



Department
for Transport

Understanding the drivers of road travel: current trends in and factors behind roads use

January 2015

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Department for Transport
Great Minster House
33 Horseferry Road
London SW1P 4DR
Telephone 0300 330 3000
Website www.gov.uk/dft
General enquiries <https://forms.dft.gov.uk>

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Foreword

We all use the country's road network in different ways, whether in our leisure time, for work or having goods delivered to our homes, and indeed most of the country's freight is carried by road.


There have been big changes in how we use our roads over time, and will be further changes in the future. The aggregate figures are striking - after decades of strong growth the total distance travelled has plateaued in the last decade. This report looks in some detail at the composition of the changes and their drivers, including income, costs, and socio-economic changes.

We conclude that growth will resume - income, driving costs, and the location of where people live and work are major determinants of the volume of road travel, and these are expected to drive up car use over time. We will publish updated road transport forecasts soon.

We will develop this work as part of our ongoing analytical strategy, and outline our plans as part of our regular communications on the strategy.

Developing our evidence base is an ongoing endeavour and we will continue to increase our engagement with experts to ensure that both our work and thinking is fully informed by the views of the transport community, and that government is in the best possible place to plan for the future.

Amanda Rowlatt



Director of Strategy and Analysis

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Executive Summary

1. The Department for Transport is committed to investing in our roads to ensure that the road network best meets the needs of the country, as set out in the Roads Investment Strategy (RIS): Strategic Vision. To inform our plans for this future, both in the near and long term, the Department has reviewed the evidence from across a range of disciplines, including social and economic research, statistics, surveys and econometrics in order to gain a rounded view of the trends in road use and the drivers behind them. We consider ten broad factors and look into the extent of each factors input, and the strength of the evidence behind them.

The national picture

2. The country has seen huge growth in traffic over the last 60 years: in Great Britain (GB) in 2013 there were 304 billion vehicle miles travelled compared to 29 billion in 1949. However, over recent decades growth in road traffic has been slowing, increasing by 34 billion vehicle miles (12%) in the decade to 2007, compared to 62 billion vehicle miles (28%) during the preceding decade.
3. During the recent economic recession traffic volumes fell, so that by 2013 for all vehicle types it was just 0.4% higher than in 2003¹. However, there are indications that it is now growing again, with all motor vehicle traffic increasing by 2.2% in the third quarter of 2014 compared to the same quarter in 2013².

A diverse set of trends

4. These headline figures mask different trends across different parts of the road network. Over the last two decades, traffic on the Strategic Road Network (SRN) - England's motorways and most significant A-roads - has continued to grow strongly, up 14% since 2000³. Across all roads in England, there has been steady growth on rural roads. It is on urban roads where traffic has levelled off, with traffic on urban A roads being at the same level in 2013 as 1993⁴.

¹ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

² Department for Transport, Road traffic estimates for Great Britain: July to September 2014. Note that quarterly figures for 2014 are provisional.

³ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, Table TRA4201

⁴ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, Table TRA0103

5. Furthermore, travel trends have varied substantially by vehicle type: car traffic has shown the greatest growth over the long-run but national levels are currently at the levels seen in 2002. The recessionary years explain part of this, but there appeared to be a levelling off even before the recession - with car traffic growing by less than 2% between 2002 and 2007. By contrast, since 2000 van traffic has grown by 31%⁵.
6. Further investigation into overall car traffic trends shows that individual (average) use has fallen over the last decade. The decline in average distance travelled by car has been largely offset by population growth, meaning overall demand has remained broadly level over the period. The fall in average distance travelled by car is mainly due to people taking fewer trips in the car (the proportion of trips people take by car, and the distances travelled per trip have remained broadly the same). This has occurred at the same time as consistent growth in car ownership.
7. Whilst average car use has declined, many groups are driving more. Annual car mileage has increased for females and older age groups. Declines in distance travelled by car has predominantly been seen amongst the young, men, and urban areas (particularly London) - with some cross-over between these. It is also noteworthy that the highest income group have reduced their car mileage the most since 2002, whilst the lowest income group saw a big increase in their mileage before the recession.

What is driving these trends?

8. Different factors are affecting the trends observed amongst the different groups and in different locations. We consider 10 broad factors and describe the evidence on how these have affected car use. This highlights that the story is not simple, and instead is one of many individual but interrelated factors. There is not a 'one size fits all' hypothesis to explain these trends.
9. There is good evidence that the factors traditionally seen and previously well established in the literature as being key determinants of car usage are an important part of the story behind recent trends, both at an aggregate and individual level. In particular:
 - a. The National Travel Survey (NTS) shows that the young consistently cite the high cost of learning and insurance costs as the main reasons why they are not learning to drive, and this has contributed to declining car use amongst this group;
 - b. The employment rate - which affects people's incomes and their ability to cover motoring costs - has fallen for young people over the last decade. For those in work, real incomes have been flat. Meanwhile,

⁵ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

- females and older age groups - who have continued to drive more - have seen rising employment rates;
- c. Traffic levels have tended to track changes in GDP over time, and have started to grow again as GDP growth has picked up.
 - d. In a literature review of travel demand elasticities commissioned by the Department, it was found that whilst much of the literature was now quite old, it continues to point towards there being a significant and positive impact of GDP on traffic.
10. However, there is good evidence that there are factors besides costs and incomes which are important for understanding recent car travel trends. In particular declines in company car use have been found to account for most of the reduction in mileage amongst men between the ages of 30 and 60. Reductions in company car use can also help explain trends for higher income households, and the decline in car use in London. These changes being attributed to changes in company car taxation rules.
 11. Urbanisation and increases in population density have also been found to have brought down car demand in recent decades. However, Headicar (2013) concludes that the effect appears to be relatively modest due to the shift in people from rural to urban areas affecting only a small proportion of the total population.
 12. Evidence on the impact other factors have had is relatively weak. In some cases there are indications they could help explain recent trends. In particular, there is some suggestion that increasing congestion in urban areas is contributing to the levelling off in traffic in these areas, and that more people in these areas are travelling by public transport. Meanwhile, increased homeworking appears to have reduced the number of commuting trips people are making, although the homeworking rate (proportion of the workforce suggesting homeworking is a significant part of their working life) has risen only 2.8 percentage points over the last 16 years, so the scale of the impact up to now may still be quite small.
 13. There is also evidence that migrants travel less, and this could help explain the reduction in average car mileage in urban areas, where they tend to locate, although the impact on aggregate traffic levels is unclear. Meanwhile, statistics show that people are delaying major life events, such as having children and getting married, and as these tend to be associated with car ownership, this could be contributing to the declining use of car amongst younger people.
 14. In contrast, the limited evidence available suggests changing attitudes do not appear to be an important factor. In particular, attitudinal research suggests that the car is still seen as the most desirable mode of

transport due to its flexibility and convenience. Moreover, whilst the young are more willing to use alternative modes, they regard car ownership as a sign of success and enjoy driving more than older groups.

15. In all these cases however, further work and investigation is needed.

What does this mean for the future?

16. There are clearly a number of factors which are contributing to the recent trends in car use, both at an aggregate level and across different groups and areas.
17. Whilst there are a range of factors that appear to be contributing to changing car use trends, and limited evidence on many of these, at an aggregate level we know there are several factors that definitely have had a significant contribution to dampening the growth in road and car traffic in recent years, and which will either have a limited effect in the future, or even start to drive up car demand.
18. In particular, as Le Vine and Jones (2012) note, the fall in company car mileage - which has contributed to falling car use amongst men - cannot continue indefinitely. Meanwhile, following a decade when costs have generally risen and incomes have been flat, the projections for the future are for GDP per capita to increase 66% to 2040, and the fuel cost of driving to decline by 22% due to improved fuel efficiencies, both of which will increase road demand.
19. So after a decade of virtually flat traffic levels - driven in part by falling company car use, rising costs and stagnant or falling incomes - the outlook is for traffic at an aggregate level to continue growing again - as these factors stop having an impact or trends reverse – and population growth of 16% (to 2037) continues to mean many more millions of people wanting and needing to travel by car.
20. But this traffic growth may continue to be at a slower rate, in line with the growth seen in the decade before the recession (an average of 1% per annum) as more people live in cities and urban areas and have access to different modes of travel, as the link between incomes and traffic weakens, and as other factors such as homeworking and online shopping continue to grow and reduce car demand.
21. Below the aggregate level, there will continue to be different trends observed across different groups and different locations. These again will depend on the underlying factors. Whilst there is limited evidence to

suggest how the different factors have been affecting different locations or groups it is possible to infer and reason from the evidence how different trends might evolve.

22. In particular, we may expect traffic in urban areas to grow less strongly, as rising populations and growing incomes continue to push up the number of people wanting to drive, but the availability of public transport services keeping traffic growth down, alongside more limited road capacity. In contrast, we would expect continued strong growth on rural roads and the SRN, where traffic has grown strongly up until now, and the availability of alternative modes of transport are more limited.
23. Growth will also depend on how the trends observed for different groups continue, and it is the future behaviour of the young which is perhaps the most uncertain. As their employment rates and incomes rise and costs fall we would expect, on the basis of the existing evidence, for them to drive more. But if current habits become ingrained this may hold back the growth in car use we see amongst this group. Further investigation into cohort effects is needed, but there is little in the evidence at present to suggest that the behaviour of the current generation of young people will impact on future generations.

What does this mean for travel demand forecasting?

24. In terms of our formal road transport forecasts, the National Transport Model already captures many of those factors where there is good evidence on their impact on traffic levels – in particular, the distribution of the population, income, and costs – and the relationship between them, as implied in the NTM, is broadly consistent with the literature.
25. In an attempt to capture the uncertainty around the role of other factors, where evidence is less strong, we have undertaken scenarios analysis, which aim to address the most important areas of uncertainty identified in our work. Further details will be provided in a new Road Transport Forecast document shortly.

Next steps

26. The Department will look to build on the existing work here by taking a leading role in transport research and engagement with leading academics and researchers. We will continue to monitor and review these trends to inform ongoing policy development, and have outlined key evidence gaps at the end of this document that we feel should be addressed. We will provide further details on how we intend to fill these in an upcoming Analytical Strategy shortly.

1. Scope and aims of the report

Purpose

- 1.1** This report aims to improve understanding of the nature of recent trends in road traffic and the recent levelling off in car traffic specifically. It reviews how trends have varied across different groups and locations (i.e. the 'what' and 'who'), and what the evidence suggests have been the main factors behind these trends (i.e. the 'why').
- 1.2** Because cars make up a clear majority - 79%⁶ - of the traffic on our roads, our primary focus is on the trends affecting car drivers. That is not to say other modes are not important for overall road demand, and we present evidence on some other modes where alternative trends are apparent and these help to understand what has happened to car demand. However, a more detailed investigation into these other modes is not the focus of this study. Other studies are emerging with an interest in understanding recent trends for these modes - for example, see Clarke et al. (2014) for an investigation into the rise in van traffic.
- 1.3** The three primary objectives of this document are as follows:
- To set out the existing evidence on road traffic trends and the factors behind them in one comprehensive document,
 - Further the Department's understanding of road traffic demand and represent our view of why the recent levelling off in car use has occurred at the aggregate level, and
 - Inform and shape current and upcoming policy and strategic decisions.
- 1.4** Meeting these objectives is crucial for the Government to better serve the country. We need to understand the nature and causes of road demand in order to know where and how to invest in our road network and ensure individuals and businesses can get around the country as efficiently as possible.
- 1.5** In meeting the above objectives, this document focuses on understanding past and recent trends. It does not address appraisal methodology and whilst we discuss the implications of current trends for

⁶ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101.

the future, we do not aim to forecast future road demand in this document. These issues are of course also crucial for informing investment decisions, but are considered elsewhere.

- 1.6** In particular, the interested reader may wish to refer to 'Understanding and Valuing the Impacts of Transport Investment',⁷ and the Department's progress report on this, as well as 'Transport Investment and Economic Performance'.⁸ All of these cover important developments in the Department's approach to appraisal and modelling. Meanwhile the Department have previously published results from its National Transport Model, used to forecast road transport. These were recently updated for the Roads Investment Strategy Vision⁹, and we will be publishing further details on these shortly.

Drawing on the existing evidence base

- 1.7** The Department produces a number of datasets which provide detailed information on travel behaviours and trends, and on which we and others have drawn upon to analyse travel behaviour. The key sources for road traffic are the National Travel Survey (NTS) - which gives detailed information on passenger transport - and Road Traffic estimates, which give information on both passenger and commercial road use (with some limited disaggregation, by road and vehicle type). Whilst there are limitations with both data sources, and difficulties making comparisons between them, they nonetheless provide a rich source of information to investigate and understand the headline travel trends in more detail. It is noted however that there is a case for further data sources to support the conclusions which can be drawn from these.
- 1.8** A number of recent studies have already sought to identify the patterns of behaviour which underlie the trends in car traffic both domestically and internationally – most notably, the RAC Foundation's 'On the Move' report, by Le Vine and Jones (2012), and the OECD International Transport Forum's 'Long-run Trends in Car Use'. Further studies are now looking into the trends for specific groups and areas, including Berrington and Mikolai (2014) and Chen et al. (2014) on the habits and behaviours of the young, and the RAC Foundation's recent collection of essays 'Moving Cities'.
- 1.9** Alongside this, the Department has previously produced analysis of the trends in and impacts of key drivers (GDP, population and fuel costs) on

⁷ Department for Transport (2013a)

⁸ Department for Transport (2014a)

⁹ Department for Transport (2014b)

aggregate traffic levels in its 'Road Traffic Forecasts' publications and has recently carried out an investigation into latest trip rate data¹⁰. It has undertaken large-scale social research studies examining travel behaviour and transport choices amongst different groups of the population and a programme of work looking at the attitudes, behaviour and needs of users of the Strategic Road Network which are being published alongside this report. It is also currently undertaking an econometric analysis of car demand using NTS data. This collection of cross-disciplinary work is building a much deeper understanding of road travel trends.

- 1.10** All of this work has been taken account of in this document. The purpose is not to repeat or replicate that work, but to review, synthesise and draw out the conclusions from it.

Approach taken

- 1.11** In terms of the approach we have taken: first we look into what the body of evidence finds in terms of how the national trend in car use breaks down across different segments of the population. We then turn to the various reasons that have been put forward in the literature to explain these trends, and investigate whether the evidence finds them as being important or not.
- 1.12** This is done in two ways, firstly by looking at how the factors which have been put forward to explain road traffic trends have changed over time, and seeing whether that is consistent with the trends in car use identified for different segments. And secondly, by reviewing the findings of the growing body of literature focused on answering these questions. This includes the findings of two reviews of the literature, which the Department commissioned earlier in the summer - one on road demand elasticities and one on the drivers of road demand more generally.
- 1.13** When reviewing the evidence, we consider the trends and impacts of different factors in general, picking out how they relate to the trends for specific groups wherever possible. An alternative approach would be to focus in on explaining the reasons for the trends in car use for select groups only - e.g. for those where car use has declined specifically. As highlighted above, a number of recently published or upcoming reports do look in more detail at such groups, and going forwards the Department will also look to investigate specific areas of interest in more detail. However, given the cross-over between different groups, and the

¹⁰ Further details may be found in the UVITI Progress Note, referenced on the previous page

important role that some factors play for a number of them, we have broadened our focus across all groups here.

- 1.14** In a number of places we find that further analysis and research is needed. We have flagged this where relevant, although restrict ourselves to identifying the broad evidence gaps; further details of how we plan to fill these gaps will be detailed in a forthcoming Analytical Strategy¹¹ to be published shortly.
- 1.15** The paper concludes with an assessment of how these trends may develop and what this implies in broad terms for the future of road traffic in England. The aim here is not to provide forecasts, but to set out the issues we think will be important and direction we expect the trends to go in the future.
- 1.16** The findings of this work have been, and will continue to be fed into our road transport forecasts, using the National Transport Model, to ensure that reflects the latest evidence and reflects key areas of uncertainty.
- 1.17** We aim to develop the analysis in this document over time, evolving our thinking and improving our evidence base and modelling as the evidence progresses. This will involve more engagement with the transport community and a bigger focus on current trends research. This will enable us to ensure the Department's policy and strategic decisions going forward are based on sound evidence and account for key areas of uncertainty.

¹¹ Due to be published early in the spring.

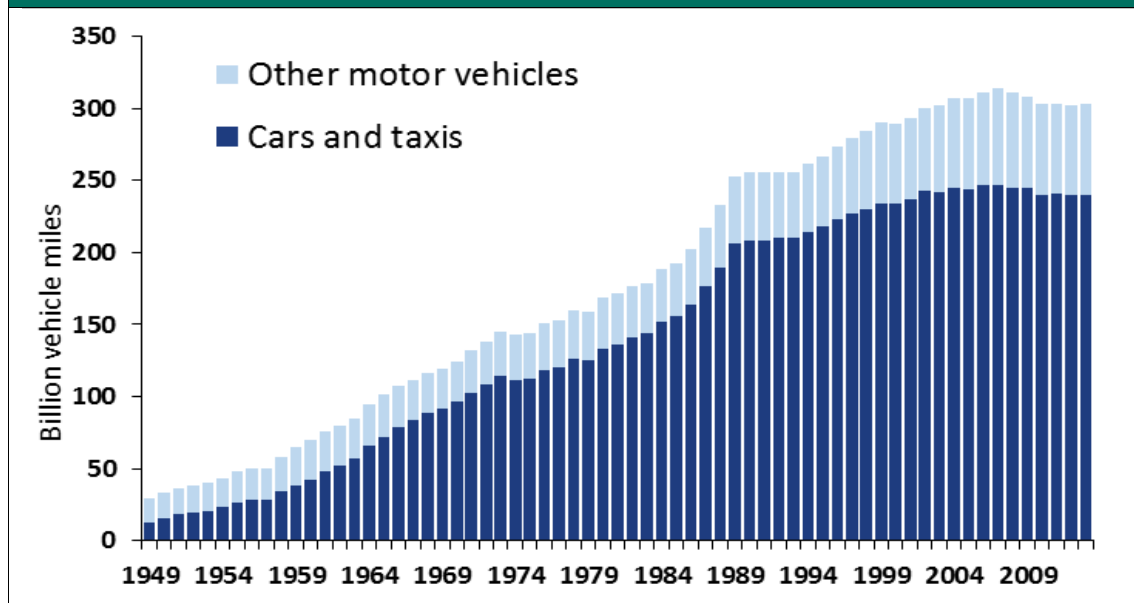
2. Trends in road transport

- 2.1** In this section evidence is presented on the existing trends, both at the aggregate national level, and at the disaggregated level in order to be clear about who, where and how travel behaviour is changing.

Long-run aggregate trends in traffic on our roads

- 2.2** Road traffic has shown considerable growth over the last 60 years. The growth has been driven by cars, which now represent by far the most common form of travel. In 1952 the proportion of all passenger distance travelled by all modes which was made in a car, taxi or van was 27%, by 2013 this figure had risen to 83%¹². On roads specifically, cars and taxis made up just over 2 out of every 5 miles in 1949 (44%), compared to almost 4 out of every 5 miles now (79%)¹³.
- 2.3** As a result of this huge increase in car use, road demand in Great Britain increased tenfold between 1949 and 2013 - from just 29 billion to 304 billion vehicle miles travelled.

Figure 2.1: Total distance travelled by motor vehicles; billion vehicle miles; Great Britain¹⁴



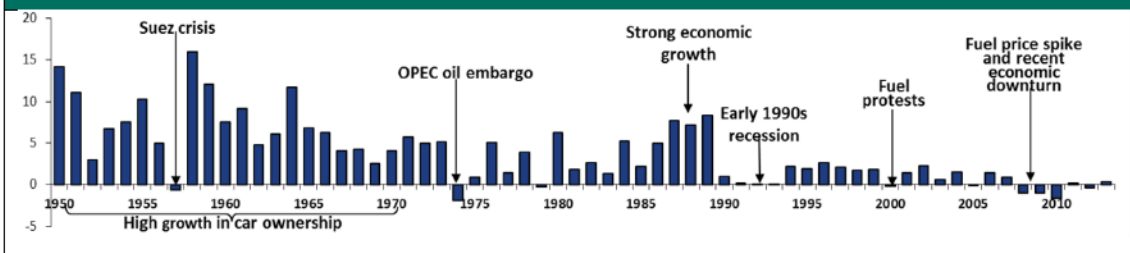
¹² Department for Transport, Transport Statistics Great Britain 2013, Table TSGB0101

¹³ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

¹⁴ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

2.4 However, the annual growth rate in the total distance travelled has been gradually falling (see Figure 2.2). The figure shows the large growth rates in traffic early on in the series with growth rates since the 1990s being noticeably lower, with peaks and troughs throughout the period coinciding with shocks to oil prices and periods of economic growth or contraction.

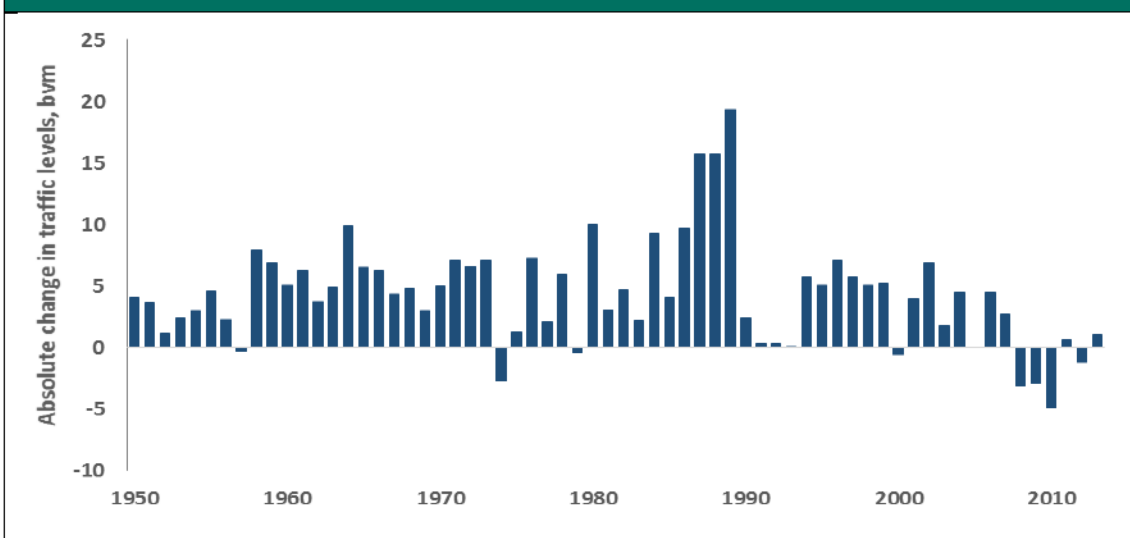
Figure 2.2: Long run growth rate of traffic, % growth, Great Britain¹⁵



2.5 Part of this slowing down simply reflects the fact traffic volumes are now much higher (so a given increase in traffic levels will represent a smaller percentage increase). That can be seen in Figure 2.3. However, the absolute change in traffic also appears to have slowed in the decade or so before the recession, increasing by 34 billion vehicle miles (12%) in the decade to 2007, compared to 62 billion vehicles miles (28%) during the preceding decade.

2.6 And during the economic recession, traffic volumes fell, so that by 2013 for all vehicle types it was just 0.4% higher than in 2003.

Figure 2.3: Long run absolute growth in traffic levels, billion vehicle miles, Great Britain¹⁶



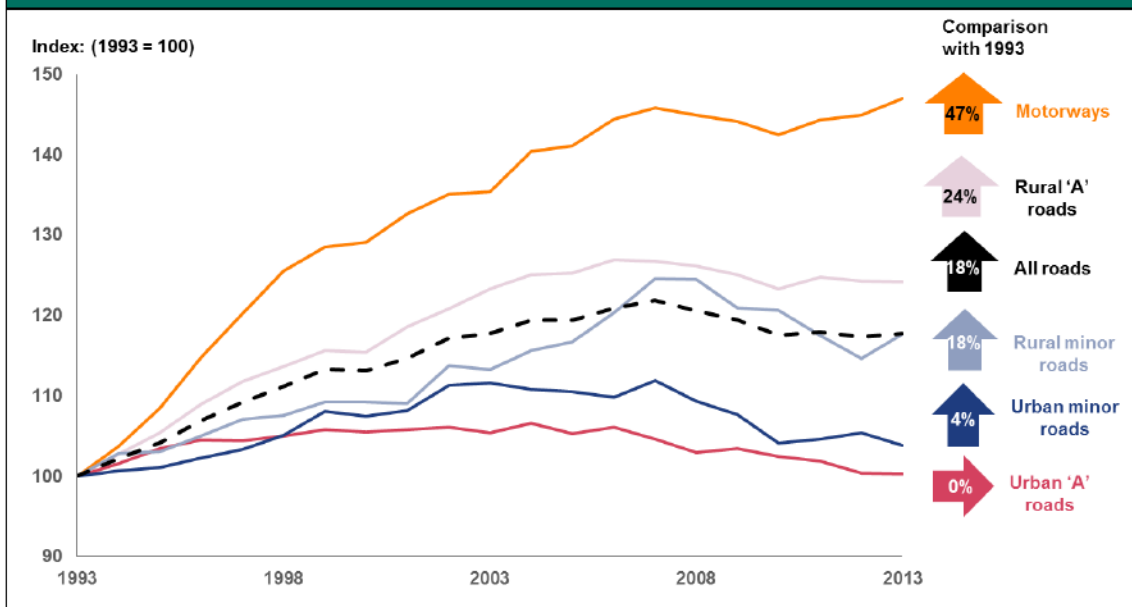
¹⁵ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

¹⁶ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101

Aggregate trends by road type and vehicle type

2.7 This levelling off in all road traffic has not been observed across all road types. Figure 2.4 shows the strong growth in traffic on motorways (47%) since 1993 - interrupted only by the recession between 2008 and 2010. Rural roads also saw strong growth in traffic levels up to the recession, albeit to a lesser degree (24% growth to 2013 for A-roads, 18% for minor roads). It is on urban roads specifically that the levelling off in road traffic has predominantly occurred, with growth of just 4% on minor urban roads, and with traffic on urban A roads being at the same level in 2013 as 1993¹⁷.

Figure 2.4: Annual road traffic on all roads by road type; England; index: 1993=100¹⁸

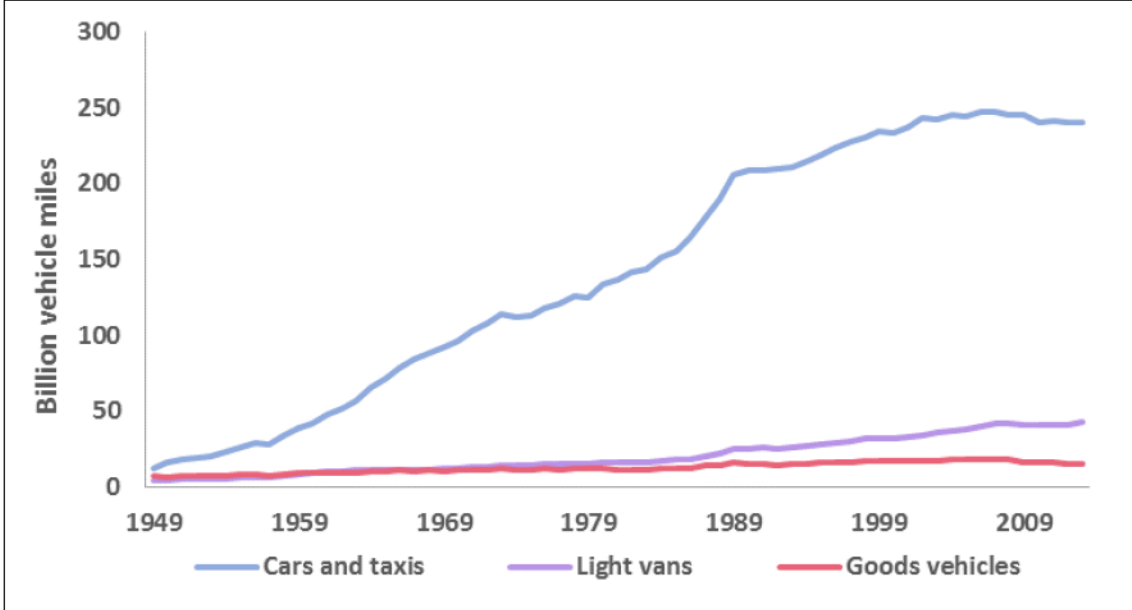


2.8 The aggregate trends in road traffic also mask differences across different vehicle types. Figure 2.5 shows that whilst cars still make up the overwhelming majority of road traffic, there has been a levelling off in cars and taxi traffic since the early 2000s - growing by less than 2% between 2002 and 2007. In contrast, steady growth in van traffic since the 1990s can be seen (65% growth between 1993 and 2013), although total billion vehicle miles travelled by light vans is still small in comparison to cars.

¹⁷ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, Table TRA0103

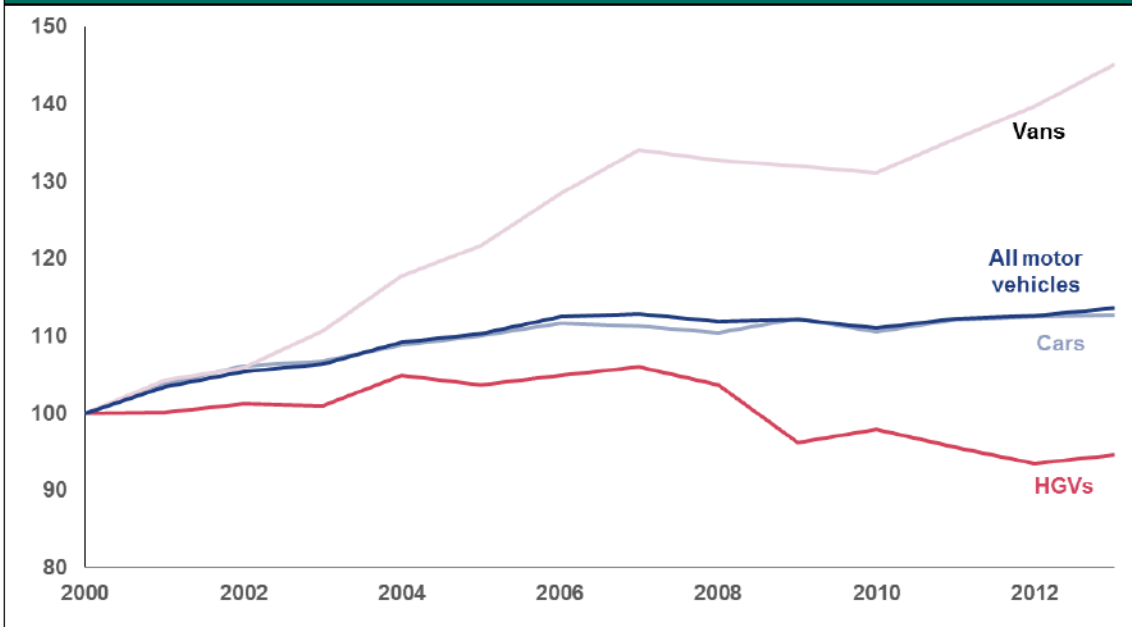
¹⁸ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, Table TRA0103

Figure 2.5: Road traffic by vehicles type; billion vehicle miles; Great Britain; 1949 to 2013¹⁹



2.9 This national picture does not tell the whole story however, as car traffic has continued to grow on the SRN - from 2000 to 2013 it has risen 13% on the SRN compared to 2% on the whole network (see Figure 2.6).²⁰

Figure 2.6: Annual road traffic on the SRN for selected vehicle types; England; index: 2000=100



¹⁹ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0101.

