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Changing Demographics

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[Abstract

Demographic determinants are of increasing salience for projections of the scale and pattern of travel demand and transport provision. Population growth is becoming more important than income growth for the overall volume of travel demand. The spatial location of additional inhabitants is a key determinant of the pattern of additional demand, as between suburban greenfield sites and urban locations, whether brownfield, infill or more intensive use of existing properties. Accommodating a growing population on greenfield sites would lead to more car use and roads investment, while increasing urban population densities would involve more public transport use and public transport investment.

Increasing longevity is contributing to growing numbers of older people, as is the ageing of the baby boom cohort. An ageing population has a need for continued mobility, particularly when driving is no longer possible on account of age-related disabilities. Increasing longevity is also leading to a deferment of maturity of younger people, who are increasingly adopting urban lifestyles for which the car is not central. Urban planning and transport provision will need to take account of these demographic developments.]

1. Introduction

Demographic developments are important for projecting future travel demand and planning transport services. For every country, population growth has always been a central consideration, as has the spatial location of additional

inhabitants. Increasing longevity and population ageing are newer concerns. All these demographic factors are of increasing salience as the historic relationship between income and travel has weakened in developed countries.

This review focuses on the main features. We consider first the main demographic developments – population growth and population ageing, including the deferral of maturity by young people. We then discuss how these developments affect travel demand, both overall demand and spatial location. References are necessarily selective, given the wide scope of the subject matter, with some emphasis on data from British sources, which are particularly comprehensive and accessible.

2. Demographic Developments and Travel Behaviour

In this section we review trends in population growth as these are affected by fertility and migration, and how the resulting changes in population density bear upon urban transport provision and urban function. We then discuss how increasing longevity is contributing both to growing numbers of older people and changing behaviour of younger people, both of which affect the pattern of travel demand.

2.1 Population growth

The global population is expected to increase from the present 7.0 billion, of whom half live in urban areas, to 9.3 billion by 2050 on the United Nations' Medium Variant case, with the urban population projected to gain 2.6 billion, reaching 6.3 billion by 2050. Population growth is becoming mainly an urban phenomenon concentrated in the developing world, leading to greater numbers of large cities. At present some 40 per cent of the world's urban population resides in cities of one million or more, projected to increase to 47 per cent by 2025 (UN, 2011a).

However, in many developed countries, the total fertility rate (the number of children a woman is likely to have in her child-bearing years) is well below the 2.1 needed to keep the population stable. In the first decade of the present

century, no European or North American countries had total fertility above 2.2 and only four (France, Iceland, Ireland and the United States of America) had levels above 2.0 children per woman. Total fertility was below 1.4 in about half of the developed countries (UN, 2013).

There is considerable pressure on the developed countries to absorb immigrants, partly from the desire of those from poorer economies to seek a better life, and partly to fill vacancies in the labour market, particularly in less well paid employment. Population growth arising from immigration can be significant. For instance, the population of the United Kingdom is projected to increase by 4.3 million over the ten years 2012-2022, of which 60 per cent is due to natural increase (more births than deaths) while 40 per cent is the projected net number of migrants. However, the impact of migration on population growth is greater than these figures imply because migration is concentrated at young adult ages, hence the assumed level of net migration affects the projected number of women of childbearing age and thus the projected number of births (ONS, 2013)

As well as population movement between countries, there is migration within countries. The movement of rural poor to the cities has largely played out in the developed economies. Indeed, during the second half of the last century there was a general suburbanisation or counter-urbanisation tendency whereby people left overcrowded cities for suburban and rural locations. In recent years, however, this trend has reversed in places and successful cities are undergoing a revival, attracting inhabitants. (Glaeser, 2011; Wachs, 2013; Headicar, 2013). This is associated with the growth of the business services sector where agglomeration generates economic benefits, and with the growth of the higher education sector in urban campuses, which contributes to economic development.

Population density is relevant for the nature of transport provision. In developed economies, the car is naturally popular for door-to-door travel in suburbs and towns where road traffic is mostly free-flowing and parking readily available. But as densities rise, these conditions are decreasingly met, so that public

transport (transit) becomes more important, particularly for journeys to work (Mees, 2010).

