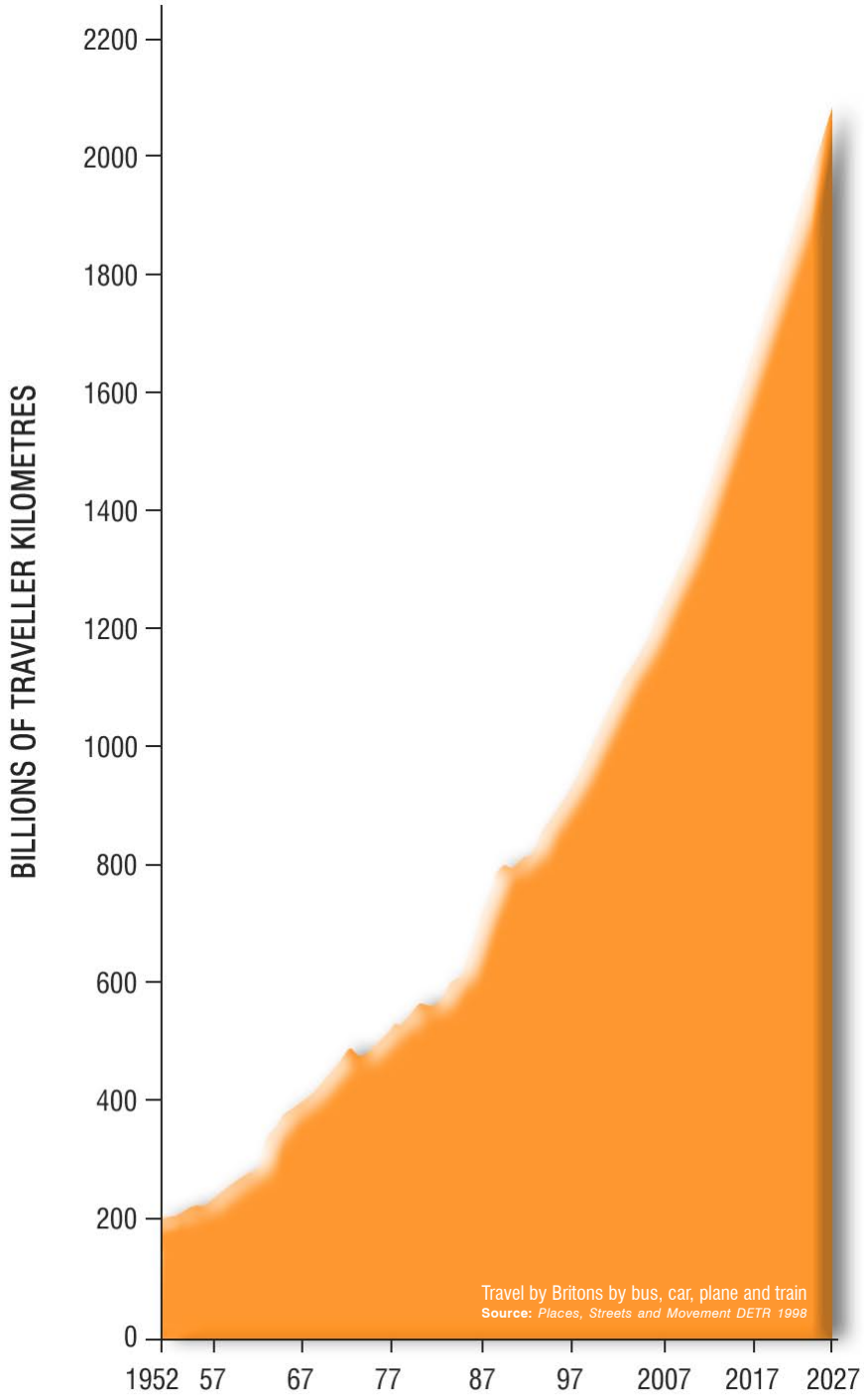
Paying to Drive
Scenarios for 2010



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Foreword by the Chairman: Sir Patrick Brown, KCB

Road pricing is creeping up the political agenda. The current Transport Secretary, though extremely cautious in public, has ensured that the Department for Transport is comprehensively at work on it and has a budget to pay for it. The Conservative and Liberal Democrat Parties are also studying pricing closely and neither has declared opposition to it.