²⁰ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, derived from Table TRA4201

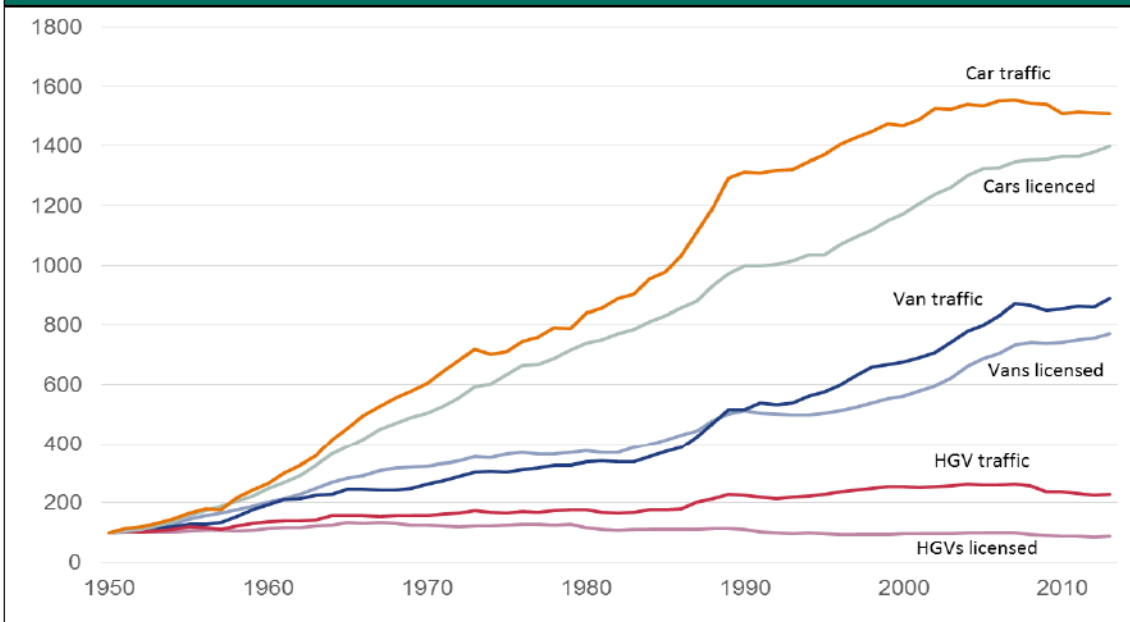
- 2.10** Van traffic has also grown faster on the SRN - 45% compared to 30% on all roads over the same period. And whilst the level of Heavy Goods Vehicles (HGVs) traffic has fallen, it has fallen less on the SRN than elsewhere (5% on the SRN, 12% on the whole network).
- 2.11** The significant rise in Light Goods Vehicles (LGVs) traffic is not explored in detail in this document, but there are a number of reasons identified as contributing to this rise in van use. Clarke et al. (2014) highlights the following reasons as playing a part, mostly relating to the suggestion that van use is substituting for HGVs:
- The wage of drivers makes business by vans cheaper: a van driver may typically earn £15k compared to £25k of a HGV driver.
 - The rise in home deliveries has encouraged the use of vans as they are more suited to the task.
 - Vans - their operation and drivers - are less regulated than HGVs.
- 2.12** However, McKinnon (2007) investigates the recent falls in HGV traffic and its relationship to GDP growth. The author notes increases in the real costs of freight transport and the increased penetration of foreign hauliers but attaches little importance to the switching from trucks to vans.
- 2.13** The degree to which this trend for increasing van use over HGVs will continue is uncertain. Clarke et al. (2014) notes that if rigid 12-tonne HGVs were replaced with vans then an additional 167% road space would be required; this figure rises to 639% if articulated 44t HGVs were also replaced by vans. However, the trends in freight traffic requires a much more detailed investigation and we do not attempt to address that specific issue in this report.

Changes in vehicle stocks

- 2.14** Figure 2.7 shows the number of registrations for the main modes of road transport. It is striking that there are now fewer HGVs licenced than in 1950; this is partly due to the type of HGV in use - today's vehicles are much larger and able to carry considerably more goods.
- 2.15** The number of cars owned in the country has risen consistently since 1950 as Figure 2.7 shows. There is a strong upwards trend in car ownership, although with the rate of increase slowing in times of economic recession - see the early 1990s and late 2000s. It is notable that over the last decade when car traffic has levelled off and

subsequently fallen, the number of licenced cars has continued to increase, albeit at a slower rate.

Figure 2.7: Trends in miles travelled and vehicles licensed by vehicle type; Great Britain; index: 1950=100²¹



Recent trends in aggregate road and car traffic

- 2.16** There are indications that traffic is now growing again, with all motor vehicle traffic increasing by 2.2% in the third quarter of 2014 compared to the same quarter in 2013²².
- 2.17** This growth has been observed across all vehicle types and road types. Latest statistics show that in the third quarter of 2014 car traffic in Great Britain increased by 1.4% compared to the same quarter in the previous year. Meanwhile motorway traffic is now at its highest level and all road classes experienced higher volumes of traffic. Urban areas have seen strong growth in the third quarter of 2014, with traffic on urban roads rising by 2.8%.
- 2.18** In the following sections, we explore the trends of the past two decades in more detail, looking at how these aggregate changes in car travel

²¹ Traffic - Department for Transport, Transport Statistics Great Britain, Table TRA0101; Vehicles licensed - Department for Transport, Transport Statistics Great Britain, Table VEH0103

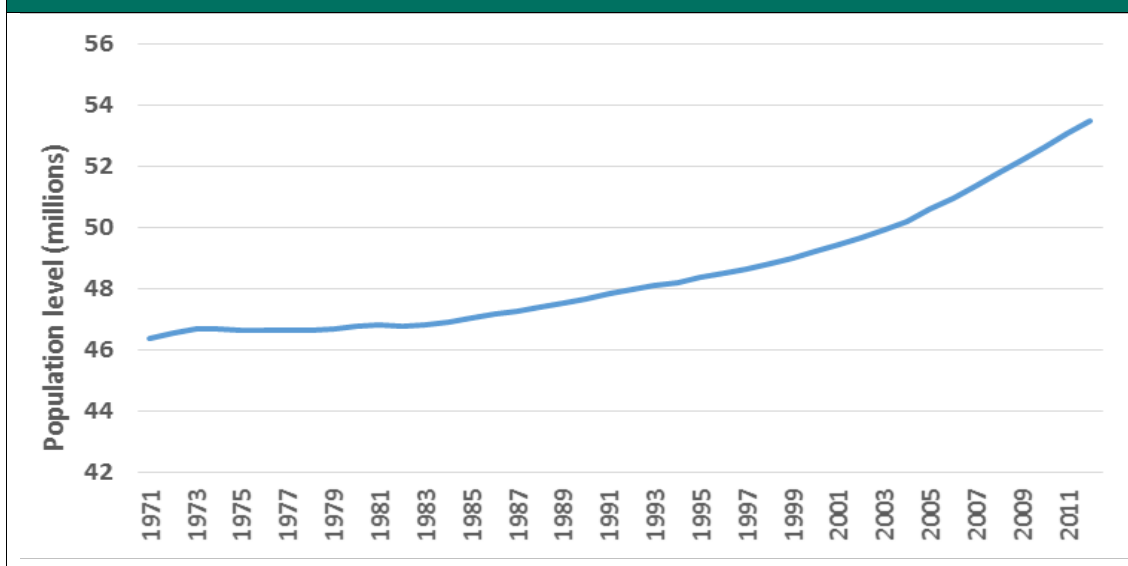
²² Department for Transport, Quarterly Road Traffic Estimates: Great Britain Quarter 2 (July - September) 2014, Table TRA2501. Note that figures are provisional

reflects individual behaviour, and how these vary across different groups and locations.

Individual versus aggregate car travel

- 2.19** The broadly level trend in overall car traffic contrasts with a decline in the average car distance driven per person²³. According to NTS estimates, annual distance driven by car per person has fallen 12% since 1995/7²⁴.
- 2.20** This highlights the key role that population growth has played, in keeping overall traffic levels rising before the recession and broadly level since. And as it is the overall level of road demand which is of primary interest to road investment decisions, it is important to account for the impact population growth is having.
- 2.21** England has seen significant population growth since the middle of the 1980s, as shown in Figure 2.8. Since 2005, average population growth has been 0.8% a year - significantly higher than the average of 0.3% between 1985 and 2004. This increase is projected to continue, with the Office for National Statistics forecasting an increase of 8 million by 2037. Everything else equal this would lead to more demand on the roads in the future, whether this is an increase in personal travel demand or through the transportation of more goods and services.

Figure 2.8: Population level in England; millions; 1971 to 2012²⁵



²³ Throughout the document, analysis refers to car drivers and not passengers.

²⁴ Department for Transport, National Travel Survey 2013, Table NTS0105. Early years of NTS data have smaller samples so are collected together to provide reliable estimates. Hence 1995/7 covers the data from 1995 to 1997.

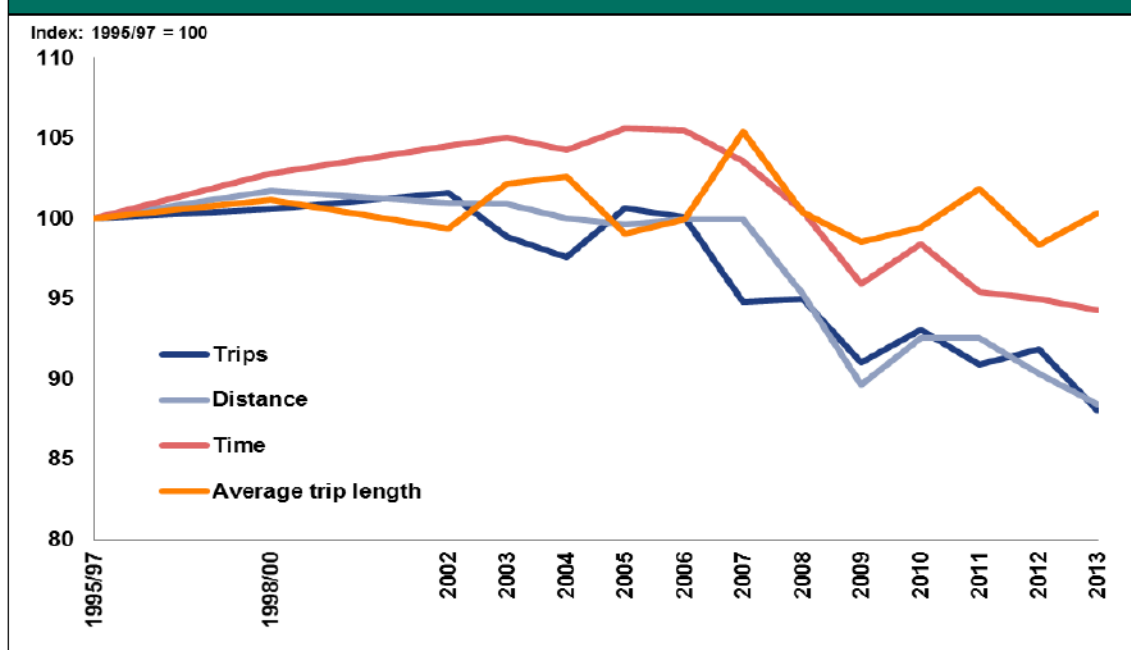
²⁵ Office for National Statistics, Population Estimates for England, 2013

2.22 However, it is clear from the data showing individual car use declining that it is not just the number of people which are important, but the structure of the population and the decisions they make. The next section explores individual car travel trends, and how these vary across different groups and locations.

Trends in individual car use

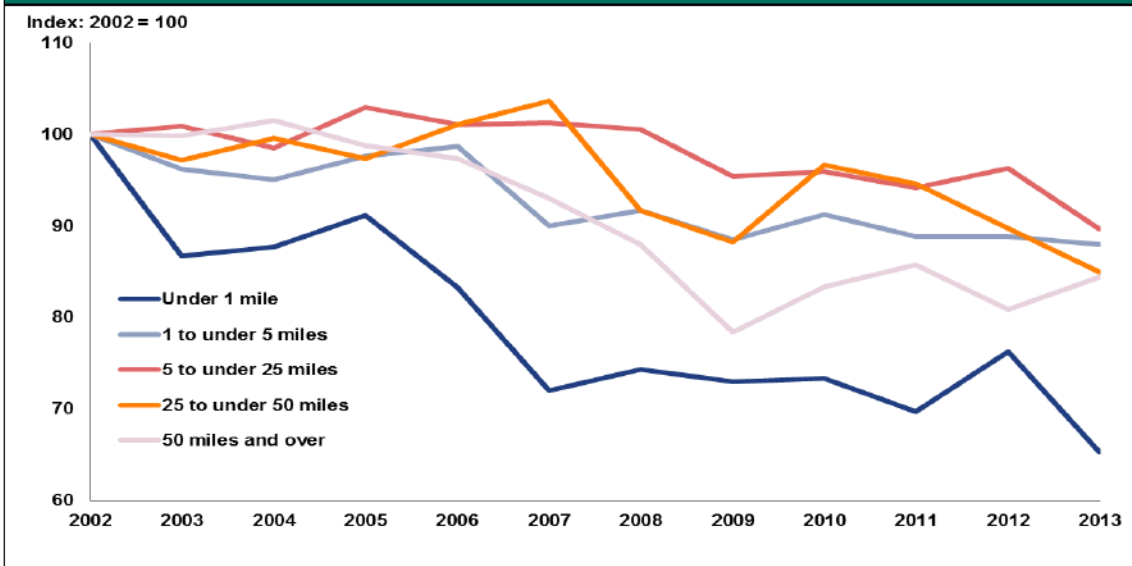
2.23 The decline in average distance travelled is primarily because people are taking fewer car trips. Between 1995/7 and 2013, the number of car driver trips people took on average per year fell by 12% from 432 to 380. Over the same period, the proportion of all trips taken by car was broadly steady (up by 1.74 percentage points), and average distance travelled per car trip has remained around 8.5 miles.

Figure 2.9: Individual annual distance, time, trip rate and distance per trip by car; index: 1995/7=100; England



2.24 Most car trips are over shorter distances (more than half of trips are under 5 miles) and it is the trips under 1 mile which have fallen most significantly (see Figure 2.10) - however, they account for very little of the total distance travelled. Car trips of different lengths over 1 mile have all fallen at roughly the same rate.

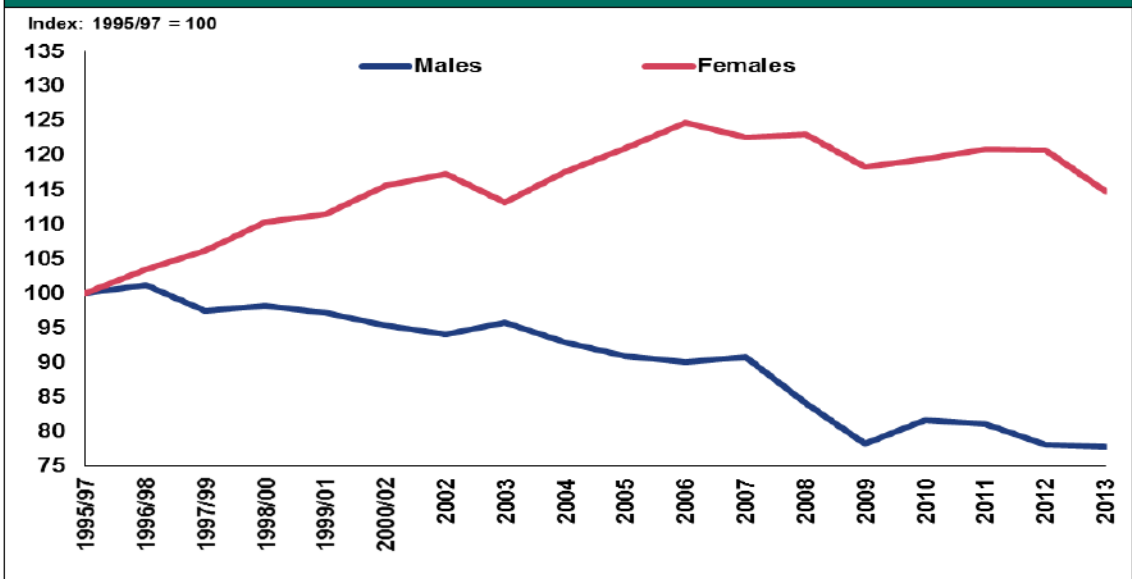
Figure 2.10: Car driver trips by trip length; England; index: 2002=100²⁶



Car travel by gender and age group

2.25 There are clear differences in the patterns of car travel across men and women. Annual mileage of males fell from 1995/7 to 2009 and has since remained relatively flat. This is in contrast to females who increased their mileage up to 2006, before this also levelled off and fell back down slightly, although it remains up over the period. Figure 2.11 shows the growth in mileage for men and women between 1995/7 and 2013.

Figure 2.11: Average car driver distance travelled per person per year by gender; England; index: 1995/7=100²⁷

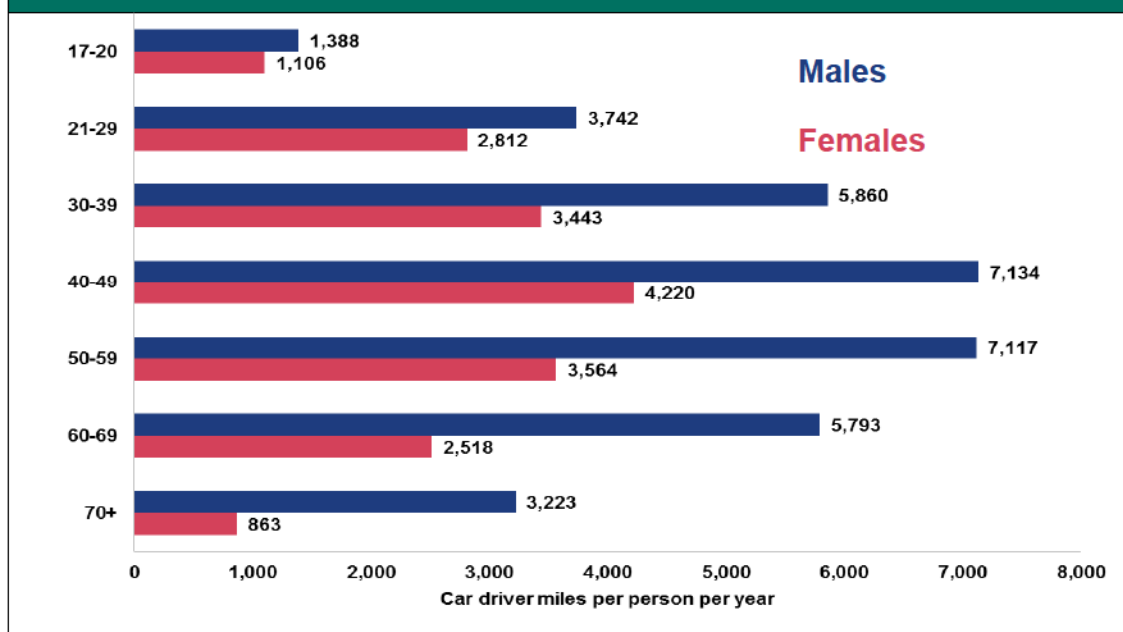


²⁶ Department for Transport, National Travel Survey 2013, Table NTS0308

²⁷ Department for Transport, National Travel Survey 2013, Table NTS0605

2.26 Despite this, men still drive around twice as many miles per year, on average, than women (4,209 miles against 2,291 miles in 2013). Differences in distance driven are more acute in older age groups as shown in Figure 2.12.

Figure 2.12: Car driver distance travelled per person per year by age and gender; England; 2013²⁸



2.27 The picture becomes clearer when disaggregating trends by age as shown in Figures 2.13 through to 2.16.

2.28 Amongst males (who have reduced their car distance travelled by 17% since 2002 overall), the younger groups (17-39) have reduced their annual car driving mileage the most. There has been smaller declines amongst those aged 40-59, whilst the older groups (60+) have broadly kept theirs constant or increased their mileage. However, it should be noted that before the recession in 2007, annual mileage for ages 17-29 was broadly the same as 2002 levels.

2.29 Amongst females (who have reduced their mileage by 2% since 2002), the younger age groups drove broadly the same amount before the economic downturn but has since seen a reduction in mileage, whereas the older groups are travelling more, significantly more in the case of those over 60.

²⁸ Department for Transport, National Travel Survey 2013, Table NTS0605

2.30 The evidence therefore points clearly to the fall in car use being concentrated amongst men, particularly the young (mileage down 20% for those aged 21-29), with women and the elderly generally driving more - in England, those and 70+ (both men and women) increased their annual car mileage by 7% and 42% between 2002 and 2013.

Figure 2.13: Average car driver distance by younger males; England; index: 2002=100²⁹

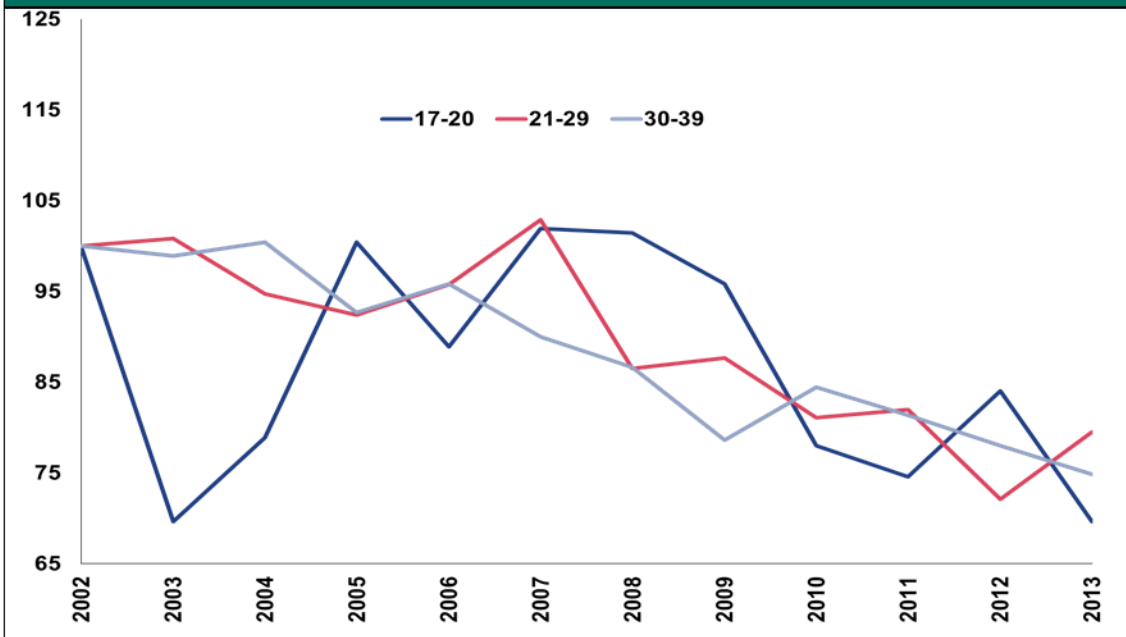
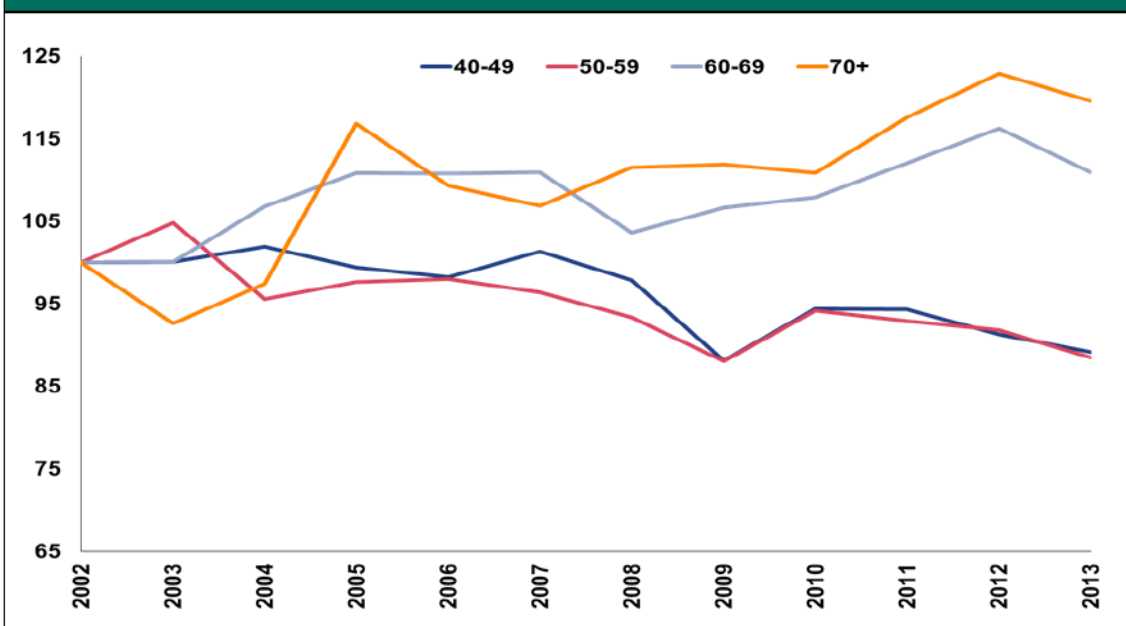


Figure 2.14: Average car driver distance by elder males; England; index: 2002=100³⁰



²⁹ Department for Transport, National Travel Survey 2013

³⁰ Department for Transport, National Travel Survey 2013

Figure 2.15: Average car driver distance by younger females; England; index: 2002=100³¹

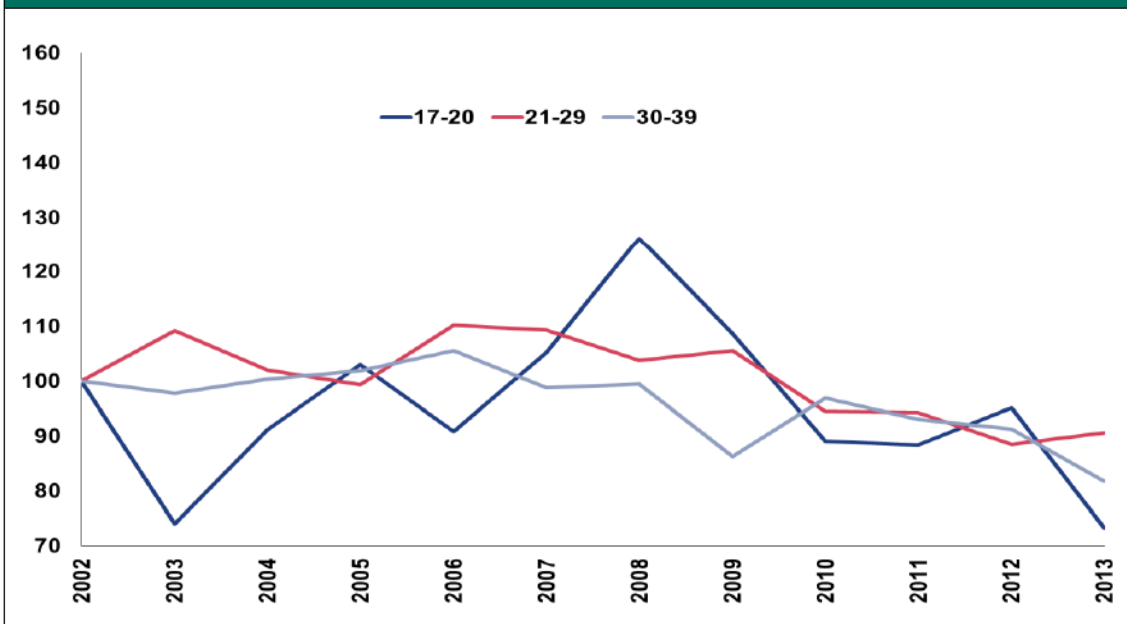
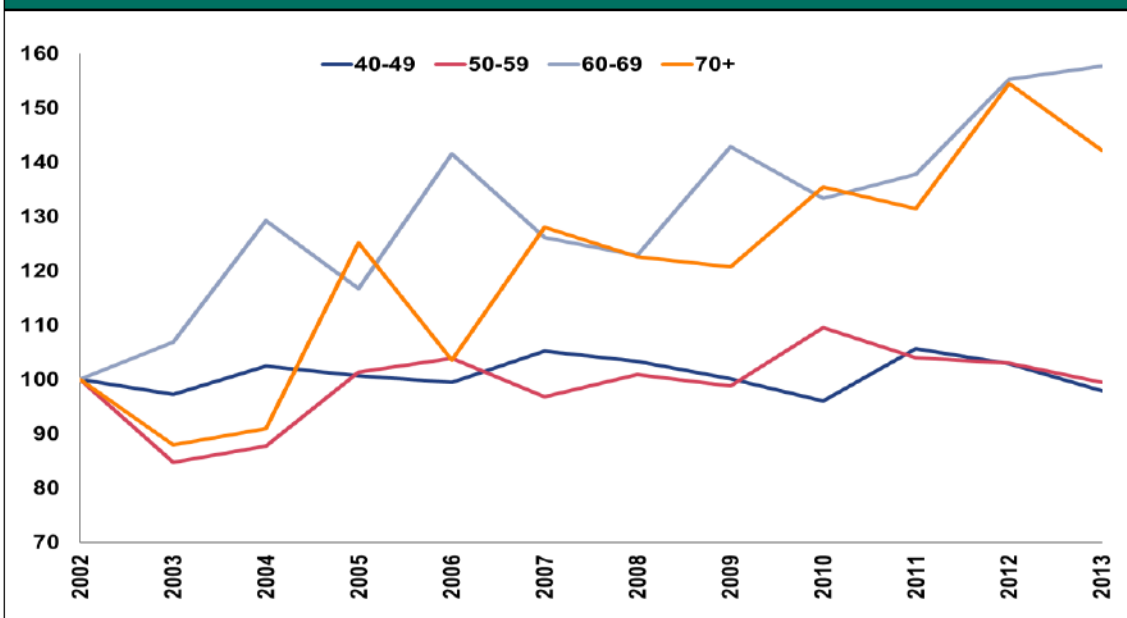


Figure 2.16: Average car driver distance by elder females; England; index: 2002=100³²



2.31 The different trends in distance travelled by car across gender and age groups is mirrored in changing car accessibility. Stokes (2012) investigates individual car accessibility by age groups and finds car access has been declining amongst successive cohorts of men, but not

³¹ Department for Transport, National Travel Survey 2013

³² Department for Transport, National Travel Survey 2013

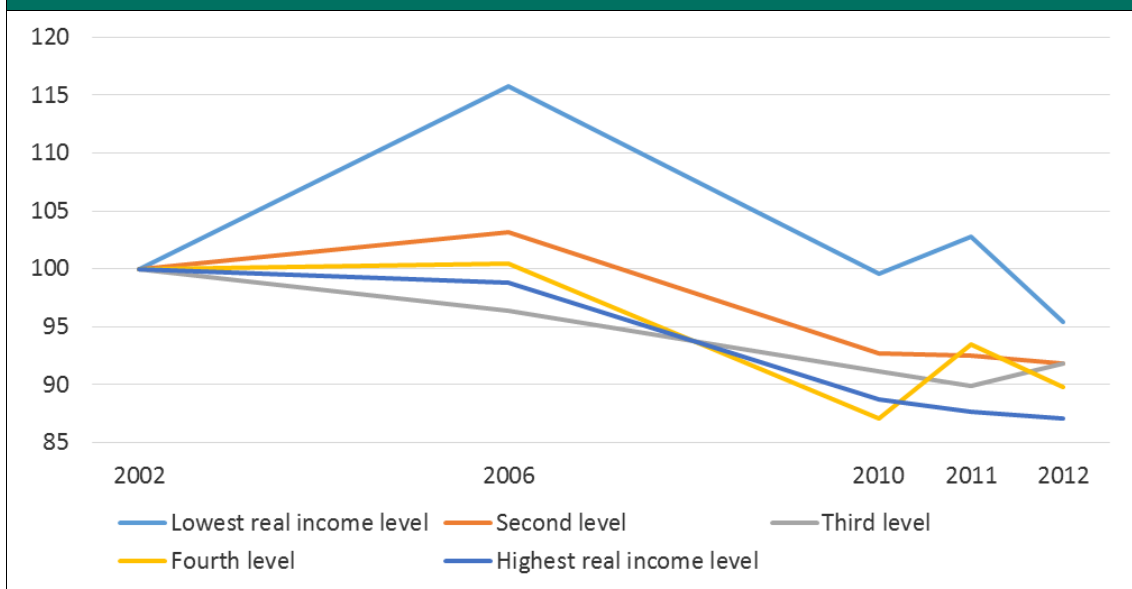
amongst women. For females, access to a car is increasing almost universally. Stokes (2012) found higher car accessibility through the successive periods across all age groups.

