5.1 shows the changing distribution of the British population among differing types of settlement size over time, contrasting people in their 20s and 50s. What is particularly striking is the increasing proportion of the younger age group living in London and the metropolitan built-up areas, with corresponding proportionate declines in the other areas. Shifts among the 50s age group have been much less marked.

The first of these analyses assessed the effect of shifts in the proportion of people living in settlements of various size categories. It was found that the shifts between 1995/7 and 2005/7 in where people live would have led to a small drop in driving mileage of 69 miles per person per year (from the 1995/7 level of 3,624), whereas there was in fact an observed increase of 35 miles/year. In other words, the shifts in where people lived had a small effect leading to reduced mileage, but this was outweighed by increasing average driving levels *within* each city size. For rail, changes in where people live were found to lead essentially to no change in rail mileage (+1 mile/year on the base 1995/7 observation of 318 miles).

**Figure 5.1: Changing distribution of residents in their 20s and 50s among differing settlement sizes, between 1995/7 and 2005/7**




### *Shifts in age/gender profiles*

A second analysis investigated the effect of shifts in the age/sex profile of Britain's population. Here it was found that if the population had aged from the 1995/7 age/sex profile to the 2005/7 one, while retaining 1995/7 levels of driving mileage, then aggregate car-driving mileage per person would have increased by 58 miles/year – only 2%, but nevertheless a larger increase than has been observed. This reflects the fact that there have been reductions in driving mileage over this period in some age/gender groups. Rail mileage would have likewise increased by only two miles/year (+1%). In other words,

the direct effect of the ageing population on both average driving and rail mileage seems to have been quite small, and in now way accounts for the rapid growth in rail mileage per person.

### *Men in their 20s*

According to the NTS, the proportion of Britain's men in their 20s living in London grew from 13% in 1995/7 to 18% in 2005/7. As living in London is associated with less driving than living elsewhere in the country, just this change alone can account for a drop in average British mileage of 130 miles/year. However, the overall drop in average driving mileage for young men was 1,911 miles/year, so the increase in the proportion living in London accounts for only about 7% of this national drop. The story was different for rail: the effect of more young men living in London can account for 17% of the 1995/7 to 2005/7 growth in national-average rail mileage for young men.

The second analysis of young men investigated effects associated with the increasing proportion of men living with their parents, and the growing percentage that were renting rather than owning their home/flat – both effects which can be ascribed to the property market. Here young men were cross-classified into one of the four categories (plus an 'Other' category for those living in rent-free housing). The results are shown in Table 5.1; note that the data in this table is a disaggregation of the results shown in Table 4.1.

**Table 5.1: Changing household composition,ownership patterns and annual car driving mileage, among men in their 20s**

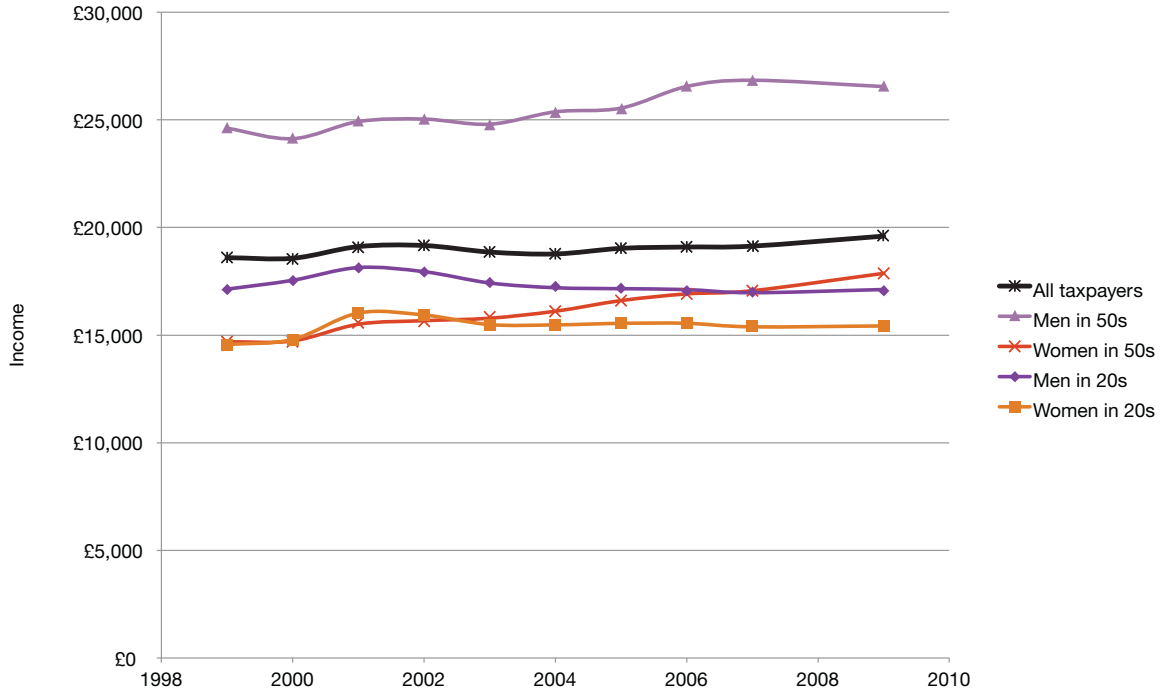
| | Percentage of men aged 20–29 in 1995/7 | Percentage of men aged 20–29 in 2005/7 | Average annual car driving mileage in 1995/7 | Average annual car driving mileage in 2005/7 |
|---|---|---|---|---|
| Owns home and NO adult 35+ in household | 28% | 20% | 9,427 | 8,076 |
| Owns home and AT LEAST ONE adult 35+ in household | 31% | 35% | 6,295 | 4,808 |
| Rents home and NO adult 35+ in household | 31% | 33% | 4,299 | 3,032 |
| Rents home and AT LEAST ONE adult 35+ in household | 8% | 11% | 4,223 | 1,526 |
| Other housing tenure (rent free) | 1% | 1% | 7,307 | 4,043 |
| All | 100% | 100% | 6,408 | 4,497 |

It was found that the shifts between these five categories alone – holding mileage within each category constant at 1995/7 levels – could account for 25% of the observed drop in mileage by men in their 20s between 1995/7 and 2005/7. This was despite an observed fall in mileage in each of the five groups over the ten-year period. Thus, these property-market-related shifts in household structure and housing tenure seem to account for a substantial part of the drop in driving by young men, although far from all of it. By contrast, these changes in housing arrangements by themselves would have led to a small drop in young men's rail mileage (–4 miles/year on the 1995/7 observed level of 492), and therefore do not explain their growing rail use at all.

### 5.1.2 Growth of personal incomes

While, on average, personal incomes have increased over time, at least until the last few years, this increase has not been evenly shared across all the population groups which are subject to taxation (Figure 5.2). In particular, while both men and women in their 50s have enjoyed increases in real personal incomes over the decade 1998 to 2008, those in their 20s have not; indeed, on average the latter's real incomes declined between 2001 and 2007. However, the gender difference is much lower for people in their 20s (at around £2,000 between the sexes) than is the case for the 50s group, where it is around £7,500.

**Figure 5.2: Changing distribution of real personal income over time, by age and gender groups**




Source: HMRC (2012a)

