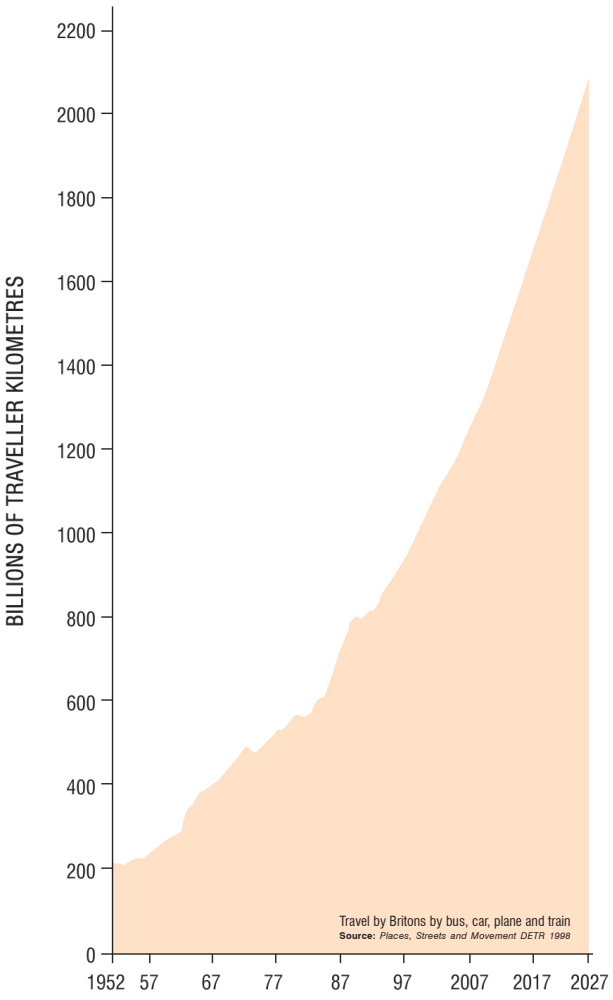
Long Distance Travel in Britain

Prospects in a time of uncertainty

March 2010



INDEPENDENT TRANSPORT COMMISSION

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PROSPECTS IN A TIME OF UNCERTAINTY

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Foreword

This is the largest piece of research ever commissioned by the ITC. It has involved: development of a pioneering multi-modal model; a substantial survey of travellers by car, plane, train and coach; and much deliberation by Members of this Commission, Britain's only independent transport and land use think tank.

I would like to thank all my colleagues for their contributions to this challenging piece of work. They know, as I do, that it could not have taken place without our financial backers, David Quarmby who has steered the project – and was my predecessor as chairman – and Professor Joyce Dargay who has pushed back the frontiers on this under-researched subject. This policy analysis has benefitted too from significant inputs from Peter Jones, Mary Bonar, and Elizabeth Gilliard.

The Independent Transport Commission, as always, would be delighted to receive feedback on this study. Comments, criticism and further ideas for research would all be welcome. Contributions should be sent to Matthew Niblett, the ITC's Secretary at matthew.niblett@keble.oxon.org.

Simon Linnett, Acting Chairman
N. M. Rothschild and Sons
12 March 2010

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The research considered in this paper could not have taken place without specific grants from the Rees Jeffreys Road Fund, the Department for Transport and Network Rail, and general subscriptions from Go-Ahead, Stagecoach and Arriva. The members of the Independent Transport Commission would like to record their warm appreciation for this support.

Disclaimer
The opinions, findings and conclusions in this paper are those of the members of the Independent Transport Commission and not the sponsoring bodies. They are published in the interests of exchanging information and encouraging informed debate.

Summary

Overview

Long distance travel in Britain is a neglected area of policy. The ITC, as a research charity concerned with the implications of present policy for the future, therefore commissioned this multi-modal study of domestic long distance travel.

The work was carried out by Professor Joyce Dargay, Institute for Transport Studies, University of Leeds, using data from the National Travel Survey and other sources. The focus was on journeys of 50 miles or more by car, train, coach and plane. At the heart of the work is a statistical model which explains, and can forecast, long distance travel demand in relation to a large number of causal factors. The model deals with aggregate demand and cannot test policies, such as high speed rail routes, but it has the advantage of showing overall impacts and cross-over effects of big policy decisions. Professor Dargay's report, The Prospects for Longer Distance Domestic Coach, Rail, Air and Car Travel in Britain, can be found at www.independenttransportcommission.org.uk.

This analysis by the Independent Transport Commission draws out the policy implications of Professor Dargay's modelling. The uncertainties in doing so were considerable. Not only could the growth of Britain's economy vary greatly over the coming decade but something unexpected is happening to car travel. A slowing down in its rate of growth was noted well before the onset of the recession. Such uncertainties need to be born in mind when considering the base scenario constructed by Professor Dargay out of official forecasts. But they add relevance to the scenarios which show high and low economic and travel growth.

Facts

Current Travel (Figure A.)

1. Journeys of over 50 miles by residents in Britain account for only three per cent of all mechanised trips but nearly one third of all the mileage travelled.
2. People make on average 20 long distance trips every year, averaging about 100 miles per trip.

Travel Growth

3. In the study's base scenario, long distance travel (defined as trips over 50 miles) is forecast to grow by 34 per cent between 2005 and 2030. Domestic air travel, largely driven by business users, is forecast to rise by 125 per cent; car, rail and coach would grow between 25 and 35%.
4. Growth in long distance travel by car has almost ceased in the last few years, and coach travel has been rather flat, while rail and air growth have been strong.

Distance Travelled (Figure A.)