Car use by income group

2.32 Figure 2.17 shows that car use has fallen across all income bands over the whole period. This in part reflects the impact of the recession. Those in the lower income quartiles increased their car use from 2002 to 2006 - i.e. before the recession - with the bottom income quartile seeing a big increase in their mileage.

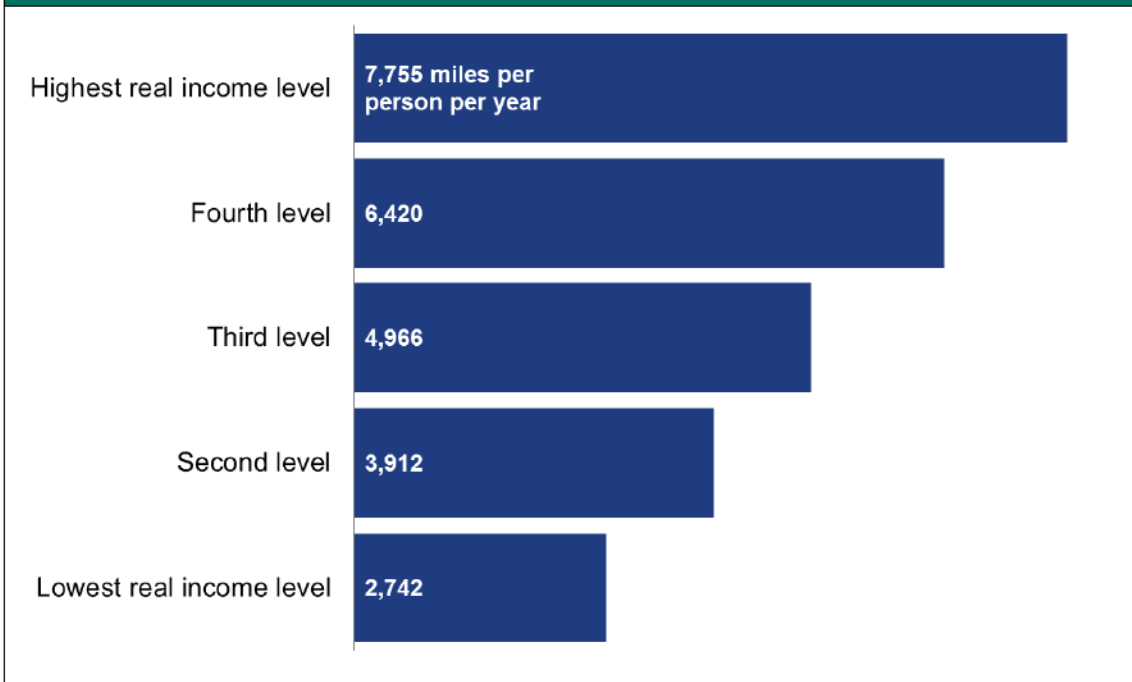
2.33 The higher income groups have seen their car use fall the most, and have seen declines since 2002, although the decline for the highest income quartile has been greater since 2006. Despite this they still use their cars significantly more than those in lower income groups (see Figure 2.18).

Figure 2.17: Car/ van driver miles per person by income quartile; Great Britain, index: 2002=100³³



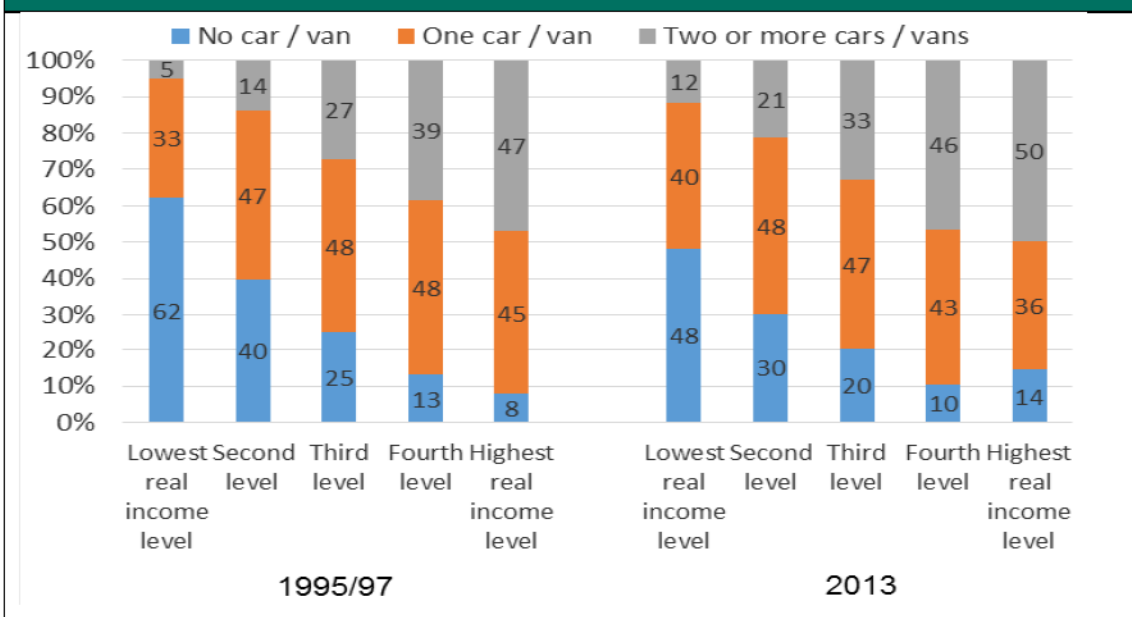
³³ Department for Transport, National Travel Survey 2013, Table NTS0705

Figure 2.18: Income influences on car travel behaviour; England, 2013³⁴



2.34 The decline in miles driven by the highest income quartile has coincided with a reduction in car access. Whereas most income quartile groups are now more likely to own cars than 1995/97 (accounting for the continued increase in licenced car stock seen in Figure 2.7), the highest income group now are more likely to not have a car compared to 1995/7 (although a greater proportion now have two or more cars) - Figure 2.19.

Figure 2.19: Household car/van ownership by household income quintile; England; 1995/7 and 2013³⁵



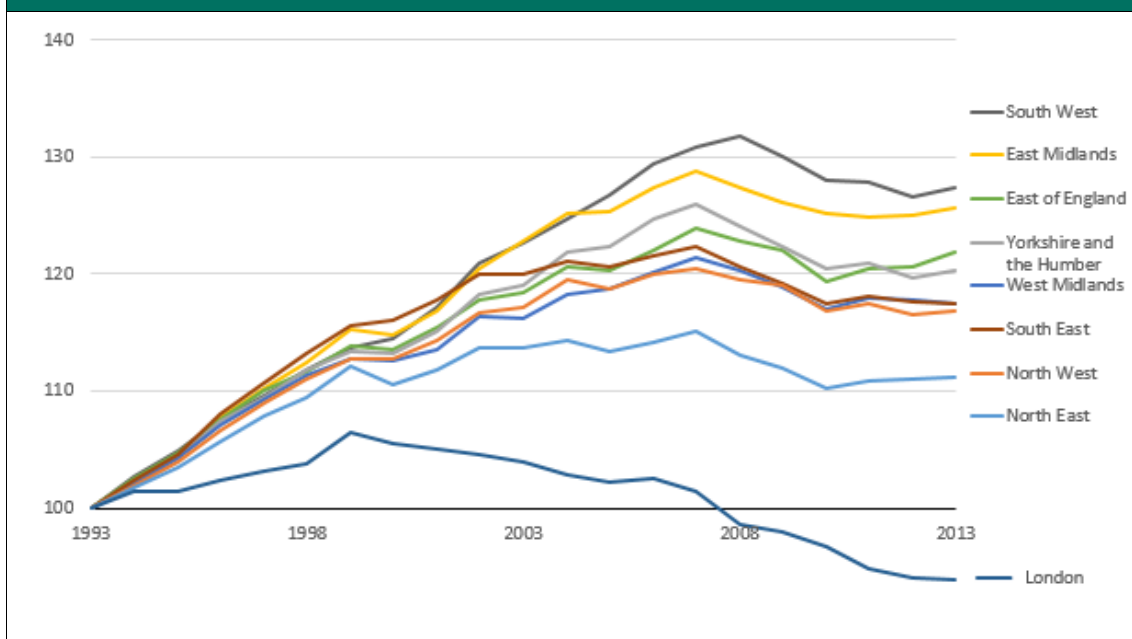
³⁴ Department for Transport, National Travel Survey 2013, Table NTS0705

³⁵ Department for Transport, National Travel Survey, 2013

Car use across different areas

2.35 All regions have seen traffic levels fall since the start of the recession. However, before the recession most regions saw traffic growth. A key exception was London, where traffic started declining in 2000, and where traffic has continued to reduce far more than all other regions which tend to have followed the national trend. The North East also saw traffic starting to fall, and the South East saw traffic level off before the recession.

Figure 2.20: Road traffic by region; England; index:1993=100³⁶



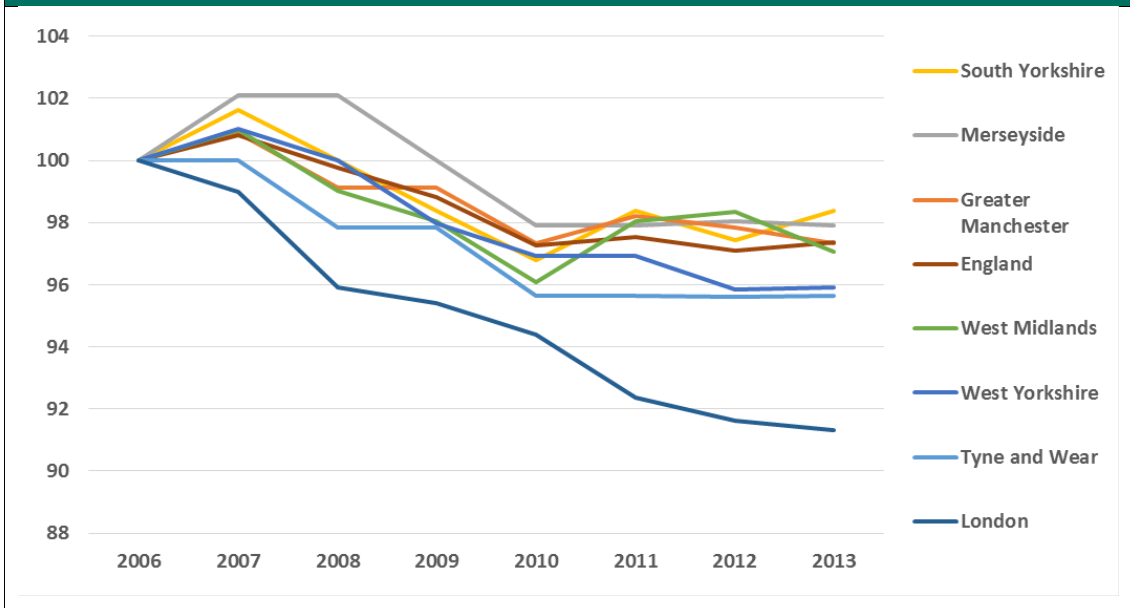
2.36 The distinction between London and the rest of the country is an important one and needs more attention. The question is whether other cities and urban areas in other regions have seen similar falls to London, or whether London stands out as a special case.

2.37 The evidence on this is mixed. Figure 2.21 - which compares traffic in London to other former metropolitan counties - suggests that London does indeed stand out from other cities. The areas shown in the chart all have a high population density - typically with populations between 1.2 to 2.8 million³⁷. It is evident that in these other high population areas, whilst traffic has fallen, the reduction in traffic is not as large as London, and more comparable to the fall in England as a whole.

³⁶ Department for Transport, Annual Road Traffic Estimates: Great Britain 2013, Table TRA0103

³⁷ Jones and Norton (2010)

Figure 2.21: Motor vehicle traffic in London and former metropolitan counties; index: 2006=100³⁸



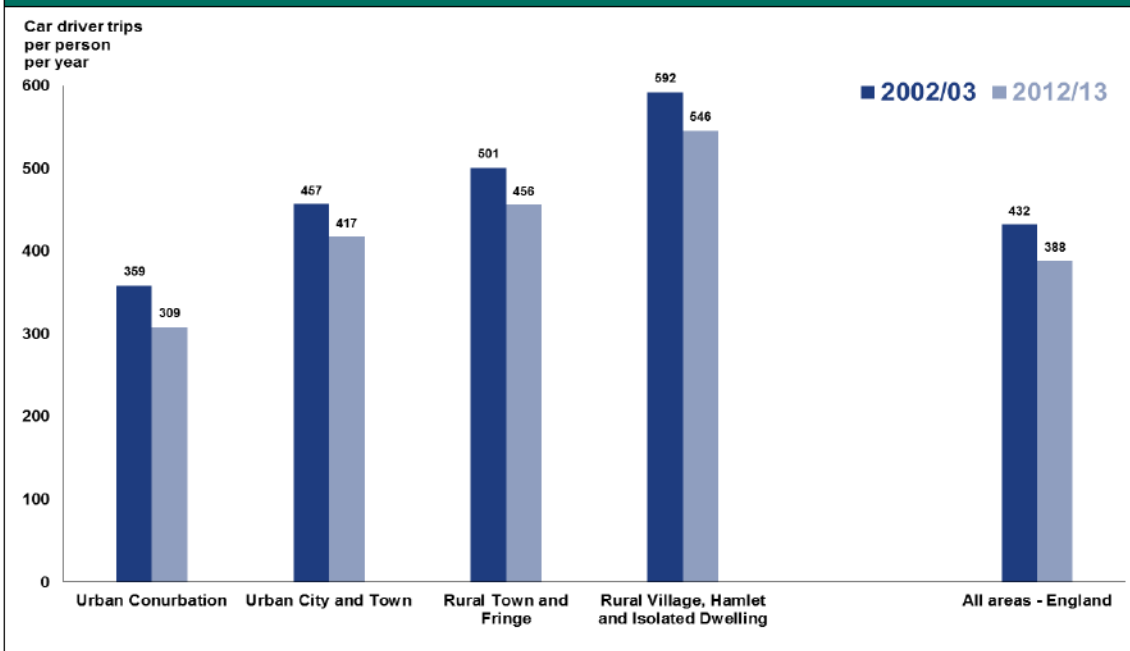
2.38 Figure 2.22 shows that car trips have fallen by a broadly similar amount across all area types, although the decline accounts for a greater proportion in urban areas.

2.39 Meanwhile, Rohr and Fox (2014) point to work by Headicar (2013) and Williams and Jin (2013) who find that car driver mileage grew slower in urban areas before 2000, that it has fallen faster in some urban areas over the last decade, and that traffic volumes and speeds have been declining in a range of cities, including in central London,

2.40 Therefore, there is some evidence that urban areas may have seen different trends to other areas, but they do not appear to mirror the reductions in car use see in London. Further work is needed to understand the trends across major UK cities.

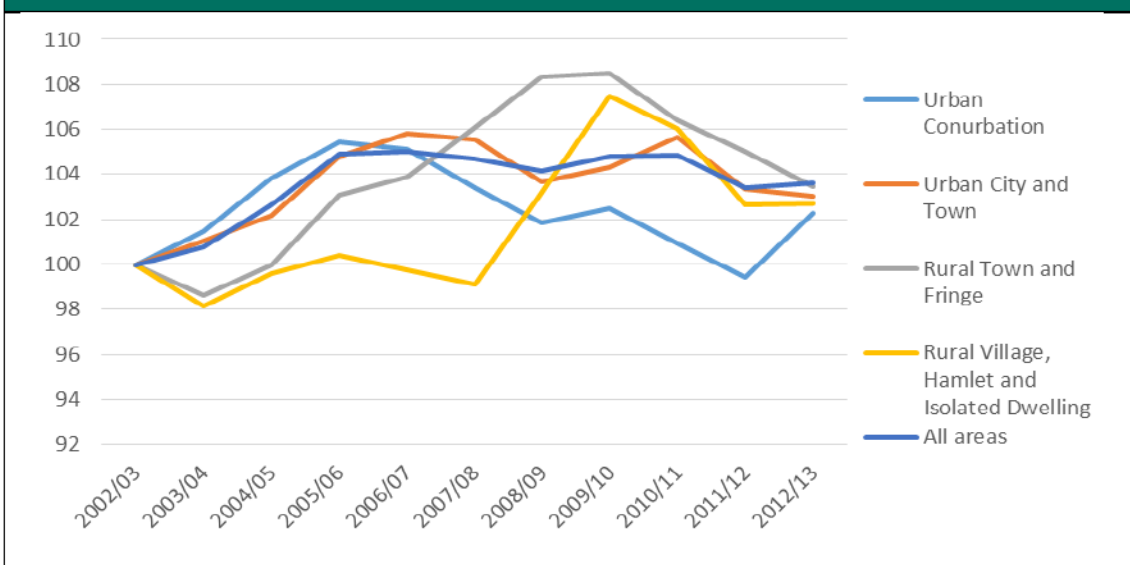
³⁸ Department for Transport, Transport Statistics Great Britain 2013, Table TRA0103

Figure 2.22: Average number of car driver trips by area type; England; 2002/3 and 2012/13 (2 year averages)³⁹



2.41 These declines in car use have been seen despite the number of cars per household being higher in all area types than 2002/03, even in population dense areas such as urban conurbations and urban city and towns. While people are making fewer trips, car ownership is still higher overall (see Figure 2.23).

Figure 2.23: Car/vans per household by Urban/rural classification; England; index: 2002/3=100⁴⁰

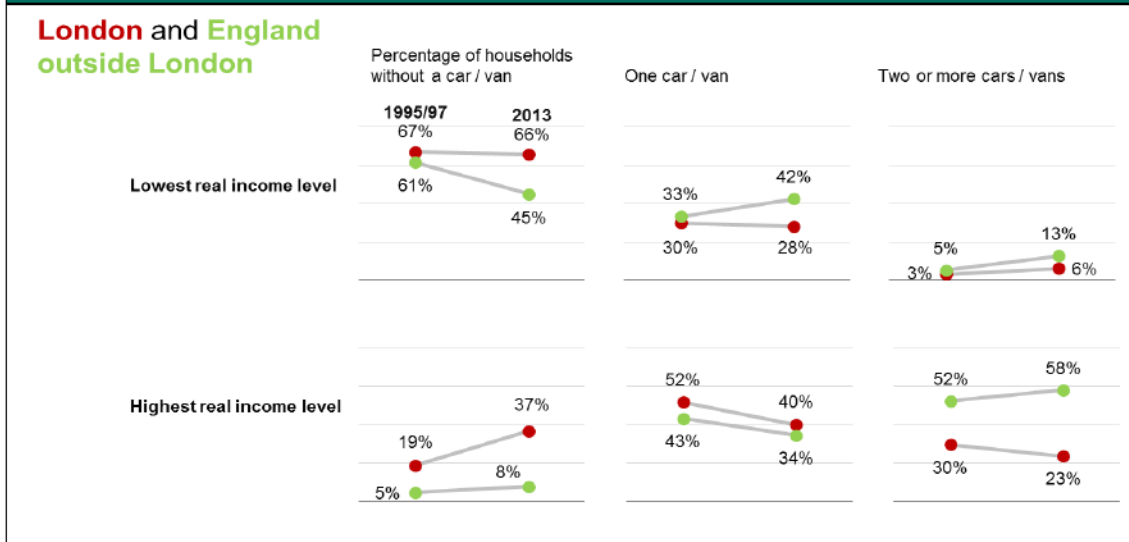


³⁹ Department for Transport, National Travel Survey 2013, Table NTS9903

⁴⁰ Department for Transport, National Travel Survey 2013, Table NTS9902

2.42 While car ownership appears to have grown in all types of area, the picture for London is established in Figure 2.24. It is clear that in England excluding London, those in the lowest income quartile have increased their car ownership whereas ownership in London has been largely flat (albeit with a doubling in the proportion of households with two or more cars, although this is from a low base). The national trend of falling car ownership for those in the highest income level is seen in both London and the rest of England although outside of London there has been a relatively small decline with a bigger shift from households with one car to households with two cars. It is London in that car ownership has particularly fallen for the high income groups. It is therefore clear that the trend in car ownership is different in London to the rest of the country.

Figure 2.24: Car ownership by household highest and lowest income quintile; London and England; 1995/7 and 2013⁴¹



⁴¹ Department for Transport, National Travel Survey 2013

A more detailed looking into changing trip rates

The Department has undertaken an investigation into the recent changes in trip rates across all modes, segmenting these across different purposes and distance bands. This has improved our understanding of recent trip rate trends, and the work will be used to inform and update the evidence base on which the National Trip Ends Model is based.

Regression analysis was undertaken in an attempt to find the key determinants of the fall in trip rates. The analysis was restricted to home-based outbound trips only and therefore will differ from official NTS statistics. This section of trips represents approximately 45% of the total.

While the headline trip rate has been steadily falling, the analysis finds that the rate of decline varies by trip purpose; commuting, shopping and visiting friends trip rates have decreased the most from 1988 to 2010. Over this time period, these four purposes accounted for 70% of trips. Holiday/ day trips have been increasing although these currently make up a small share of total trips.

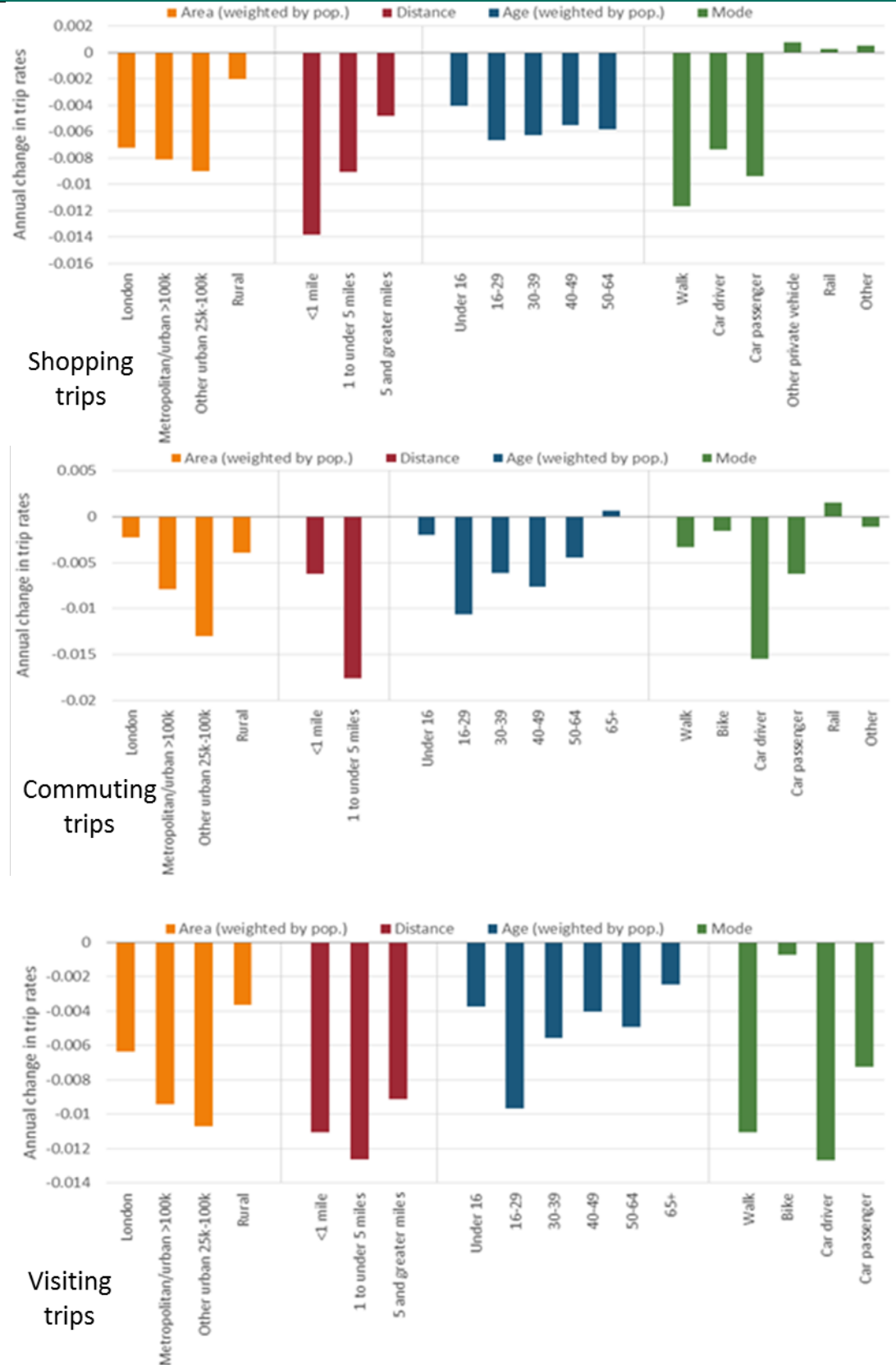
The largest areas (metropolitan and other urban) accounted for most of the fall in trip rates, mainly because they contained the majority of people. London accounted for a disproportionately large effect on trip rates with substantial declines, despite accounting for only 14% of people in the sample.

The young (those aged 16-29) generally experienced the largest falls across the trip purposes although the disparity between age groups is much larger for shopping and commuting trips; visiting friends and family has seen falls across all age groups.

For most trip categories (i.e. purposes, modes and distance bands) work status, the number of cars in the household and driving licence ownership were the key drivers of the number of trips made.

Caution should be taken with these results as they apply to all modes, and not just car trips.

Figure 2.25: Shopping, commuting, and visiting friends and family trip rates - trend weighted by average population proportions; NTS 1998-2010



Take-out messages:

- There has been long-run growth in road and car traffic but this has slowed down in recent decades, and car traffic has been broadly flat since 2002.
- The national, aggregate picture over the past two decades hides different trends by road type and vehicle type:
 - Motorways and rural roads have continued to see steady growth in traffic levels. It is on urban roads where traffic has been broadly flat or fallen;
 - Van traffic continues to see strong growth while car traffic has been more muted – although both car and van traffic have grown on the SRN. HGV traffic has fallen recently;
 - Despite the levelling off in car traffic, the number of licenced cars has continued to grow.
- Individual car use has fallen, offset by a rise in the population.
- The fall in average mileage is mainly as a result of fewer trips being made.
- Importantly, car use trends differ by group and location:
 - Young males are driving less while older females are driving more;
 - All income groups have reduced their car driver mileage, particularly those in the highest income bracket. However, those in the lowest income group were driving significantly more prior to the recession;
 - Trips have fallen in all areas, but proportionately more in urban areas - despite car ownership rising across both rural and urban areas.
 - London stands out as seeing car use fall more than other areas, including other metropolitan areas.

3. Understanding the factors causing these trends

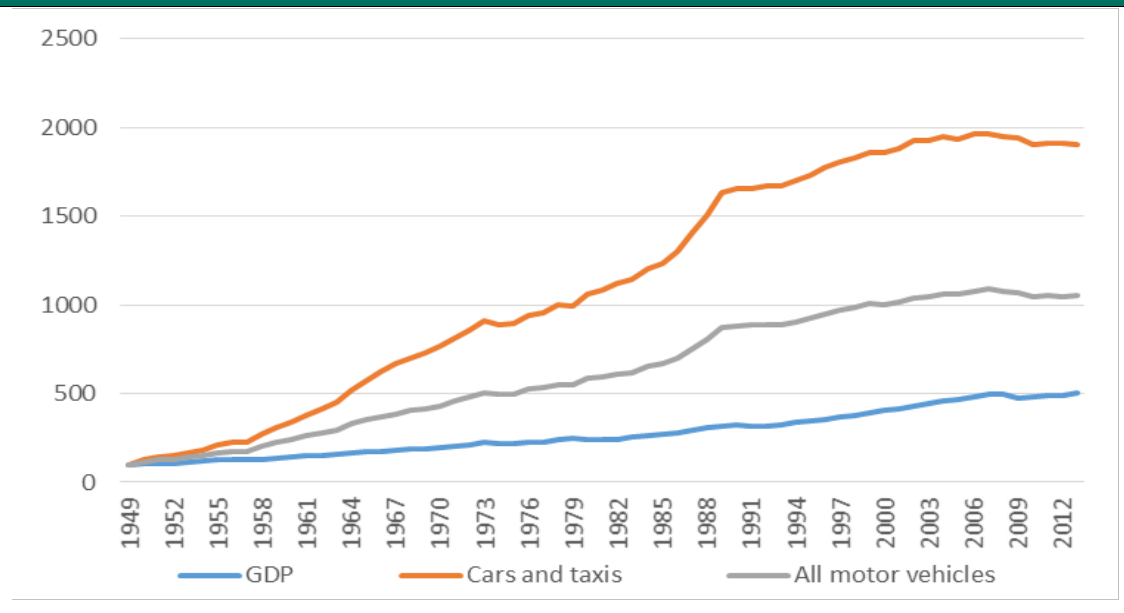
- 3.1** This section proceeds from looking at the trends in traffic across different groups and locations to look at the factors that may be causing these. This draws on a range of evidence and literature, from the Department's own work and the wider literature, providing an assessment on whether, and to what degree the different factors appear on the basis of the evidence to be influencing recent trends.
- 3.2** We consider 10 broad factors, some that include multiple dimensions. The Department does not deem this to be an exhaustive list of all potential factors which could help explain changing travel behaviour. We recognise there could be other factors - including but not restricted to increasing life expectancy, changing urban landscapes and health - which could potentially apply to individual groups or locations. However, we do feel that the most important ones that have been discussed in the literature are covered.
- 3.3** Firstly we discuss those factors where we believe there is good evidence, and then go on to discuss the other factors where there is weaker evidence. In some cases this suggests they could be important drivers of the trends we have observed, in other cases the available evidence suggests they might not be. Finally, there are a number of instances where there is little or no evidence, and further work is needed.