## 5.2 Tax treatment of company cars

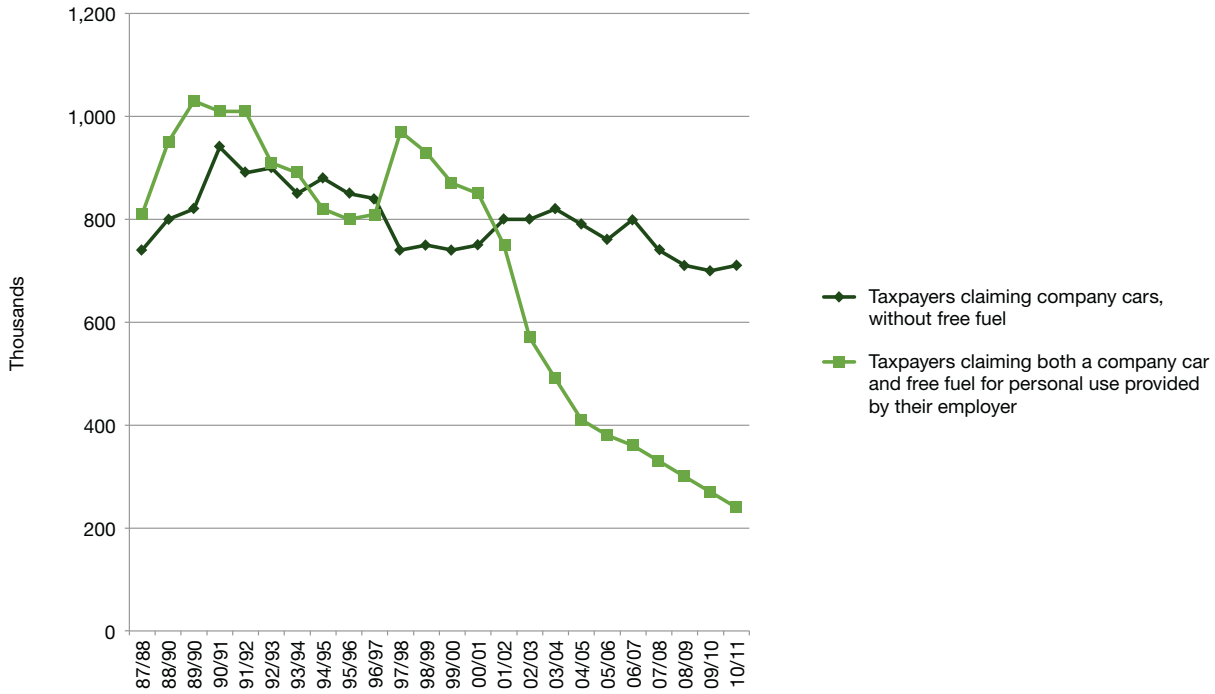
About half of the two million or so new cars sold annually in the UK are first registered to a firm or public agency rather than to an individual. These corporately registered cars are used in various ways: rental fleets, use by local authorities and other government agencies, corporate car pools, and other niche uses. Only a relatively small proportion are 'company cars' for the use of individual employees.

The analysis in this study has brought to the fore the important role of 'company cars' – specifically those reserved for the use of a particular employee as a benefit in kind – in contributing to the levelling off in national car traffic levels. The natural question is, then: what has been causing the rapid drop-off in the ownership, and also the use, of company cars?

While we cannot answer this question in terms of causality, it is instructive to examine how changes in government policy towards company cars has encouraged a reduction in company car ownership and use. In the 2009/10 tax year, 970,000 UK taxpayers paid tax for use of a company car, a drop of 41% from the 1995/6 figure of 1,650,000 (Figure 5.3).

Of company car drivers in 1995/6, around half (48%) reported receiving free fuel, whereas only 28% did in 2009/10. What has happened is that the number of company car drivers that receive no free fuel has fallen by only 16%, whilst those receiving free fuel has dropped by 70%.

**Figure 5.3: Number of taxpayers claiming company car benefit, 1987/8–2010/11**




Source: HMRC (2012b)

Cars as a benefit first emerged as a means of providing staff with in-kind value that did not violate the wage freezes of the 1970s; prior to the Finance Act 1976, company cars provided for personal use were not taxed at all. From 1987/8 to 1993/4, company cars were taxed on the basis of age, engine size, and their original value when new. The 'scale charge' – the amount taxpayers were required to add to their taxable income – escalated rapidly year-on-year in the early 1990s: for a car under four years old with an engine size between 1.4 litres and 2.0 litres, the charge grew from £1,031 in 1987/8 to £3,226 in 1993/4 (both quoted at 2010 prices).

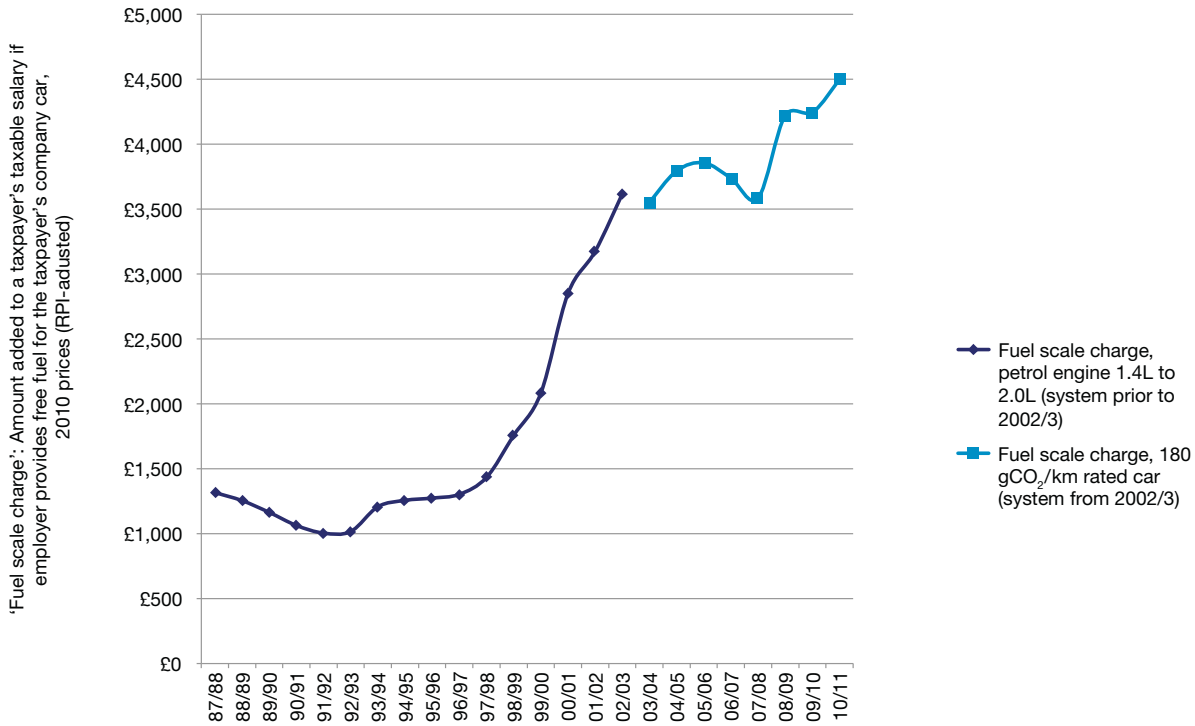
The scale charge also depended on how much the car was driven – the 18,000$^{th}$ mile driven for business purposes led to an abrupt 50% drop in taxation, providing a strong incentive for company car drivers to reach that threshold.

Employers could also provide unlimited 'free' fuel to an employee, with the staff member incurring only a *fixed* tax liability – an amount that did not vary at all with the amount of fuel used, whether a single gallon or a thousand.

The tax treatment of fuel provided by one's employer changed most markedly in a five-year period centred on the turn of the millennium.

Thus, driving high levels of mileage was further encouraged, as having fuel paid for by one's employer made financial sense only if enough fuel was consumed to justify the tax liability (the 'fuel scale charge'). Interestingly, the fuel scale charge changed most rapidly from the late 1990s to the early 2000s (Figure 5.4), more than doubling (in real terms) from about £1,400 in 1997/8 to £3,600 in 2001/2 (both in 2010 prices), for a petrol car with an engine size between 1.4 litres and 2.0 litres.

**Figure 5.4: Changes in fuel scale charge over time**




Source: HMRC (2012b)

From 1993/4 the system for company cars (though not the one for fuel) was revised, with the annual taxable amount now set at 35% of the car's original market value; engine size and age no longer affected it. But the tax incentives for driving high business mileage remained: the 35% charge fell by a third after the first 2,500, and by two thirds after 18,000 miles. The system was updated again in 1999/2000, with the effect of reducing somewhat the tax incentives accruing from high business mileage (to a reduction of 29% after 2,500 miles, a drop from the previous 33% savings, and 57% after 18,000, rather than 67%).