5. Cars are used for nearly 80% of all long distance travel mileage.
6. Domestic aviation has grown fast but still has a small (4%) share of travel over 50 miles. Even for trips over 150 miles, air travellers do only 10% of all mileage.
7. Rail accounts for 12% of all long distance travel.
8. One in six coach journeys is over 50 miles, but coaches account for only 6% of all long distance mileage.

Journey Purpose

9. Seven out of ten long distance trips are made for personal reasons – leisure, holidays or visiting friends and relatives – with only 20% for business and 10% for commuting.
10. Car is dominant for all journey purposes; rail is strong for long distance commuting and visiting friends and relatives; rail and air are significant for business, and coach is significant only for holidays and leisure travel.

Figure A. Annual long distance travel per person (2002-06, National Travel Survey)

	Car	Rail	Coach	Air	Total
Number of long distance trips by each mode	16.9	2.3	1.1	0.2	20.5
Long distance trips as % of all trips by each mode	3%	15%	15%	100%	3%
Miles travelled on long distance trips by each mode	1654	252	132	75	2114
Long distance travel mileage as % of all travel mileage by each mode	29%	54%	68%	100%	31%
The % share each mode has of long distance travel mileage	78%	12%	6%	4%	100%
Average trip length, miles	98	110	122	406	103

Factors affecting the amount of long distance travel

As incomes grow or decline so does travel. But the effect of income varies with mode: rising incomes generate rail commuting and air travel; they cause car travel to grow modestly, and have virtually no effect on coach travel.

Where people live affects their long distance travel – people in metropolitan areas make fewer long trips, while those in rural areas make most, with town-dwellers in between.

Cost affects the volume of long distance travel but not all types of trips in the same way. Business travel and commuting are less affected, whilst holidays, leisure travel and visiting friends and relatives are more price sensitive, whether travelling by coach, rail, car or by air.

The duration of journeys also affects demand, particularly for car and train. A 10% reduction in time, such as cutting a 5 hour journey to 4½ hours, can increase travel by 10-20% – and vice versa. With rail services having become more frequent, faster and more reliable in recent years, this could help to explain this mode's rapid growth; meanwhile the perceived gradual worsening of congestion on motorways and main roads over the past 5 to 10 years may help explain the muted growth in car travel.

Scenarios

The Commission looked at a 'base case', which used government forecasts, and tested a series of variations on the base case. 'Scenarios' were devised by varying some of the base case factors and the model was used to estimate how these would affect demand for long distance travel. As Figure B shows, the scenarios asked - what if economic growth is slower than the government's 2.5% per year forecast? What if national road pricing is introduced? What if rail, air or motoring costs change significantly? The model could be used to run other scenarios, provided that they can be expressed in an aggregate (non-geographical) form.

Figure B. Forecast growth of long distance travel demand (%) from 2005 to 2030, for different scenarios, compared with the base case

	Car	Rail	Coach	Air	Total
Base case % growth from 2005 to 2030	30	35	25	126	34
Constant real rail fares	28	60	17	120	35
Road User Charging	27	48	27	123	33
Air fares: £10 APD	30	36	25	101	33
Air fares: -25%	30	33	24	154	35
Car: low efficiency	24	38	27	127	30
Car: high efficiency	36	31	22	125	38
Motoring costs 1% pa	19	42	30	128	26
GDP growth 1.25%	18	-1	26	45	18

Conclusions

Policy. The strong influence of income on longer distance travel, especially for business and holidays, means that an increase in prosperity over the next twenty years could lead longer journeys to grow faster than shorter, local ones. A prolonged recession would have the opposite effect.

If Britain emerges strongly from the current recession (as assumed in the base case), demand for long distance travel by road, rail and air could grow vigorously. On the road network, which carries the bulk of long distance travel, congestion would worsen in the absence of investment or, for instance, road charging.

The implications of growth for the rail network are similar: without investment or demand management, overcrowding and less reliable services are the likely result.

If Britain emerges more slowly from the recession and growth is sluggish for a decade or more, demand would grow more slowly, pressure on roads and railways would be less, and there would be less finance (public or private) available to invest in infrastructure and other improvements.

Research. Long distance travel accounts for nearly a third of all mileage travelled by British residents within Britain. This study shows a range of factors to which such travel is sensitive and raises a number of questions that have implications for public policy. The challenge now is for Government to respond to these questions. It would also be valuable if the model could be used to determine a) the levels of carbon emissions related to the ITC's different scenarios, b) the relationship between the growth of domestic and overseas travel, and c) the effects on travel of different demographic futures. Anyone interested in running these or other scenarios (only those at the level of national networks are possible) should contact Matthew Niblett, the Commission's Secretary.

1 The origin and design of the study

Motivation

In 2007, the Independent Transport Commission decided to research long distance domestic travel in Great Britain. The context was debate about the rapid growth of rail travel and increasing concern about carbon emissions, especially from carbon-intensive means of transport such as aircraft. The study excludes Northern Ireland because it is not covered by the National Travel Survey. In covering all modes of long distance travel the Commission was breaking new ground. The ITC is aware of no precedent for this comprehensive inter-modal study of long distance travel within Britain.

Questions which the Commission asked Professor Dargay to investigate included: What are the prospects for further long distance travel growth up to 2030? What would be the effect of charging drivers to use the roads? What might be the effect on air travel of increasing air passenger duty? As the study progressed, the Commission became interested in a wider range of policies and economic scenarios.

This report draws out the policy implications of the consultants' research. The full report, 'The Prospects for Longer Distance Domestic Coach, Rail, Air and Car Travel in Britain' can be found at www.independenttransportcommission.org.uk.