GDP, incomes and employment

GDP and traffic growth

3.4 There is a long and well-established link between rising GDP and traffic levels over the long-run. Figure 3.1 shows the upward trend in GDP, car and all motor vehicle traffic.

Figure 3.1: GDP and road traffic (billion vehicle miles driven); United Kingdom and Great Britain; index: 1949=100⁴²



3.5 However, it has been reported in a number of places that the relationship between GDP and traffic has been weakening over time. This is shown in Figure 3.2, which plots a 5-year moving average of growth in the three series.

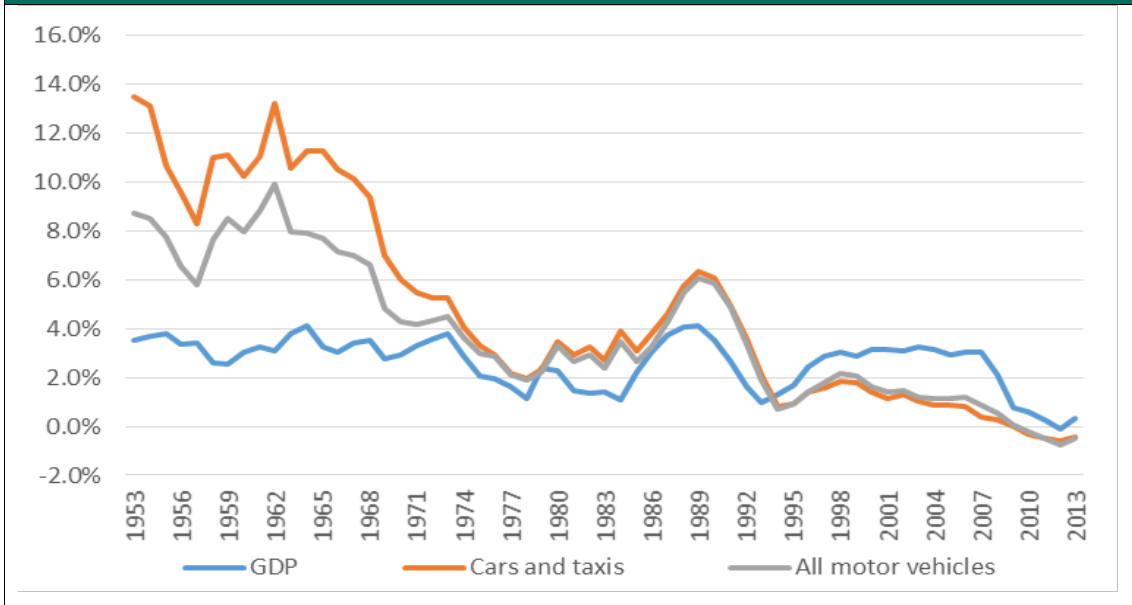
3.6 GDP growth has been relatively constant, fluctuating around 2-4% growth per annum in most years, falling below this during periods of economic recession. Over the same period, the growth in car and motor traffic was initially high, as rising prosperity allowed vast numbers to purchase cars and travel much more than was possible previously, but has fallen steadily, to 3% growth by the early 1980s, and 1-2% growth between the mid-1990s and late 2000s.

3.7 Nonetheless, the two series continue to move together, with traffic growth rising during periods when GDP grows more strongly - for

⁴² Office for National Statistics, UK Output, Income and Expenditure, 2014 Q3

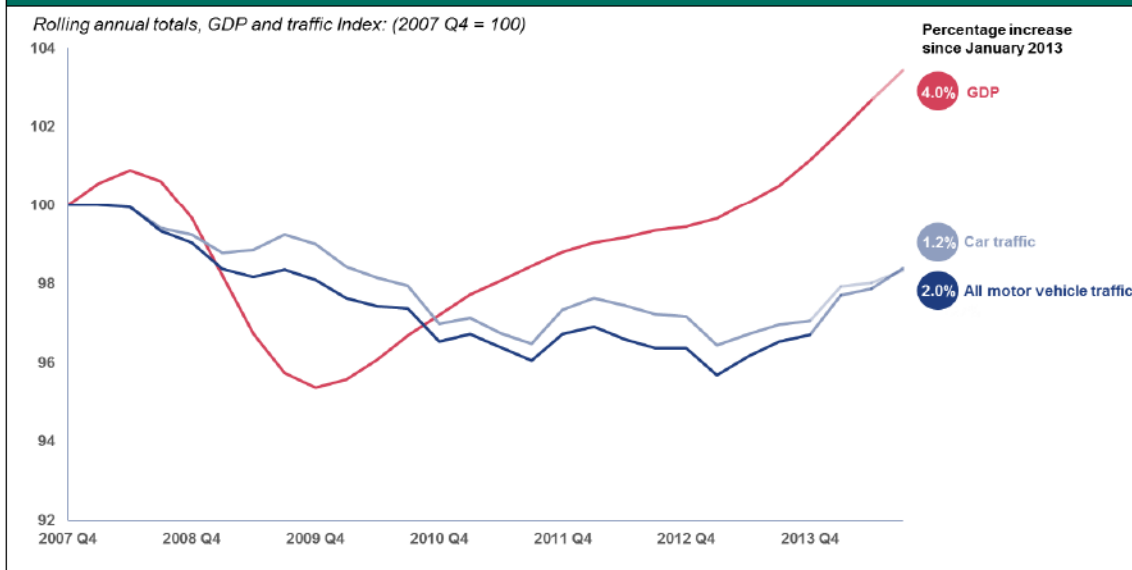
example during the period of strong economic growth of the late 1980s - and traffic growth falling (or becoming negative) during economic recessions, including during the early 1990s and more recently since 2008.

Figure 3.2: 5-year moving average of growth in GDP and road traffic (billion vehicle miles driven); 1953 to 2013



3.8 The link between more recent trends in GDP growth and road traffic growth is considered in Figure 3.3 - which shows quarterly traffic estimates increasing since early 2013 as GDP started to grow more strongly, suggesting that changes in GDP continue to have a positive effect on traffic levels.

Figure 3.3: GDP and road traffic; rolling annual totals; index: 2007Q4=100⁴³



3.9 Of course, these charts do not establish a direct relationship between the two, and so to understand what the latest research finds about the effect of GDP growth on traffic and how this has changed over time, the Department commissioned a review of road transport elasticities from the academic literature.

3.10 Whilst much of the literature is now quite old, the review found a strong positive relationship between GDP and traffic. And whilst there is some limited evidence of a weakening relationship, the available evidence continues to point towards GDP growth having a positive effect on traffic levels.

3.11 There is a case for carrying out a more detailed, up-to-date assessment of the relationship between GDP and traffic levels taking into account a range of factors. It is possible that GDP growth effects different types of traffic in different ways, and increases in personal car use arising from GDP growth may depend on how, and the speed with which it feeds through into personal disposable incomes.

⁴³ Department for Transport, Quarterly Road Traffic Estimates: Great Britain, Quarter 2 2014

Road Traffic Demand Elasticities

The Department commissioned RAND Europe to conduct a rapid evidence assessment review of road traffic demand elasticities. The aim was to understand what estimates have been made of elasticities, i.e. the responsiveness of road traffic to changes in key economic and demographic factors, and, where possible, to gain an understanding of how these relationships have changed over time.

The key conclusions from this review for passenger road transport demand are presented here:

Fuel Price Elasticities: Based on the evidence reviewed, the fuel cost (price) elasticity was found to fall within a fairly narrow range of -0.1 to -0.5, but some trips may be more elastic, depending on distance and trip purpose. The evidence is limited on whether these have changed over time: according to one study (Van Dender and Clever, 2013) looking at five OECD countries including the UK, the elasticity for the period 2000 to 2010 was smaller than for the preceding decade. However, another study (Litman, 2012) showed that elasticities decreased from 1980 to 2005 and have since been increasing again (although this may be a US-specific phenomenon).

GDP / Income Elasticities: The evidence suggests that income elasticity is positive and may be as large as 1.4. However, the evidence is also compatible with long run elasticities in the range 0.5 to 1.4. The impact of including car ownership on income elasticity seems to be important, and is determined differently in different models. There is limited evidence that income elasticities have decreased over time; two studies find that GDP elasticity fell after the year 2000.

Population Elasticities: There was no information found on population elasticities per se. However, a few studies were found to include demographic explanatory variables such as urban density, population density, employment and age, from which an elasticity is calculated (or could be with additional data).

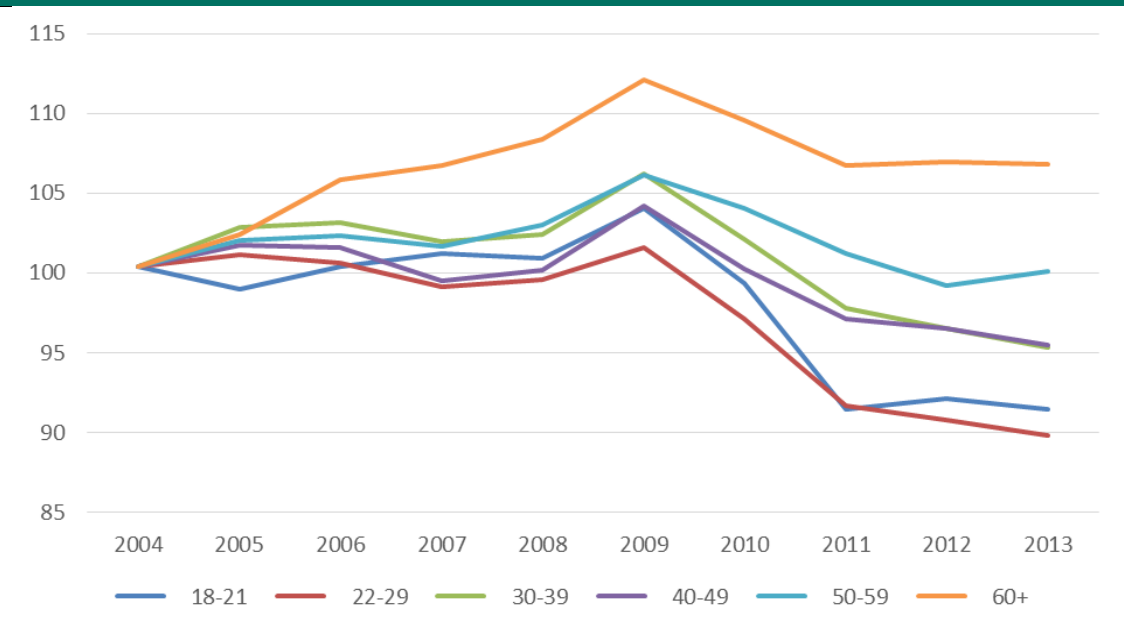
It was also noted however, that in view of the age of the data used in much of the empirical work reviewed for the UK, there is need for a detailed study to quantify fuel price and income elasticities using more recent data.

Further details on the above, and findings for freight road transport demand elasticities can be found in the RAND Europe report.

The link between income, employment and traffic

3.12 Moving from changes in GDP to individual earnings, Figure 3.4 shows that whilst GDP may have been rising prior to the recession, real incomes were relatively flat. From 2004 to 2007 the only age groups to see a significant rise in income was those over 60 years of age, who in turn have increased their miles driven by car. More generally older age groups have tended on the whole to see slightly higher income growth than younger age groups.

Figure 3.4: Median real annual earnings by age group; United Kingdom; index: 2004=100⁴⁴



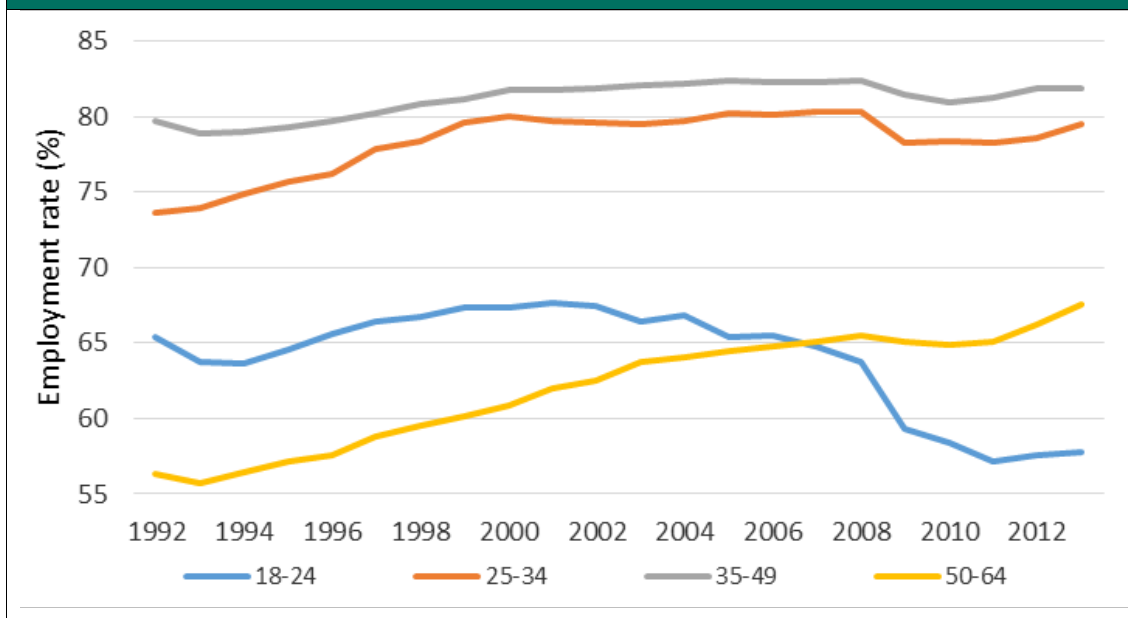
3.13 Because earnings are only reported by those in employment, Figure 3.4 does not capture the full extent to which individuals incomes may have changed.

3.14 Employment rate statistics throw further light on how incomes are likely to have changed for different age groups. As Figure 3.5 shows, the youngest adults - who have seen the largest falls in miles driven - have seen a substantial fall in their employment rate, down 10.5 percentage points from peak to trough (2001 to 2011). Whilst most of this fall occurred following the recession in 2008, it can be seen that employment

⁴⁴ ONS, Annual Survey of Hours and Earnings, 2013. Income series is deflated using RPIJ inflation index. The Institute for Fiscal Studies recommends use of the RPIJ index to deflate nominal incomes as the usual CPI index does not cover owner-occupied housing costs. The RPIJ index does include these and also avoids the upward bias inherent in the RPI index.

rates had started to fall for this group much earlier, when older age groups were seeing their employment rates rise.

Figure 3.5: Employment rate (%) by age group; United Kingdom; 1992 to 2013⁴⁵



3.15 This decline in the employment rate of young people could be expected to have two effects: firstly to reduce incomes, and through this the ability to own and use a car, and secondly to directly reduce the number of commuting trips they make.

3.16 Furthermore, the rise in part-time work over recent years will have had a direct negative impact on commuting and wider travel. In 1984 the proportion of those in employment that worked part-time was 20.8%, in 2013 this had risen to 27.1%⁴⁶. Le Vine and Jones (2012) show that the annual mileage of someone in part-time work is less than half of someone employed full-time.

3.17 There has been a trend of increasing employment rates of females, contrasting to falling rates amongst males over the long run (see Figure 3.6). Whilst this does not provide firm evidence of a direct effect of employment and income on traffic, the trends are entirely consistent with the trends in car travel across different groups.

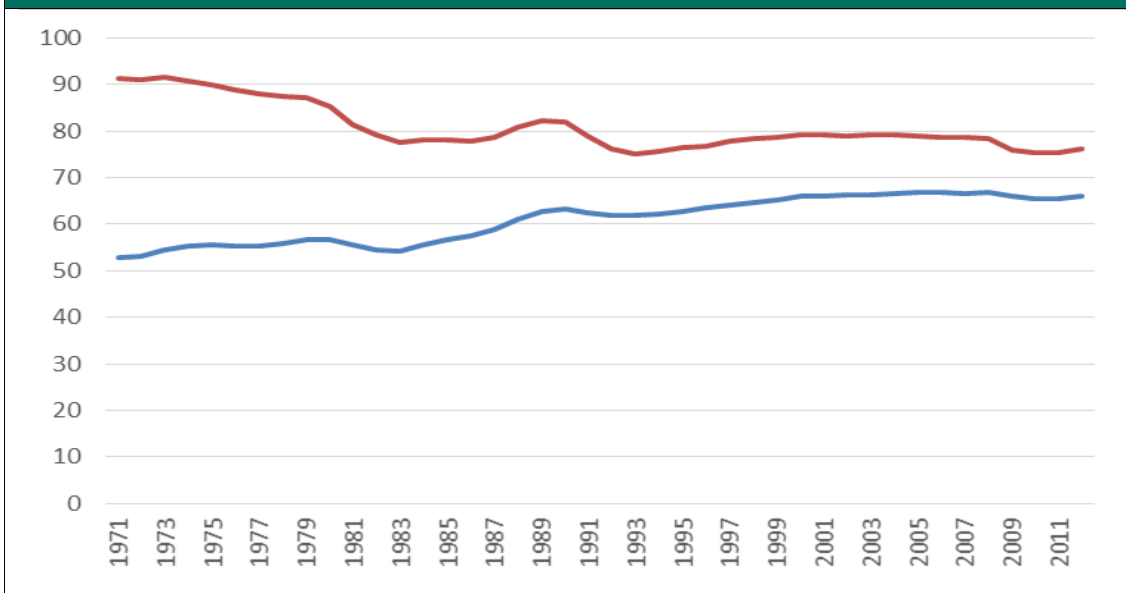
3.18 The role of employment in changing car demand was touched on in the review of road traffic elasticities carried out for the Department. One study (Dargay, 2010) looked at the impact of employment on car

⁴⁵ Office for National Statistics, Labour Market Statistics 2013

⁴⁶ Office for National Statistics, Labour Force Survey 2013

demand, and estimated an employment elasticities of demand for car long distance travel of 0.5 for business travellers and 0.6 for commuters.

Figure 3.6: Employment rate (%) by gender; United Kingdom; 1971 to 2012⁴⁷



3.19 The relationship between income and car use may appear not to follow from the findings in Figures 2.16 and 2.17 which showed how from 2002 to 2012 car mileage fell most for those of higher incomes (but that these groups still drive significantly more).

3.20 Rohr and Fox (2014) show that the literature proposes a variety of reasons why this might be occurring, including the suggestion that people with higher incomes find it easier to switch to a less car-dependent lifestyle (Goodwin, 2012) or that as incomes rise, people move to more expensive urban locations (Dender and Clever, 2012). However, as we see below, we think this could be explained to a large extent by falling company car use.

3.21 Overall therefore we think there is good evidence showing that economic factors continue to be important, and are a major cause of recent trends. It is evident that groups that have seen lower car use have seen flat incomes and falling employment over the past decade. At an aggregate level, the literature and evidence continues to point towards a positive relationship between GDP and traffic. But it is clearly not the only important factor.

⁴⁷ Office for National Statistics, Labour Force Survey 2013

Take-out messages:

- There is good evidence of a significant and positive long-run relationship between GDP and traffic, albeit with some evidence this has weakened over time, and that GDP has affected car traffic at an aggregate level over the last decade.
- Trends in incomes and employment also appear to help explain recent travel trends across different groups; females and old aged people have seen rising incomes and employment and are driving more, while the young have seen the reverse.

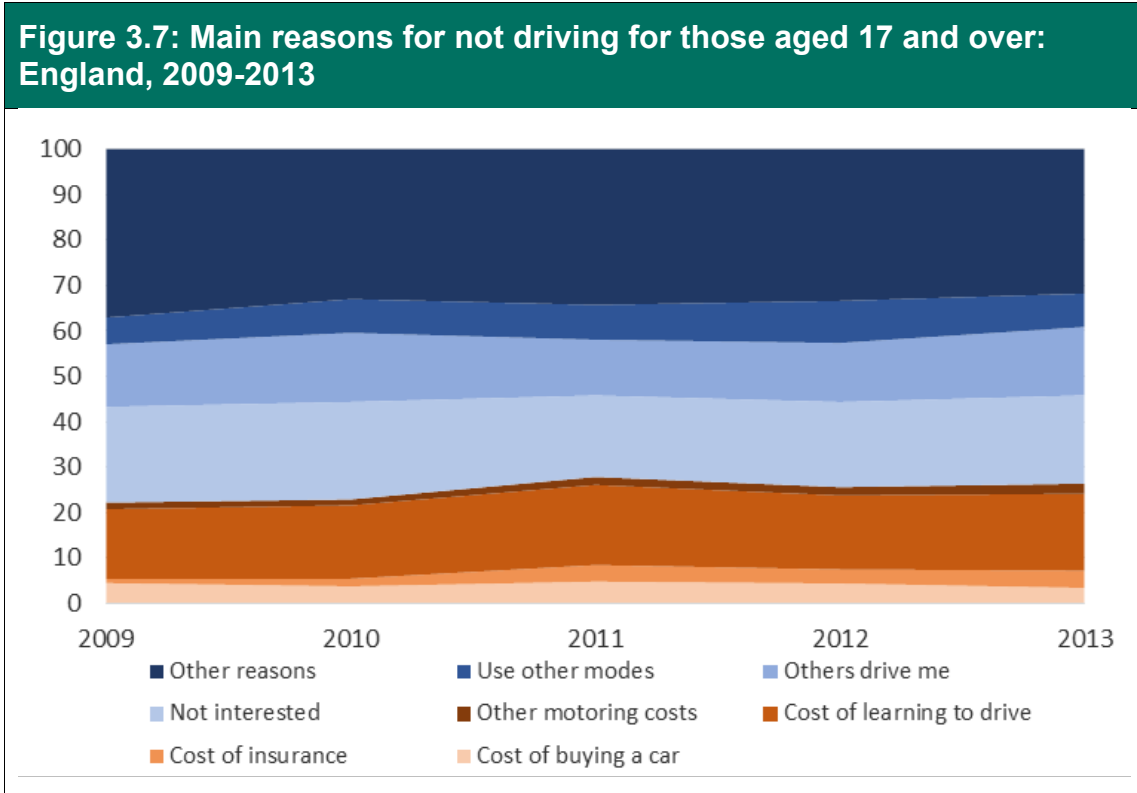
The costs of driving

- 3.22** In addition to incomes, the costs of travel are generally considered to be an important influence on whether, and how much people drive. This includes the cost of gaining a licence, learning to drive, buying a car, and the cost of driving - be it insurance, fuel or maintenance costs.
- 3.23** Rohr and Fox (2014) note that a number of studies suggest that driving costs have generally risen since the 1990s. While the prices of first and second hand cars have fallen, most other car ownership costs have risen (Le Vine and Jones, 2012).
- 3.24** Furthermore, Williams and Jin (2013) note that the costs of owning and using a car in dynamic urban areas have grown significantly, perhaps explaining why car travel has levelled off in urban areas specifically.
- 3.25** Costs appear to be particularly important for young people - and again appear to be an important element in explaining different trends in car use across age groups.
- 3.26** In 2013, the reason most commonly cited by young people for not learning to drive was the cost of learning, with 3 in 10 young individuals (ages 17-29) without a licence stating this as the main reason for not doing so. This reason has consistently been the most common reason cited in recent years, although in the last couple of years the proportion citing it as a factor has fallen somewhat; down 4 percentage points between 2011 and 2013 for age groups 17-20 and 20-29⁴⁸.

⁴⁸ Department for Transport, National Travel Survey 2013, Table NTS0203

3.27 Costs do not appear to be as important for older groups. Figures 3.7 to 3.9 show the main reasons cited for not learning to drive by (i) all individuals without a licence; (ii) those aged 17-20; and (iii) those aged 21-29. The bottom four segments in the charts are all the stated cost reasons preventing individual's learning to drive. For the first group (i.e. the whole population) the proportion is relatively low, between 22% and 28%. For the younger group (17-20) this figure varies between 48% and 58% and between 36% and 46% for those in their 20s⁴⁹.

Cost reasons given as the main reason for not learning to drive:
48% = aged 17-20
14% = aged 50-59
 Source: National Travel Survey, DfT



⁴⁹ Department for Transport, National Travel Survey 2013, Table NTS0203

Figure 3.8: Main reasons for not driving for those aged 17-20: England, 2009-2013

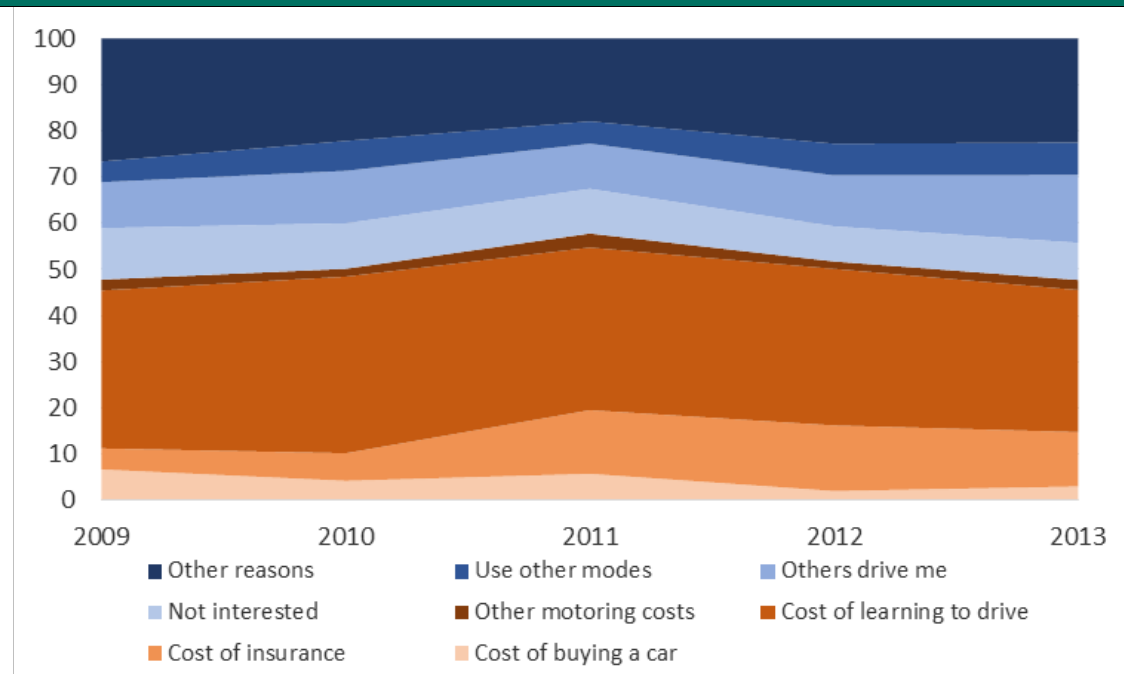
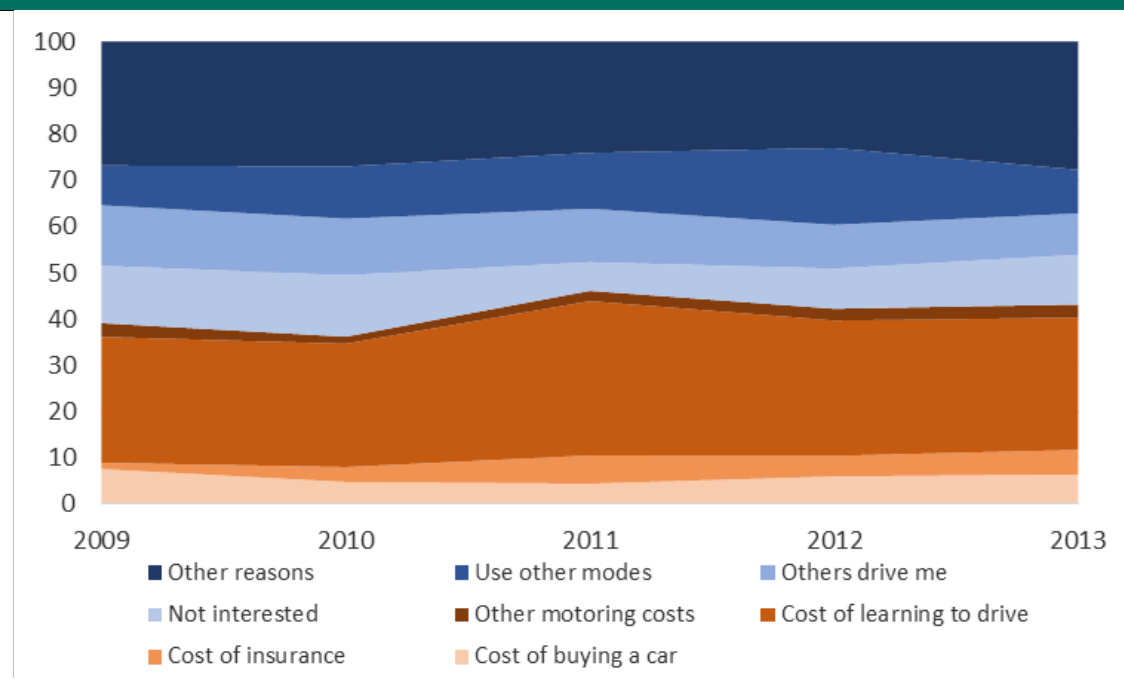


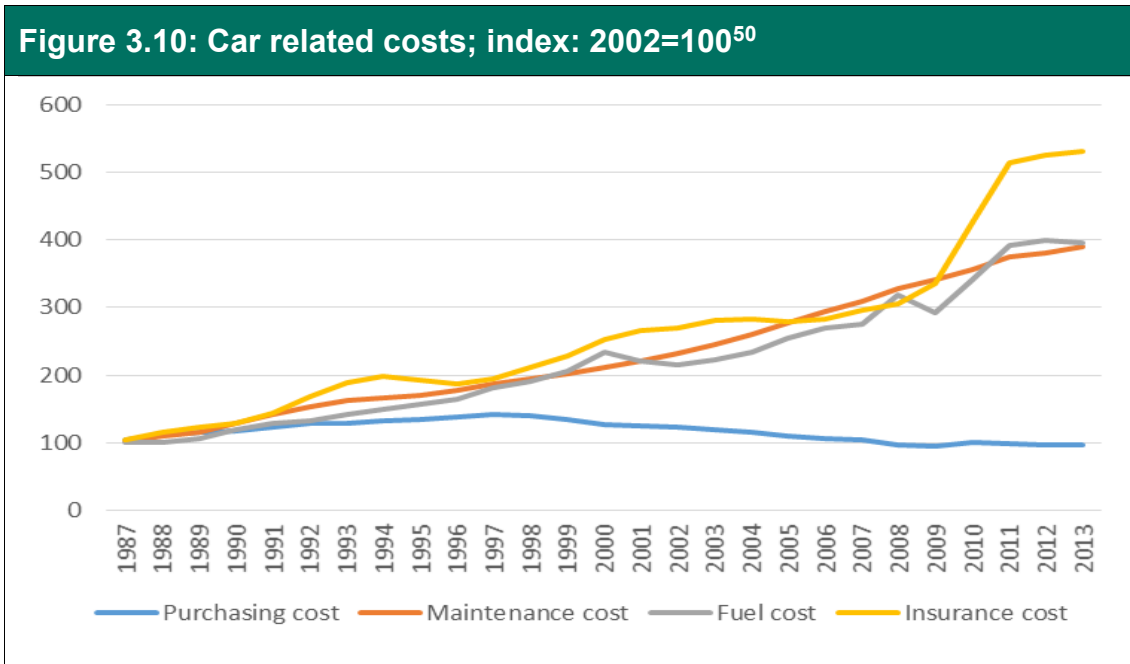
Figure 3.9: Main reasons for not driving for those aged 21-29: England, 2009-2013



3.28 By discouraging younger people from learning to drive, costs would appear to be an important factor in explaining the decline in car use across different age groups. Le Vine and Jones (2012) find that around half the drop in annual mileage by men is due to fewer people driving, with the remaining half due to a reduction in mileage by those who do

drive, and Rohr and Fox (2014) find that delayed driving licence acquisition is part of the explanation for reductions in driving levels amongst young people.