The implications of these demographic trends for urban planning are varied. In some locations, particularly in the United States, the counter-urbanisation trend continues, leading to spreading suburbs and decline of the central business district. For example, Detroit has experienced a decline in population from a peak of 1.8 million in 1950 to 700,000 in 2010, and the city filed for bankruptcy in 2013. In contrast, other US cities are undergoing growth, as are many European cities (Glaeser, 2011). London, for instance, grew from 1 million inhabitants in 1800 to a peak of 8.6m in 1939. The population subsequently declined, falling to 6.7m in the late 1980s, as people sought better housing beyond the city boundaries. Then the tide turned as the attractions of urban living grew, with the population reaching 8.5m in 2014 and projected to increase to 10m before 2040 and to over 11m by 2050 (GLA, 2013).

For cities with a growing population and a growing economy, the challenge is to invest in the transport system on a sufficient scale to accommodate both kinds of growth. The type of investment is critical, as discussed below. Cities with declining populations may be tempted to invest in transport as a means of promoting economic activity. However, the relationship between additional transport provision and increased economic activity is not sufficiently clear to permit the confident conclusion that investment in transport facilities is likely to be the best use of public funds to promote economic revival.

2.2 Population ageing

The populations of developed countries are ageing. Life expectancy in the leading countries has been increasing linearly for a century and a half. In Japan, currently the country with the greatest longevity, life expectancy at birth for women is 85 years (Oeppen and Vaupel, 2002). In developed economies, life expectancy is increasing by some two years every decade.

A further contributing factor to the growing numbers of older people is the ageing of the baby-boom generations born in a number of countries following World War II. In the United States, for instance, there was a substantially larger cohort of those born between 1945 and 1964, a generation now partially having entered retirement. The spatial distribution of older people can vary considerably, as in the US where the over 65s constitute 20 per cent of the population in some popular retirement locations, but only 5 per cent in other places (US Census, 2011).

An increasing proportion of older people in the population has wide ranging implications for society. However, much depends on how the health of those in later life develops. While debate continues, the balance of evidence suggests that as people live longer, deterioration in health is postponed. The outcome is that time spent in poor physical functioning is being increasingly compressed into the period before death, and that levels of health that used to be prevalent at age 70 are now found at age 80 (Vaupel, 2010; Cutler, Ghosh and Landrum, 2013).

The combination of increasing numbers and improving health has resulted in the mobility of older people attracting increasing attention (Schwanen and Paez , 2010). The general finding is that older people are less likely to travel than younger people—the number of journeys made declines with age and the trips get shorter. In part this is due to changing needs, for instance far fewer journeys for work and business, although the numbers of leisure and shopping trips hold up (Mackett, 2014a). Income will often be a constraining factor. Failing health and increasing disability also limit travel behaviour; as age increases, there is decline in self-rated health, increase in limiting long-standing illness, and reduction in mean walking speed (Zaninotto and Steptoe, 2012).

It is generally agreed that there is an important relationship between mobility and the quality of life of older people (Metz, 2000; Banister and Bowling, 2004). Quality of life at all stages of life depends on access to people, places and services. Such access reflects both location and mobility. Access to dispersed locations—family, friends, shops or hospitals—is facilitated by high levels of

mobility, whether by means of the car or good public transport that may be found in urban areas. Loss of mobility in later life reduces access and quality of life, which makes decisions on location more important. Rural isolation without use of a car leaves older people dependent on infrequent bus services (if they exist at all) or on the willingness of family and neighbours to offer rides.

However, the relationship between mobility and quality of life in old age is not well defined, being based on limited, albeit suggestive, evidence. Thus the longitudinal study of Marottoli et al. (1997) concluded that driving cessation was among the strongest predictors of increased depressive symptoms in older people in the United States. Jivraj, Nazroo and Barnes (2012) found that lack of access to transport is a strong determinant of social detachment in later life in England, as assessed by engagement in civic, leisure and cultural activities. Mackett (2014b) reviewed the evidence for the impact of free bus travel on the wellbeing of older people in Britain, concluding that the policy objectives have been largely met but that many of the impacts might have happened anyway and are probably less than many studies claim. More generally, Nordbakke and Schwanen (2014), reviewing the available literature, concluded that there is only a very sketchy evidence base regarding to what extent, for whom, under what conditions and in which contexts the hypothesised linkages hold between wellbeing and mobility of older people.