The Model

The model is a mathematical representation of the way people have travelled in the past and could in the future. It deals only with journeys over 50 miles and it covers air, rail, car and coach. It is important to note that the model forecasts travel demand without regard for whether or not there is sufficient capacity on the transport networks.

The model as built is non-geographical. It is based, not on travel along networks of routes, but on national travel volumes. Given that all the assumptions being tested are national in their coverage, this raises no problems. While the model has a horizon of 2030 (though it could be extended further into the future), it also depicts travel in Britain in the recent past. The result is a picture of the social, economic, behavioural and demographic forces that shaped longer journeys over the decade 1996 to 2007.

At the heart of the model are elasticities. These values make it possible, for instance, to show how travel by car would change for every penny added to, or cut from, the price of fuel, or how domestic air trips might be affected by every weakening or strengthening in the country's output (GDP). No less important are cross-elasticities which calculate how increases in, say, train fares might affect travel by coach and car.

Given the normal uncertainties about the future, the ITC is treating the outputs of this modelling not so much as forecasts as stimuli for thinking.

Assembling the data

Forecasting travel necessitates making assumptions about the rate of growth in incomes, changes to population and households, changes in travel costs, the effect of congestion on travel time, over-crowding, and possible policies covering fuel taxes, air passenger duty, road user charging and other factors.

For this purpose, the Commission created a 'base case' using government assumptions and forecasts, the central one of which is that the economy will grow at 2.5% a year from 2012 to 2030. The table below summarises some other base case assumptions.

Figure 1: Base Case Assumptions

	Increase 2009 to 2030	*Source/assumptions*
Petrol prices	+27%	DECC
Car fuel efficiency	+23%	1% per year
Per km fuel prices	+4%	as above
Total motoring costs	0.5%	Non-fuel motoring costs constant
Journey time (roads)	7.5%	DfT NTM 2008
Rail fares	+28%	RPI+1%
Air fares	-12.5%	half of DfT's assumption

2 Rising incomes - changing life-styles - travelling further

Over the past three decades incomes have risen, suburban living has expanded and car ownership has grown. Over the past decade car ownership has continued to grow, including a substantial rise among the poorest fifth of British households.

A consequence of these changes is that between 1978/9 and 2008 the distance travelled by the average Briton rose by more than 2,000 miles a year, from 4,800 to 6,900 miles[1]. Distances travelled by car, coach and rail all increased. But such figures do not tell the full story. A significant reduction in the rate of growth in travel began in about 1990. A further flattening out in growth took place after 2000 when, in the height of an economic boom, long distance travel by car per person ceased to grow. This is discussed below in Section 7; it does not mean that travel has stopped growing: with rising population and rising wealth, travel overall and by car is still rising.

1 Department for Transport (2009) Transport statistics Great Britain: Table 2.1. London: TSO or www.dft.gov.uk

3 How people travel – car, coach, rail, air

Distances

So what are the facts? Every year Britons on average make 20 long distance domestic journeys of over 50 miles one way. This involves travelling over 2100 miles and accounts for about one third of all annual travel. The average one way trip amongst these long distance journeys is about a hundred miles.

Looking at the different means used for these journeys, trips by air are by far the longest, while the average length of trips by car, rail and coach are fairly close. Note how in line two of Figure 2 "all trips by each mode" are by motorised means only; if walking and cycling journeys are included in the base, then long distance travel amounts to 2% of all trips.

Figure 2: Average annual long distance travel per person (2002-2006, NTS)[2]

	Car	*Rail*	*Coach*	*Air*	*Total*
Number of long distance trips by each mode	16.9	2.3	1.1	0.2	20.5
Long distance trips as % of all trips by each mode	3%	15%	15%	100%	3%
Miles travelled on long distance trips by each mode	1654	252	132	75	2114
Long distance travel mileage as % of all travel mileage by each mode	29%	54%	68%	100%	31%
The % share each mode has of long distance travel mileage	78%	12%	6%	4%	100%
Average trip length, miles	98	110	122	406	103

2 Unless stated otherwise, all figures and tables, and all references, are drawn from Professor Dargay's report.

Car travel

In the decade up to 2001, annual car travel in Britain for local and long distance journeys, aided by car ownership rising at about 500,000 vehicles a year and expansion of the main road network, grew by 42 billion passenger kilometres. (That is the equivalent of more than a million circuits of Earth.)

The implication is that compared with journeys by car, long distance travel by all other modes is relatively minor. Rail accounts for 12% of the total distance, coach for 6 per cent and air only 4 per cent. Nearly 80 % of all long distance mileage is by car.

Therefore, a 5% switch in car travel to rail will give rise to an increase in rail demand of 30%.

Coach travel

Holiday and leisure trips are the main market for coaching companies but the market is small and coach travel comprises only 6% of all long distance mileage. Most coach journeys are either to airports or inter-city. Thus the growth of foreign air travel has seen Heathrow become a hub for National Express and substantial growth in coach services to other airports. In inter-city travel Stagecoach introduced 'Megabus', a new inter-city coach concept based on low-cost yield management fares.

Rail travel

The last decade has seen a transformation of the railways. Heavy investment, which continues, in both track and stations has driven up reliability and other service standards while operating companies have procured new and faster trains and backed them by modern ticketing and marketing techniques. Since 1996, rail travel has grown by over 50 per cent.

Some off-peak rail travel is still priced very attractively, as a result of fares based on yield management techniques. Passengers visiting family and friends, or on holiday or leisure trips tend to be the main beneficiaries.