But road pricing is only a tool. The fundamental issues in transport are its contribution or otherwise to Britain's competitiveness, the dependability of journeys by road, and the comfort and convenience of going by car to visit friends or catch a train. Concerns such as these, which daily occupy the minds of businesses, bus operators and ordinary motorists, are what need to be addressed. Pay-as-you-drive road charges are significant only to the extent that they can or cannot contribute to such wider economic and social objectives.

In this report the ITC draws on further work by Professor Stephen Glaister and Dr Daniel Graham to show the potential of two national road charging scenarios to effect, amongst other things, the different regions of Great Britain, low income drivers, public transport and aspects of driver behaviour. We ask who, if road charging comes to pass, would manage it and decide what drivers would have to pay. We note too that many, many questions remain to be answered. Nevertheless I am confident that this piece of work will contribute to the debate on road charging called for by Alistair Darling.

I know my colleagues would want me to report on the pleasure we get from working with Professor Glaister and Dr Graham. I can say for myself the same of the Members of the Commission; they are the brains of the think tank and very stimulating colleagues they are. Then there are our sponsors. We could not do this work without them and are, in this case, particularly indebted to the Esmee Fairbairn Foundation and the Rees Jeffreys Road Fund.

April 2006

1. INTRODUCTION

This is the Independent Transport Commission's second report on national road user charging. Like the first it draws on insights from econometric modelling by Professor Stephen Glaister and Dr Daniel Graham of Imperial College.[1] In particular it shows in a general way, how two particular scenarios might work out on the ground.

The main findings of the new work concern:

- The likely state of traffic speeds and flows in 2010 assuming that national road pricing is in place and taking into account current and planned road building.
- The effects of a regime of national road pricing which, in order to collect only as much money as would be gathered by continuing with fuel duties and the tax disc, would lower costs for drivers using uncongested roads.
- The effects of a second regime in which road charges were used to raise £16 bn. in addition to fuel duty.
- How road pricing would prompt some drivers to change the timing of their journeys to avoid paying the most expensive charges.
- How road pricing could persuade others to commute with neighbours or colleagues in order to share the cost of driving at expensive times and places.
- Some implications of road charges for low income car owners.
- How the weekly cost of road charges would vary for households in different regions.
- The special case of Greater London.

The last time the ITC reported on national road user charging,[2] it concluded:

- The pricing of road travel in Britain is a muddle. What many people pay bears no relation to the real costs of their journeys.
- Given the practical limitations to road building, the country faces a choice between worsening congestion and road use charging. Delay over the introduction of charging will make things worse.

And in his technical report Professor Glaister found that under today's overall rates of fuel duty, city areas and major inter-city routes tend to be relatively under-charged while country areas are significantly over-charged.

[1] 'Road Pricing in Great Britain: Winners and Losers', Professor Stephen Glaister and Dr Daniel Graham, Imperial College, London (2006) may be downloaded from www.trg.soton.ac.uk/itc.

[2] 'Transport Pricing: Better for Travellers' (ITC 2003) reviewed modelling by Professor Stephen Glaister and Dr Daniel Graham of Imperial College, London, of the spatial effects of different road charging scenarios. Their technical report, called 'Transport Pricing and Investment in England' (2003), and the ITC's report may be downloaded from www.trg.soton.ac.uk/itc.