In part because of the lack of a well-understood relationship between mobility and quality of life, the impact of interventions aimed at enhancing mobility is hard to assess. The kinds of intervention which are relevant in this context are those which affect the provision of transport services used by older people, for instance through subsidy or regulation; the design of such services to facilitate their use by older people; the availability of assistive technologies which facilitate movement by those with more severely impaired mobility; and the accessibility of health, welfare and other services used by older people.

Growth in both numbers and fitness of older people leads to an increase in the number of older drivers. A further contributing factor is the increase in women holding a driving licence in successive cohorts. In Britain, driving licence holding

by men in their seventies has saturated at about 80 per cent, as has happened for women in their forties, but for successive older age groups of women, licence holding is still increasing (NTS, 2012, Table NTS0201).

The increased incidence of disability with increasing age is important for the decision by individuals about when to give up driving. Generally, this decision is triggered by the cumulative impact of a number of minor disabilities—of vision, hearing, dexterity, cognition—any one of which alone would not prompt abandonment of the car, a very convenient form of door-to-door travel for older people whose ambulatory mobility may be limited. In practice, withdrawal from driving takes place in stages, as more demanding environments and tasks are avoided, for example night driving, motorway driving, difficult parking manoeuvres, or turns at junctions against traffic. Such voluntary withdrawal contributes to an outcome in which older road users have fewer slight accidents than younger users, although a disproportionate number of older users are killed in accidents on account of fragility and vulnerability to injury (Eby and Molnar, 2009; Mitchell, 2010).

Cessation of driving can be a hardship for those who have become dependant on the car for daily travel. The prospect of driverless cars would be of particular benefit to older drivers, should this innovation prove safe and acceptable. However, giving up the car can be encouraged by the provision of free or lower-cost bus travel. In Britain, bus use is free of charge to older people, a national policy which has proved very popular, contributes to wellbeing and has stimulated bus travel (Mackett 2014b; Green, Jones and Roberts, 2014). It is important that every stage can be managed if a journey by public transport is to be undertaken; this requires in particular that vehicles are accessible (Metz, 2003; Maynard, 2009; Levin et al , 2012).

Later life is therefore better spent in urban settings—mature suburbs, market towns, seaside resorts and the like—where facilities are near to hand and where transport facilities tend to be better than in lower density settlements. As well as general public transport, there is also scope for specialised services for those

with disabilities, for instance the Dial-a-Ride door-to-door service in London or the taxi service operated by the ITNAmerica social enterprise franchise in the United States. For those who have ambulatory difficulties, pavement-running mobility scooters are growing in popularity (Blais, Rutenberg and Suen, 2012).

2.3 Deferred maturity

Increasing life expectancy contributes to the growing numbers of older people. It also appears to be having an impact on the maturation of younger people in the developed economies. They are continuing in education for longer and are deferring commitment to careers and starting families. For instance, in Britain the average age at which women give birth has been increasing steadily, from 26.5 years in the mid-1970s to 30 years currently (ONS, 2014). A similar pattern is seen in the other countries of Western Europe, consistent with the idea of a prolonged period of career and personal development before 'settling down'. Billari and Liefbroer (2010) have suggested that a new European pattern of the transition to adulthood is emerging that can be characterized as 'late, protracted and complex', compared with the recent past. Most events are postponed and, as a result, the transition to adulthood occurs both later and becomes more protracted, while the increased popularity of living on one's own, unmarried cohabitation and childbirth outside marriage, makes the transition more complex.