During the past couple of years interest in domestic high speed rail has increased dramatically. Since the model used in this study is of aggregate demand and is not geographically specific, it has not been possible to evaluate particular high speed rail proposals.

Air travel

Domestic air travel, though starting from a small base and still serving a small market, has grown fast for journeys over 350 miles. Low cost carriers, offering tempting yield management tickets, have come to dominate such routes as Stansted to Edinburgh, while other, more expensive, services have been introduced between British city pairs, such as Norwich and Exeter. Figure 3 below gives examples of air routes from Aberdeen, Bristol, Exeter, Glasgow, Newquay and Norwich, which mostly cut across rather than run parallel to the trunk rail network. It is only in the case of flights between London and Glasgow and Edinburgh – some 400 miles - that air and rail compete.

The reality is that Britain's emerging domestic network of air routes has grown up, not so much to compete with rail (except over 300 miles), but to cover routes for which there is no satisfactory rail option. All this helps to explain why, in the period 1995/2001 to 2006/2008, the proportion of domestic air trips which exceed 350 miles grew from 28 to 45 per cent of the total.

Figure 3: Selected airports and long distance routes in mainland Britain

Airports	Destinations
Aberdeen to:	Birmingham, Bristol, Cardiff, Exeter, Leeds/Bradford Nottingham, Norwich, Southampton
Bristol to:	Aberdeen, Edinburgh, Glasgow, Inverness, Leeds/Bradford, Manchester, Newcastle, Newquay, Plymouth
Exeter to:	Aberdeen, Edinburgh, Glasgow, Leeds/Bradford, Manchester, Newcastle, Norwich
Glasgow to:	Birmingham, Bristol, Cardiff, East Midlands, Exeter, Leeds/Bradford, London City, London Gatwick, London Heathrow, Luton, London Stansted, Manchester, Newquay, Plymouth, Southampton
Newquay to:	Bristol, East Midlands, Edinburgh, Glasgow, Leeds/Bradford, London City, London Gatwick, Manchester, Newcastle
Norwich to:	Aberdeen, Edinburgh, Exeter, Manchester

4 Why we travel – long distance journey purposes

People travel for many reasons but, for longer journeys, five main purposes can be identified. The most important, with 28 per cent of all personal mileage, is visiting friends and relatives (VFR). Other categories of personal travel are leisure (21%) and holidays (21%). As a result, personal travel accounts for 70% of all long distance travel. Business travel is 20% and commuting a further 10%.

Figure 4 shows how journey purposes vary considerably from mode to mode and how the distance travelled for different purposes varies too.

Figure 4: Mode shares of distance travelled by journey purpose, %, mean 2002-2006, National Travel Survey

	Car	Rail	Coach	Air	Total	% share of all long distance travel
Business	75	13	2	10	100	20
Commuting	74	23	2	1	100	10
Holiday	75	9	12	4	100	21
Leisure	79	9	11	1	100	21
VFR	84	12	3	1	100	28

The leading reason why people make longer distance car trips is to visit friends and relatives. In a society where moving to some other part of the country, whether for work, college or retirement, is increasingly common, cars have become the primary means of linking those who are now apart. Thus cars account for 84% of the distance travelled to visit friends and relatives. Holiday and leisure trips are the main market for coaching companies. About 80 per cent of all coach travel (by distance) is for these two purposes.

In the case of air travel, a different picture emerges. More than half the mileage travelled is on business. Holidays account for another quarter. Similarly with rail, 40% of all long distance rail travel is for business and commuting; visiting friends and relatives is another 28%, with holidays and leisure 32% between them.

5 The drivers of long distance travel

The analysis and modelling of long distance travel trends between 1995 and 2006 from the National Travel Survey has enabled us to identify the main drivers of such journeys. We can now see how sensitive travel demand is to various factors.

First, the analysis has shown that household incomes are a key factor affecting long distance travel, and also that the effects of incomes vary considerably between journey purposes and modes of travel. We use the term 'elasticity' to indicate the effect of changes in income, cost or time on travel demand – for example an income elasticity of 0.5 means that a 10% increase in income will cause a 5% rise in the amount of travel. In these tables, more dots indicate stronger income effects on travel demand. The elasticities presented here are the long-run elasticities, that is, the total effects after all adjustment in travel has been made in response to the income change. These effects can take a number of years to be realised.

In the following three tables, the "stars" are "awarded" as

Key: * < 0.5 elasticity (low effect)
** 0.5 to 1.0 elasticity (medium effect)
*** > 1.0 elasticity (strong effect)
Market share very small (difficult to reach conclusion)

Figure 5: Long run effects of income on long distance travel demand

	Car	Rail	Coach	Air
Business	**	***	-	***
Commuting	**	***	-	-
Holiday	**	**	*	***
Leisure	**	**	*	***
VFR	**	**	*	***

Rising incomes over the decade to 2006 have been a major driver of rail demand for business and commuting, and on air travel. Income has relatively little effect on coach travel, and only moderate effects on longer distance car travel.

Next, the analysis shows the effects of price or cost on long distance travel

Figure 6: Long-run effects of price or cost on long distance travel demand

	Car	Rail	Coach	Air
Business	*	**	-	*
Commuting	**	**	-	-
Holiday	**	***	**	***
Leisure	**	***	**	***
VFR	**	***	**	**

The effects of price or cost are quite different: rail demand for leisure and VFR journeys is particularly sensitive to price, and this has been effectively exploited by the rail companies in their pricing over this period. Long distance travel for holidays and leisure is – almost irrespective of mode – fairly sensitive to price. It is interesting to note that the elasticity makes it some 2-3 times as sensitive to price as local, day-to-day travel.