2. WHY ROAD USER CHARGING?

National road user charging is not an end in itself. Its function is to make the roads in Britain work better, contribute to the creation of wealth and make travel a more enjoyable experience. The answer to the question 'Why change from fuel duty to road pricing?' is:- to make Britain a better place in which to live, work and play. If road journeys were more reliable, if the environmental damage caused by cars, vans and lorries was reduced and if travel by other means from walking to going by bus increased, it is the Commission's view that Britain would be both more productive and better to live in. The key issue is whether road pricing could deliver such a future. In the Commission's view it looks like a more promising tool than any other on offer but many questions remain to be answered. These range from how road pricing would affect travel to work to whether or not it would promote moves out of cities into the country.

3. ECONOMIC, SOCIAL AND POLITICAL CONTEXT

Travel and transport trends: 1980 - 2004

The appetite of Britons for travel persists. Between 1980 and 2004 traffic on Britain's roads increased by 81% while the distance travelled by buses and coaches went up by 49%. Journeys on the national railways also increased – by 43%.

The number of vehicles on the roads grew from over 19 to over 32 million and by 2003 three out of four households had at least one car. Over the same period the relationship between road traffic and economic growth changed. Before 1992 traffic grew faster than GDP. After that GDP grew by 42% – twice as fast as road traffic.

Traffic speeds have, meanwhile, been falling on main roads. Over the same 24 year period average speeds fell at all times on Trunk roads. The greatest fall – from 55 to 52mph – was during evening peaks.

Motoring meanwhile continues to offer increased value for money. New models of car consistently offer higher performance and more equipment than those they replace but, thanks to increases in engine efficiency, longer maintenance intervals and little change in the real cost of fuel, the cost of running cars in 2004 was 'at or below' the 1980 level. Bus, coach and rail fares, by contrast, rose by 37%.

Travel by bus declined in the big cities except for Greater London. In the capital a combination of low car ownership, slow traffic speeds, controlled parking, high densities, fare concessions and dense bus and railway networks help to explain a decade of rising public transport travel. Some towns such as Brighton, Oxford, Nottingham, York and Edinburgh have also created conditions favourable to bus travel – and seen it grow.

Investment

Investment in roads peaked in 1992 at £6.2bn and fell to £3.5bn in 2000 rising thereafter to £4.2bn in 2003/4. Railway investment, which has grown four times since 1995/6, exceeded road investment for the first time in decades in 2003/4. In that year the total was £4.7bn.

Road pricing technology

In many countries technologies are being developed that could underpin road charging in the future. So far Germany's lorry tolling regime is geographically the biggest exercise in the use of satellite positioning. Nearly half a million black boxes on the lorries receive signals from satellites in order to fix their progress along the roads and calculate tolls. But manual payment is also possible.

In Stockholm, where a cordon for variable charges was introduced in January 2006, roadside beacons and automatic number plate recognition form a basic enforcement and accounting system that is becoming less costly to operate as increasing numbers of drivers use direct debit 'tags'.

In Britain, Norwich Union is piloting pay-as-you-drive insurance which, like the German lorry tolls, relies on satellite positioning. Information needed for billing is assembled on-board and beamed back via cell phone for processing. Data collected in this way in the course of road charging could be used to improve both road safety and highway management - provided that sufficient drivers gave permission for their vehicles to be used as 'probes'. Information about journey speeds gathered in this way would, for instance, point to the presence of congestion. Where drivers were being repeatedly obliged to brake hard, this would point to road layouts needing redesign.

In London, where Transport for London is exploring the extension of congestion charging beyond the central area, it is estimated that, with per kilometre tolls at 50p in central Boroughs, 20p in inner Boroughs and 10p in outer Boroughs, a satellite based system could raise £3bn a year gross, cut congestion by 40% and raise between £1 and £2 bn for investment.

In the state of Oregon in the United States, experiments are under way with using technology at petrol stations to collect mileage charges from vehicles. The charge is calculated by a box on the petrol pump which interrogates an on-board unit. The mileage charges, which could include environmental weightings, is then collected along with the fuel payment.

Hovering above all of this in Europe is the 'Interoperable Road Pricing Directive' by which the European Commission aims to ensure that vehicles equipped to pay road charges in one city or country could pay them wherever else they were being collected.