This changed pattern of maturation has implications for travel behaviour. There is growing evidence that, in recent years, access of young adults to cars, measured in terms of drivers' licences and household car ownership, has decreased in major developed countries, especially for men (Kuhnimhof et al, 2012; Sivak and Schoettle, 2012; IFMO, 2013). The extent of decline in youth driving licence holding has been reviewed by Delbosc and Currie (2013) who discuss the possible causal factors—for which the evidence is weak and preliminary but suggests multiple influences, with life stage factors and affordability significant. While the proportion of men in their twenties holding driving licences has been declining in recent years, this has not been the case for

those in their thirties, suggesting deferral rather than abandonment of the convenience of the car (Metz, 2012; Le Vine and Jones, 2012).

For the developed economies, the picture that is emerging is one in which a substantial proportion of the cohort now enters higher education, deferring income from working that makes a car affordable. College education occurs mostly in urban campuses where the car is not part of the lifestyle. The growth of sectors of the economy located in central urban areas—business services, financial services, creative, media, digital—retains graduates who experience the interactions that contribute to economic benefits arising from agglomeration as well as social and cultural activities that enhance the attractiveness of cities. The costs of car ownership seem high, compared to the digital technologies that are central to the urban lifestyles of young people. Fewer young men are attracted to the exercise mechanical engineering skills involved in fixing old cars, in part because of the sophisticated electronics incorporated into modern vehicles. In contrast, the simplicity of the bicycle doubtless contributes to its growing popularity in urban areas, as well as exercise, low cost travel and journey time reliability (Metz, 2013a).

The move to the suburbs and car-dependent lifestyles comes later in a longer life course. Stokes (2013) has noted that the older a person is when they learn to drive, the less distance they drive at any particular age. This could be due to the wider experience of other modes at an earlier stage on the part of those who defer learning to drive, which carries over into the period of car ownership. On the other hand, it is possible that those who learn to drive at an early opportunity are those who have most need of a car, for instance to get to work in rural areas, and who for similar reasons continue to drive more subsequently.

2.4 Demographic developments – key points

Urban populations are generally growing. Urban planners therefore must aim to accommodate increasing numbers of inhabitants in homes and employment, and transport planners need to address their mobility needs. Changes in the structure of the economy – the shift from manufacturing to business services –

are tending to boost population densities in central urban areas, to which young people are increasingly attracted, to study, work and live. At the same time the population is ageing, which means more older drivers and more ceasing to drive on account of disability, but still with mobility needs. The implications of these varied demographic developments for future travel behaviour are considered next.

3. Travel demand trends

The developments in demography and travel behaviour discussed above will be important for the future magnitude and pattern of travel demand. In the developed economies, the historic relationship between income and travel seems likely to be less important in the future than it was in the past, while demographic determinants will be more significant.

3.1 Cessation of growth of average distance travelled.

The United Kingdom has employed a National Travel Survey to follow changes in travel behaviour for forty years. The key time series data for England shown in Figure 1 are average travel time, trip rate and annual distance travelled, for all modes except international air travel. Travel time and trip rate have remained substantially unchanged over the period, while distance travelled increased from about 4500 miles to about 7000 miles a year, the consequence of investment in the transport system that allowed faster travel. However, the average distance travelled ceased to grow from the mid-1990s, indicating that the historic relationship between income and travel has become uncoupled (Metz, 2012). To the extent that data are available, a similar pattern is seen for other countries (Metz, 2008). In particular, an average travel time of about an hour a day appears to be a general characteristic of populations of both developed and developing countries (Schafer and Victor, 2000).

[insert Figure 1]

About 80 per cent of the 7000 miles average annual distance travelled in Britain is by car. Accordingly, average per capita car use has ceased to grow in Britain

(Lucas and Jones, 2009; Le Vine and Jones, 2012). There is increasing evidence that car use per capita in many of the developed countries has stopped growing (Puentes and Tomer, 2008; Millard-Ball and Schipper, 2011; Kuhnimhof et al, 2012). This cessation of growth of car travel is known as the 'Peak Car' phenomenon (Goodwin and Van Dender, 2013) and first occurred well before the recent economic recession.