Even long distance business travel and commuting are not immune to price sensitivity, with price elasticities generally higher than for short distance travel.

Finally, we can see the effect of travel times on long distance travel demand.

Figure 7: Effect of travel time on long distance travel demand

	Car	Rail	Coach	Air
Business	***	***	-	*
Commuting	***	**	-	-
Holiday	***	***	***	**
Leisure	***	***	***	**
VFR	***	***	***	*

This demonstrates the dramatic effect that travel time improvements – or worsening – can have on long distance travel demand. The high sensitivity to travel times for car travel may explain why the growth in car travel has tailed off in recent years, but we cannot say more than that from this study, as we have not used any independent data about road network performance, journey times or worsening congestion over this period.

Given the particularly high sensitivity of rail demand to travel times for the three personal journey purposes, it is little surprise that the improvements in perceived journey speeds, frequencies and reliability on many parts of the rail network in the last 10 years will have helped drive the substantial increase in rail demand.

The analysis has also thrown light on "cross-elasticities" – that is, the extent to which changes in travel time or cost of one mode can cause switching to other modes (rather that suggest suppressing or increasing travel on the mode in question).

Key findings

There are very low (*) cross-elasticities of cost between the different modes of travel. That means that changes in the price of (say) rail will increase or suppress rail travel demand, but will bring very little shift to other modes.

The one significant cross-elasticity is to car travel time – a change in car travel time will shift a modest proportion of car users over to other modes, which in turn has a large effect on those other modes (because the scale of car travel is so much greater). The largest is for holiday travel – a 10% worsening of car travel time will shift 2 ½ % of car travellers to rail, but as a proportion of existing rail travellers that becomes a 15% increase in rail travel.

Summary of effects on long distance travel demand by mode

By car

- income has a moderate effect on demand, as does the cost of motoring
- but any worsening of travel times has a significant impact on demand, especially for longer distance holidays
- worsening of travel times does divert demand to rail for business travel, and to rail for holidays

By rail

- income has a major effect on business and commuting, and a strong effect on other journey purposes
- fares changes have a moderate effect on business and commuting, but a major effect on holiday
- travel, leisure and VFR changes in travel time affect rail similarly. Switching to other modes is modest

By coach

- travel is relatively unaffected by income
- coach fares and travel times have a major effect on demand
- switching to other modes is modest

By air

- income has a major impact for all journey purposes
- price elasticity is moderate for business travel and commuting, high for all other journey purposes
- there is moderate switching between air (proportionately) and car and rail as their travel times change

6 Forecasts and scenarios

In order to show the effects of different scenarios in forecasting to 2030, it is necessary to create a base case of assumptions. This involves projecting, into the long term, recent trends in, for instance, the socio-economic characteristics and geographical distribution of the population and best estimates of the future state of the national economy. Transport costs are mostly related to oil prices. (The details are set out in Section 5 of Professor Dargay's report.). Official government forecasts and sources are used, wherever possible, for the base case assumptions.

In the base case GDP is assumed, once the effects of the recession are past, to grow at 2.5 per cent per year compound from 2012 over the years to 2030[3], and the resulting income growth is the main driver of change. Demand for rail travel is assumed to suffer no constraints due to lack of capacity; on the roads, worsening congestion is reckoned to lead to a 7.5% per cent increase in journey times up to 2030.

One point to bear in mind is that with tax accounting for 65 per cent of the cost of unleaded petrol (72p out of 112p – AA Fuel Price Report February 2010), increases in global fuel prices affect petrol and diesel prices for road users much less than for rail or air where fuel is untaxed. However, the marginal cost of fuel in rail fares is small.

Scenarios

Figure 8. The eight other scenarios tested by the ITC.

Scenario	Impact on all LDT *	Assumptions
Constant real rail fares	Rail fare 0% (+28%)	Real rail fares at today's level
Road user Charging	Motoring cost (+0.5%) +21% bus. & comm. +8% other Journey time +3% (+6%)	5p/km business & comm. 2p/km all other purposes
Air fares: APD £10	Fares +1% (-12.5%)	£10 increase
Air fares: 25% fall	Fares -25% (-12.5%)	DfT projections 2008
Car: low fuel efficiency	Motoring cost +10% (+0.5%)	No improvement in eff. (23%)
Car: high fuel efficiency	Motoring cost -10% (+0.5%)	DfT: eff. 92% petrol, 43% diesel
Motoring costs +1% pa	Motoring cost +23% (+0.5%)	Increase in total motoring cost
GDP growth 1.25%		Economic growth half that predicted by HM Treasury

3 This is based on the HM Treasury forecast of April 2009.

Figure 9. Forecast growth of long distance travel demand from 2005 to 2030, for eight scenarios, compared with the base case

Scenario	Car	Rail	Coach	Air	Total
Base case % growth from 2005 to 2030	30	35	25	126	34
Constant real rail fares	28	60	17	120	35
Road User Charging	27	48	27	123	33
Air fares: £10 APD	30	36	25	101	33
Air fares: -25%	30	33	24	154	35
Car: low efficiency	24	38	27	127	30
Car: high efficiency	36	31	22	125	38
Motoring costs 1% pa	19	42	30	128	26
GDP growth 1.25%	18	-1	26	45	18

Discussion of the scenarios

Context

In considering long distance travel, the dominance of car journeys needs to be kept in mind. Other modes together account for fewer than one in five trips. Furthermore, travel by rail is dominated by trips to and from London. It should be noted too that the distance people intend to travel affects how they choose to go. No air travel is recorded in the National Travel Survey for journeys between 50 and 149 miles where cars account for 86 per cent of the mileage, rail 10 per cent and coach 4 per cent. For journeys of 150 miles or more, air is 8% of the total with rail 12%, coach almost doubling to 7% and car falling to 73%, which is still dominant.