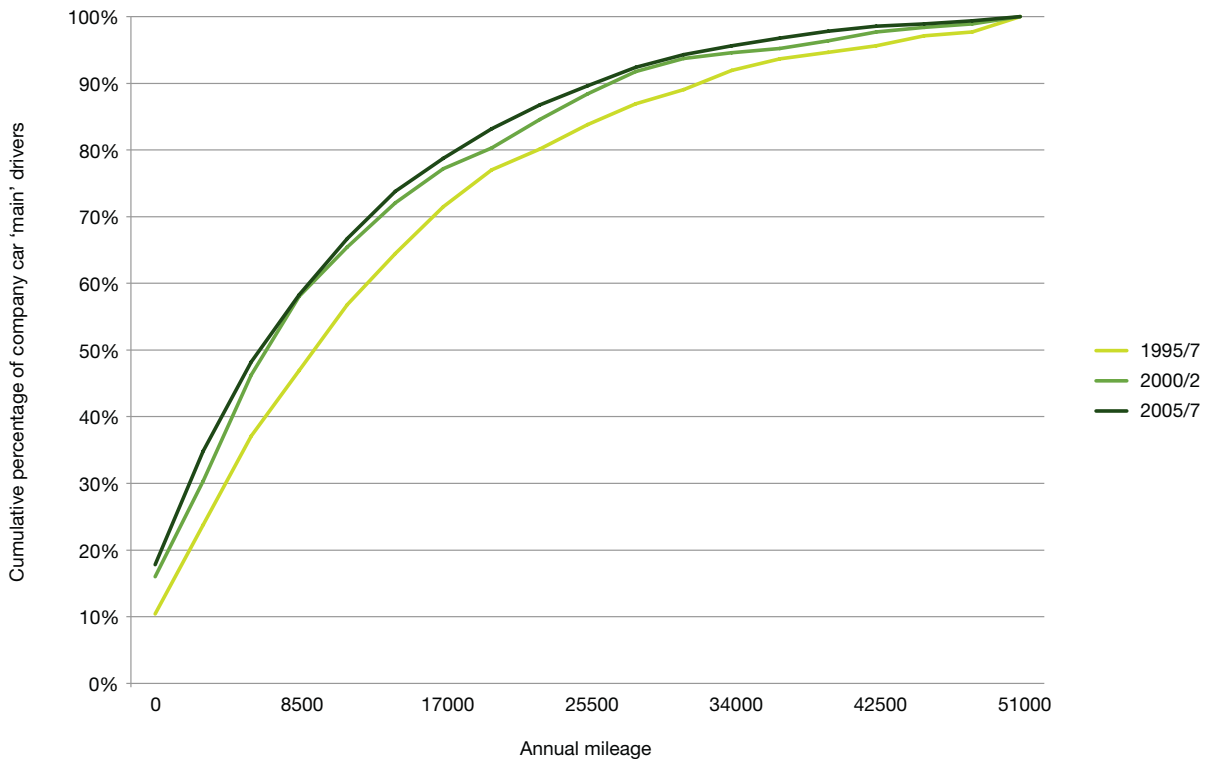
The system was more radically overhauled in the 2002/3 tax year, such that the scale charges both for having a company car and for receiving free fuel

now depended on the car's $CO_2$ emissions band, with rates ranging from 15% for the lowest-emissions bands up to 35% for the highest per-mile emitters. Crucially, the tax incentives for reaching specific mileage thresholds that had been in place since the 1980s were removed in 2002/3.

In more recent years, company car tax policy has further incentivised lower-emitting cars, to the point that zero-emission cars (e.g. electric cars) have not been subject to any company tax since 2010/11, which HMRC has publicly stated will remain until 2015/16. In other words, company car policy has in a sense come full circle, once again providing large tax incentives to compensate staff with vehicles (paid for by the employer with pre-tax money) instead of salary, but in its contemporary incarnation providing much stronger incentives for lower-emitting cars. What has not returned, however, is tax policy that encouraged employers to provide 'free' fuel to company car drivers, and that then encouraged those drivers to maximise their mileage.

Figure 5.5 shows the distribution of combined commuting/business mileage by company car drivers in 1995/7, 2000/2, and 2005/7. As elsewhere in this report, annual mileage is estimated by factoring up the observed weekly mileage, thus week-to-week variation will introduce noise into these distribution plots. The chart shows a shift amongst company car drivers towards driving fewer miles for commuting/business purposes over time, as would be expected, and what is more the drop between 1995/7 and 2000/2 (which is when the fuel scale charge increased most rapidly) was larger than the decrease from 2000/2 to 2005/7.

**Figure 5.5: Percentage distribution of company car mileage**



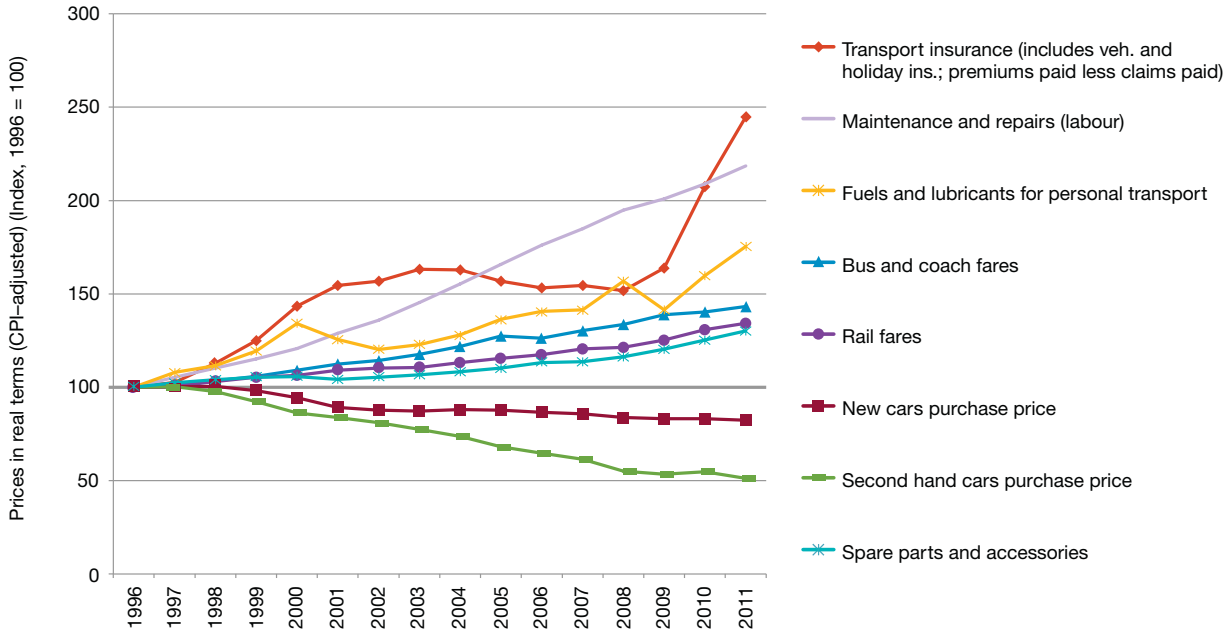

## 5.3 Transport supply characteristics

Most road and rail forecasting models take particular account of changes in transport supply characteristics. Some aspects of these have changed quite significantly over the period 1995 to 2007.

### 5.3.1 Transport prices

While the prices of new and second-hand cars have fallen, most other costs associated with car ownership and use have risen sharply, alongside marked increases in bus and rail fares (Figure 5.6). These are average prices and do not take account, for example, of the much higher insurance costs paid by young drivers.

## Figure 5.6: Relative changes in transport prices since 1996




Source: ONS (2012i)

Since 2006 the NTS has included questions about the reasons why respondents without a car driving licence do not have one; one set of response options concerns the costs of learning to drive and owning/running a car. The question was last revised in 2009: Figure 5.7 shows the proportions in the 2009/10 sample which cites cost reasons, by household income band, male/female, for respondents in the 20–29 and 50–59 age groups.