3.29 Other costs are likely to have had a mixed effect: the inflation indicators used in the calculation of RPI by the ONS have shown that while nominal purchasing costs have fallen, costs of insurance, fuel and car maintenance have risen over the past decade.



3.30 Fuel prices have risen by approximately 40% since 1998 (see Figure 3.11) which would have a significant downward impact on travel demand, all other things equal - the review of travel demand elasticities found a fairly clear negative relationship between fuel prices and traffic levels, with a 1% increase in the latter reducing traffic between 0.1 to 0.5%.

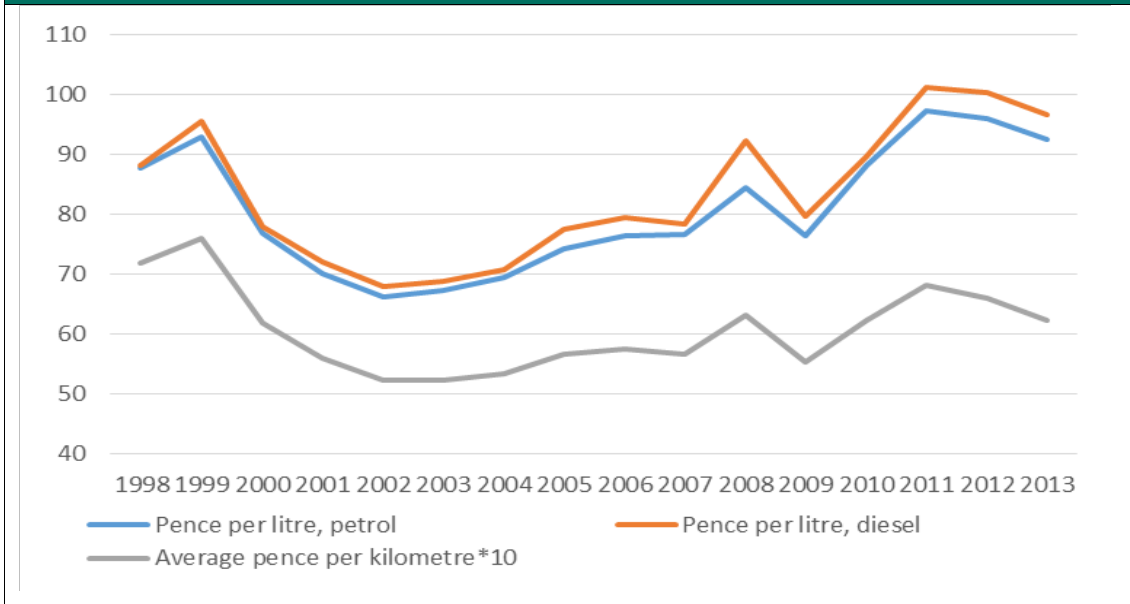
3.31 However, freezes to fuel duty since 2011 have helped keep costs down in recent years and the increasing fuel efficiency of new cars has further contained the average rise in fuel driving costs (see Figure 3.11). This is confirmed in the literature review commissioned by the Department, which found that between 1995 and 2010 a number of studies noted real increases in fuel prices but also improvements in fuel efficiency.

3.32 If these new and fuel efficient cars were purchased by older, wealthier individuals, then the improved fuel efficiency would benefit them whilst the young would continue to drive less fuel-efficient cars and see their costs rise, contributing to the diverging trends in car use between these

⁵⁰ Office for National Statistics, Retail Price Indices; Fuel cost does not relate to the average cost of driving but to a composite measure for expenditure on petrol, diesel and oil.

groups. On the other hand, it may be expected that the improved efficiency would feed through the vehicle fleet resulting in increased efficiency at all levels. However, we have found no evidence investigating either of these hypotheses.

Figure 3.11: Fuel costs and pence per kilometre; 1998 to 2013⁵¹



3.33 Meanwhile, the cost of insurance has risen significantly - by 58% since 2009. Whilst we cannot investigate how these have changed over a longer period of time for different groups to see whether they can explain the different trends in car use, it is noteworthy that the latest average insurance cost for a 17-22 year old remains nearly four times as high as the cost for a 60-69 year old, despite recent falls as shown in Table 3.1.

⁵¹ Fuel prices - Department for Energy and Climate Change, Energy Trends and Prices; Fuel efficiency assumptions - Department for Transport, Car fuel and CO2 emissions data

Table 3.1 Insurance costs by age group⁵²

Age	2014 Q2 cost	Quarterly change	Annual change
17-22	£1,100	-7.5%	-24.0%
23-29	£650	-7.8%	-22.6%
30-39	£430	-5.5%	-16.9%
40-49	£400	-4.3%	-15.4%
50-59	£340	-6.1%	-15.2%
60-69	£290	-3.4%	-12.9%
70+	£360	-2.6%	-10.1%

Take-out messages:

- Some motoring costs have increased significantly, and there is good evidence that costs have been an important influence on recent trends, particularly for young people – who cite this as the most common reason for not learning to drive.

Company car taxation

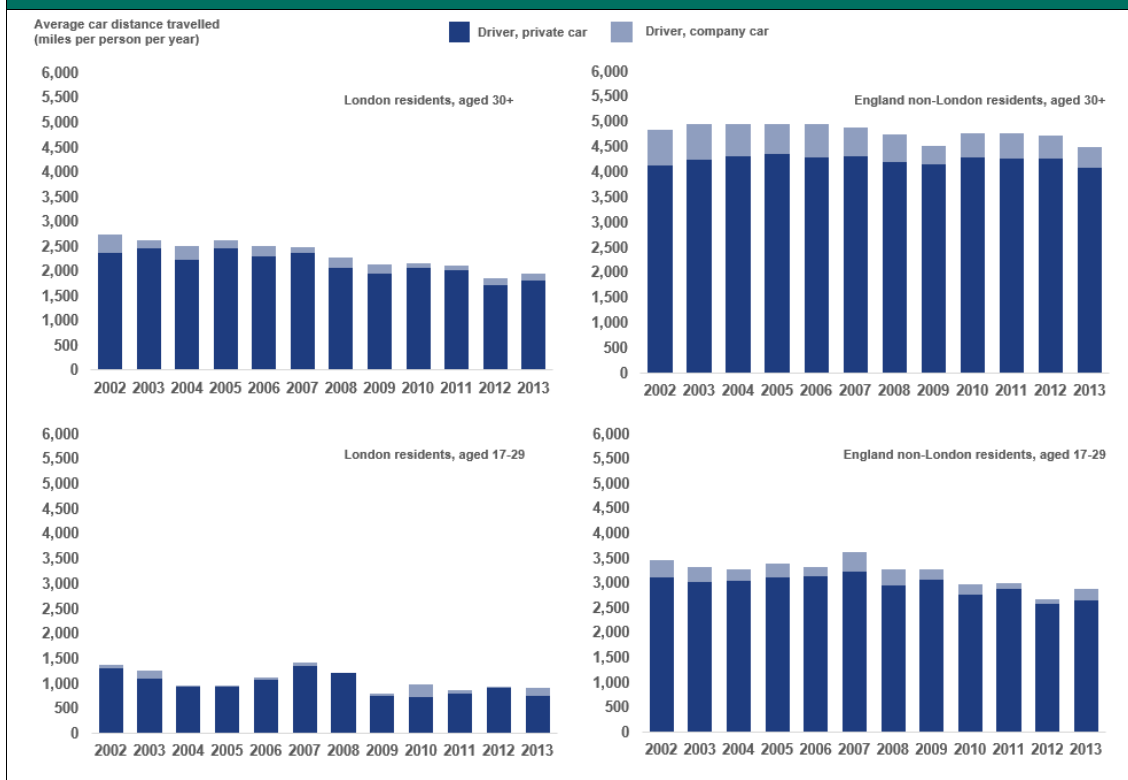
3.34 In addition to these income and cost effects, there is good evidence that changes in company car use have strongly impacted on the fall in car mileage, as highlighted in Le Vine and Jones (2012). Using NTS data, they find that company car mileage fell by 37% between 1995/7 and 2005/07. Over the same period, company car ownership per person fell by 20% compared to a rise of 17% in private car ownership per person.

3.35 The authors detail the substantial changes to the tax treatment of company cars over time - originally company cars were not taxed at all. With reform, taxation incentivised higher mileage. The resulting lower taxation led to companies offering free fuel. Further notable changes came in 1993/4 and 2002/3 where taxation was based on the car's original value and its emissions band respectively. Whilst the changes in company car use cannot be directly attributed to these, it is noted that the changes "seem to be linked to the large increases in taxation on fuel provided for private use".

⁵² AA British Insurance Premium Index, Q2 2014

- 3.36** They find that a lot of the reduction in mileage amongst males may be attributed to changes in company car usage. Males' annual car mileage fell over the period of study (although elder males increased their annual mileage), and the changing trends of company car use can explain most of these falls for middle-aged men, but not for those under 30 - see Figure 3.12.
- 3.37** The change in company car usage may also account for falls in annual mileage by higher income bands. The authors state "there is a sharp reduction in company car ownership which is directly related, in terms of the steepness of the decline, to income" before going on to suggest that at the same time over this period, "the relationship between personal car ownership and income is much more stable".
- 3.38** The study also finds evidence of company car impacts corresponding to other trends in car use. Company car use is found to be a major contributor to the fall in London car use. Furthermore, company car use was found to be relatively level across the period for females and when considered together with rising personal car usage has resulted in rising overall distance driven.

Figure 3.12: Company car use by location and age, England, 2002-2013⁵³



⁵³ Department for Transport, National Travel Survey 2013

- 3.39** Le Vine and Jones (2012) conclude that for those aged 30+ outside of London there has been a persistent increase in car usage, were it not for declining company car mileage, which is significant given that they make up 70% of the driving-age population.

Take-out messages:

- Company car use has fallen significantly over the past two decades, and this has been attributed to changes in taxation.
- There is good evidence that these falls explain a lot of recent trends across different groups - including falling annual mileage amongst men, richer income groups and those in London.

Population growth, population density and urbanisation

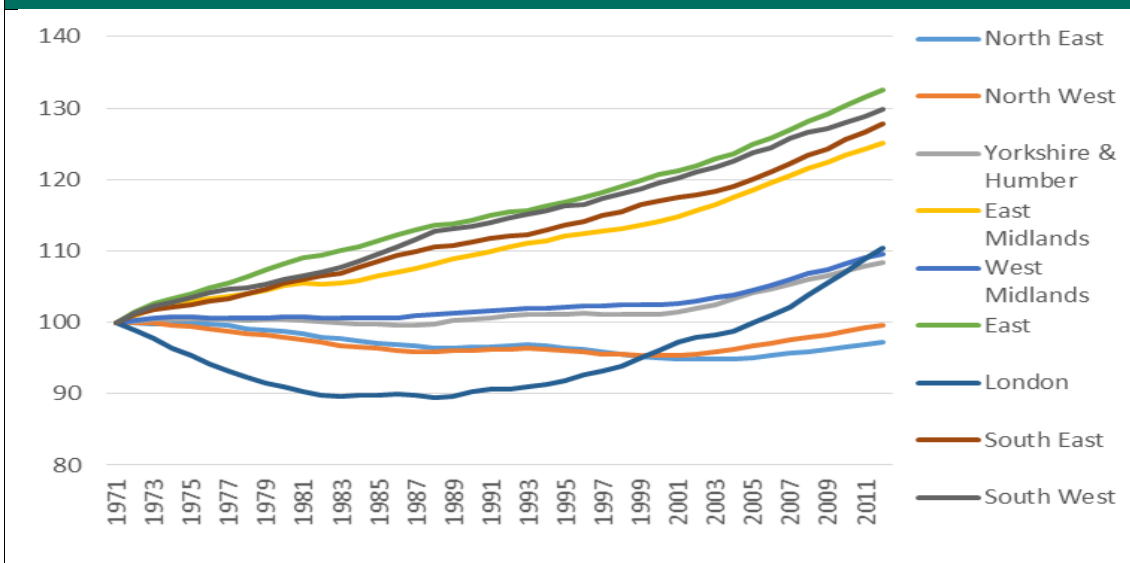
- 3.40** Population growth has clearly been a crucial determinant of road traffic trends over the last two decades. With each individual driving on average 3,235 miles a year, it is straightforward to see that the increase in population of 3.8 million over the decade to 2012 will have had a significant upward pressure on road demand.

- 3.41** However, the nature of population growth is also important, and the increase in population has exhibited different trends by region. Figure 3.13 shows there have been four distinct categories of regions since 1971, although all regions are now experiencing strong growth:

- The south, excluding London (more specifically, the East, South East, East Midlands and South West) have seen uninterrupted growth in the population level.
- The West Midlands and Yorkshire and Humber have seen low growth until the turn of the millennium where the growth rate has increased.
- The North East and North West saw slight falls in their population levels until the beginning of the 2000s when population increased.
- London saw large falls in its population level until the early 1990s when population began to grow strongly.

- 3.42** The growth in the population has therefore occurred in different parts of the country over time. The growth in the population from the 1980s (see Figure 3.13) was initially concentrated in the southern regions, but over the last decade has been seen across all regions, but grown more strongly in London than elsewhere.

Figure 3.13: Population change by region; index:1971=100⁵⁴



3.43 This reflects a more general trend towards population levels rising faster in urban areas between 1991 and 2011 (Rohr and Fox, 2014).

3.44 This move towards greater urbanisation may be important, as people generally drive less in urban areas (see Figure 2.22). This does not simply reflect the type of people who live in urban areas - Aditjandra (2012) use data from Tyne and Wear to show that after controlling for self-selection, neighbourhood characteristics do influence travel behaviour.

3.45 The review of road traffic elasticities carried out for the Department identified a number of studies which found that urban population (as a proportion of total population) has a negative influence on the levels of car traffic - including Hymel et al. (2010) and Dender and Clever (2013), whilst another study (Litman, 2012) noted that “per capita vehicle ownership and travel tend to be higher in rural and automobile-dependent suburban areas, while walking, cycling and public transit travel tend to be higher in urban areas” (although these are not quantified).

3.46 Headicar (2013) has also investigated the impact of changing spatial distribution on traffic trends, i.e. whether changes to the location of the population is driving the current trend of levelling off in car traffic. He notes that high immigration and birth rates in London and some other cities has led to an increase in the share of the population living in the more urbanised areas (where people drive less) for the first time. However, he concludes that “the scale of impact relative to that arising from increases in car use itself has, however, been small”. Only 6.7% of the population was spatially located in a different area between 1971 and

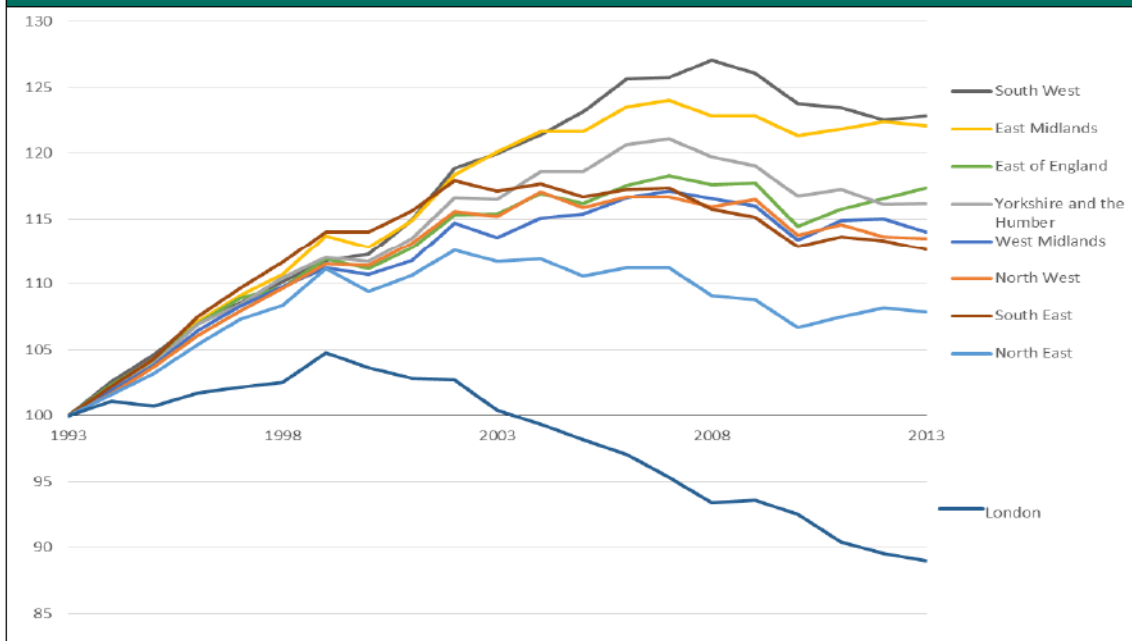
⁵⁴ Office for National Statistics, Subnational Population Projections for Regions in England, 2012

2011 suggesting that a small proportion has moved areas such as from rural to urban. This is largely due to the number of people moving areas being modest relative to the whole population and because the trend in redistribution becoming progressively smaller as the population increases. He concludes that the impact on average car driver mileage is relatively modest due to this being a small proportion of the total population.

3.47 It would appear therefore that some the trends we have observed in road travel are due to urbanisation, but that this is only a relatively minor contributor. This is backed up in Le Vine and Jones (2012) who conclude that in general, very little of the observed aggregate change in car 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.

3.48 The notion that changes in travel behaviour by people within areas has been more important than where people live, can be seen when comparing the trends in population across regions with the changes observed in traffic levels across regions. Figure 3.14 below recreates Figure 2.20 for ease of comparison, and shows clearly that that whilst the region which has seen the strongest growth in traffic since 1993 (South East) is one of the regions where population has grown most strongly, and the region where population has grown least (the North East) has seen particularly slow growth in traffic, there is not a clear correlation across other regions. Most obviously, London which has seen the fastest growth in population over the last decade has seen traffic levels fall faster than anywhere else.

Figure 3.14: Road traffic by region; England; index:2006=100⁵⁵



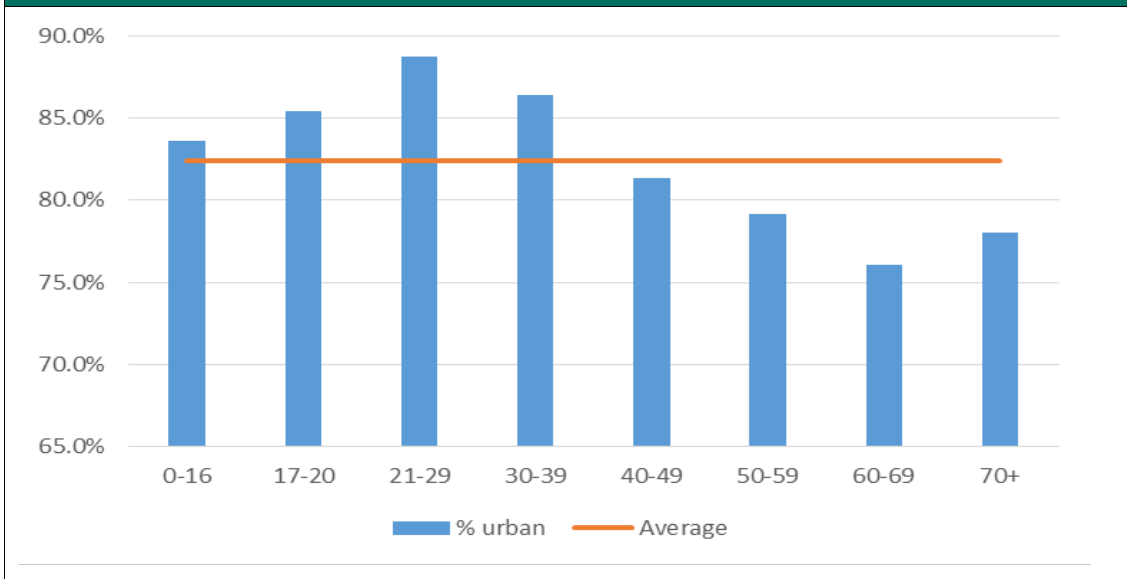
3.49 It is possible that the growth in population levels in urban areas has affected the behaviour of people already in cities - for example, greater concentrations of people affecting people's choices and scope for travelling. There is some evidence that population density has an important impact on traffic levels and so these second-order impacts could explain some of the falling car use of people in urban areas. For example, Karathodorou et al. (2009) calculated an elasticity of metropolitan car demand with respect to urban density of -0.229 (statistically significant). However, there is a need to get further evidence on this.

3.50 At least some of the decline in London and other urban areas (to the extent these have also seen greater declines) is due to the tendency for the young to live in urban areas (see figure 3.15). It has already been established that young people are driving less - and this effect is likely to have a greater effect on London and other cities, given the greater concentration of young people in these areas.

Median age in:	
URBAN AREAS	37
RURAL AREAS	45
Source: ONS 2011 Census	

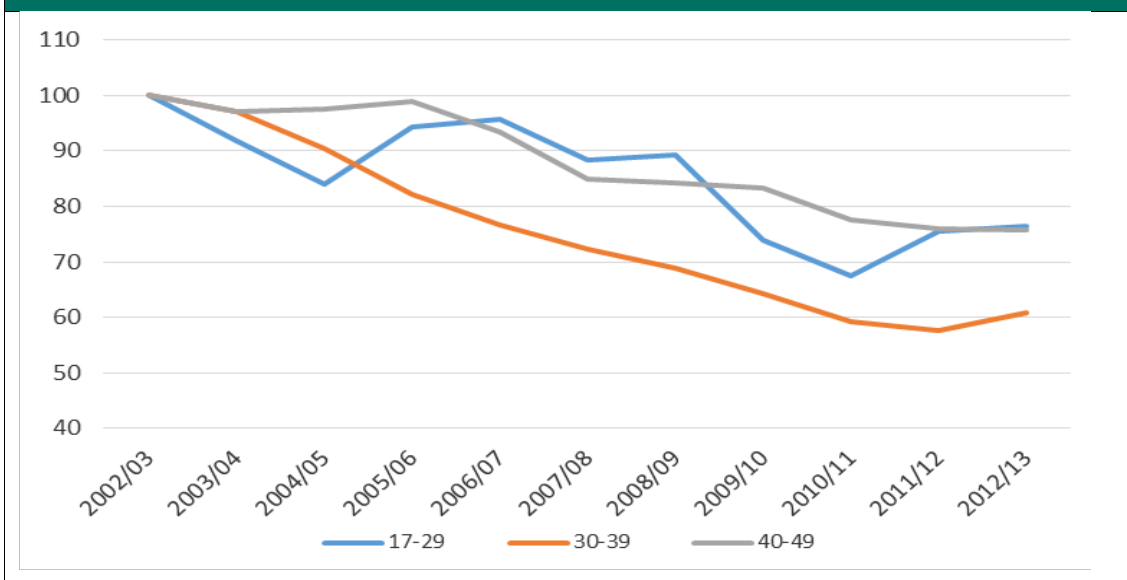
⁵⁵ Department for Transport, Transport Statistics Great Britain, Table TRA0103

Figure 3.15: Proportion of the population in urban areas by age group; England; 2011⁵⁶



3.51 In London the fall in traffic is concentrated amongst younger age groups. Figures 3.16 show that car driver mileage has fallen significantly for those under 50. Whereas elder age groups have been driving more nationally, the charts show that those 50 and over in London have kept their driving broadly constant since 2002/3.

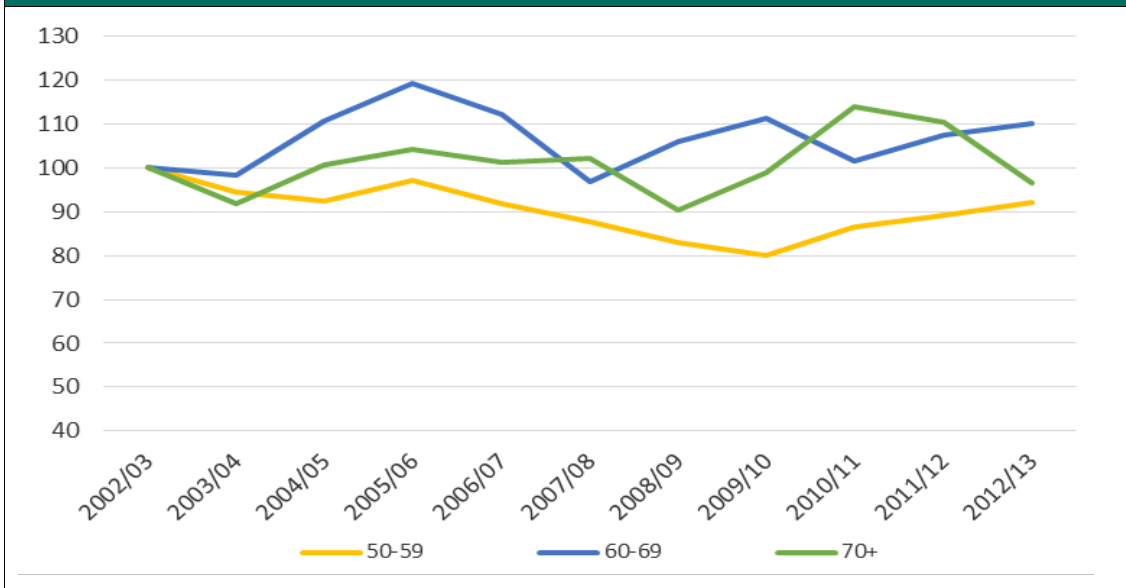
Figure 3.16: Car driver mileage by younger age groups; London; index: 2002/3=100⁵⁷



⁵⁶ Office for National Statistics, Census 2011

⁵⁷ Department for Transport, National Travel Survey 2013

Figure 3.17: Car driver mileage by elder age groups; London; index: 2002/3=100⁵⁸



Differences in accessibility and impact of alternative modes of transport

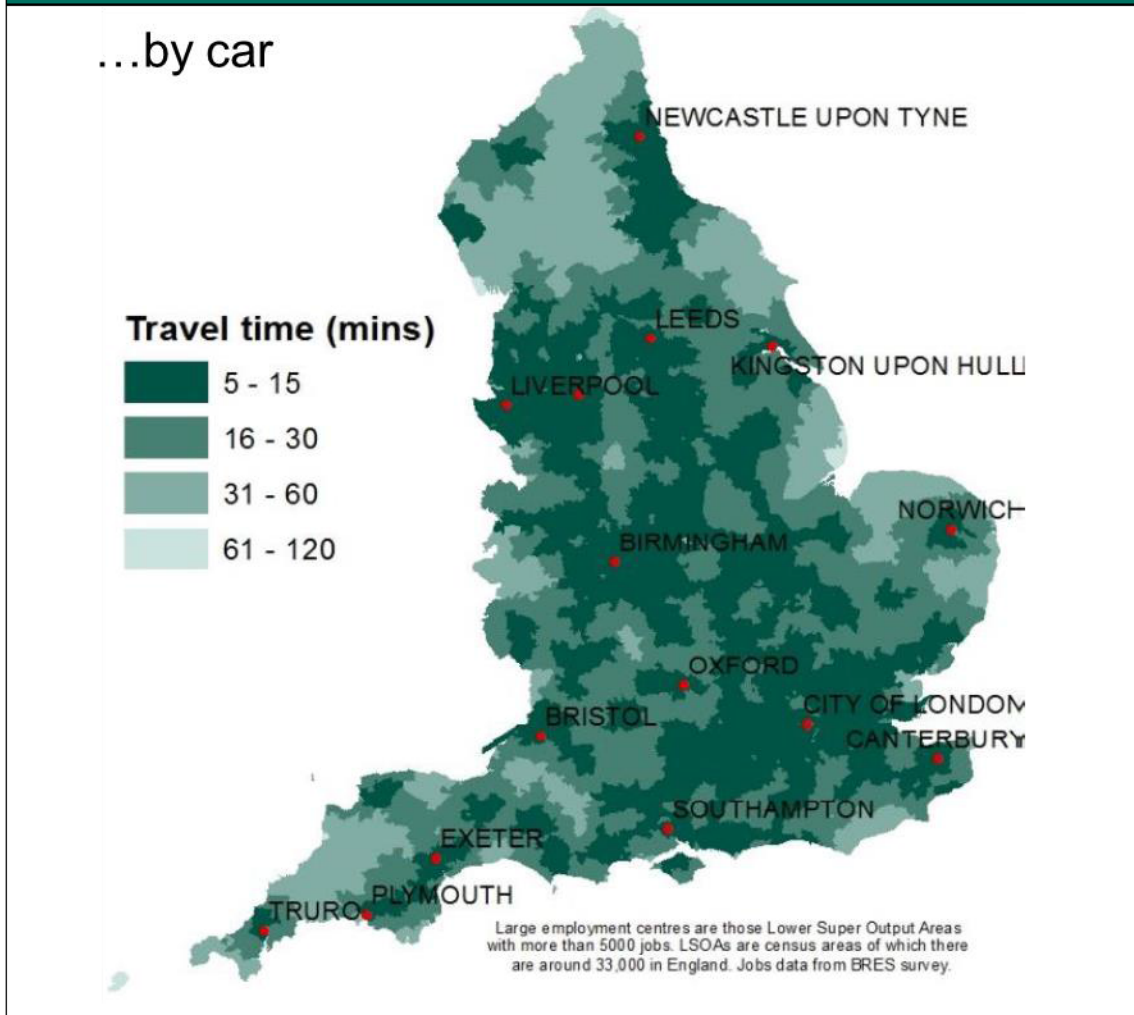
3.52 We have reviewed whether better availability and increasing use of public transport can offer some explanation for changing car demand. Public transport is generally in greater supply in urban areas giving people much greater access to the places that they need to visit, and choice over how to get there. This compares to rural areas where public transport services may be comparatively less frequent meaning the car remains popular.