Cars and car travel

Since the spike in oil prices in 2007 and 2008 the motor industry has been forced to increase its focus on fuel efficiency. The recession further sharpened perceptions about the need for technological change. Existing models are being re-tuned; highly-efficient new models are coming into the market, and battery electrics are close to mass production. The ITC therefore looked at a scenario under which the industry succeeds in delivering new vehicles with high fuel efficiency.

This showed that *fuel efficient cars could offset rises in fuel prices and lead to a big, five percent, jump in motoring as well as falls in both rail and coach travel*. Total travel would grow by three percent compared to the base case. This has implications for the Treasury if fuel tax revenue falls and demand for rail subsidies rises.

If, by contrast, fuel efficiency was *unimproved* up to 2030, the outcome would be growth in car travel 5% lower than the baseline growth forecast and a similar lower growth in forecast total travel.

To test the opposite line of thinking, the Commission examined the effect of increasing motoring costs by 1% per year in real terms up to 2030. This would reduce total travel growth by 6% below the base case – *more than in any other scenario*. The biggest shift would be to rail but coach and even air would also gain.

Finally, the Commission considered what might happen if growth in car travel, as some data suggest, becomes so much affected by slower speeds, congestion and unreliable journeys that car owners cease to aspire to drive more as incomes rise. Under such conditions car travel would grow by only about one third as much as in the base case, due largely to growth in population, and would drag total travel down by more than any other measure.

Road charging

Road user charging proposals have, in recent years, attracted negative press and public opposition. Politicians are, accordingly, wary of the concept – however logical it may be in principle. But might there be a change if progressive improvements in vehicle fuel efficiency, combined with a growing fleet of electric or electric hybrid cars, cut into the Treasury's income from fuel duty?

Professor Dargay sought to test the effect of introducing a national road user charging regime, set to manage travel demand over different parts of the network. Because the model forecasts aggregate demand and is not geographically specific, a simplified approach had to be adopted. This involved using two rates of distance-related-charges. Five pence per kilometre was chosen for business and commuting and two pence per km for all other trips. The former is designed to reflect the more congested times and places likely to be encountered by commuters and long distance business travellers. The latter aims to reflect conditions for those travelling for leisure or holidays. The effect of the charges was, perhaps, surprisingly slight – a reduction in growth of car travel to 2030 from 30% to 27%.

Railways

As has been noted, the non-geographical nature of the model used in this research made it impractical to test the effect of building a new high speed railway along a specific route.

Given the importance of incomes in determining how much people travel by rail, much will depend on the future of the economy. If it grows strongly after the end of the recession, then rail travel may be expected to grow again as it did in the years before 2008. Another factor in rail travel is the level of fares. In a scenario in which fares were held constant in real terms, an attractive though perhaps unlikely prospect, the growth in rail travel nearly doubled, from 35% to 60%. Shifts to rail were notable, with coach travel growing 17% rather than 25% in the base case; air travel less affected at 120% growth rather than 126%, and long distance car travel growing 28% by 2030, instead of 30%.

Air travel

Air travel is different from all other modes. Those on business account for over half of all passengers whilst those on holidays account for a further quarter. Travel is also highly income elastic.

The effects of the recession on aviation are well known and predictable, given its close relationship with GDP and incomes. It is also the mode most exposed to environmental concerns.

It follows that, in the absence of a targeted tax on domestic air travel, demand could be more buoyant than is often predicted. Provided that the economy grows and that incomes rise, there is no obvious reason why business demand should slacken for air travel between distant city pairs which are not well-served by Britain's London-centric railway network.

The Commission accordingly tested a scenario in which all domestic air trips were subject to an extra £10 of Air Passenger Duty. This tax cut growth in demand for travel by about one fifth compared with the forecast in the base case. In a second air travel scenario, the model was used to test increases in aviation operating efficiency. (Higher seat occupancies, new designs of aircraft and jet engines and changes to air traffic control and ground handling are all envisaged by the industry.) Such developments were modelled by assuming a 25% cut in fares and this led the already high level of growth in the base case to rise by a further fifth to 154% by 2030.

A low GDP scenario, by contrast, showed air travel growing by only about one third of the base case or 45%.

Coaches
Coach travel is largely unaffected by income changes. Passengers are, however, influenced by the price of tickets and the duration of journeys.

It follows that an ageing population, increasingly accustomed to mobility but fearful of driving, may form one segment of the future market for long distance coach travel. Students and airport-bound passengers are others. But the real prize for the coaching industry would be the introduction of toll lanes or high occupancy vehicle lanes on motorways and major city roads. These would increase reliability and revenues, and thus make services more attractive and profitable. However such futures were beyond the ITC's present model.

Lower GDP growth
If we assume that GDP growth recovers by 2012 not to 2.5% pa (as in the base case) but to 1.25% through to 2030, total long distance travel demand only grows by 18% by 2030, compare with 34% in the base case. Since population growth is also forecast at 18% over this period, it means that – given all the other base case assumptions - long distance travel per head of population remains static. The striking figure is the slight reduction in total long distance rail travel: this demonstrates not only the high income elasticities for rail travel (whether incomes fall or rise), but also the effect of rail fares being assumed to rise at RPI+1% every year.

Summing up
The total amount of travel is strongly affected by population growth, and the amount that individuals travel has, traditionally, also been strongly affected by their incomes. If households are divided into five income groups, those in the poorest quintile travel about 4,000 miles per year while those with the highest incomes do over 10,000. The better-off also travel far more by train than other income groups.