Technology for road charging raises three big questions. Would it work? Could it be part of some other service such as route guidance, fuel purchase or insurance? And what would it cost?

Political developments

No doubt some Britons believe that the country's only transport problem is inadequate roads and that, if only the government would allocate sufficient investment, it could slay the dragon of congestion. Ministers, however, seem increasingly sceptical about their power to play St. George in a battle with the traffic dragon. In particular they express doubt about the practicality of meeting all demands for road space in and around the big cities. And, as anxiety about climate change grows, they are increasingly accepting the need to cut CO_2 emissions.

However, if Ministers see road charging as a solution to some of the problems they face, they are also cautious. The government has accordingly chosen to proceed by local or regional schemes towards one that might cover the country. Given these prospects how might the new road charges be collected? Today fuel duty is collected, as a legal requirement, by firms such as Shell and Tesco. In the future, as with London's congestion charges, the government hopes that the prospect of substantial business will attract other contractors. One model is the M6 Toll. It demonstrates that 'road service' can be provided by the holder of a franchise with the revenues being used to fund the infrastructure. But given the importance of the skills of billing and telecoms management in providing 'road service', utilities and insurance companies could come forward as contractors. And if the new road charges are to be more than new taxes, then drivers with different patterns of road use, will want to be offered different tariffs. Think here of choosing a gas company or buying an airline ticket from an array of suppliers offering a variety of tariffs. This points too to the importance of skills in setting prices to manage loads - whether on airline, cell phone or electricity networks.

How can local authorities be persuaded to take on the political risk of introducing road charging in their districts? The government's solution is a Transport Innovation Fund (TIF) designed to offer financial carrots to local authorities willing to leap the road charging hurdle. TIF, the economy permitting, could be worth £290 m in 2008/9 rising to £2.55 bn in 2014/15.

Productivity

Productivity is the new buzz-word in transport. It is a topic on which Sir Rod Eddington, in his enquiry for the Treasury and the Department for Transport, invited evidence. It crops up too in the Department for Transport's January 2006 TIF guidance which says that, while one criterion for funding will be proposals offering demand management, the other will be: 'packages and schemes ranging from national to inter-urban and "exceptionally" local schemes that contribute to national economic productivity objectives'.

4. EXEMPTIONS FROM PAYING ROAD USER CHARGES

Were road user charges to be introduced in Britain, many groups would no doubt seek exemption from them. These might range from the elderly or unemployed to emergency services and vehicles powered by 'clean' fuels. This assumption is supported by the arrangements for the London congestion charge where exemptions include a 90 per cent discount for residents in the charging zone and free passage for 9,000 'low emission' vehicles.

For the purposes of the scenarios discussed here, Professor Glaister assumed that no exemptions would be given on the grounds that, should government want to reduce road charges for, say, disabled drivers, it could be done outside the charging regime. Exemptions would, nevertheless, be an issue to be decided in the design of any scheme of road charging.

5. TRAVEL IN BRITAIN IN 2010: TWO SCENARIOS

The Model

Since they published their 2003 technical report 'Transport Pricing and Investment in England', Professor Glaister and Dr. Graham have updated their model. They have expanded it to take in Scotland and Wales and incorporated 10,070 census wards to which are ascribed traffic characteristics. (The model does not simulate transport networks.) The base data now consists of incomes, traffic flows, fuel cost, environmental impacts etc., forecast to 2010. Road costs, which cover road maintainance and depreciation, crashes, air pollution, noise and climate change, are estimated to average 2.54 pence per car km. – depending on circumstances. The sources of such data were the Department for Transport and other independent bodies.