3.53 In urban areas people face a car journey of approximately 5 minutes to reach 7 key services such as the hospital, food store, and school. It takes twice the time to make the same journey by public transport or walking.

3.54 In rural areas, the advantage of travelling by car is much greater. A similar journey to reach the 7 key services in rural areas takes only 7 minutes in a car (not much greater than in urban areas), compared to an average of 19 minutes by public transport or walking - almost three times as long.

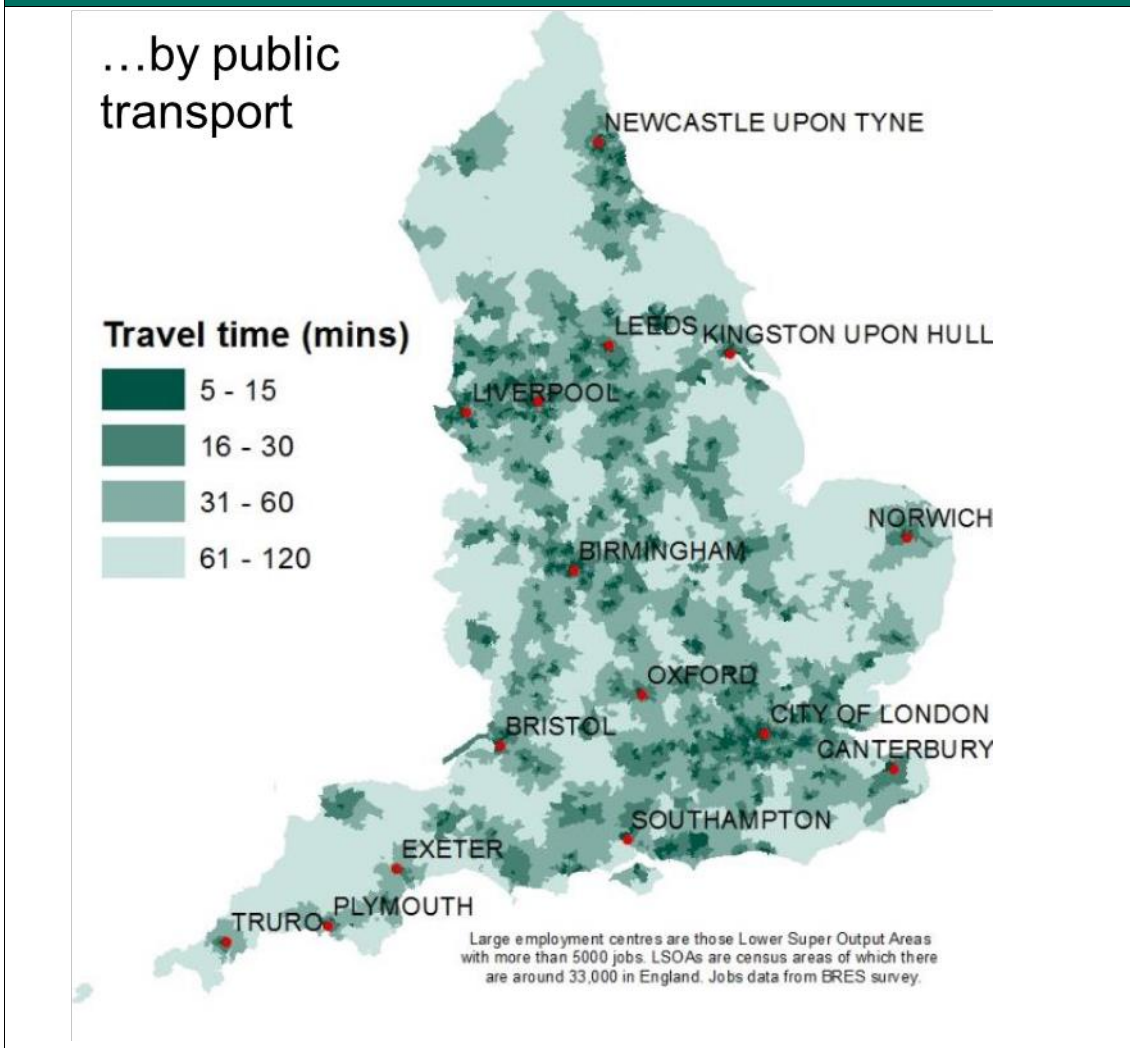
⁵⁸ Department for Transport, National Travel Survey 2013

Figure 3.18: Travel times to nearest large employment centre by car, England, 2013⁵⁹



⁵⁹ Department for Transport, Accessibility statistics 2013

Figure 3.19: Travel times to nearest large employment centre by public transport, England, 2013⁶⁰



3.55 Figures 3.18 and 3.19 show this effect visually with dark green areas indicating places with low travel times (5-15 minutes) by each mode. This shows that most areas within England have access to a large number of employment locations by car.

3.56 However, the same is not true for public transport – Figure 3.19 shows that large parts of England require over half an hour to reach the nearest large employment centre by public transport. It is in and around the larger cities that people can get to employment locations much quicker - showing that it is here where it offers a more viable alternative to the car.

3.57 Outside of London the car is the dominant mode of transport for commuting to work. Gomm and Wengraf (2013) show that in rural areas, nearly three quarters of workers commute by car (either as driver or

⁶⁰ Department for Transport, Accessibility statistics 2013

passenger). In urban areas outside of London, the same figure is lower at 67% - although this suggests that even in areas with greater accessibility from public transport, the car remains popular for the commute.

3.58 Over 1 in 10 of those in urban conurbations that are not learning to drive attribute this to the availability of other modes; this compares to 1 in 33 and 1 in 50 for rural towns and villages respectively⁶¹.

“Other transport available” given as the main reason for not learning to drive:

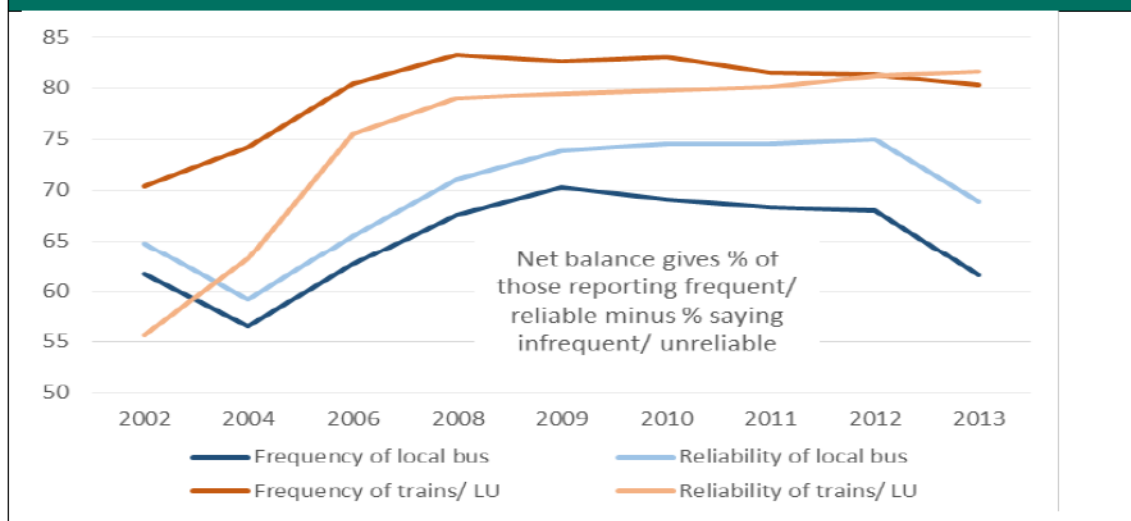
11% = Urban Conurbation

2% = Rural Village, Hamlet and Isolated Dwelling

Source: DfT, NTS

3.59 And it appears that perceptions of both the frequency and reliability of public transport have been improving over time. Figure 3.20 shows perceptions of frequency and reliability of public transport modes. A higher number represents an improvement in the measure. Perceived measures of surface rail and the London Underground saw large increases in the early 2000s, with smaller but notable increases in the reliability of local buses from 2004.

Figure 3.20: Frequency and reliability of public transport; England; index: 2002 to 2013⁶²



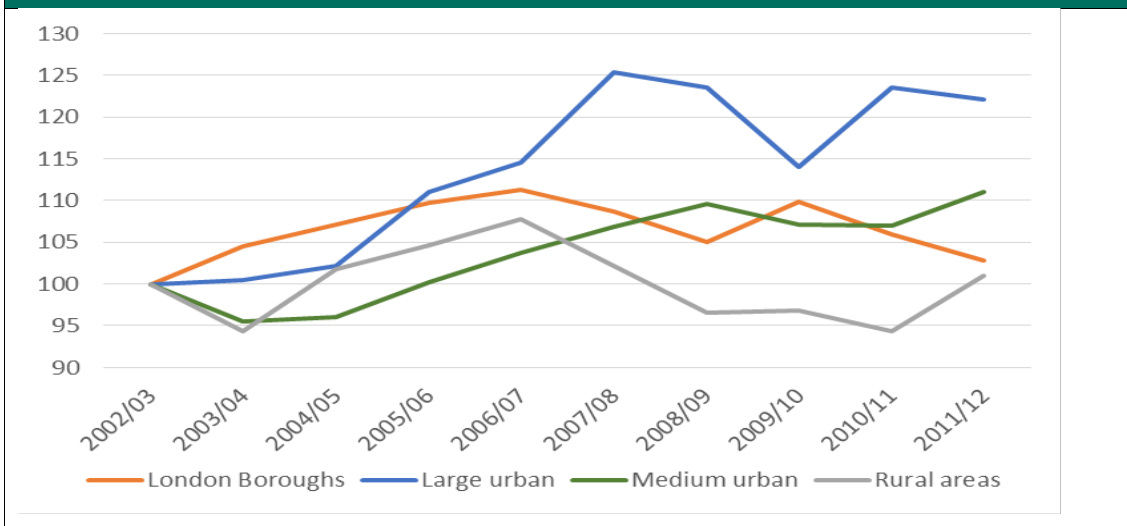
3.60 Improved perceptions have been associated with public transport use increasing in urban areas, with metropolitan areas seeing a 12% increase and large urban areas a 22% increase since 2002/03. However, public transport use is now only slightly higher than it was a decade ago

⁶¹ Department for Transport, National Travel Survey 2002/13

⁶² Department for Transport, National Travel Survey 2013, Table NTS0802

in London, despite initially rising over the first half of the decade. In rural areas it has also remained broadly flat.

Figure 3.21: Growth in public transport miles per person by type of area; England; index: 2002/03=100⁶³



3.61 So the increase in public transport appears to be a factor in other urban areas but does not appear to explain much of the fall in traffic in London. Table 3.2 shows that the small increase in public transport trips accounts for just a small fraction of the decline in car trips in London.

Table 3.2: Change in trips per person by selected mode; 2002/03 to 2012/13⁶⁴

Geographic area	Metric	Car/ van driver	Local bus	Other public transport
England	Trip rates	-44	-2	+4
	% change	-10.2%	-3.7%	+9.1%
London	Trip rates	-53	+2	+2
	% change	-20.5%	+1.5%	+1.8%

3.62 Transport for London (2014) highlights the importance of differentiating between inner and outer London. It notes that the increased investment in public transport has led to much greater capacity and quality of services which has contributed - but cannot fully explain - the fall in car use in the capital.

⁶³ Department for Transport, National Travel Survey 2013, Table NTS9904

⁶⁴ Department for Transport, National Travel Survey 2013, Table NTS9902. These figures are for London residents only

Take-out messages:

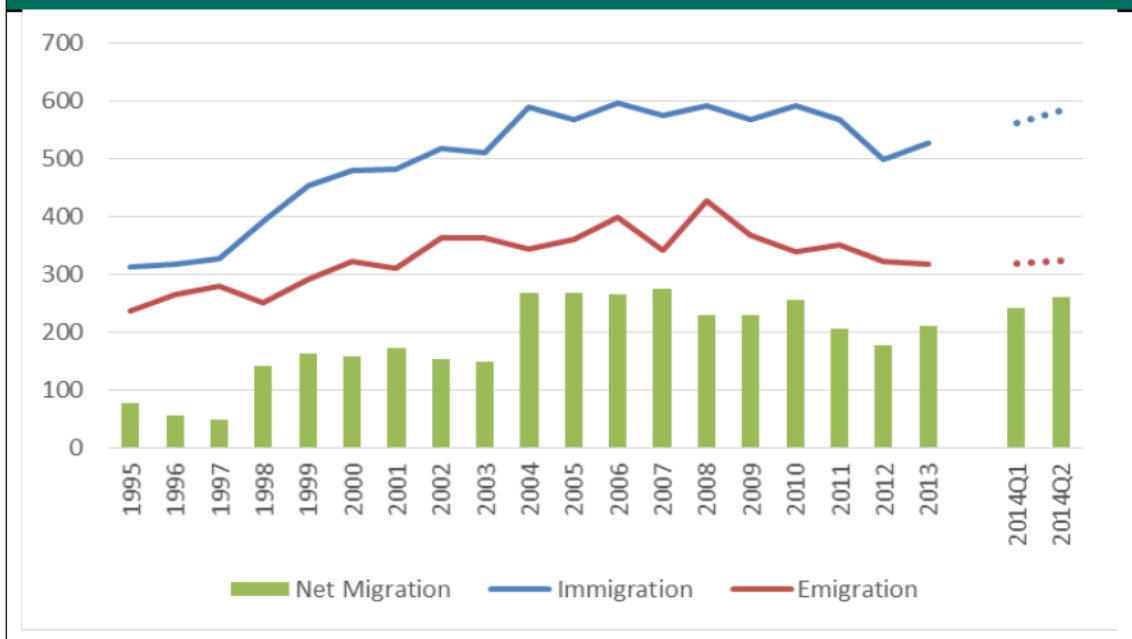
- The population has grown significantly over the long-run adding upward pressure to road demand
- Much of this growth has been in urban areas in the last two decades, and there is good evidence this has reduced average car demand, but evidence suggests the impact is relatively modest.
- Car use has fallen in urban areas to a higher degree than in rural areas. This is partly explained by there being more young individuals in urban areas. An increase in use of public transport is also evident in urban areas, but this can explain only a small part of the fall in car use in London.

Migration

3.63 It has been noted in the literature that travel trends in urban areas are influenced by migrants as they exhibit different travel patterns.

3.64 Tsang and Rohr (2011) show that migrants tend to locate in metropolitan areas - for example, 40% of the non-European Economic Area (non-EEA) migrant population is within London compared to 11% of UK nationals. Furthermore, there have been strong levels of migration since the mid-1990s (see Figure 3.22).

Figure 3.22: Migration levels; United Kingdom; 1995 to Q2 2014⁶⁵

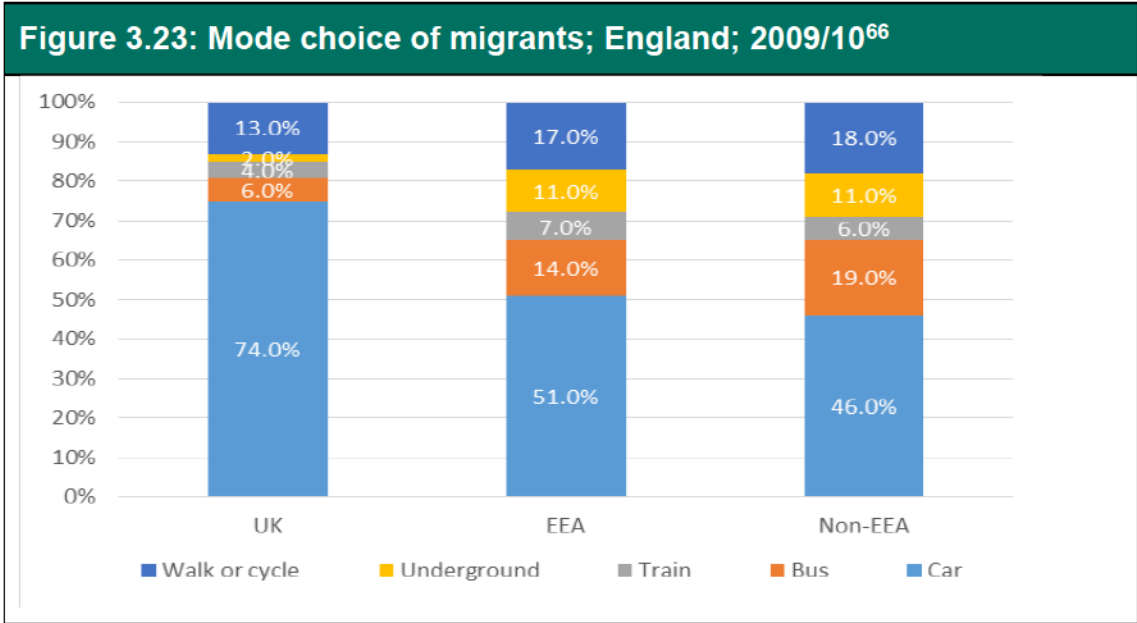


⁶⁵ Office for National Statistics, Migration Statistics Quarterly Report, November 2014

3.65 Migrants tend to travel less by car, and make greater use of public transport, cycling and walking. Although this will in part reflect their location, with use of these modes being greater in urban areas where migrants tend to reside. Tsang and Rohr (2011) also find that in the UK, even after accounting for factors such as arrival year, socio-demographic characteristics and home/work location, migrants avoid the car and use buses.

In 2010, migrants made 10% fewer total trips than UK-born residents but made 35% more commuting trips

Source: Tsang and Rohr (2011)



3.66 Whilst it is difficult to say how much the travel behaviour of migrants will influence aggregate travel trends or the trends observed for specific groups and locations, the evidence does suggest the strong growth in migration in London and other urban areas has affected car trends. To the extent that migrants have added to population levels, they will have contributed to rising traffic levels. However, their tendency to drive less will have reduced average car use in London and other urban areas in the last two decades. Transport for London (2014) further note that migrants are more likely to live in inner London where the need for a car may be less.

3.67 It is important to note however that there is no evidence that the travel patterns of migrants influence those of domestic-born individuals, and

⁶⁶ Office for National Statistics, Annual Population Survey, Oct 2009- Sep 2010

some evidence that over time migrants tend to 'transport assimilate' (see Blumenberg and Evans (2010) and Tsang and Rohr (2011)), where their transport decisions become increasingly similar to those of the locals.

Take-out messages:

- There is modest evidence that increasing migration may have been contributing to falling average car travel in urban areas, as they tend to drive less on average, but the overall impact on aggregate traffic growth is unclear.

The impacts of technology

Tele-commuting

3.68 Homeworking (telecommuting) is often cited as a potential factor in reducing total miles driven due to fewer commuting trips. Whilst much of the evidence is US-based, Mans et al (2012) and White et al (2007) do find evidence of reductions in car mileage associated with teleworking - with the latter finding a reduction in car mileage of 9-11% a week.

3.69 Perhaps unsurprisingly the impact is predominantly on commuting trips. Interestingly White et al. (2007) found individuals working from home made more business trips. They also find that telecommuting is much more likely amongst higher income groups (who have seen the biggest declines in car use in recent years).

3.70 However, analysis by the ONS suggests the scale of change in homeworking may have been quite small (see Figure 3.24). Over the 16 years of available data, the homeworking rate⁶⁷ has only risen from 11.1% to 13.9% - a rise of 2.8 percentage points. This would suggest the impact on car use would be small.

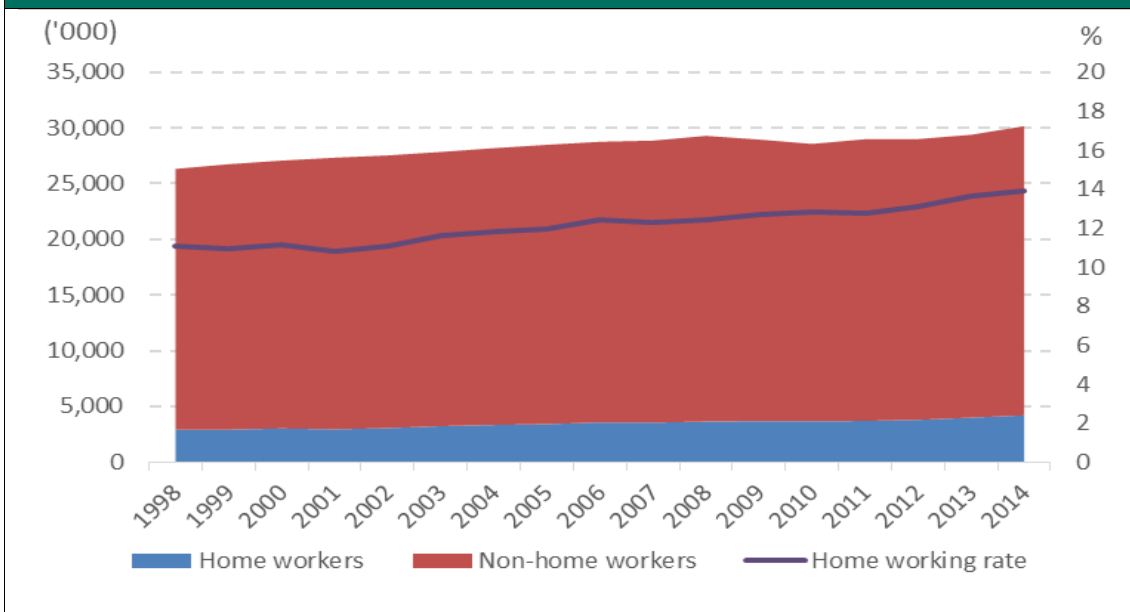
3.71 The figures in Figure 3.24 relate only to those who spend the majority of their time working from home, and does not pick up those who work from home occasionally. Whilst this may mean it underestimates the growth and impact of telecommuting, White et al (2007) find that a fall in average distances travelled only becomes evident when people work from home

⁶⁷ Home working rate is the percentage of people in employment who report that home working is a significant factor in their employment as they spend the majority of their time working from home.

three or more times a week, so an increase in occasional working from home may not have a great impact on car use.

3.72 Given the evidence available, there is some indication that an increase in telecommuting may have led to a small reduction in car use, particularly commuting trips, but further evidence and investigation is clearly needed.

Figure 3.24: Home and non-home workers (LHS) and home working rate (RHS); 1998 to 2014⁶⁸



Online shopping

3.73 Another trend associated with the increased use of technology is the increase in online shopping. This may help explain the fall in shopping trips identified earlier (see page 33-34). Figure 3.25 shows how this has changed over time for different age groups. There are two key points of note: (i) fewer of those in the older groups shop online; while only 4 in 10 of the over 65 years category make purchases online, approximately 9 in 10 of those under 35 years do; (ii) there is a clear trend over time (albeit with only 6 years of data) for increasing use of shopping online across all age groups - rising by around 20 percentage points for all age groups.

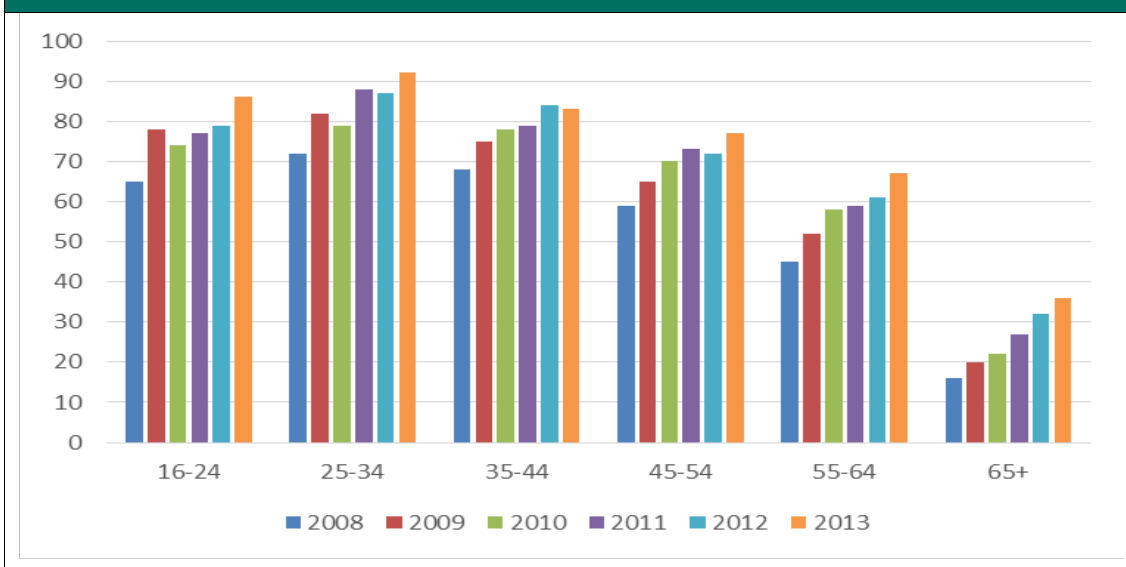
3.74 This appears to suggest online shopping provides little explanation for the diverging trends in car use across old and young - whilst the young are more likely to shop online, over time the growth in the number of people making purchases online has grown just as much for older age

⁶⁸ Office for National Statistics, Characteristics of Home Workers 2014

groups. However, the data provides no indication for how many transactions take place online.

3.75 Moreover, the impact of online shopping on aggregate travel trends is unclear. In their evidence review for the Department, Rohr and Fox (2014) highlight that whilst in some cases online purchases may replace a shopping trip, in other cases it may result in new trips as people make a special trip to the shop for that item, and may increase the number of trips for mail and package delivery. Meanwhile, individuals may choose to purchase some items online but still travel to the shops to purchase other items which they may have previously done in the same trip.

Figure 3.25: Proportion of age group that make purchases online; Great Britain; 2008 to 2013⁶⁹



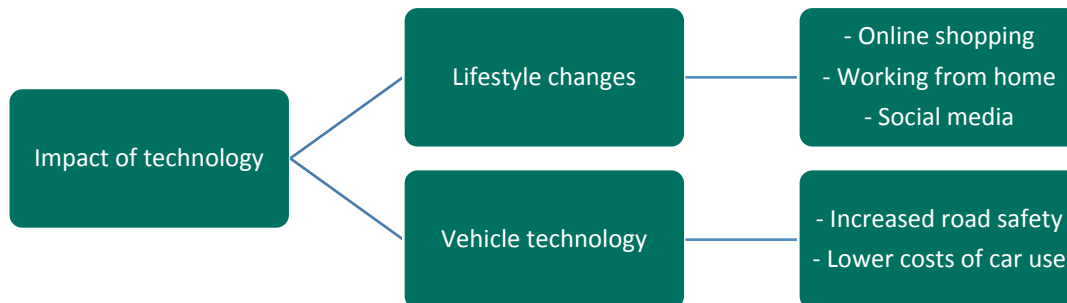
Social media

3.76 There is very little evidence investigating the impacts of social media on car use (Rohr and Fox, 2014). Mans et al. (2012) suggests that the impact of social networking on transport are complex and not yet understood although there is some preliminary evidence from the US that internet users may be reducing their time travelling for social and recreational reasons (Contrino and McGuckin, 2006).

⁶⁹ Office for National Statistics, Internet Access - Households and Individuals, 2013

Other impacts through technology

3.77 We can divide the role of technology into two distinct areas: the impact on people's lifestyles and the impact on vehicles themselves and the wider transport infrastructure:



3.78 The impact of technology on lifestyle changes has been discussed above. The impact of technology on travel behaviour from advances such as autonomous vehicles are uncertain although there is increasingly more research being undertaken in this area. The change in behaviour will depend on many factors such as the cost of vehicles, the degree and rate of market penetration and how road infrastructure develops.

3.79 There are further technological impacts to consider - including the role of real-time information, big data, and apps which allow people to better plan their journeys, and travel more reliably.

Papers investigating the effects of autonomous vehicles:

- Le Vine et al (2015) find there may be a trade-off between the suggested additional capacity that may arise from autonomous vehicles and passenger experiences (e.g. productive use of time).
- The ITF (2014) studied the effects on urban mobility; the same mobility may be delivered with many fewer cars and despite overall car traffic levels likely to increase, congestion will fall.
- The Eno Center for Transportation (2013) explore the breadth of benefits through the introduction of autonomous vehicles such as: reduction in crashes, reduced congestion, improved fuel efficiency, reduced parking needs, better mobility and overall dramatically change the nature of travel.

All papers conclude that the impacts are uncertain and further research is required to investigate these and how policy can aid and support their introduction.