A number of explanations have been suggest for the Peak Car phenomenon, which are not mutually exclusive and which include: less driving by young men in many countries (as discussed in section 2.3 above); changes in company car taxation which reduces men's driving, significant in Britain but not elsewhere (Le Vine and Jones, 2012); and technological limits that prevent faster travel (Metz, 2013a). The detailed study by Le Vine and Jones (2012), using data from the UK National Travel Survey, indicates a complex picture in which little change in average car mileage over a ten year period masks large differences between men (distance decreased) and women (distance increased, in part due to a rise in adult female licence holding); and between London (less car travel, see below) and the rest of the country (continuing growth of non-company car travel for those aged 30 and over).

A further explanation of the cessation of growth of the average annual distance travelled is that demand for daily travel has saturated (Metz, 2010). Analysis of accessibility statistics, which relate where people live to the kinds of destinations that they need to reach regularly, indicates that those who live in urban areas with use of a car or good public transport have high levels of choice of schools, health facilities, food stores and employment. This is consistent with the idea that access and choice increase with the square of the speed of travel but that choice is subject to diminishing marginal utility, resulting in demand saturation (Metz, 2013b).

3.2 Spatial location of travel demand

If per capita car use and overall travel demand in the developed economies has ceased to grow, it follows that total car use and travel demand will depend on

population changes. A static or declining population would remove the need to invest for growth, although expenditure on maintenance and operational enhancement of the transport system would remain important. But where the population is growing, transport investment to accommodate such growth would be necessary. Much then depends on where the increased numbers are located. New housing in new suburbs built on greenfield sites would require investment in roads since car use would be natural for those who would live in such locations. This has been the common pattern where land is available for housing beyond the historic city boundaries (Bruegmann, 2005). On the other hand, the scope for expansion of the road network to service new dwellings in existing urban areas is usually quite limited, whether new construction on former industrial land ('brownfield sites'), infill within existing built areas or through conversion of existing properties for more intensive use. In these situations, the opportunities for investment in public transport are of particular relevance (Metz, 2012).

Recent developments in London illustrate the implications for travel of population growth within existing boundaries, both new construction on brownfield sites in the former Docklands (London had been Britain's largest port until the advent of containers required shipping to move to deeper water berths) and elsewhere, as well as more intensive use of existing buildings. Car use in London, whether measured as traffic (car-miles) or as trips has remained broadly steady over the past twenty years, despite growth of both population and incomes (Metz, 2013a). The main reason lies in decisions not to expand road capacity, and indeed to reduce carriageway available for cars through the expansion of bus and cycle lanes, and pedestrian space, as well through the rigorous control of on-road parking in central areas and the central congestion charging zone where a daily charge is levied on vehicles on the move. Given unchanging car use and a growing population, it follows that the share of journeys by car has fallen, from almost 50 per cent of all trips in 1993 to 36 per cent in 2013. Public transport trips have risen correspondingly, with walking little changed.

On the basis of current policies, which emphasise investment to increase rail capacity but not road capacity, the share of journeys by car in London could fall to below 30 per cent when the population is expected to exceed to 10 million (Metz, 2014; Mayor, 2014). The estimated pattern of car use in London over a century, 1950-2050, is shown in Figure 2. Car use increased steadily in the latter half of the last century as car ownership grew and the population declined. Car use reached a peak of about 50 per cent of all trips around 1990 when the population was at a minimum. Since then car use has declined as the population has increased. Figure 2 depicts the Peak Car concept in a particularly striking form, the consequence of population growth without road capacity increase. Also shown is an alternative trajectory, which starts at the low levels of car use found in the 1950s and does not exceed the mode share estimated for London in 2050, but without the peak. For London, this alternative is purely theoretical. But for cities in developing countries still with low levels of car use, it suggests another possible route to a similar outcome, avoiding excessive investment in vehicles and unnecessary carbon and other emissions.