Spending the revenue

Road charging reduces congestion when the charges on the busiest roads at the busiest times are more than some drivers are willing to pay. This frees up space for those who value their journeys more highly. In reality the heaviest charges would be levied in metropolitan areas, including their suburbs and ring motorways, big cities and on some intercity motorways and trunk roads. This is shown in Maps 1 and 2 below. This leads to a key issue. What should happen to the extra money collected on congested roads? Glaister & Graham list the following options:

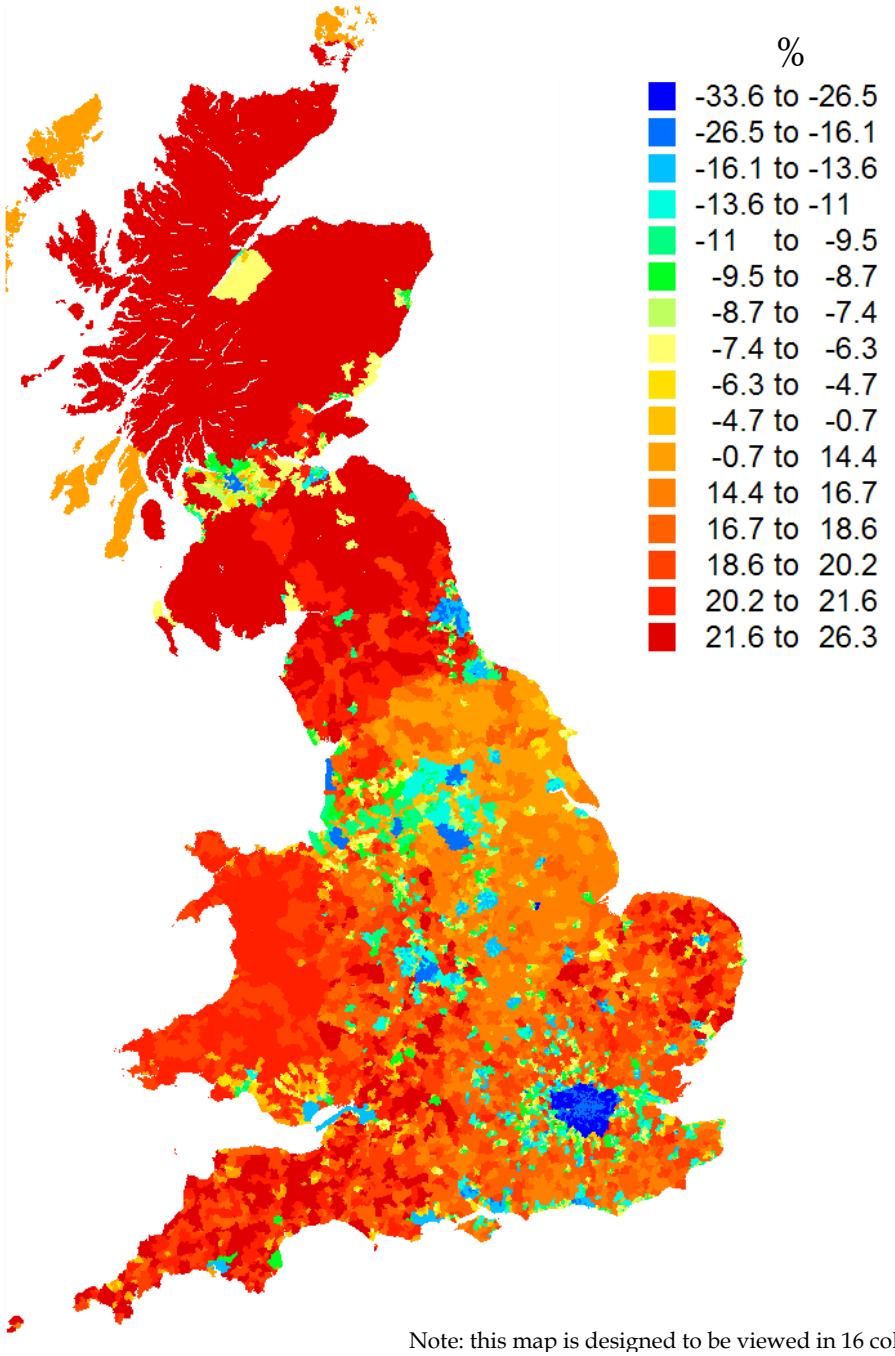
a) To improve road maintenance and increase capacity.
b) To improve public transport alternatives.
c) To pay for the initial and operating costs of a road charging system.
d) To reduce fuel duty or Vehicle Excise Duty (the tax disc).
e) To devote the proceeds to other local or national public expenditure.