Take-out messages:

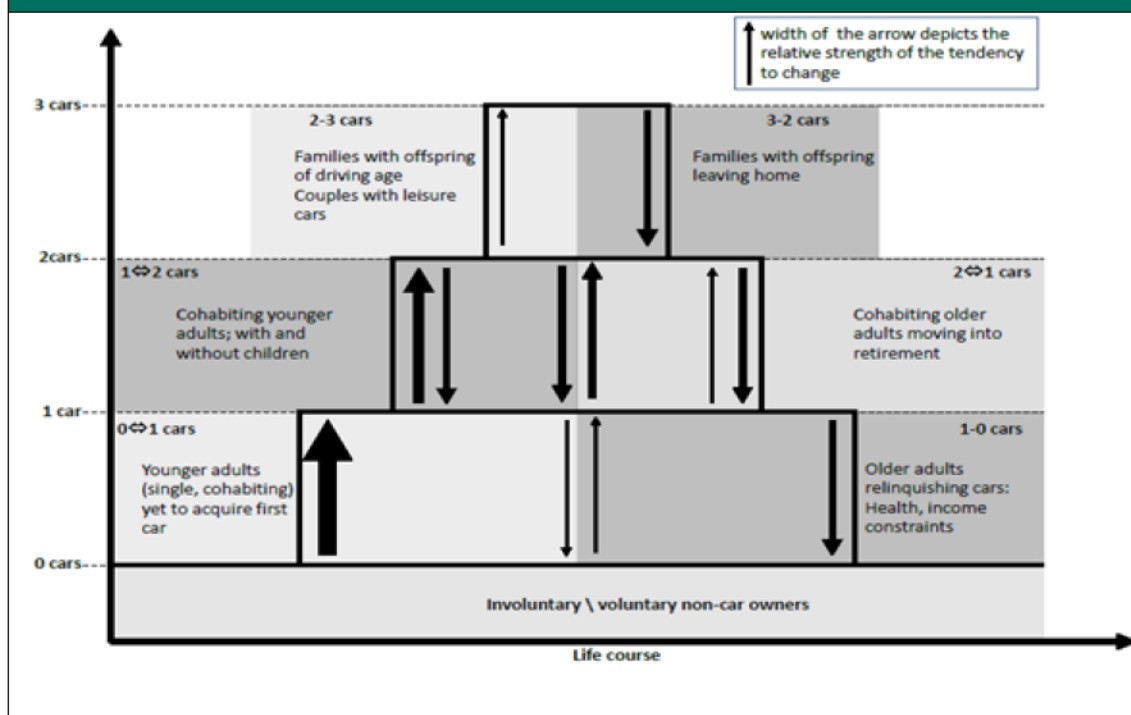
- Telecommuting is becoming more prevalent and there is some evidence suggesting that it may have had an impact on recent car travel trends.
- There is little or no evidence on the impact of other technological developments. For instance, there has been growth in online shopping although the impacts on road traffic remain unclear.

Household and family formation

3.80 The reduction in car ownership and car travel amongst younger people has coincided with people also delaying the age at which they have children and get married. ONS figures show the average age of a mother for first births increased from 26.8 in 2002 to 28.1 in 2012⁷⁰, whilst the number of people getting married in 2009 fell 34% from 1981 figures⁷¹.

3.81 These life decisions can have an important influence on car ownership and travel decisions. Figure 3.26 below conceptualises the stages in an individual's life that may alter their car ownership behaviour (Clark et al., forthcoming).

Figure 3.26: Conceptualising car ownership level transition spaces⁷²



⁷⁰ Office for National Statistics, Live Births in England and Wales by Characteristics of Mother 1, 2012

⁷¹ Office for National Statistics, Marriages in England and Wales (Provisional), 2012

⁷² Clark et al. (forthcoming)

3.82 A study on Life Transitions and Travel Behaviour⁷³ investigated the impact of major life events that may alter individual's travel behaviour – particularly car ownership – using Understanding Society (UK Household Longitudinal Study) data. Table 3.3 shows the percentage of the sample (representing households in England) that experiences a change in car ownership together with the life event or without. It shows that gaining a partner and having a child is associated with a higher likelihood of gaining a car. It also shows the importance of entering employment and acquiring a driving licence (which as we saw above has been affected by costs).

Table 3.3: Impact of life events on likelihood of car ownership change; United Kingdom

Life event	% households increasing/decreasing cars with or without life event			
	Increase cars with life event	Increase cars without life event	Decrease cars with life event	Decrease cars without life event
Lost a partner	7.0	9.0	42.7	8.4
Gained a partner	38.7	8.2	14.8	8.9
Gained a driving licence	34.0	7.9	5.7	9.2
Residential relocation	14.4	8.5	23.4	7.9
Entered employment from non-employment	15.0	8.4	9.8	9.0
Lost employment (excluding retirement)	9.4	8.9	14.8	8.7
Changed employer	15.6	8.3	11.4	8.8
Had child	11.4	8.9	11.9	9.0
Retired	6.8	9.0	12.7	9.0

3.83 This provides tentative evidence that the changing social circumstances of young people may be contributing to their reduction in car use. However, delays to getting married may in part reflect the economic

⁷³ Chatterjee et al. (2014)

circumstances of young people and may not be the root cause, and it has coincided with a rise in co-habitation, so may not by itself have had any impact. Meanwhile, the delay to having children may in part reflect the increase in female labour market participation, which is associated with rising car use for that group.

- 3.84** Furthermore the delay in having children does not appear significant - rising by just one year over ten years, and the analysis suggests that the number of individuals that experience these life transitions in any given year is also relatively small; 3.1% of the sample had a child in any one year, 5.1% gained employment and 1.6% gained a partner. This might limit the extent to which it helps explain recent car travel trends.
- 3.85** Whilst there is some evidence therefore that these trends may have contributed to car use trends amongst younger people, it would appear on the basis of the existing evidence that it would only be a part of the explanation - and possibly only a small one. However, further research on this issue is clearly needed too. In particular, what is unclear from the existing literature is the impact of the delay in ownership on traffic trends.

Take-out messages:

- There is some evidence that life events (getting married, having children) have an impact on car ownership decisions. These events are increasingly happening later in life, and this may have had some impact on recent car trends amongst younger people, but is likely to have only affected a small proportion of the population.

Attitudes to driving and the environment

- 3.86** It is well established in the literature that the car plays a dominant role in British society, not only in terms of how we travel but in the way our social and cultural world is structured.⁷⁴ For some car users, car travel is felt to be a necessity. In a DfT study⁷⁵ around two thirds (65%) of car owners surveyed agreed that they couldn't manage without a car. Amongst residents of rural areas the figure rose to 82%, whilst just under half (46%) of non-car owners also agreed with the statement.

⁷⁴ See for example Lyons et al. (2008) and Lucas and Jones (2009)

⁷⁵ Thornton et al. (2011)

Attitudes to cars, particularly amongst young adults

- 3.87** Cars are often seen as having important advantages over other modes. The evidence suggests that cars are seen to overcome the issues associated with other modes and therefore are regarded as better. For example, 64% of non-users of buses cite the fact that car journeys are both easier and more convenient as reasons for not choosing buses for journeys⁷⁶. The speed of buses relative to cars was also cited by around half of non-users. Data suggest that bus travel can be seen to be a last resort in terms of modal choice, with 70% of infrequent bus users agreeing that they would only use bus services if there was no other choice.
- 3.88** In contrast rail use is viewed more favourably, with 64% of the public enjoying train travel. There are still barriers however, with 66% of the public in 2010 expressing that train fares were expensive. This can be seen in the fact that 46% of people saying they would only travel by train as a last choice⁷⁷.
- 3.89** The distance of journeys also plays a part in people's perceptions of mode choice. Long journeys were said to be easier to make by car or plane by 23% of the public, while for those that made short journeys less than once a month, the most quoted reason (31%) was also that journeys were easier to make by car.
- 3.90** In addition to the perceived practical benefits of car travel, such as the relative quickness compared to other modes, convenience, flexibility, comfort and control (Lucas and Jones, 2009), there are also emotional benefits, covering issues such as comfort and pleasure of driving, and the security, self-image and status derived from owning a car⁷⁸. There is also the fact that cars act as a source of freedom or independence.
- 3.91** A Departmental research study⁷⁹ found a variety of push and pull factors affecting people's decision to learn to drive, such as peer pressure, parental influence, the financial and time cost of taking driving lessons, the desire for or necessity of being able to travel autonomously. For some learning to drive is seen as normative - a rite of passage, a marker of adulthood or a natural progression.
- 3.92** These emotional benefits can play an important part in individual's travel decisions. Amongst those aged 16-39, the largest factor that would be

⁷⁶ Department for Transport (2011)

⁷⁷ Thornton et al. (2011)

⁷⁸ Toombs et al. (2015)

⁷⁹ Taylor et al. (2007)

missed if there was no car in the household was reported to be a 'sense of freedom', which made up 48% of the responses⁸⁰. In contrast, the ability to go shopping was reported to be missed by only 10%.

- 3.93** One line of thought is that attitudes to and perceptions of the car may have changed over time, particularly amongst young people, and this is one factor behind their declining car use.
- 3.94** Research⁸¹ suggests that younger generations are more likely to consider alternative forms of transport: 44% of young adults agreed that there was no practical alternative to having a car, compared to 52% of the population as a whole. When broken down it was found that agreement increases with age as 26% of 16-20 agreeing with the statement, while 53% of 30-39 year olds agreed.
- 3.95** However, there is little evidence that the young see the car less favourably than older groups - while 78% of people agreed that they enjoyed driving, the levels of agreement actually decreased with age. The main perceived disadvantages were congestion/traffic jams (41%) and expenses/cost (25%). And importantly, a greater proportion of 16-20 year olds (27%) agreed that having a car was a sign of success, than amongst 30-39 year olds (20%).
- 3.96** Furthermore, Figure 3.7 shows that in 2013 just 13% of 17-20 year olds stated that they were not interested in learning to drive compared to 31% of 40-49 year olds, 37% of 50-59 year olds and 43% aged 60+.
- 3.97** Unfortunately there is no evidence to see how these proportions have changed over time, but from the research above there is little evidence to suggest that the young have different attitudes towards the car, or less of an emotional attachment towards it, and that this is a factor behind the decline in car use amongst them.
- 3.98** In addition to the research above, Rohr and Fox (2014) find that there is little evidence in the studies they reviewed of significant attitudinal changes towards car ownership and usage.
- 3.99** Interestingly, Chen et al. (2014) who studied individuals of ages 11-16 found that car mileage for this group (passenger only) rose 13% between 1995/7 and 2008/10. This compares to a fall of 25% by those aged 17 and 29. Chen et al state that "pre-driving age young people travel more by car today than they used to do, while the opposite is true for young

⁸⁰ Thornton et al. (2011)

⁸¹ Unpublished analysis of data from Climate Change and Transport Choices 2011 study conducted internally by DfT in 2014

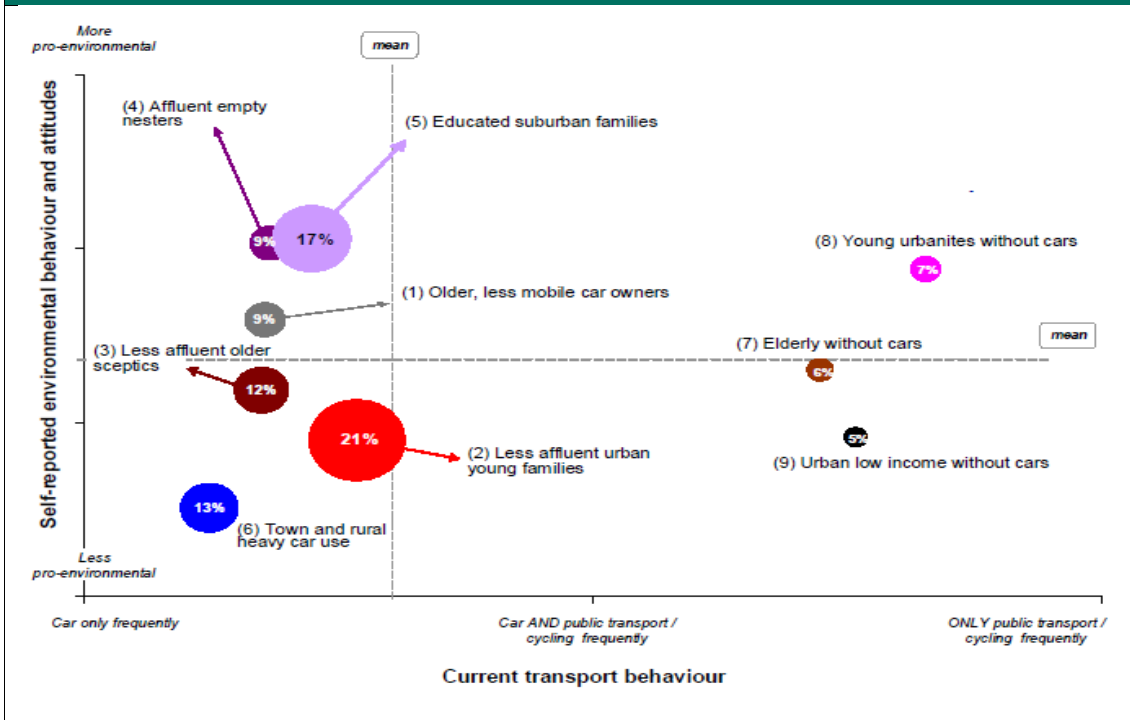
adults above the driving age". It is the author's view that as pre-driving age young people are increasingly travelling in cars, they may become more inclined to drive in the future than the current cohort of driving age young adults.

Environmental concerns

- 3.100** One particular aspect influencing people's attitudes towards driving, is environmental concerns. In 2011, the Department published a Segmentation Study in 2011 that identified and analysed nine segments of the population and their travel behaviour.
- 3.101** The focus of the study was on reducing emissions, and therefore looked at environmental concerns and behaviour alongside transport behaviour.
- 3.102** The report - findings presented in Figure 3.27 - suggest that a number of groups, making up a large share of the population, have potential for reducing their travel demand - including educated suburban families (17%), affluent empty nesters (9%), and less affluent urban young families (21%).
- 3.103** However, whilst the first two of these are found to be more pro-environmental, they continue to use only the car frequently, rather than public transport or cycling. The latter group, were found to be less pro-environmental. Only young urbanites without cars (making up just 7% of the population) were found to be both pro-environmental and travelling only by public transport and cycling⁸².

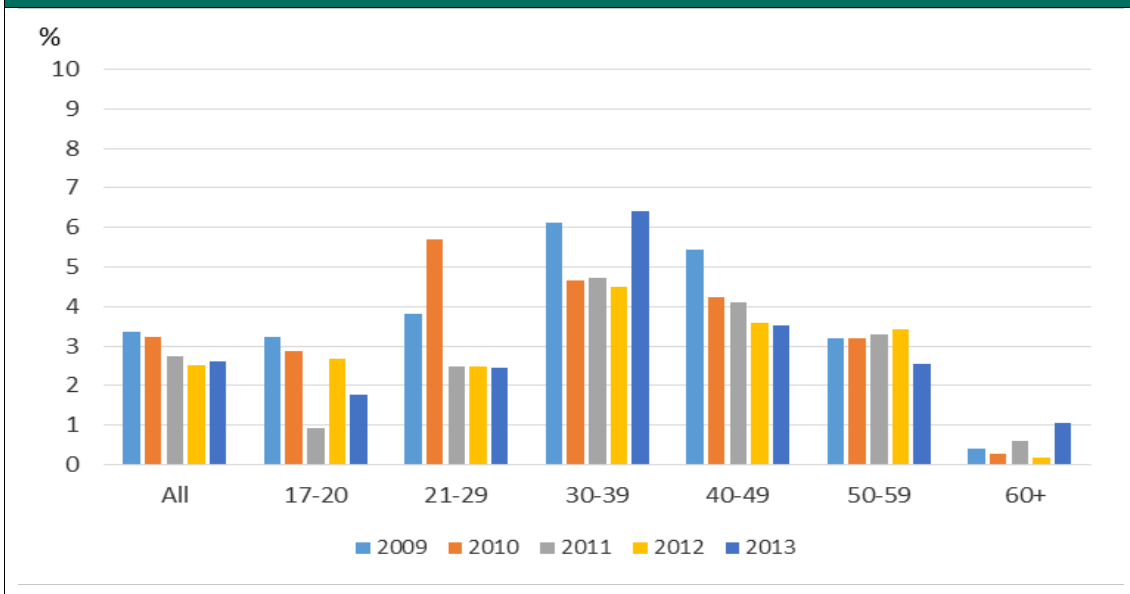
⁸² Thornton et al. (2011)

Figure 3.27: Population segmentation and their transport behaviour⁸³



3.104 Furthermore, in citing reasons for not learning to drive in 2013, only a small proportion (2.6%) state environmental concerns as a reason. Asked for the main reason for not learning, the proportion falls to 0.4%⁸⁴.

Figure 3.28: Proportion of non-licence holders citing the environment as a reason why⁸⁵



⁸³ Thornton et al. (2011)

⁸⁴ Department for Transport, National Travel Survey 2013, Table NTS0203

⁸⁵ Department for Transport, National Travel Survey 2013, Table NTS0203

3.105 Further, there is evidence from social research that although people state that they have concerns about the environment, this does not translate to any change in their driving patterns.

3.106 Overall therefore, whilst environmental concerns may be influencing a small number of young people in cities not to drive, the evidence suggests this is not a big factor behind recent car travel trends.

Take-out messages:

- Cars are seen as the most desirable mode of choice due to advantages such as convenience, status and flexibility over other modes.
- There is little evidence to suggest that attitudes are changing, and that young people view cars less favourably than older generations. Evidence suggests that while some young people would be more willing to use other modes, they are more likely to see the car as a sign of success and enjoy driving than older groups.

Market saturation

3.107 One theory put forward for the slowing down, and levelling off in car traffic is that the market is reaching saturation. This could refer either to saturation in cars owned (as everyone who wants a car has one); in the proportion of trips taken by car (as car owners have no more trips they can or want to take by car instead of other modes), or distance they travel (as people can access all the places they need to).

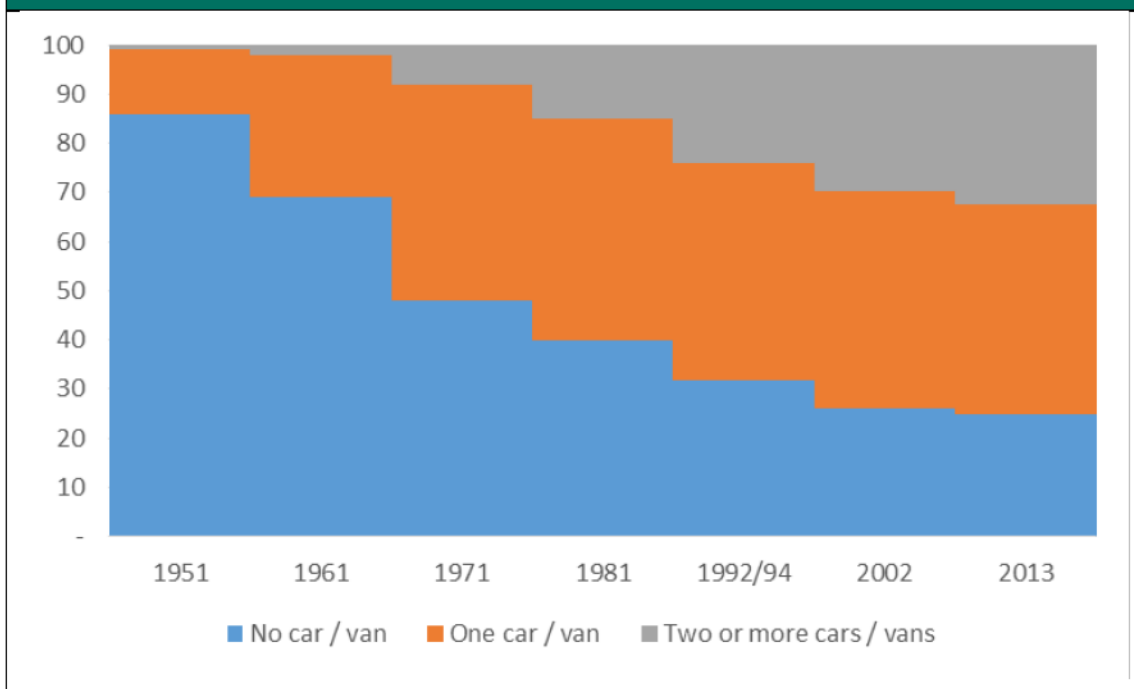
3.108 Metz (2012) notes that travel times have remained steady over time, at around 1 hour a day (the Marchetti constant) - so that even as incomes increase, because total travel time is stable, there is increasing resistance to travelling further. Meanwhile, Goodwin (2012) has highlighted that aggregate forecasts incorporating a saturation effect from the early 1970s predict 2010 car ownership levels (cars/people) and 2010 car traffic levels remarkably well.

3.109 It has been highlighted above that the distance per car trip has been steady and the proportion of trips taken by car has not risen significantly. However, these and past forecasts are not evidence that the nation has reached saturation.

3.110 As shown above, there has been a clear trend of increasing car ownership at the household level over the long-run (see Figure 3.29) - although the proportion of households with at least one car is growing more slowly. The proportion of households with two or more cars is still growing, although it is widely acknowledged that the change in miles driven from a second vehicle is less than that of gaining the first vehicle. And as the population continues to grow, the number of licenced vehicles at an aggregate level would be expected to continue growing. So there is little sign of saturation in car ownership.

3.111 And whilst the proportion of trips taken by car, and distance travelled by car has remained broadly level over the last decade, this could be attributed to the factors considered above. As Rohr and Fox (2014) note, the case for this reflecting saturation in car use relies on aggregate car trends, which do not adequately account for the significant changes in car travel patterns across different segments of the population.

Figure 3.29: Household car availability; England; 1951 to 2013⁸⁶



Take-out messages:

- There is little evidence confirming saturation in either car ownership levels or distance travelled. Car ownership has continued to rise, albeit at a slower rate, and while car use may have levelled off recently at an aggregate level, this masks different trends across different groups.

⁸⁶ Department for Transport, National Travel Survey 2013, Table NTS0205

Network effects

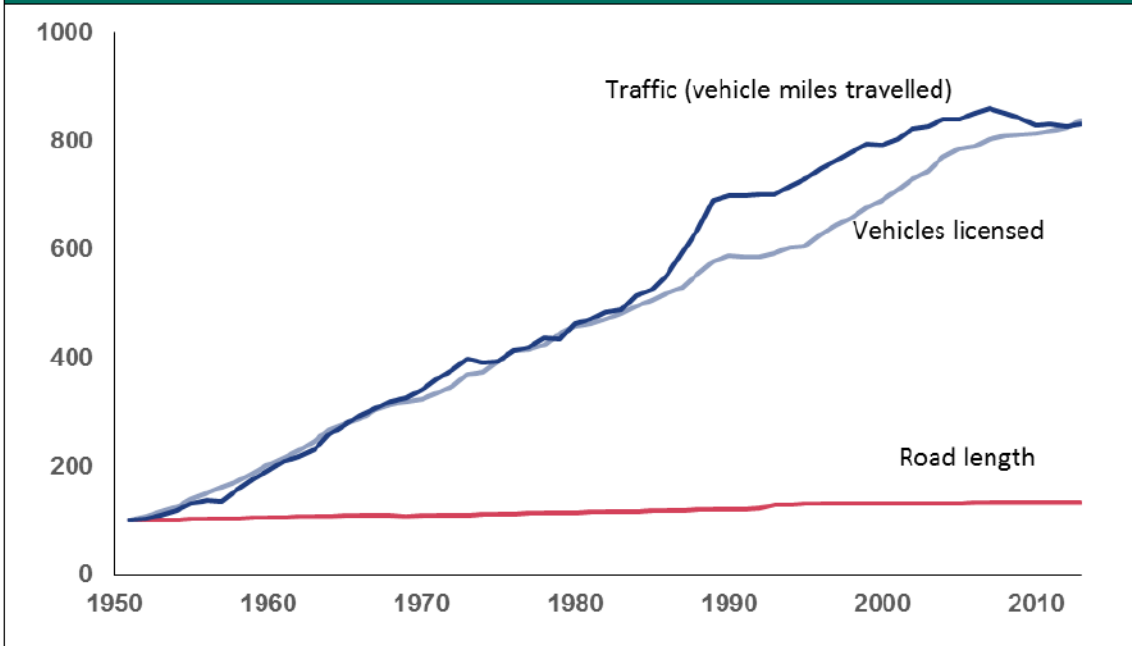
- 3.112** All the factors considered thus far have focused on factors affecting the demand for car travel. Of course supply (in terms of road space, parking availability and costs, and congestion) could be an important factor influencing people's travel decisions, by increasing the cost of travelling - in terms of time and reliability. This is especially important for time-critical journeys.
- 3.113** Some evidence⁸⁷ suggests that one of the main issues with congestion was the fact that it made journey times uncertain, and research has found that one of the most important factors concerning individual's attitudes towards travel is predictability, with one of the most important wants for road users being the ability to make a journey in the time they allocated for it.
- 3.114** For example, 60% of respondents to the British Social Attitudes Survey in 2011 agreed with the statement 'it is more important to arrive at your destination in a consistently reliable time than to arrive faster some of the time and slower at other times'. This does vary depending on the purpose of trip however, with levels of agreement on being able to arrive on time being important at 55% for commutes but as low as 5% for shopping trips.
- 3.115** Few road users plan out their journeys before setting off, instead relying on prior experience and rules of thumb to predict journey time and traffic conditions. Few actually plan out their journeys, with only 6% of road users interviewed in a recent survey with road users of the SRN⁸⁸ stating that they planned their route before leaving. Furthermore, road-users primarily rely on real-time information to find out about road issues⁸⁹, with evidence suggesting that road users will be more responsive to information provided while already on their journeys.
- 3.116** So congestion is clearly an important determinant of people's decision of whether to travel by car or not, and Figure 3.30 shows that the total amount of road length has not grown significantly when compared with the amount of vehicles and traffic on the road. Although capacity in terms of total lane length has been increasing to some degree, this has likely been small relative to the total size of the network.

⁸⁷ Department for Transport (2010)

⁸⁸ Highways Agency (2011-12)

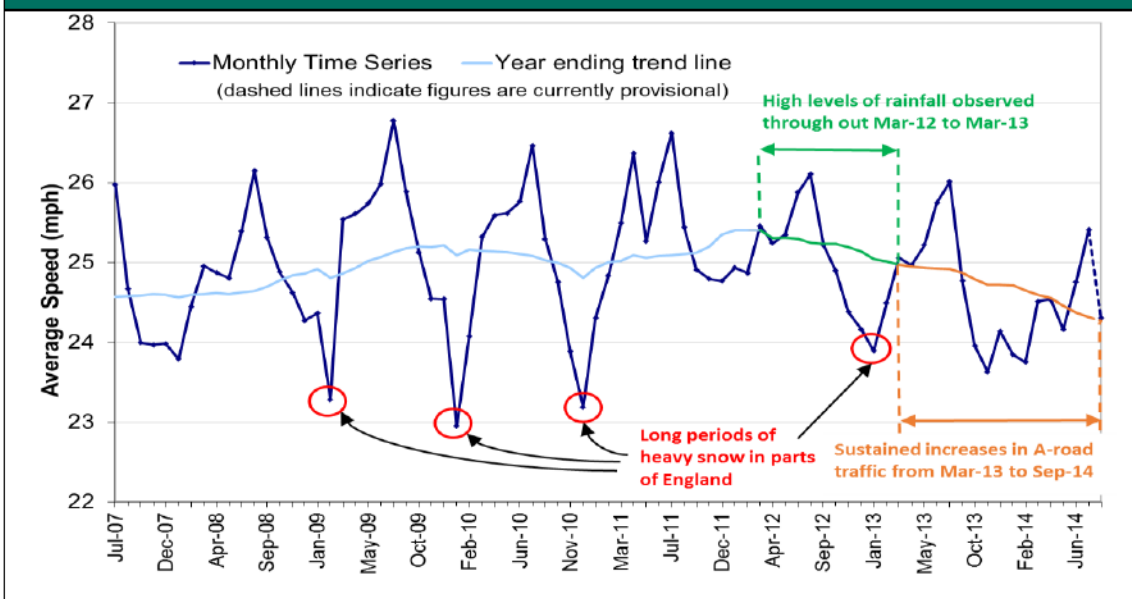
⁸⁹ Department for Transport (2014)

Figure 3.30: Trends in road length, vehicles and traffic, Great Britain, index: 1951=100⁹⁰



3.117 It is straightforward to see how this significant increase in traffic will have led to an increase in congestion. Unfortunately, there is no accurate measure of congestion over the long-run. Whilst Figure 3.31 shows average speeds on 'A' roads has been approximately constant since mid-2007, this is during a period in which total traffic has been flat, so it is hard to draw too many inferences.

Figure 3.31: Average speeds on local 'A' roads during the weekday morning peak, England, 2007 to 2013⁹¹



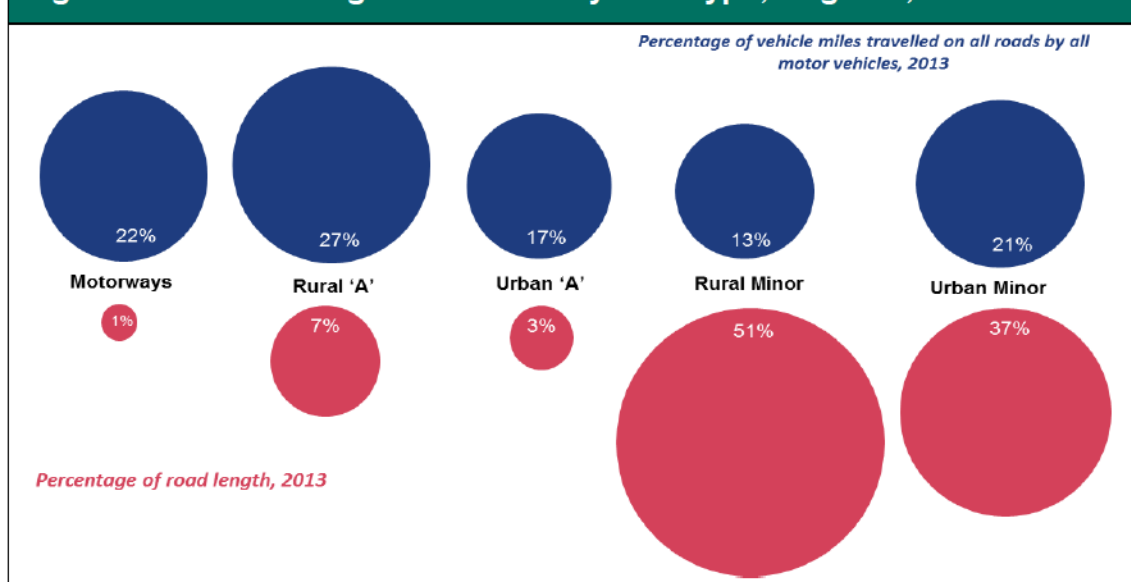
⁹⁰ Department for Transport, Road Length Statistics 2013, Vehicle Licensing Statistics 2013, and Road Traffic Statistics 2013

⁹¹ Department for Transport, Road Congestion and Reliability Statistics, Q3 2014

3.118 Le Vine and Jones (2012) note that the provision of additional motorway and dual carriageway levelled off around 2000 and that travel speeds are falling likely due to additional traffic. Rohr and Fox (2014) suggest that "it could be hypothesised that worsening of the highway supply is playing a role in the levelling off in car mileage, but Le Vine and Jones (2012) do not explicitly suggest this".

3.119 And whilst motorways make up only a small proportion of the country's total road length (1%), they account for a large share of traffic, whereas urban roads – where traffic has been falling – account for 40% of the road network, as shown in Figure 3.32.