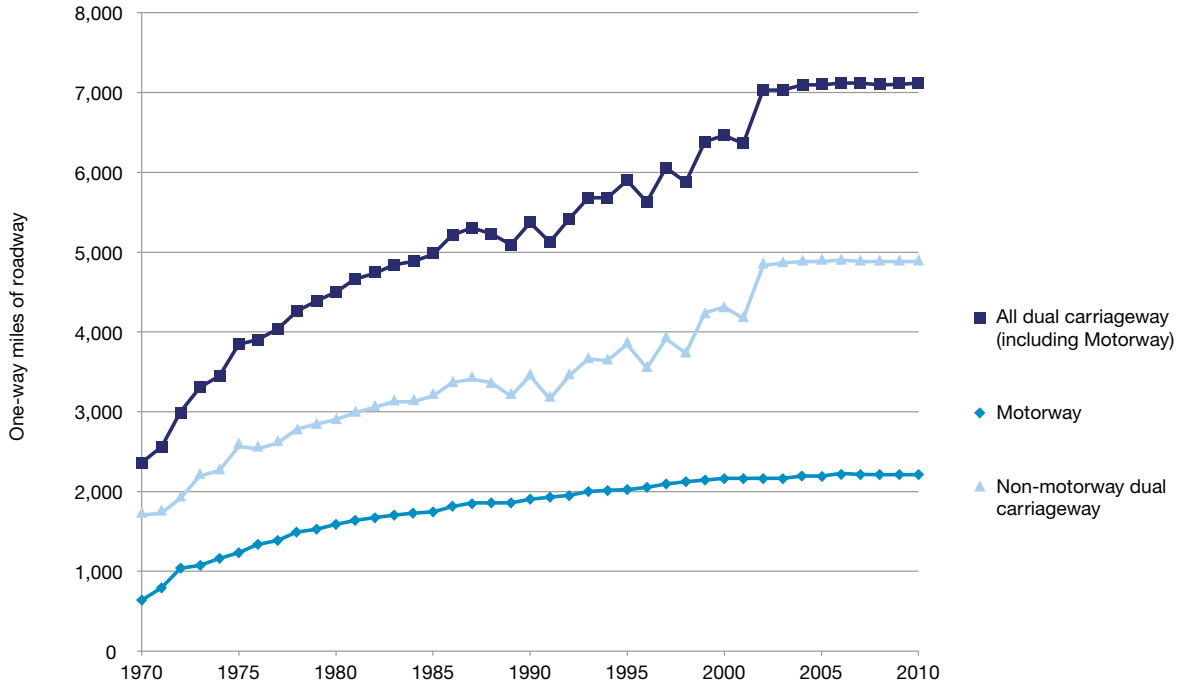
## Figure 5.7: Influence of cost as a factor in not having a driving licence, by household income

Responses by males and females in each age group are very similar. For those in their 20s there is a sharp drop in the percentage citing cost reasons with increasing household income – down from over 50% where incomes are below £10,000 to around 25% for household incomes over £50,000. Proportions giving this reason are lower, and differences much less marked across incomes, among people in their 50s.

### 5.3.2 Transport infrastructure

In terms of transport infrastructure, Figure 5.8 shows the growth in motorway and dual carriageway route mileage from 1970. There was a steady growth between 1970 and 2000 (up from around 2,200 miles to 7,100 miles), but since then there has been no significant increase (note that year-on-year fluctuations are due to changing definitions).

**Figure 5.8: Increases in route mileage of motorways and dual carriageways over time**




Source: Department for Transport (2012c)

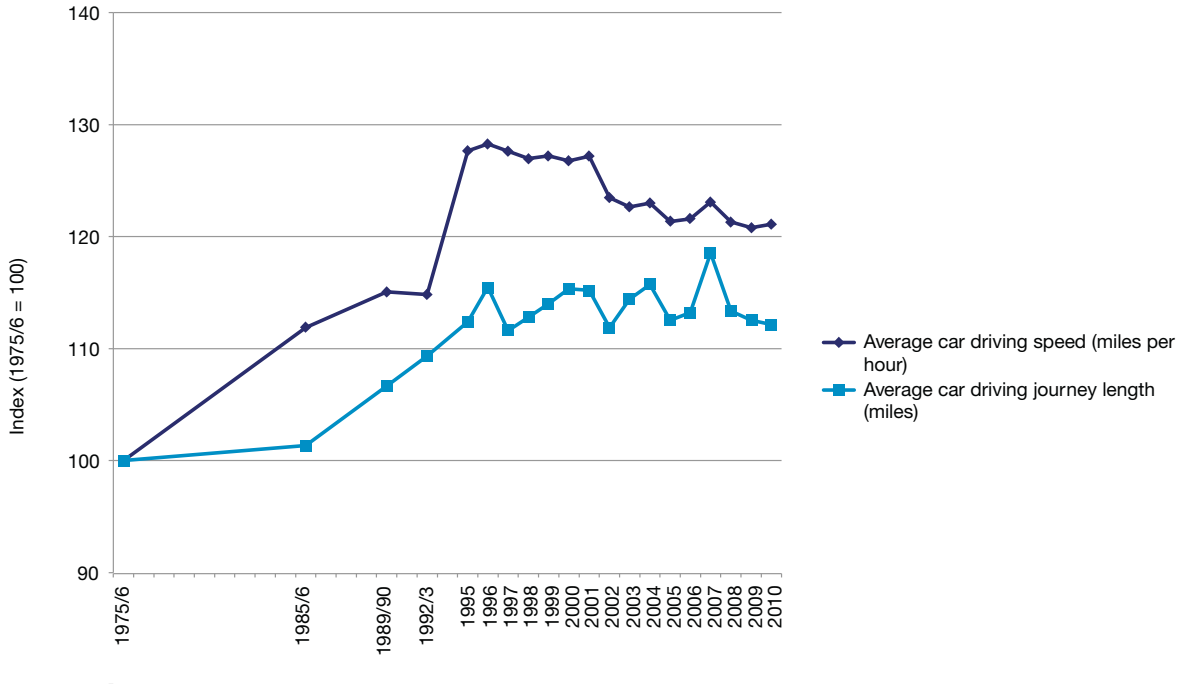
There is evidence of average speeds on these roads falling, because of increasing traffic volumes, and also in built-up areas – in the latter case this is probably due to increases in traffic signalised junctions and the growth of 20 mph zones.

The cumulative effect of such supply changes is shown in Figure 5.9, which is derived from reported trip times and distances in the NTS. While the average

length of car trip stopped growing in the late 1990s, and has been largely stable since then, speeds have fallen. As noted in Chapter 2, this led to an increased car travel time per year which has recently dropped back as a result of a reduction in the average number of trips by car – possibly reflecting the operation of a longer term travel time budget constraint.

At the same time there have been major improvements to non-car modes. In London, for example, there have been large investments in the Underground and Overground networks, as well as improvements to bus services, and measures to encourage cycling.

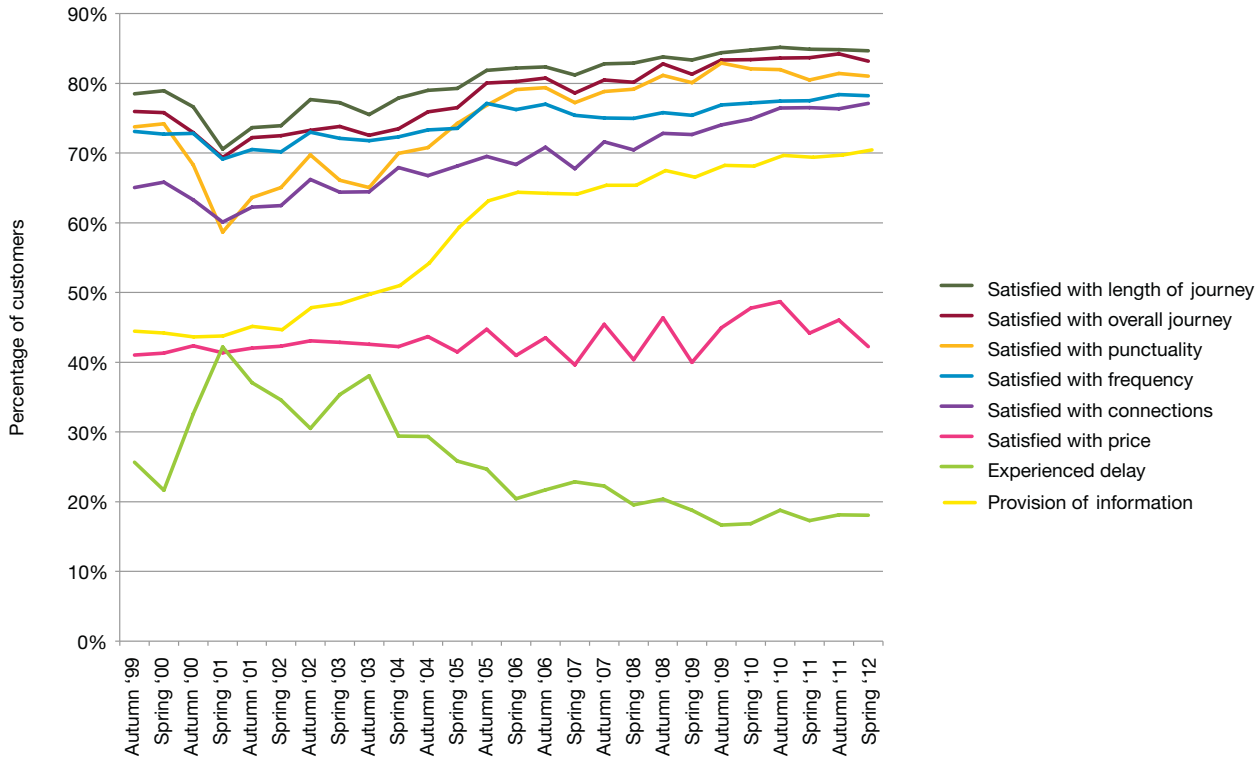
**Figure 5.9: Trends in mean distance per trip and mean door-to-door car-driving speeds**