[insert Figure 2]

The more important consideration, however, is the outcome reached, regardless of the route taken. The proposition is that for a medium density city of 10 million inhabitants, constraining car mode share to around 30 per cent would permit the city to function effectively. The experience of London suggests that the key policy to achieve this aim is investment in rail transport in all its forms (as well as Bus Rapid Transit), which provides speedy and reliable travel for time-critical work journeys and can therefore attract professionals and business people out of their cars for this journey purpose. For instance, the new financial district at Canary Wharf in the former Docklands now accommodates 100,000 well paid people who very largely use rail to get to work. In contrast, it is harder to attract such people onto crowded buses in mixed traffic, which are no faster nor more reliable than cars on the streets they share, so that cities that rely on buses for public transport tend to suffer from serious traffic congestion. An important complementary policy is to ensure the flow of essential road traffic—buses, taxis,

goods and emergency vehicles— by regulating parking in central areas and by use of adaptive traffic control systems.

The extensive travel and transport data available for London (TfL, 2014) facilitate the above analysis. For other cities relatively little is available. In the cases of Birmingham and Manchester, the second and third largest British cities, there is evidence the car travel into the centre at the morning peak hour is declining while rail travel is rising, and there is suggestive evidence of similar developments in other cities (Metz, 2013a). There is also evidence for declining car use per capita in the main Australian cities from 2003-04 and a rise in public transport use (Stanley and Barrett, 2010).

More generally, the revival of cities, as discussed above (section 2.1), involving growing populations and vibrant economic, social and cultural activity in their centres, would suggest the potential to reduce car mode share, as is happening in London, if investment is made in rail systems. Bus Rapid Transit is a low cost alternative to rail that is fast and reliable on dedicated road space from which general traffic is excluded (Cervero, 2013).

The example of London strongly suggests that investment in new urban transport services should be planned in the context of a spatial plan that aims to promote economic and employment growth and accommodate population growth (Mayor, 2104). Both these objectives can be met while car use is declining and public transport trips are rising. Indeed, it is likely that these objectives are positively facilitated by declining car use, which lessens traffic congestion and enhances the utility of the public realm.

4. Conclusions

The weakening of the historic relationship between income and travel in developed economies means that demographic factors are becoming relatively more important. Population growth has always been a major determinant of the growth of travel demand. However, the pattern of this demand growth across the range of transport modes depends on where the additional inhabitants are to be

housed, broadly as between suburban (or rural) greenfield sites, or urban locations, both new build on brownfield sites, infill and more intensive use of existing properties. Those accommodated on greenfield sites will use cars and additional road capacity will need to be provided. For urban population growth, the scope for additional road space is limited, constrained by competing requirements for land, so that investment in public transport and cycling is appropriate.

The greenfield-suburban versus brownfield-urban distinction is important for sustainability, for reducing carbon emissions in particular. London and other cities are experiencing a substantial shift away from car use, the consequence of population growth in the absence of greenfield land for new housing, leading to higher population densities, in relation to which the policy response has been to invest in public transport. Urban per capita carbon emissions are substantially lower than the average per capita emissions for the developed countries in which they are located (Dodman, 2009), reflecting both less car use and high property prices which constrain residential and commercial space occupied and hence energy consumption.

The location of future population growth needs to be projected not only broadly and strategically, but also specifically and locally for both employment and housing. Travel is a derived demand, hence new transport investment needs to reflect demographic expectations and policy choices between options for spatial location of both dwellings and employment. An example of such an approach is the London Infrastructure Plan 2050, which outlines the possible transport and other investments needed to accommodate the further three million inhabitants expected (Mayor, 2014).

Population ageing is a newer consideration in transport and urban planning. There are two contributing elements: increasing longevity, and the large baby boom cohort now entering later life in many developed countries. Increasing longevity adds to the numbers of older people. By extending the duration of the life course, increasing longevity is also contributing to changed behaviours of

younger people, who take longer to mature, spend more time in attractive urban environments where the car is not part of the lifestyle, and who make more use of digital technologies, both for communication and to facilitate travel by public transport. The public acceptability of declining car use in inner urban areas is likely to be due in part to these changing attitudes of younger people for whom the car is not central to their wellbeing.