Figure 3.32: Road length and traffic by road type; England; 2013⁹²



3.120 However, as identified above, car mileage on the motorway network has been growing strongly since 2000. It is on urban roads where traffic levels have been flat. And the literature points to urban areas being where supply has become most scarce. Williams and Jin (2013) for example note that the cost of owning and using a car in dynamic urban areas has grown significantly, reflecting resident parking charges, destination parking charges, difficulties in finding parking places at workplaces in inner cities and road congestion - and suggest evidence supports the hypothesis that in dense dynamic cities road capacity reductions are the major cause of reduced road traffic volumes in the most congested areas, whereas away from the main centres, within the conurbations, the pressures of congestion are often much less.

3.121 In London in particular, there has been a further reduction in capacity for cars as parking policy has changed significantly since the mid-1990s. As

⁹² Department for Transport, Road Traffic Statistics 2013 and Road Length Statistics 2013

Transport for London (2014) notes "regulation relating to the provision of both off-street parking and on-street parking both saw substantial changes in the 1990s. Off-street parking regulation saw a reversal of the historical policy of minimum standards for parking associated with new developments, with maximum standards introduced instead. This meant that the quantity of additional parking supply delivered through new developments have been constrained over the past 10 to 15 years". This is particularly true in population dense areas, where the demand for land is high, there is a shift away from parking spaces increasing the effort and cost required to drive in cities and large towns.

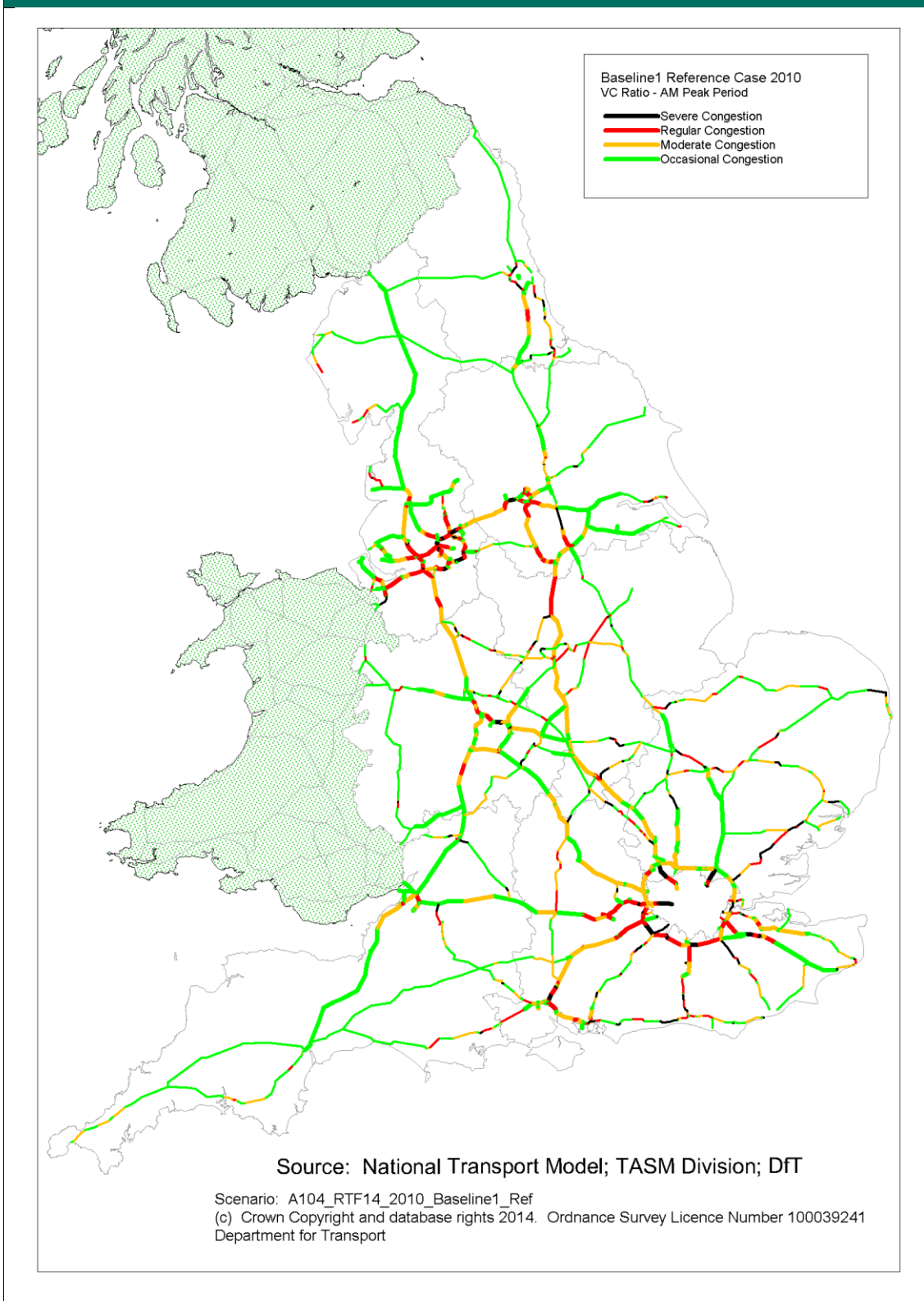
3.122 In recent years there is likely an additional constraint in more urban areas as some existing road capacity has been shifted towards use only by buses and cyclists.

3.123 This increased congestion in urban areas likely has feed-through effects to other parts in the locality. Figure 3.33 shows how congestion varies around the network. For instance, parts of the SRN that are close to London and urban areas in the North West in particular are subject to congestion and delays that other parts of the network - such as in the South West - are not.

3.124 Furthermore, congestion varies throughout the day as it is during peak times of morning and evening rush hour in the week, and mid-day at the weekend that demand puts the most pressure on the network. Whilst this will bear on people's travel decisions, data from the Department's automatic traffic counters⁹³ suggests this has not changed significantly over time.

⁹³ Department for Transport, Transport Statistics: Traffic counts

Figure 3.33: Congestion on the road network; England; 2010⁹⁴



⁹⁴ Department for Transport (2015, forthcoming)

3.125 So capacity limits do appear to offer some explanation of the diverging trends on urban roads and the SRN, although it is again an area where further analysis and evidence is needed.

Take-out messages:

- There is some evidence that capacity constraints in urban areas are impacting upon congestion and this may be contributing to the levelling off in car traffic in these areas.

Other factors

3.126 There are other factors which could potentially be contributing to the trends observed in Chapter 2, including new forms of car access, changing trends in educational participation, and land-use.

New forms of car access

3.127 Since the inception of large-scale car-clubs in 2000, the number of subscribers has increased dramatically, particularly over recent years; in 2006 the level of subscribers was below 5000⁹⁵ compared to 160,000 as of December 2013⁹⁶, and London dominates this market with 80% of British subscribers⁹⁷ which has likely had an impact on car ownership and car travel trends in London. One estimate suggests that car-clubs have prevented nearly 3 in 10 from purchasing a car themselves, equating to the deferred purchase of 11 cars for every car-club car⁹⁸.

3.128 It is likely that these will play an increasingly important role in people's car ownership decisions but as numbers of subscribers have been small (Department for Transport (2009) shows that only 1% were a member of a car club), it explains little of the car trends seen over the past two decades.

Land use

3.129 Another important aspect that has received attention in the literature is the location of new developments (see for example Metz, 2013). Figure

⁹⁵ Le Vine (2012)

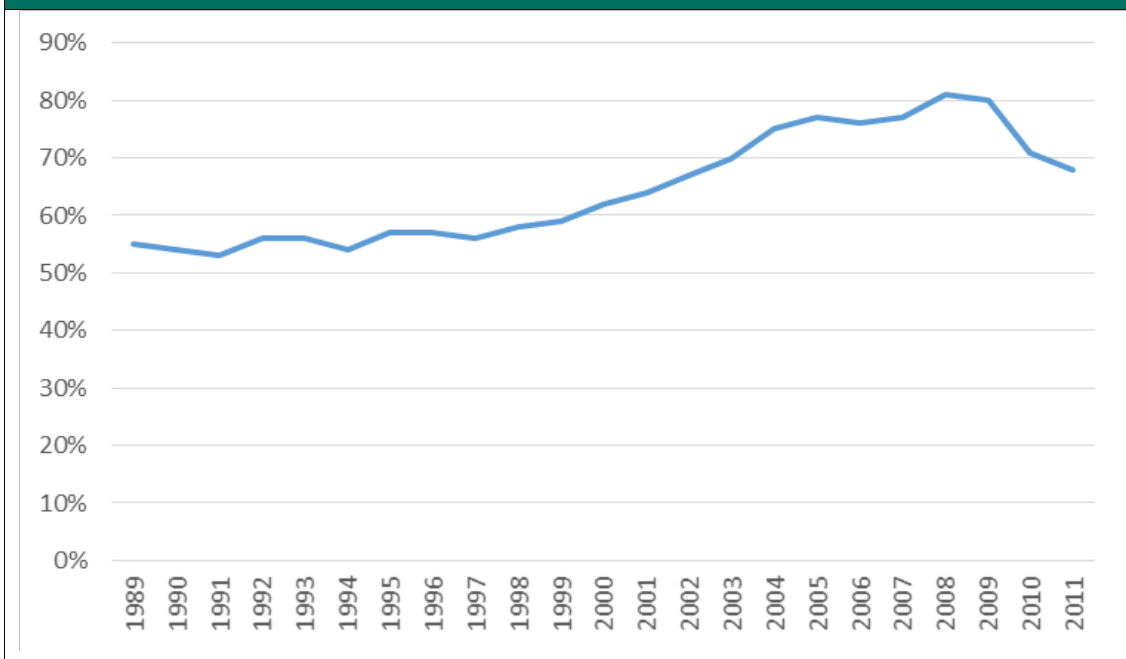
⁹⁶ Ball, Gifford and Le Vine (2014)

⁹⁷ Carplus, Annual Survey 2013/14

⁹⁸ Carplus, Annual Survey 2013/14

3.34 shows that over the past 15 years an increasing share of development has taken place on land which has previously been developed. If this type of land is located in urban areas ('brownfield site') there is likely greater provision of public transport already in place, as opposed to if the new dwellings are located in rural, previously undeveloped land.

Figure 3.34: Proportion of new dwellings on previously developed land, England, 1989 to 2011⁹⁹



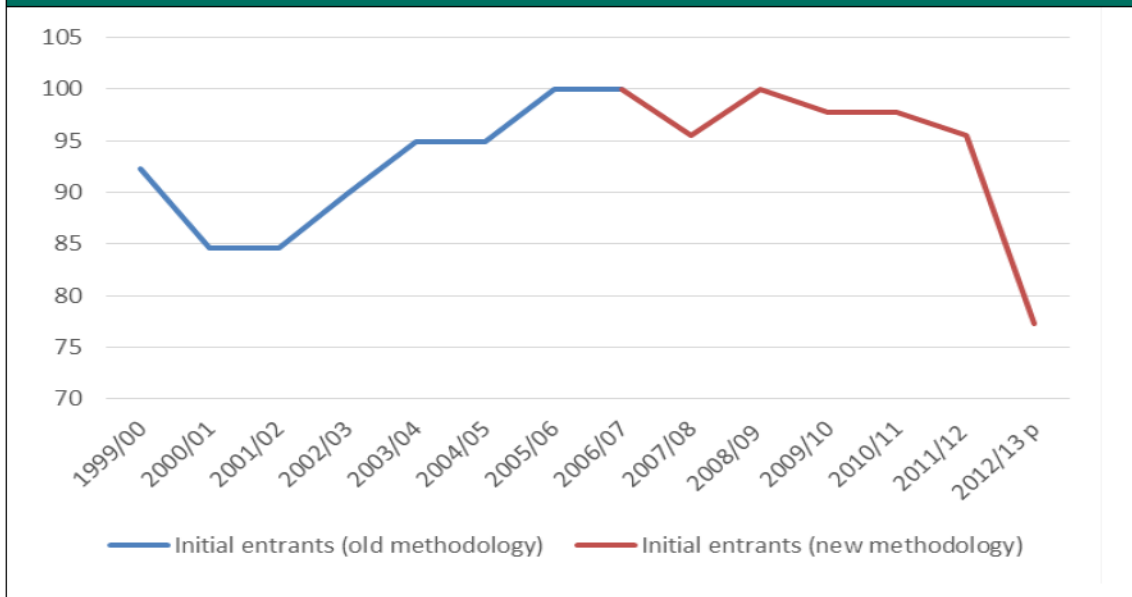
3.130 However, recently an increasing proportion of new dwellings are being developed in locations that are previously undeveloped as can be seen from the fall in the proportion since 2008 in Figure 3.34, suggesting a reversal of this trend (although caution should be taken: previously developed land does not necessarily imply that these are brownfield sites located in urban areas).

Educational participation

3.131 Between 2000 and 2006 there was a trend of increasing numbers of entrants to higher education. The implications of this are not clear although Berrington and Mikolai (2014) suggests that of those aged 17-34, students are approximately half as likely to hold a licence as someone in employment. For their regression on miles driven, being a male student only makes you marginally more likely to drive than the reference case of being employed but not driving to work, however, being the same categories for female makes you much more likely.

⁹⁹ Department for Communities and Local Government, Land use change statistics in England, 2011

Figure 3.35: Entrants to higher education; United Kingdom; index: 2006/07=100¹⁰⁰



3.132 The implication is that rising educational participation may have contributed to falling car use, particularly of young people, in the last decade. However, the consequence may be rising car use in the future, as a number of studies show how with increasing educational attainment, an individual is more likely to have increased commuting distances and times (see Lee and McDonald (2003), Papanikdaou (2006), and Shen (2000)). Holzer (1987) suggested that higher educated people carried out their daily lives over a wider area. For example, their social networks are spread out over larger distances, as are the places where they might work.

3.133 Of course, this must be considered in the context of other factors - including the possibility that these individuals may increasingly locate in urban areas leading to less travelling by car.

3.134 As with the issues highlighted above, there is a need for more evidence and analysis in these areas.

Take-out messages:

- The evidence is weak in other areas such as the impact of different forms of car access and trends in education. Whilst these may be having an impact, further investigation into these factors is needed.

¹⁰⁰ Department for Business, Innovation & Skills, Participation in higher education statistics 2014, provisional figures. Note that these two methodologies cannot give a direct comparison. Recent figures from UCAS suggest the number of University entrants is increasing once more.

4. Trends in the future

- 4.1** In this section, we consider what the identified trends and determining factors might mean for future road demand. There have been a number of changes - including social, technological, and demographic - over the last two decades, which may have impacted on travel choices, but there remains uncertainty over whether and how much they have contributed to the changing trends in car use.
- 4.2** But there are also a number of factors which we have a reasonably firm understanding of how they affect traffic levels – e.g. people's incomes, costs, and where people live - and we know that these have made a significant contribution to dampening the growth in road and car traffic.
- 4.3** In the future some of these will become less important. Le Vine and Jones (2012) note that the fall in company car mileage cannot continue indefinitely. Whilst the evidence on future migrants' behaviour remains unclear, it suggests that over time migrants might begin to travel more like the rest of the population which would suggest they will increasingly drive more.
- 4.4** Furthermore, some of these factors are projected to have the reverse effect in the future. With GDP per capita forecast to increase 66% to 2040, and the fuel cost of driving projected to decline by 22% due to improved fuel efficiencies, this suggests an increase in road demand.
- 4.5** So after traffic levels being the same as a decade ago - driven in part by falling company car use, rising costs and stagnant or falling income - the expectation is that traffic at an aggregate level will continue to grow - as these factors have less effect on car use or go in reverse – and population growth of 16% (to 2037) continues to mean many more millions of people wanting and needing to travel by car.
- 4.6** But this traffic growth may continue to be slower than in previous decades and closer to the rates seen before the recession (average 1% per annum) as more people live in cities and urban areas and have other mode choices available to them, as the link between incomes and traffic continues to weaken, and as homeworking, online shopping and other lifestyle factors that reduce car dependency continue to grow.

4.7 Below the aggregate level, there will continue to be different trends observed across different groups and different locations. These again will depend on the underlying factors. Whilst there is limited evidence to suggest how the different factors have been affecting different locations or groups it is possible to infer and reason from the evidence how different trends might evolve.

Trends across different areas and different parts of the road network

4.8 If people continue to move into cities, some of whom will want to drive, road capacity is likely to reach its limits, and the cost of travelling by car in urban areas would be expected to rise. In contrast, even with strong traffic growth we expect congestion on the SRN to be relatively lighter in many areas - see Figure 3.33 - and investment through the RIS aims to address congestion hotspots such as sections on the A27 and the A1 Newcastle-Gateshead western bypass.

4.9 In response to the higher costs of car travel in cities, public transport might be expected to continue becoming an increasingly important feature in these areas, whilst greater support and access to cycling - from the Government's Cycling Delivery Plan and the Super-cycle highway proposed for London - may encourage people to travel by other modes. In contrast, given the findings in Figure 3.18, outside urban areas people are likely to continue to use their car to access employment centres and other locations, as they see the car as the quickest, most reliable and convenient form of travel.

4.10 More generally, improving land-use in cities, and the emergence of northern powerhouses, may potentially reduce the need to travel within cities whilst simultaneously increasing movement between the major cities of the UK to do business and socialise.

4.11 Meanwhile, technology is changing the nature of transport both in terms of how we travel and why we travel. White et al. (2007) suggest there may be a relationship between working at home and greater average distances between home and the workplace. Autonomous vehicles may reduce the costs of driving through lower congestion but the size of the impact will depend on uptake of vehicles.

4.12 With all this, we are likely to see slower traffic growth in urban areas, with ever growing numbers of people living in cities pushing up demand for roads (and other modes of transport), bolstered by rising incomes which will increase demand for goods and services (creating further upward

pressure on road demand), but this growth constrained by limited supply, increasing congestion, rising costs, a greater proportion of young people who may continue to delay cohabitation and having children, using public transport, and shopping and socialising in different ways.

- 4.13** In contrast, traffic on the SRN is likely to continue the upward trend in traffic it has seen over the last two decades in the face of these changes, with the network continuing to accommodate rising traffic volumes supported by improvements to the SRN which will allow people to travel in more congested parts more quickly and reliably. This will be underpinned by van traffic continuing to grow strongly on the SRN, as online shopping reduces personal car use in urban areas, but increases van traffic on the SRN – to transfer goods from warehouses and depots to the people in urban areas.

Trends across different groups

- 4.14** The future will also look different for different groups. Middle-aged men, and richer groups are likely to see rising car use as the impact of company car use becomes less and less important, relative to their private car use - which has continued to increase. Le Vine and Jones (2012) show private car use increased 17% from 1995/7 to 2005/7. Females too would be expected to continue increasing their car use, as their employment rates continue to increase and their incomes rise. They prefer travelling by car as it allows them the flexibility to balance home, work and personal responsibilities more easily than other modes.
- 4.15** It is amongst young people where perhaps the greatest uncertainty lies. As their incomes and employment prospects improve and costs reduce, we would expect on the basis of the existing evidence that more of them will learn to drive and use a car. However, if they continue to delay major life events, staying in cities longer, and only driving more when they get older and move out to rural areas – they may not increase their car use until later in life.
- 4.16** Furthermore, there is the possibility that this cohort's attitude to the car has fundamentally changed and habits become ingrained so that their car use remains at lower levels. However, there is little evidence at present to suggest that this is the case with nearly four in five reporting that they enjoy driving and the most common answer for what people would miss without a car being the freedom that it provides.
- 4.17** Might this impact on future cohorts? The limited evidence available suggests this might not be the case – Chen (2014) finds that the young of pre-driving age are travelling more in the car than previous cohorts did

suggesting that they may be more inclined to use the car in the future. As with the current generation of 17-30 year olds, the behaviour of past generations is not necessarily a good guide.

Forecasting road traffic

- 4.18** Whilst we have attempted to set out what we think the implications of the recent trends and factors behind them might mean for the future, the purpose of this paper is not to forecast traffic levels. To do that we have developed the National Transport Model (NTM), which has been developed over a many number of years, and draws on a wide and rich set of data.
- 4.19** In the Road Investment Strategy: Strategic vision the Department outlined its latest NTM Road Transport Forecasts. In those, we accounted for the key findings and key areas of uncertainty identified in this study. In particular, a wider range of forecast scenarios were considered to account for different possible future outcomes. Given that recent declines in per person car use have been driven by a falling number of trips, we considered alternative scenarios for how this trend might continue in the future. This reduces the need to know whether this was due to technological, social or demographic factors – but allows us to show how a continued fall in trip rates - which was generated by any of these - might affect future traffic levels.
- 4.20** We also considered a scenario where the link between income, car ownership and car use was removed. Whilst we have found no evidence to suggest that the link has actually ceased to exist, modelling this allowed us to consider a scenario where other factors offset the impact of rising incomes. Other factors found to be important – in particular, incomes, costs and where people live, are already taken into account in our National Transport Model.
- 4.21** Further details of our forecasts will be published shortly. Based on the evidence available, we are confident that they are sound, being based on robust evidence, and consistent with our analysis of the wide range of evidence in this document. They remain a reasonable input for planning transport policy. Nonetheless, we will continue to improve and update our assumptions as the evidence base evolves.

5. Next steps

- 5.1** The forthcoming Road Transport Forecasts 2015 details our latest projections for road traffic demand which have been informed by this study. The publication will include details of how we are producing a wider set of forecasts to better represent the uncertainty in the transport sector.

- 5.2** We will also be publishing an Analytical Strategy detailing the evidence gaps and how we plan to work to reduce these. This is important for us to engage with the transport community, explain the direction for our research and have their input to help shape our work.

- 5.3** This direction is informed by the evidence presented here. Throughout this report, we identified a number of key evidence gaps. These are summarised below. It is noted that they are not placed in order of priority.
 - 1 The drivers affecting different vehicles types, such as buses, LGVs and HGVs.
 - 2 The drivers affecting key groups where travel behaviour has changed - those under 30, those aged 60+, females and urban areas.
 - 3 The effect of income on car usage, including disposable income, income distribution and other such issues.
 - 4 The impact of technology, including autonomous vehicles, home working, the impact of social media, etc.
 - 5 Attitudinal and behavioural change to understand implications of any changes amongst the young for the future
 - 6 How travel differs by employment, such as occupation type and working patterns.
 - 7 The drivers of trips by purpose type.
 - 8 Econometric study into the effect of key drivers.

- 5.4** From this, particularly the last, the ultimate aim will be to provide a quantitative assessment of to what degree the recent trends in car traffic by different cohorts and characteristics have been influenced by effects

from different factors. There is a need to quantify these impacts and understand the causality between the relationships.

- 5.5** Our work so far on this subject has benefitted greatly from the research undertaken within the transport analysis community, and the engagement of experts and stakeholders. We are very grateful for this. We will continue to engage with experts and stakeholders, to ensure the information we provide to decision-makers and stakeholders remains relevant, trusted, and robust. We look forward to holding the next in our series of engagement events on this subject in the spring.

6. References

- Ball, C., Gifford, K. and Le Vine, S. (2014). The year that was: Progress in the British car club [carsharing] sector in 2013.
<http://www.carplus.org.uk/resources/research-and-reports/>
- Berrington, A. and Mikolaj, J. (2014). Young Adults' Licence-Holding and Driving Behaviour in the UK.
<http://www.racfoundation.org/research/mobility/young-adult-drivers-berrington-report>
- Blumenberg, E. and Evans, A. E. (2010). Planning for Demographic Diversity: The Case of Immigrants and Public Transit. *Journal of Public Transportation*, 13.
- Chen, Q., Le Vine, S. and Polak, J. (2014). Generation Next: The changing travel habits of pre-driving age young people in Britain.
<http://www.racfoundation.org/research/mobility/generation-next-teenage-travel-behaviour-report-October-2014>
- Clarke, B., Chatterjee, K., Melia, S. (forthcoming). Changes in level of household car ownership: The role of life events and spatial context. *Transportation*.
- Clark, B., Chatterjee, K., Melia, S., Knies, G. and Laurie, H. (2014). Life events and travel behaviour: Exploring the interrelationship using the UK Household Longitudinal Study. *Transport Research Record*, 2413, 54-64. Available from www.travelbehaviour.com/project-outputs
- Clarke, G., Johnson, A., Nankivell, J. and Turpin, M., AECOM (2014), Van travel trends in Great Britain.
<http://www.racfoundation.org/research/mobility/van-travel-trends-in-great-britain-report>
- Contrino, H. and McGuckin, N. (2006). An Exploration of the Internet's Effect on Travel.
- Dargay, J. (2010). The prospects for longer distance domestic coach, rail, air and car travel in Great Britain. ITC report.
- Dender, K. and Clever, M. (2013). Recent Trends in Car Usage in Advanced Economies – Slower Growth Ahead? Summary and Conclusions. Discussion Paper 09. Paris, France: International Transport Forum.

Department for Transport (2011), Public attitudes towards buses: A report on the bus module of the March 2011, Office for National Statistics' Opinion omnibus survey.

<https://www.gov.uk/government/statistics/public-attitudes-towards-buses-march-2011>

Department for Transport (2013a), Understanding and Valuing the Impacts of Transport Investment.

<https://www.gov.uk/government/publications/transport-appraisal-in-investment-decisions-understanding-and-valuing-the-impacts-of-transport-investment>

Department for Transport (2013b), Road Transport Forecasts 2013.

<https://www.gov.uk/government/publications/road-transport-forecasts-2013>

Department for Transport (2014a), Transport Investment and Economic Performance.

<https://www.gov.uk/government/publications/transport-investment-and-economic-performance-tiep-report>

Department for Transport (2014b), Road Investment Strategy.

<https://www.gov.uk/government/collections/road-investment-strategy>

Department for Transport (2015, forthcoming), Road Transport Forecasts 2015.

Dunkerley, F., Rohr, C. and Daly, A. (2015). Road traffic demand elasticities. London: Department for Transport.

Eno Center for Transportation. (2013). Preparing a Nation for Autonomous Vehicles: Opportunities, Barriers and Policy Recommendations.

Gomm, P. and Wengraf, I. (2013). The Car and the Commute.

<http://www.racfoundation.org/research/mobility/the-car-and-the-commute>

Goodwin, P. (2012). Peak Travel, Peak Car and the Future of Mobility: Evidence, Unresolved Issues, and Policy Implications, and a Research Agenda. Paris, France: International Transport Forum.

Headicar, P. (2013), The Changing Spatial Distribution of the Population in England: Its Nature and Significance for 'Peak Car', Transport Reviews: A Transnational Transdisciplinary Journal, 33:3, p.310-324.

Holzer, H. (1987). Informal job search and black youth unemployment. American Economic Review, 77, p.446-452.

Hymel, K. M., Small, K. A. and Van Dender, K. (2010). Induced Demand and Rebound Effects in Road Transport. Transportation Research Part B: Methodological 44 (10): 1220-1241.

Jones, B. and Norton, P. (2010), Politics UK, Routledge, 7th edition.

Karathodorou, N., Graham, D. J. and Noland, R. B. (2009). Estimating the Effect of Urban Density on Fuel Demand. 88th Annual Meeting of the Transportation Research Board.

Le Vine, S. (2012), Car Rental 2.0: Car club innovations and why they matter. <http://www.racfoundation.org/research/mobility/car-rental-2>

Le Vine, S. and Jones, P. (2012), On the Move: Making sense of car and train travel trends in Britain. <http://www.racfoundation.org/research/mobility/on-the-move-main-research-page>

Le Vine, S., Zolfaghari, A., Polak, J. (2015), Autonomous Cars: The tension between occupant-experience and intersection capacity. Transportation Research Part C: Emerging Technologies, in press.

Lee, B. S. and McDonald, J. F. (2003). Determinants of commuting time and distance for Seoul residents: the impact of family status on commuting of women, Urban Studies, 40, p.1283-1302.

Litman, T. (2012). Understanding Transport Demands and Elasticities: How Prices and Other Factors Affect Travel Behaviour. Victoria Transport Policy Institute.

Lucas, K. and Jones, P. (2009) The Car in British Society. London: RAC Foundation. http://www.racfoundation.org/assets/rac_foundation/content/downloadables/car_in_british_society-lucas_et_al-170409.pdf

Lyons, G., Goodwin, P., Hanly, M., Chatterjee, K., Anable, J., Wiltshire, P. and Susilo, Y. (2008) Public Attitudes to Transport: Knowledge Review of Existing Evidence. London: Department for Transport. <http://webarchive.nationalarchives.gov.uk/20091003125851/http://www.dft.gov.uk/pgr/scienceresearch/social/evidence.pdf>

Mans, J., Interrante, E., Lem, L., Mueller, J. and Lawrence, M. (2012). Next Generation of Travel Behavior: Potential Impacts Related to Household Use of Information and Communication Technology. Transportation Research Record: Journal of the Transportation Research Board 2323: 90-98.

McKinnon, A. C. (2007), Decoupling of Road Freight Transport and Economic Growth Trends in the UK: An Exploratory Analysis. Transport Reviews 27 (1): 37-64.

Metz, D. (2014). Peak Car: The Future of Travel.

OECD/ITF (2013), Long-run Trends in Car Use, ITF Round Tables, No. 152, OECD Publishing/ITF.

Papanikolaou, G. (2006), Spatial and individual influence on commuting behaviour in Germany. Paper presented at the 46th Congress of the European

Regional Science Association (ESRA), August 30-September 2, Volos (Greece).

RAC Foundation, Glaister and Box (eds) (2014), Moving Cities: The future of urban travel.

<http://www.racfoundation.org/research/mobility/380610>

Rohr, C. and Fox, J. (2015). Evidence review of car traffic levels in Britain. London: Department for Transport.

Shen, Q. (2000). Spatial and social dimensions of commuting. Journal of the American Planning Association, 66, p.68-82.

Stokes, G. (2012), Has car use per person peaked? Age, gender and car use. Presentation to Transport Statistics User Group, London, April 2012.

http://www.gordonstokes.co.uk/transport/peak_car_2012.pdf

Taylor, J., Barnard, M., White, C. and Lewis, J (2007) Understanding the Travel Aspirations, Needs and Behaviour of Young Adults. London: Department for Transport.

<http://webarchive.nationalarchives.gov.uk/20091003125851/http://www.dft.gov.uk/pgr/scienceresearch/social/youngaspirations>

Thornton, A., Evans, L., Bunt, K., Simon, A., King, S. and Webster, T. (2011) Climate Change and Transport Choices. London: Department for Transport.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/49971/climate-change-transport-choices-full.pdf

Toombs, B., Clay, D., Kenrick, M., Parkhurst, G. and Lyons, G. (2015), Understanding Strategic Road Network Users' Experiences and Needs: November 2013. London: Department for Transport.

Transport for London. (2014). Drivers of Demand for Travel in London: A review of trends in travel demand and their causes.

<https://www.tfl.gov.uk/corporate/publications-and-reports/travel-in-london-reports>

White, P., Christodoulou, G., Mackett, R., Titheridge, H., Thoreau, R. and Polak, J. (2007). The Role of Teleworking in Britain: Its Implications for the Transport System and Economic Evaluation. European Transport Conference, The Netherlands.

Williams, I. and Jin, Y. (2013). The Impacts of Urban Densification of Transport. Slide presentation, European Transport Conference, Frankfurt.