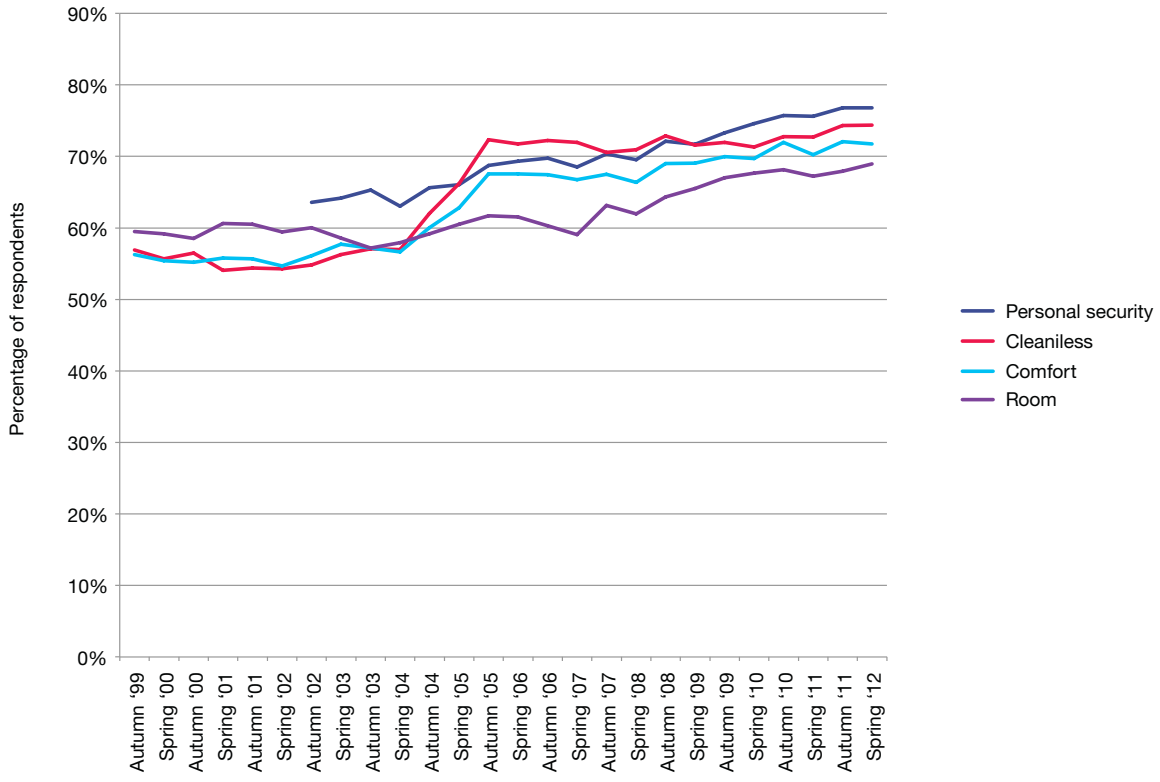

More generally, for rail travel in Britain the indicators have generally been positive over time, measured in terms of passenger satisfaction. Figure 5.10 shows rising passenger satisfaction with journey frequency, punctuality and connections, and less likelihood of experiencing a delay. Only satisfaction with price is relatively low (at 40%), and has shown no sustained improvement over time. It is worth noting that this seems to relate to the age of rail passengers, with older passengers generally reporting higher rates of satisfaction with ticket prices.[3] As with the service dimensions shown in Figure 5.10, Figure 5.11 shows satisfaction with the physical condition of trains to have also risen.

3 This is discussed in depth in this study's detailed report on rail passenger satisfaction, which can be accessed on the sponsors' websites.

## Figure 5.10: Satisfaction with journey performance




## Figure 5.11: Satisfaction with physical conditions on the National Rail train



In addition to what has occurred nationally, there have also been major structural changes in London's transport network in recent years.

Much investment has gone into the public transport system: from 2001/2 to 2010/11 bus miles operated increased by about one-third; Underground train mileage increased by 8% (in the context of a fixed network); and National Rail train mileage (London and South East, from 2003) grew by 20%. Transport for London (TfL) reports that at the same time key indicators of service quality have improved, with many indicators of service performance now at 'best ever' levels.

Supply-side factors affecting the road network in London also differ from those at the GB level. The general thrust of road network policy in London over this period has been towards interventions that remove capacity for 'general' traffic, in favour either of specific groups of road users (buses, cyclists, pedestrians), or particular policy goals (e.g. road safety, local amenities), or to accommodate increasing development activity and (in particular in London) utility replacement works. At the same time there has been little new road capacity (infrastructure) in London.

TfL has estimated the reduction in effective highway network capacity in central/Inner/Outer London that is implied by the observed relationships between traffic speeds and flows (volumes). The effect has been most pronounced in Central and Inner London, with implied reductions of up to 30% in Central London, 15% in Inner London and with Outer London following more recently.

## 5.4 Other government policies

Aside from direct investment in road and rail infrastructure, and the efforts of the public transport operators to improve service quality, national and local governments have pursued a number of policies designed to discourage car use and increase the use of more sustainable travel modes, including rail.

Parking policies have generally become more restrictive over time, and the growing introduction of traffic calming measures and 20 mph zones in residential areas may provide some disincentive to car use. There have also been various 'road space reallocation' initiatives (e.g. introduction of bus and cycle lanes) on busier urban roads.

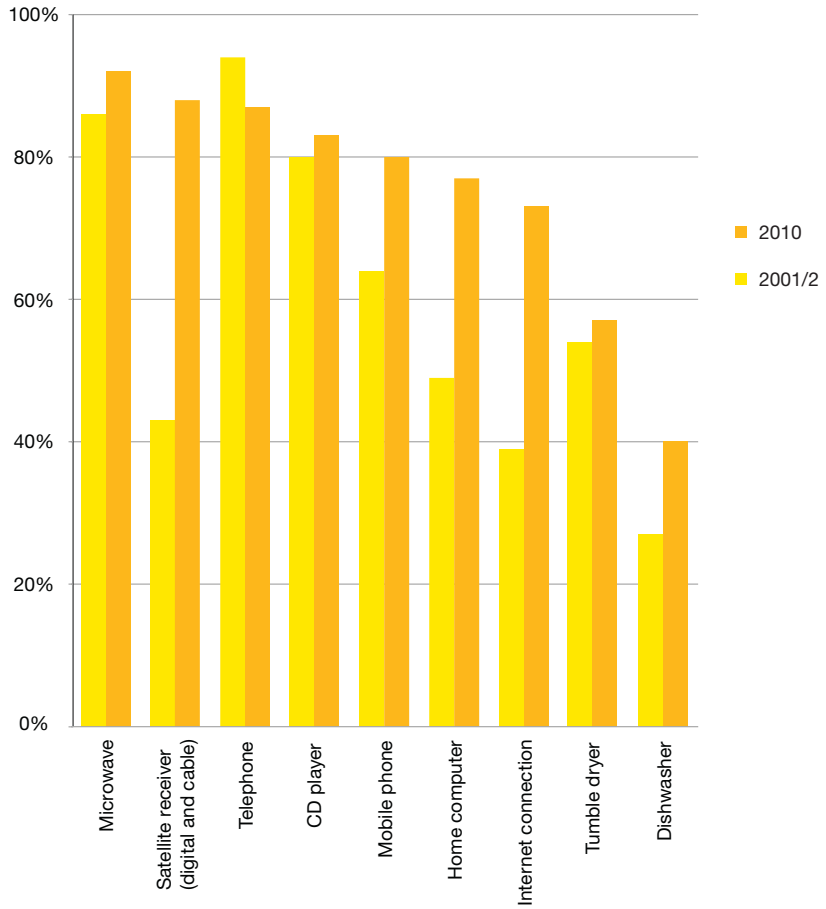
National governments have advocated, and local governments have applied, a range of 'soft measures' intended to encourage a switch of trips from car to other modes, through the provision of information, targeted marketing initiatives, and various incentives, financial and other. School and workplace travel plans have often succeeded in reducing car use at their sites by between 10% and 20%, and the Sustainable Travel Demonstration Town project – which combined a range of initiatives in three small to medium-sized towns – achieved a reduction in car driver trips by residents of around 9% per person, and car driver distances fell by 5% to 7%.