Successful cities are characterised by growing populations—since success attracts people who can contribute to success—and by investment in rail and rail-like public transport, which can meet the need for travel between home and work, and on business in city centres, more efficiently than road transport. Growth of the service sector in developed economies is increasingly located in central urban areas. The entertainment and hospitality sectors follow their clients, collocating with workplaces. More people means more demand for public transport, more investment in more frequent services, which attract more patronage and revenue—a virtuous circle.

But what about the position of less dynamic towns and cities? Should they attempt to invest in public transport, to push back the car and help energise the urban environment; or should they aim to accommodate the car, so attracting those for whom car-based mobility is central to their lives? Transport planning is of course just one aspect of urban planning, in respect of which the secrets of success are elusive.

For suitable cities, one possible option would be to adapt to the needs of an ageing population, aiming to take advantage of the spending power of the growing numbers of people in later life. This cohort is particularly heterogeneous with respect to health, wealth, life stage and lifestyle, such that chronological age is only a limited indicator of status and need (Metz, 2006). In general people in later life will wish to retain their mobility and access to desired destinations as much as possible, and will want substitutes when a preferred means is no longer practicable, in particular when driving has to be abandoned. So the need is to facilitate the transitions of later life and mitigate their adverse

consequences, which include loss of mobility, reduced access to services, isolation and loneliness. The World Health Organisation's concept of 'Age-Friendly Cities' is a helpful approach (Plouffe and Kalache, 2010).

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Figures

Figure 1. National Travel Survey time series data for England: average annual distance travelled, travel time and trip rate. Source: National Travel Survey, Department for Transport, Table NTS0101.

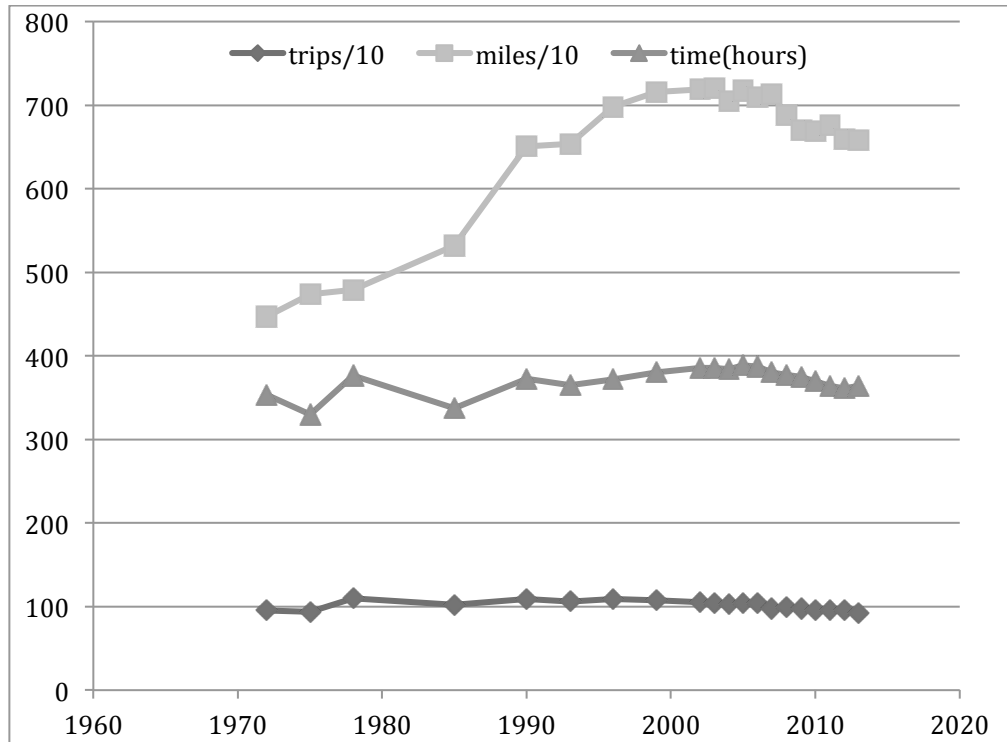


Figure 2. Car use in London: car journeys as proportion of all journeys. Source: TfL (2014) Table 2.2 and author's estimates.