So, how influential might possible policy-driven changes be in shaping behaviour? What stands out is that the present recession will reduce travel, and in the long term none of the policy interventions examined by the Commission will be as significant in changing travel behaviour as changes in income.

This points to the significance of the recession. Professor Dargay's model includes an estimate that the downturn will result in a cumulative reduction of GDP of eight per cent between 2008 and 2010. Growth in long distance travel is assumed to fall by a comparable amount. NTS data on changes in long distance travel since 2007 are not available but, for all travel, reductions in mileage between 2007 and 2008 were 4 per cent for cars, 2.7 per cent for rail and 21 per cent for coach.

If GDP growth were to be 1.25% p.a. from 2012 onwards, and not the 2.5% assumed by the Treasury in April 2009, and as used in this study for the base case, the effect on travel would be profound. This scenario shows no growth at all in rail travel and no change in growth for coach. Growth in car travel would be little more than half that in the base case while air travel would have its growth prospects cut by nearly two thirds. GDP is clearly a very significant determinant in long distance travel.

7 Is income-driven growth in car travel coming to an end?

The case for continued growth in long distance mobility is based on further economic growth plus population increases, continuing geographical dispersal of families, the introduction of hyper-economical cars and, whether due to road user charging or information technologies, increasingly reliable motorway journeys. The case against continued growth is that from about 1990 traffic and travel began less closely to track the growth in GDP, and that from about 2002 the National Travel Survey shows a flattening out in car mileage per capita per year. In other words, an apparent sea change in travel behaviour began to set in nearly two decades ago.

However, the cause of this is not clear. The Leeds study finds that income elasticities were no lower in the latter part of the study period (i.e. from 2002 onwards) than in the earlier part. In other words, the cross-sectional analysis suggests that income was as powerful a driver of travel by car in the later as well as the earlier part of the study period.

Whatever has caused the slackening of individual travel growth, there is no direct evidence of a break of the link between travel and incomes. We have no other explanation to hand, but we suggest that the gradual perceived worsening of travel times and journey time reliability on the main motorway and road networks may have affected the demand for long distance travel by car. We know from the modelling analysis that demand is quite sensitive to journey times and this may have offset the potential for rising incomes to increase demand over the last decade. Again, we should stress that the fall in individual travel growth does not lead to an overall fall: a rising population and rising incomes still bring large scale travel growth.

Finally, a survey of International Energy Agency countries notes that: 'Car ownership is still growing, but on per capita bases that growth is slowing relative to GDP as the number of cars approaches the number of licensed drivers. Car use per capita, which represents the growth in car ownership and a much slower change in car use per car, has stagnated recently, a likely consequence of saturation of ownership and use'[4].

All the scenarios in this study, except for that based on 1.25% GDP growth, contain the assumption that once the recession is past, incomes will rise and drive further growth in travel demand. Will this happen? It depends on other assumptions about worsening congestion and journey time reliability. In the base case scenario, for instance, road journey times are assumed to increase by 7.5% to 2030 (DfT NTM 2008). Other allowances could be made for additional car and other traffic also leading to slower travel.

4 Energy Policy (2009) Fuel economy, vehicle use and other factors affecting CO2 emissions from transport. www.elsevier.com/locate/enpol

8 Further research questions

While this report gives many useful insights into the future of long distance travel in Britain, it also opens up fresh questions. The Commission believes that the following issues are particularly pressing, and is keen to use the Dargay model to investigate them. Anyone interested in supporting such research should contact the ITC Secretary, Matthew Niblett [matthew.niblett@keble.oxon.org]

1. The Stagnation of Car Travel
Why has the growth of long distance car travel declined dramatically? What is happening? Only the slowdown in recent years can be related to the recession. And Professor Peter Jones and the RAC Foundation have published work showing that the phenomenon has been recorded in the USA as well as Britain. This study suggests that the lull could be temporary and that over the next 20 years road travel could start rising again. One useful step would be to adapt the Dargay model to distinguish between growth in the use of cars and vans. One question that needs addressing is whether on-line shopping is driving significant changes in patterns of leisure and retailing.

2. Future Carbon Emissions from Transport
Given the finding that some 30% of all travel mileage is for journeys over 50 miles the total carbon emissions associated with the forecasts and the different policy scenarios would be of particular interest. The model could be used to do this, assist in determining future carbon policy and increase understanding of how transport could be incorporated into the national climate change framework.

3. The Effects of International Travel Growth.
To what extent does the recent slowdown in growth in personal mileage reflect increases in travel outside Britain? Are weekends in Europe and America replacing ones in the Cotswolds and London? Tourist data could be mined to investigate this question and reveal whether overseas travel has dampened domestic demand.

4. The Effects of Population and Demographic Change
The ONS forecasts that, chiefly due to migration, population will by 2030 grow 14% above 2005 levels. Sensitivity testing of this forecast shows that reducing such a population increase by half would have limited effect on total travel demand – though it would increase the proportion of rail and air journeys compared with those made by road. It would also be possible to predict the travel demand related to other population estimates and to the ageing of the population. How, for instance, will travel by the over-60s affect off-peak journeys and capacity requirements?

5. Directness of Routes
Another untested question is whether the directness of long distance journeys has an effect on demand. Recent research has revealed the usefulness of a pallet concept, whereby people mixed needs for particular types of trip, the implications then being used to redesign the Transport Direct (TD) web portal. This research could be revisited with emphasis on long distant trips including using more recent TD records.

6. Travel Time Budgets
Recent research by Professor David Metz at UCL has suggested that there is a natural limit to the time people are prepared to spend on daily travelling. This value of time issue could be tested for different modes.