## 5.5 Technological factors

Technology can potentially influence travel behaviour in several ways, from making journeys undertaken by car and rail easier (for example through improved information systems), to providing substitutes for travel, by using the Internet for banking and shopping, or for social contact.

Figure 5.12 indicates the increase in take-up of a range of consumer goods by households in Britain between 2001/2 and 2010. All have shown substantial increases over the decade, except for a small drop in (fixed-line) telephone ownership – presumably compensated for by the large increase in mobile phone and Internet connection uptake. Nearly 75% of households reported having an Internet connection, which makes it much simpler to both obtain travel information and carry out social interactions and commercial transactions online.

**Figure 5.12: Percentage of households owning various consumer goods, 2001/2 and 2010**



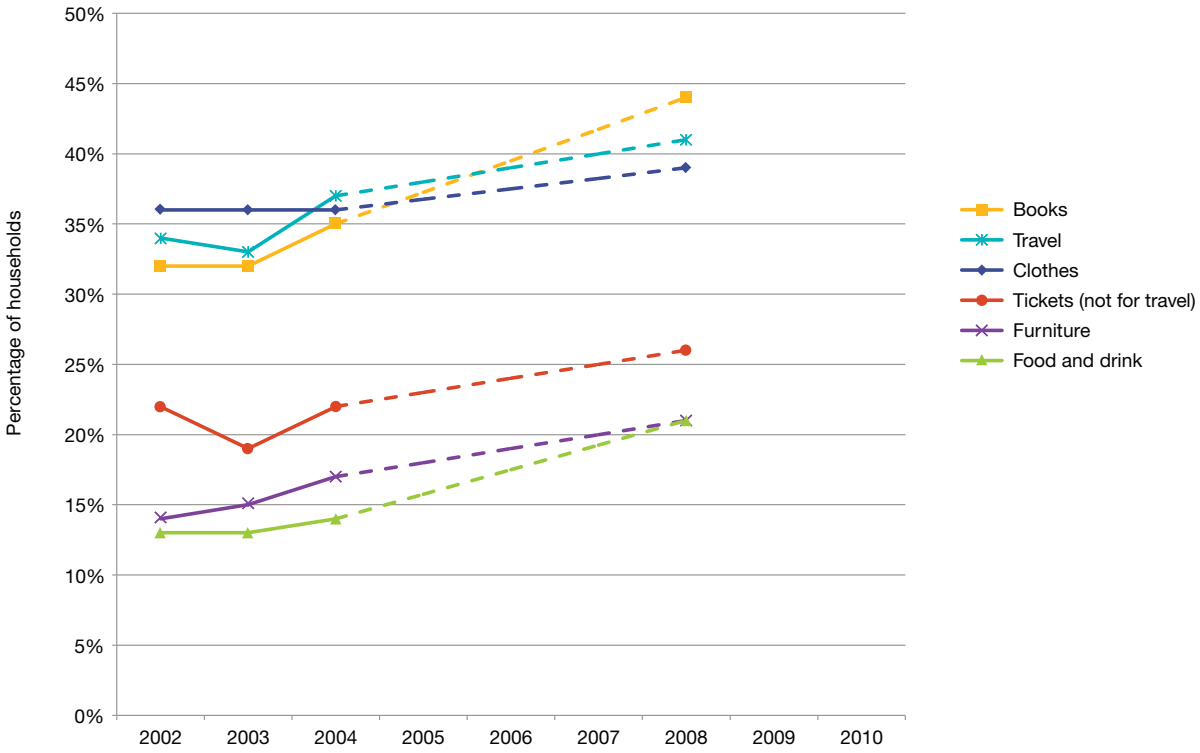

Source: ONS (2012j)

The NTS has periodically included a question asking "Nowadays does anyone in your household ever order any of these things over the phone, by post or

on the Internet…?". The responses are illustrated in Figure 5.13 (note no data was collected in 2006). Here we can see a steady increase in the proportions ordering goods and travel remotely; the highest percentages (around 40% in 2008) were for books, travel and clothes.

A further analysis was carried out to see whether this was affected by the age of the household members (split by whether the oldest member is under 35, or aged 35 or over). This found that while both groups have increased their usage, in households with all members aged under 35 higher proportions obtained some items in all categories of goods and services remotely; the differences were particularly large for books and furniture.

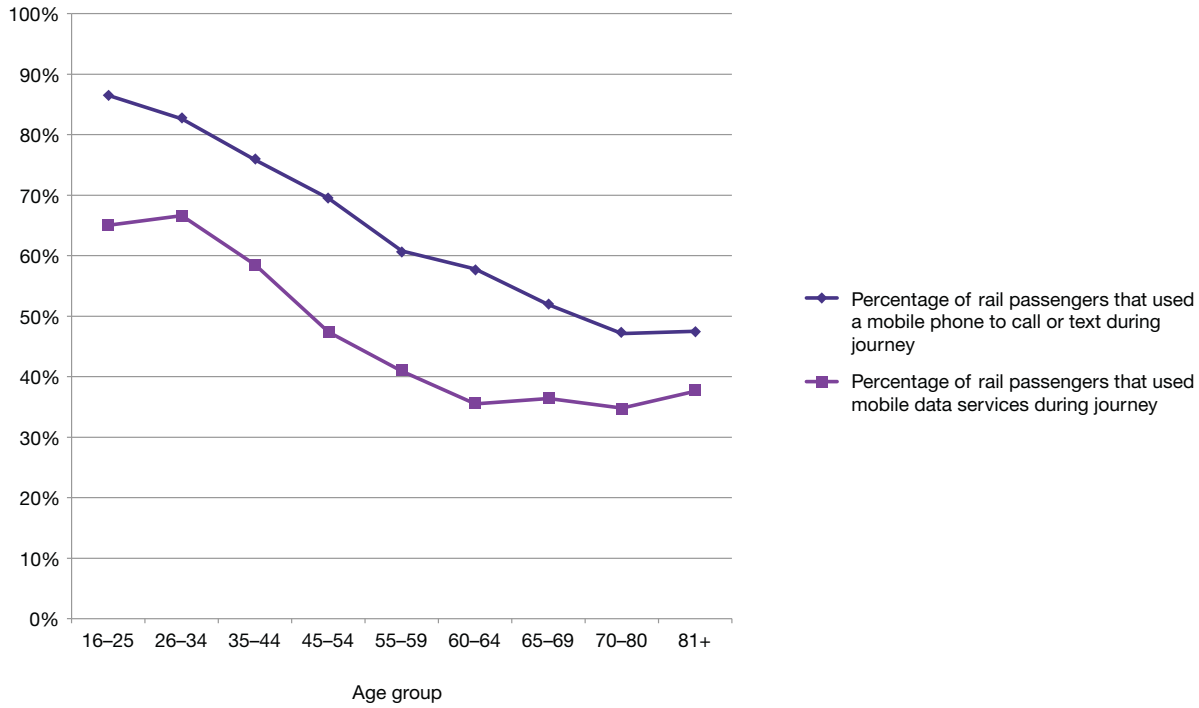
**Figure 5.13: Percentage of households answering yes to "Nowadays does anyone in your household (do you) ever order any of these things over the phone, by post or on the Internet…?"**




The National Rail Passenger Survey (a continuous survey of over 50,000 rail passengers yearly that is undertaken by Passenger Focus) asked respondents to the autumn 2011 survey questions about their use of telecommunications during their rail journey; 71% of all passengers reported making calls or sending texts during their journey, and 53% used a mobile data service. Percentages were similar for commuting and business travel (around six percentage points more than the average), and correspondingly lower for leisure travel (about ten percentage points less).

Figure 5.14 shows the breakdown by age. As would be expected, usage rates are higher for younger adults.

**Figure 5.14: Percentage of rail passengers making calls/sending texts and using mobile data services**




# 6. Assessment and Conclusions

## 6.1 Study objectives and methods

This study has been primarily an exploratory exercise, designed to identify the changes in travel behaviour among population subgroups which have, collectively, contributed to the national car and rail travel trends that have been observed across Great Britain as a whole. These aggregate trends comprise a levelling off in car mileage driven per person during the 2000s, and a rapid and sustained growth in rail traffic which has continued even through the current recession – neither of which was anticipated by most professionals.