In consultation with the ITC Professor Glaister decided to explore the last two options (in reality paying for the charging system would be the first charge on revenue). In one scenario he shows what might happen if the extra revenue was returned to drivers – in this case by using the model to reduce the cost of travel on uncongested roads.

In the second scenario, by contrast, he chose to assume that any additional revenue would be kept by national or local government and returned, not just to drivers, but to everyone in the form of additional public spending.

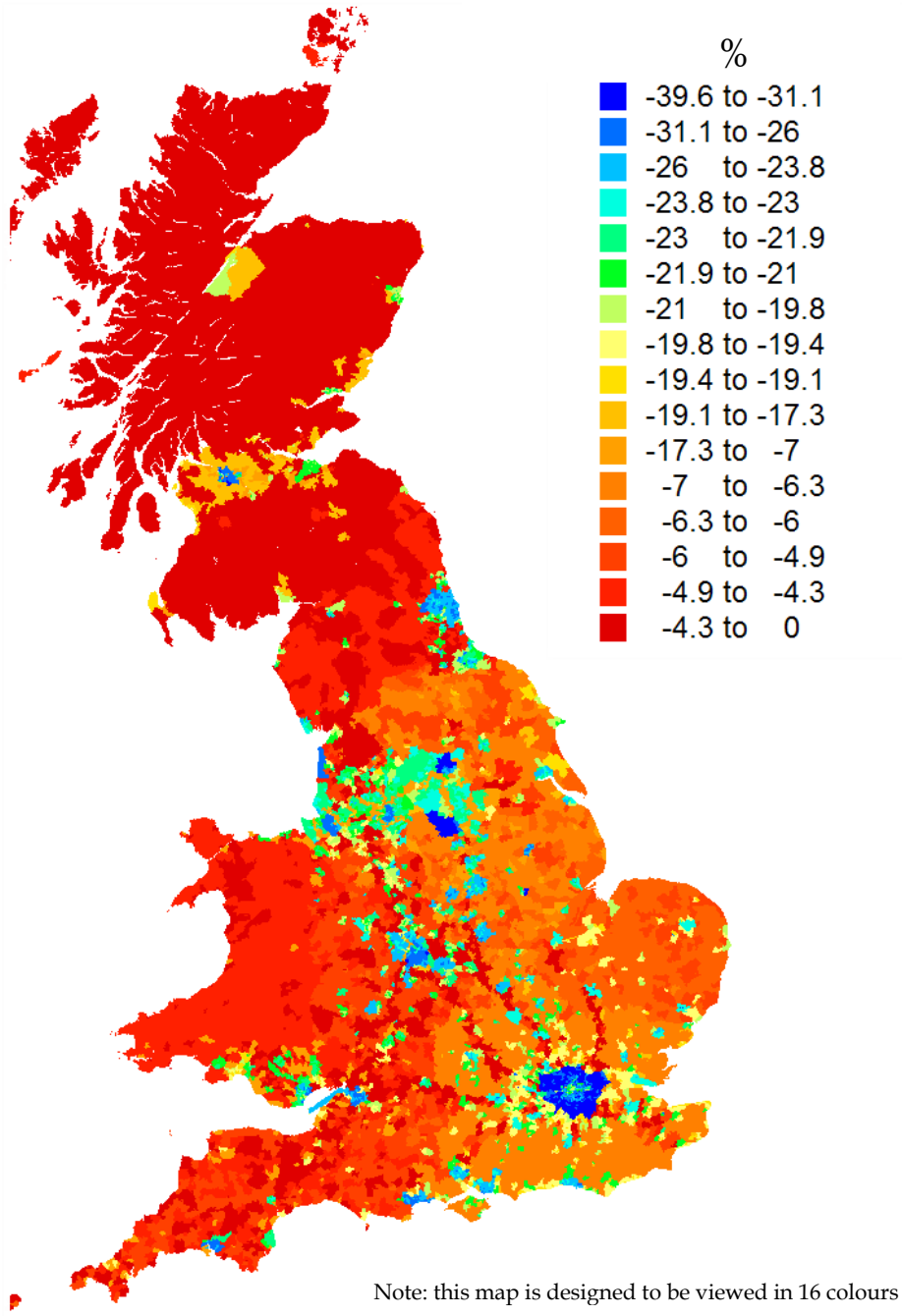
Scenario one: return surplus funds to drivers