7. What is the significance of Dual Mode journeys?
As the model does not always pick up dual mode journeys it would be useful to investigate them. A related issue is what determines mode choice. Why do travellers choose to fly or go by train for long distance domestic trips? And why to they chose cars or coaches (or car plus coach) for shorter ones?

8. Cost assumptions on Air Travel
The air travel cost assumptions used in this study (which were provided by the DfT and which suggest a fall in real terms) have been widely questioned. Scenarios based on different cost assumptions could help to throw light on this subject.

9 Findings and Conclusions

Findings

Current Travel

1. Long distance travel - journeys of more than 50 miles – by residents in Britain accounts for 3% of all mechanised trips but nearly a third of all the distance travelled.

2. Four in every five long distance trips are made by car.

3. Seven out of ten long distance journeys are for leisure, holidays and visiting friends and relatives. Business travel and commuting are in the minority.

Forecast Travel

4. Official demographic and economic growth forecasts suggest that total long distance domestic travel demand could grow by a third overall by 2030. In this scenario rail travel would increase by 35%, car by 30%, coach by 25%, and air travel by 125%. The study has focussed only on demand, and has not investigated whether or not there is sufficient capacity on the networks concerned.

Effect of Income and Population

5. Growth in long distance travel is highly sensitive to incomes and economic growth. If the economy grows at 1.25% from 2012, instead of the government forecast of 2.5% a year used in the base case scenario, then long distance travel would grow only 18% by 2030, rather than 34%.

6. Rail commuting, business journeys and air travel, but not travel by coach, are strongly affected by the level of incomes. Long distance rail would accordingly decline by 1% under the 1.25% economic growth scenario, compared with an increase of 35% in the base case. The assumption that rail fares could rise by RPI+1% has a significant effect in limiting growth.

7. A forecast 15% growth in population by 2030 is also important in driving total long distance travel demand.

Modal Choice

8. Long distance rail travel has grown fast in the last 15 years, while the growth in car travel has been slower, and has recently tailed off. Long distance car travel is particularly sensitive to variations in journey times.

9. Changes in journey times or costs influence the use of the different modes but have little effect on causing people to switch from one to another. Decisions about long distance journeys seem to be made with particular forms of travel in mind. And since nearly 4 out of 5 longer journeys are by car, it is only changes in motoring costs, rising congestion or lower income growth, that affect the amount of travel by car and thus total long distance travel.

10. However, the predominance of car travel for longer journeys means that, even modest shifts to or from cars, would create large changes in demand for travel by, say, rail or coach. For example, a 5% switch from car to rail would increase long distance rail journeys by about 30%.

Policy Scenarios

11. An increase in air passenger duty of £10 could cut back the growth of domestic air travel by 9 per cent – leaving total growth still at 100%.

12. A 1% per annum increase in motorist costs could cut 8% from the growth of car travel by 2030 – reducing the total to 22%.

13. If rail fares kept pace with inflation, long distance rail travel in 2030 could be 19% higher than the base forecast (which assumes fares rise at RPI+1%). This would give a total growth of 60%.

Conclusions

Journeys over 50 miles account for one third of all the distance travelled by residents within Britain, yet they differ strongly from the shorter day-to-day urban and suburban journeys that most capture the attention of policy makers.

The strong influence of income on longer distance travel, especially for business and holidays, means that an increase in prosperity over the next 20 years could lead longer journeys to grow faster than shorter, local ones. A prolonged recession would have the opposite effect.

The dominance of the car for journeys over 50 miles reflects the geographic dispersal of many households. It reflects too the limited extent and accessibility of the railway network. Cars have the additional advantages of being able to reach remote rural and coastal destinations, carry children's and sporting equipment, and provide mobility at destinations.

There seems to be little scope to influence choice of mode for long distance travel – changes in cost or time may suppress or generate travel on one mode but do not appear to switch many people to other modes. Most long distance journeys seem to be chosen with a particular mode in mind – "I can get there by train so that's where I will go and that's how I will travel". If policy-makers wish, for example, to cut travel by air or car, they must act directly on the mode itself. Improvements to rail or coach services will do little to attract people out of cars or planes.

However, since car travel is so dominant, even modest switches from car (due to cost or time increases) would cause overwhelming growth for rail or coach. For example, a 5% switch in long distance car travel to rail amounts to a 30% increase in long distance rail demand.

The dominance of long distance travel by discretionary visits, including those to see friends and relatives, or leisure and holiday trips (only 30% is for business and commuting), explains why it is sensitive to changes in cost and duration.

If Britain emerges strongly from the current recession (as assumed in the base case), demand for long distance travel by road, rail and air could grow vigorously. On the road network, which carries the bulk of long distance travel, congestion would worsen in the absence of investment or, for instance, road charging.

The implications of growth for the rail network are similar: without investment or demand management, overcrowding and less reliable services are the likely result.

If Britain emerges more slowly from the recession and growth is sluggish for a decade or more, demand would grow rather more slowly, pressure on roads and railways would be less, and there would be less finance (public or private) available to invest in infrastructure and improvements.

The scenarios in this study have yet to be assessed for their carbon emissions. But given that longer journeys account one third of all travel mileage, given the possibility of further travel growth by 2030, and given the barriers to switching between modes, the ITC is keen to undertake this work. It could help to throw light on possible carbon reduction strategies.

Finally, notwithstanding the value of the findings of this study, much remains unclear about the nature of long distance domestic travel. Given the extent of such journeys and given too the prospect that they will increase, it is important to fill the gaps in knowledge that have been uncovered.

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