The analysis reported here has drawn mainly on National Travel Survey (NTS) data, which, with its seven-day travel diary dataset, provides a unique source of information that is well suited to such in-depth analysis; it would not have been possible to uncover the insights presented in this report using any other existing dataset. However, there are two caveats that need to be applied: first, sample sizes – particularly in the case of rail – are relatively small, which has meant that the depth of the analyses that could be undertaken was limited; and second, there are known to be discrepancies between NTS data on car driving per person when grossed up to represent a total national estimate of car travel, and the values obtained from national road traffic counts. These discrepancies are explainable in part, but not entirely, by differences in sampling and in methodology.

To overcome potential problems arising from small sample sizes among some modes and population subgroups, and to focus on trends rather than year-to-year variability, most of the analyses we have presented are based on a comparison of three time periods: 1995/7, 2000/2 and 2005/7. This has ensured acceptable minimum sample sizes among the smaller population subgroups and categories of journeys. We have not reported on the post-2007 period in the main analysis, as car-driving patterns in particular have been strongly affected since then by the recession.

## 6.2 Main findings

Major differences in travel behaviour were found between population subgroups based on age, gender, company car ownership and location – some of these relationships were already well established in the literature, others not. It is very likely that these variables interact, to varying degrees, and that it will be possible to establish the full extent of any such interrelationships only through a full multivariate analysis, something that is beyond the scope of this study.

In the case of car driving, we observe large differences in the size and direction of trends in annual mileage between different population subgroups, which largely balance out at a national level to result in apparently stable levels of car use per person over time. For rail, by contrast, all the subgroupings we examined increased their rail mileage between 1995/7 and 2005/7 – there were no countervailing trends.

The main findings concerning changes in car mileage over time were as follows:

- Men have decreased their average car mileage per head over time, but the proportion of this group who drive during their diary week has not changed. The reduction is thus due to a reducing annual mileage per driver.
- When we additionally look at age, we find that men aged 60 and over increased their car use, and that this increase was more than offset by reductions among younger male drivers; these reductions are generally larger the younger the age groups we examine.
- Conversely, women above age 20 increased their average car mileage per head in all age categories, with the largest increases found among women aged between 50 and 59. In this case, the increases in mileage resulted from a combination of a higher proportion of women recording car driver trips, *and* a higher annual mileage for each driver.
- The so-called 'peak car' effect (i.e. the situation in which there is no increase over a sustained period of time – and in some cases an actual decline – in the annual average car mileage per person, even during periods of economic growth) seems to apply to the resident population of London, and to most groups of males at a national level; there is no evidence of such an effect among females living outside London, who have experienced strong growth in car use throughout the period.

Full car driving licence ownership is lower for women than for men, but differences are narrowing fairly quickly over time, and young women have now nearly caught up in their licence ownership rates with those of young men.

A major new finding from this study is the dominant contribution that declining company car ownership and use has played in the national drop in male car-driving mileage, particularly among the 'Professional' employment category. This is due to reductions in both the level of company car ownership and the annual mileage driven in each remaining company car. Looked at across the male population as a whole, the net reduction in car mileage per person is all explicable by the drop in company car mileage.

We uncovered limited evidence of some switch of mileage from company cars to private cars, but this does not seem to apply to the 'Professional' occupational group, who experienced the steepest decline in company car use.

If we discount the company car component of the average car mileage per person, then:

- Outside London, private car mileage per person continued to grow until the onset of the recession. This was due to strong growth in annual car mileage among women, while male car-driving mileage remained fairly stable.
- Within London, average car-driving mileage by residents was broadly stable (both among men and women) rather than declining, if looked at only in terms of private car mileage. So the overall decline in car mileage seems to be almost entirely attributable to reductions in company car use.

The main findings concerning the observed increases in rail travel are that:

- The growth in passenger kilometres is due to an expanding market base: higher proportions of the population are travelling by train, rather than the existing users making more frequent or longer rail trips.
- Rail travel is growing among both the male and female population, and in all parts of Great Britain, more rapidly among those without a full driving licence; market penetration is increasing fastest among residents of regions where the proportion of the population travelling by train has historically been highest.
- The overall share of the rail market that takes the form of commuting trips, or as rail trips beginning or ending in London, is showing a relative decline. In the case of the latter, the proportion of journeys to/from London is down from 63% in 1995/7 to 57% in 2005/7, although it is still growing in absolute terms. The fastest growth has been in (non-commuting) business travel by rail.

The current behaviour of people in their 20s differs in several ways from that of earlier cohorts of people of this age:

- Young men are driving much less: fewer men in their 20s are driving, and those that do are doing less mileage than comparable young men in the 1990s; this, in part, seems to be associated with an increased likelihood these days of living with parents, of remaining single, and of being in part-time work. If this generational difference persists – and on the present evidence, it is not clear whether it will or not – it would signal a structural change in car-driving patterns in the future, as this group ages.
- Women in their 20s, particularly those without a full car driving licence, have increased their use of rail to a much greater extent than older women, whereas growth in rail use by men has been somewhat more evenly spread across age groups.

For both car and rail trends, there are some effects that are associated with differences in the labour market between London and the rest of Britain:

- Annual car mileage has fallen (especially in company cars) among London residents, and among those living outside but travelling to London on two or more days per week for commuting/business purposes (by any mode).
- For rail travel, the fastest rates of growth (from a low base) have been observed among employed people who neither work nor live in London.

There is some evidence of a limited substitution effect between road and rail, in two areas. First, for men living outside London but travelling in regularly for work/business purposes, there has been a direct transfer (of around 1,250 miles per year) from company cars to rail for commuting journeys. Secondly, there has been a national switch of some business travel by men from company cars to rail: on average, a reduction of around four business miles in a company car has been accompanied by a one-mile increase in rail business travel.

In general, very little of the observed aggregate change in car and rail travel is accounted for by the ongoing changes in the proportions of the population that fall in each age group, or that live in different types of area. Most of the trends seem to be due to real changes in personal behaviour *within* these groups; however, a full multivariate analysis would be needed to confirm this finding.

## 6.3 Corroboration from other studies

The findings presented here are generally consistent with the academic literature on changing patterns of car/rail ownership and use; we now present a sample of recent findings. To begin with, studies of international comparisons have reported falling rates in most developed countries of some or all of: car ownership, car use, and licence-holding rates (Kuhnimhof, 2012; Sivak &

Schoettle, 2011). Mitchell (2012), however, notes that stabilisation in car travel is a developed-world phenomenon; he shows continuing rapid rises in Central and Eastern Europe, and other developing economies.

Several studies have noted new patterns of behaviour among young people. Kuhnimhof and et al. (2012), Madre and colleagues (2012), and Stokes (2012) demonstrate that falling rates of licence holding are occurring among young men in Germany, France and Britain respectively. Frändberg and Vilhelmson (2011) find reduced travel among younger people (especially men) in Sweden, and a general convergence of travel behaviour patterns between men and women. Meanwhile, in the United States, Davis and et al. (2012) show that driving has fallen among young Americans, and suggest that this trend will continue, in part because of the growing use of mobile computing technologies.

Tilley (2012), Lucas and Jones (2009), and Stokes (2012) all find evidence of age-cohort effects among older people – in particular, they report that current generations of people of pensionable age in Britain drive more than previous generations did at comparable points in their lives. Stokes (2012) also shows that acquiring a driving licence later in life is associated with driving fewer miles per year than people of similar age who acquired their licence earlier in life.

In relation to settlement sizes, Grimal (2012) reports that in France the differences in travel behaviour patterns between residents of the largest cities and those living elsewhere are growing. Car use has fallen in Paris and stabilised in the next tier of metropolitan areas, while it continues to grow in smaller cities and rural areas.

Looking at the treatment of company cars, Macharis and de Witte (2012) find that in several major EU countries – notably Germany, the Netherlands, France, the UK, and Belgium – company cars are ‘undertaxed’ relative to the taxes imposed on the ownership and use of private cars.

Finally, in terms of public transport use, Kuhnimhof et al. (2012) show that among young adults in Germany, both rail and on-road (bus and tram) services have increased their modal share among car drivers and non-drivers. In Britain, Crockett et al. (2010) report that the growth in regional rail travel (excluding trips to/from London) seems to relate to increased city-centre activity (both residential and non-residential), restructuring of employment, increased roadway congestion, and parking limitations.