In this scenario, motor vehicle users would, as a group, be better off than they are now. With congestion greatly reduced, drivers using the busiest urban and inter-urban routes would travel faster and save time. (Some would, as a result, decide to travel more.) Those using uncongested roads would enjoy lower charges, while everyone would benefit from a modest reduction in emissions. The overall benefits would thus be greater than the costs but there would be losers. Some ***individuals***, such as those with low incomes and no alternative but to drive on urban roads in peak hours, could be worse off – though they would not necessarily be 'forced off the roads'. (See Sections 8 & 9.) Others, who put high value on saving time (such as executives getting to 9 am meetings) would be better off. Collectively all would be better off.



Note: this map is designed to be viewed in 16 colours

MAP 1. SCENARIO 1. RETURN SURPLUS FUNDS TO DRIVERS. THE MAP SHOWS AVERAGE PERCENTAGE CHANGES IN TRAFFIC BY CENSUS WARDS FOR 2010



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MAP 2. SCENARIO 2. DEVOTE £16 BN SURPLUS TO GENERAL PUBLIC SPENDING. THE MAP SHOWS AVERAGE PERCENTAGE CHANGES IN TRAFFIC BY CENSUS WARDS FOR 2010

Scenario two: devote surplus to general public spending.

Devoting the surplus revenue to public spending makes a big difference. While the economy as a whole would see a benefit, drivers and their passengers, as a group, would be worse off than now. Even on uncongested roads and in rural districts the cost of motoring would go up - prompting people to drive less. The additional public spending would give benefits but, even though some of them might be in the form of new roads and so benefit drivers, most of them, including substantial environmental gains, would be enjoyed by everyone.

A combination of smoother traffic flows and less car travel would not only reduce fuel consumption but also emissions per mile. Pedestrians and residents in houses overlooking roads would thus benefit from cleaner air – as would drivers when not driving. Again, as with the first scenario, drivers for whom the benefits of speedier travel outweighed its cost would be better off. But many others would not. Even so their loss would be outweighed by gains for everyone in the form of reduced environmental damage, speedier driving and increased public spending.

Economic efficiency.

Analysis of the two scenarios show that, whether or not additional funds are raised, road pricing ***is*** economically efficient. If surplus revenue is returned to motorists benefits of £6.8 billion a year are created, while if the surplus is allocated to public spending the benefits would be £9.7 billion.

	Change in traveller benefit	Saving in environmental costs	Changes in revenue	Net benefit
Surplus revenue to drivers	6.3	0.5	0.00	£6.8
Surplus revenue to public spending	- 8.2	2.1	15.8	£9.7

TABLE 1. ECONOMIC PERFORMANCE OF TWO ROAD CHARGING SCENARIOS IN £ BILLIONS PER ANNUM

It is now time to look at the two scenarios in greater detail.

6. SIDE EFFECTS

Public transport.

The two scenarios have, as might be expected, different implications for travel by bus and train – although the generally crowded state of commuter trains implies that, in any circumstances, efforts would be concentrated on adding capacity to bus services.