## 6.4 Possible causes of these behavioural changes

Although identifying the underlying causes of the behavioural changes that we have documented in this report is beyond the scope of this study, we suggest a number of possible factors that are likely to be contributing – to varying

degrees – to these observed changes in car and rail travel behaviour among the various population subgroups.

These include:

- increases in car running costs, ranging from higher insurance costs to oil price rises and higher parking charges;
- income and GDP effects;
- taxation of company cars and private fuel (see below);
- reductions in traffic speeds on some roads(due to higher traffic levels or lower speed limits), resulting in lengthening journey times;
- reductions in effective road capacity for general traffic in urban areas (particularly in Central and Inner London);
- improvements to rail and other public transport services (particularly, though not exclusively, in London);
- spatial planning policies, encouraging the reuse of brownfield sites and the application of the 'sequential test' (i.e. look for development sites in or close to the town centre first) to proposals for new commercial and retail development;
- the impacts of a range of other government policies (e.g. 'Smarter Choices', which encourage behaviour change - DfT, 2012a); and
- improvements in broadband/mobile communications, possibly contributing to:
  - reductions in food shopping by car
  - reductions in visiting friends and relatives at home
  - reductions in business trips by car
  - increasing relative attractiveness of train travel.

Figures from HM Revenue and Customs show that the notional taxable value of an employee being provided with free fuel for private use rose sharply during the late 1990s/early 2000s. This resulted in an 80% drop in the number of people provided with both a company car *and* free fuel for private use between 1991/2 and 2010/11. There has been a much smaller reduction in company car ownership where the arrangement is that the driver purchases their own fuel for non-business use.

## 6.5 Some possible scenarios

Here we briefly consider how car-driving and rail passenger behaviour might develop in the future, under some illustrative examples of simple, extreme case, single-variable assumptions.

The changes quoted below are from a 2005/7 base and are on a *per-person* basis. In other words, they do not take account of the effects of the expected national population growth of 18% in the next 25 years, nor of other developments such as changes in the age profile – which would tend to magnify the cumulative effects of increases in mileage per head and offset (to some extent) average reductions in mileage per head. But these scenarios do give a broad indication of the likely magnitude and direction of some possible future developments – but this is certainly not an exhaustive list of possibilities.

- **Scenario 1: company cars**. Company car mileage dropped by nearly 40% between 1995/7 and 2005/7. If company car mileage were to disappear completely, *without any corresponding increase in personal car mileage*, then this would cut total national car mileage per person by a further 10%.
- **Scenario 2: gender comparability**. If women's car use rose over time to the same levels as men right across the age spectrum, then this would add 35% to the average national car mileage per person.
- **Scenario 3: generational change**. If those currently in their 20s (and younger) preserve their lower mobility characteristics as they age, then over time this would eventually imply a decrease in per-person driving mileage of approximately 20%, once it had worked its way through the population as all cohorts aged.
- **Scenario 4: increases in rail market penetration**. How far can the base of the rail market keep increasing? In 2005/7, 18% of Londoners used surface rail during their diary week, up from 15% in 1995/7; outside London, this figure grew from 4% to 7%. If these proportions grew to, say, 20% of Londoners and 10% of those living in the rest of Great Britain, then per-person rail mileage would increase by around 40% from its 2005/7 level.

We would encourage the Department for Transport to consider adopting some form of scenario framework to guide future traffic forecasting exercises. Scenario-based planning is well established in the private sector: the effectiveness of Shell's response (relative to the competition) to the 1970s oil shocks is frequently attributed to the scenario-planning methods it developed in the preceding years. In the present day, many agencies responsible for transport infrastructure in the USA are experimenting with the use of scenario-based planning to provide input into budgeting processes; this is encouraged by the federal Department of Transportation.

## 6.6 Rail and road traffic forecasts

This study has briefly investigated the rail industry's current methods of forecasting rail patronage, and the detailed findings are published in a separate report of work carried out by Tom Worsley as part of this study. There the principles of the forecasting method are set out, which is primarily based on the short- and long-term analysis of past data on rail ticket sales. Recommendations about possible improvements to these methods are provided.

Few national or regional rail forecasts of rail patronage have been published, but those that have tend to have underestimated the recent growth in rail demand. The key message for rail is that all markets have been growing, to varying degrees. But without access to the full modelling framework, we have not been able to estimate the precise extent of the underestimate in the model forecasts, nor to reach a considered view about the likelihood that this growth will moderate in the longer term.

There is a much longer history of publishing national forecasts of road traffic growth, going back to the 1960s. These have varied considerably in their ability to replicate the actual traffic levels in later years (some forecasts seem to have been much more accurate than others) – partly as a result of difficulties in forecasting key exogenous variables which have a major impact on car usage (for example income, levels of economic activity, and population). Again, without having access to the details of the forecasting models and their results, it has not been possible to assess the nature and causes of differences between forecasts and observed trends in car mileage.

This study has demonstrated that there have been some major differences in travel behaviour over time that are associated with certain socio-demographic factors, car ownership patterns and residential/employment locations.

Moreover, it has shown that, in the case of car traffic, in contrast to rail, the stable aggregate levels of average mileage per person conceal substantially divergent trends in car mileage (in particular, decreases for men that are offset by increases for women). These gross differences need to be explicitly modelled, in a manner similar to migration forecasts which estimate net changes by forecasting gross changes in both in- and out-migration.

Table 6.1 assesses the extent to which the main components of behavioural change identified in this study are explicitly considered in the current national car and rail forecasting models. Most are not.

**Table 6.1: Extent to which the components of behavioural change identified in this report are explicitly considered in national car and rail forecasting models**

| Component of change | Car mileage forecasts (NRTF) | Rail mileage forecasts (PDFH) |
|---|---|---|
| Male/female groups | Yes | No |
| Age groups | Partially | No |
| Type of employment | Yes | No |
| Place of birth (UK/non-UK) | No | No |
| Company car usage | No | No |
| Regional differences | Partially | Partially |
| Settlement sizes | No | Partially |
| Market penetration | No | No |
| Age-cohort effects | No | No |

Note: NRTF – National Road Traffic Forecasts; PDFH – Passenger Demand Forecasting Handbook

Note, however, that where these groups are not explicitly identified, some of the behavioural differences may be captured through proxy variables (e.g. driving licence holding). Furthermore, there is no reason in principle why these additional categories could not be included in national forecasting models – although, in the case of rail, this would require more detailed customer information than is available in the ticket sales data which is used at present.

## 6.7 Future research

This study was exploratory in nature and has helped to throw light on the components of behavioural change in travel that underlie the aggregate

changes in car and rail travel that have occurred in Britain since the mid-1990s. But it has not definitively documented these changes in observed behaviour – as many factors are likely to be interrelated – nor has it identified what has caused these changes.

Looking beyond the research undertaken in this study, there are a number of issues that have been identified but which will require further research to better understand their ramifications.

One line of enquiry would employ qualitative methods. Topics suitable for such an investigation might include: changes in lifestyles and travel patterns of people in their 20s now, and those who were in their 20s in the late 1990s; the shrinking 'gender gaps' in many of the mobility indicators; the unique travel patterns of migrants; changes in company car and business travel practices; and the impacts of new technologies, particularly mobile computing, on travel patterns.

Multivariate econometric analysis will be essential to disentangle several of the various explanations for changing relationships, such as cohort effects versus simple time trends, effects arising from changing cost structures, policy effects versus changing attitudes, the effects attributable to the many variables which are correlated with each other, and causality as opposed to correlation (via the use of advanced techniques to accommodate two-way causality). This is likely to benefit from linking the National Travel Survey with other sources of complementary data, such as the Census, expenditure surveys, and the Omnibus surveys undertaken by the Office for National Statistics.

There is also a need for a detailed exercise to enhance rail data sources in order to improve forecasting capabilities, and for an investigation of the scope that rail has to continue expanding its market base.

Some issues will require collection of new quantitative data, whether attitudinal or stated-preference, so as to better understand traveller responses to changes in market supply conditions.

Finally, it should be pointed out that the scenario forecasts which we have presented in Section 6.4 are very basic, intended simply to illustrate that the effects identified here could have major impacts on future-year road/rail traffic forecasts. Future research using scenario-based methods will be needed to understand more fully the direct and indirect implications of such effects.

In short, the findings presented in this report have helped to unpack and identify the diverse changes in behaviour that underlie the aggregate national picture of a stability in car use and a rapid growth in rail use. But, to act on the policy implications of these findings, it will be necessary to acquire deeper insights and firm quantitative evidence of the contribution of economic and other factors to stimulating these observed behavioural changes.

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