With no additional revenue being raised, rail passengers would, across the country, decline by 2 per cent while those using buses would rise by 9 per cent. (The explanation is that with lower off-peak road travel costs, some rural rail passengers would switch to driving while in cities and suburbs, higher charges would persuade some drivers to switch to the more widely available buses.) In the added revenue scenario, by contrast, rail passengers would on average increase by 1 per cent and those on the buses by 12 per cent.

Glaister & Graham observe that 'individuals who do not own cars and do not use them as passengers will be much less affected' by road pricing than those who do. 'Indeed,' they say,' they are more likely to be public transport users and therefore more likely to benefit from the improved speed and reliability of bus services if congestion is reduced.'

Country drivers.

Big towns, suburbs and metropolitan areas with high levels of congestion would see traffic cut by as much as 30% under both scenarios. But the effects on rural areas would be very different.

If no additional revenue was raised and money collected in cities was rebated to drivers on uncongested roads, considerable sums would be transferred from town to country. And because rural motoring would become cheaper, traffic could grow by 20 per cent. This would lead to more wear and tear, noise, collisions and pollution.

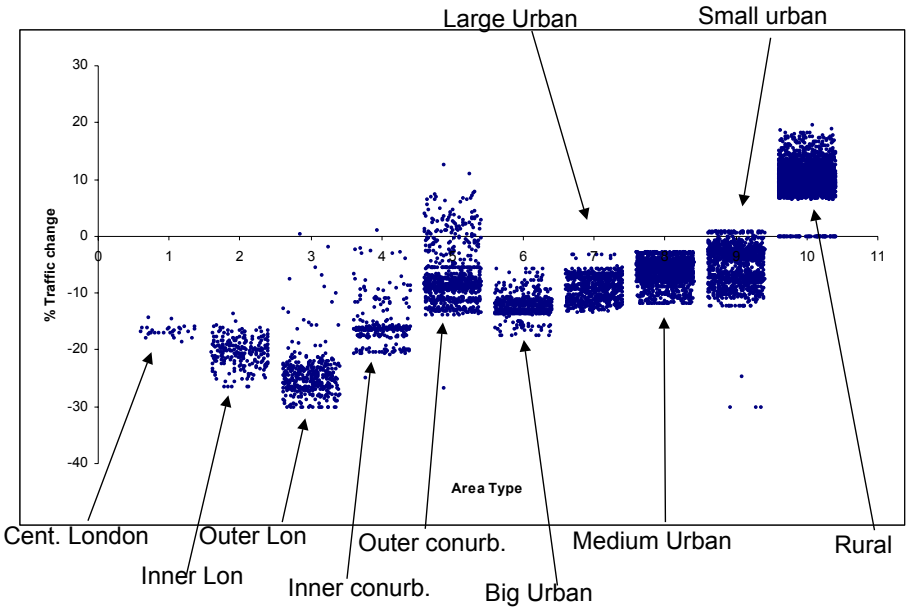

FIGURE 1. HOW TRAFFIC COULD CHANGE BY 2010 IN DIFFERENT TYPES OF AREA IN GREAT BRITAIN. BY CENSUS WARDS AND WITH NO ADDED REVENUE.

The upshot is that about four in five people in England would live with less traffic and a better environment while about one in five, mostly in country districts, would see more traffic and a slightly worse environment. For Great Britain the corresponding figures are 77% with less traffic and 23% with more.

Should increases in traffic in country districts be a cause for concern? Not on economic grounds: even though they would be paying less drivers would be paying their direct and environmental costs in full. But making rural driving cheaper could attract additional people to move from cities and suburbs to the country and so add to long distance commuting. This would, in turn, conflict with the Deputy Prime Minister's 'compact city' policy which is aimed at promoting healthy, fuel efficient life-styles based on increased travel on foot, bicycle and public transport.

Under the additional revenue scenario, by contrast, traffic on country roads and in villages would fall slightly as drivers paid all existing road taxes plus relatively small amounts per mile to cover the costs of road maintenance, road safety and damage to the environment. The problem with this scenario is that it would worsen the plight of low income rural car owners and be a damper on rural economies.

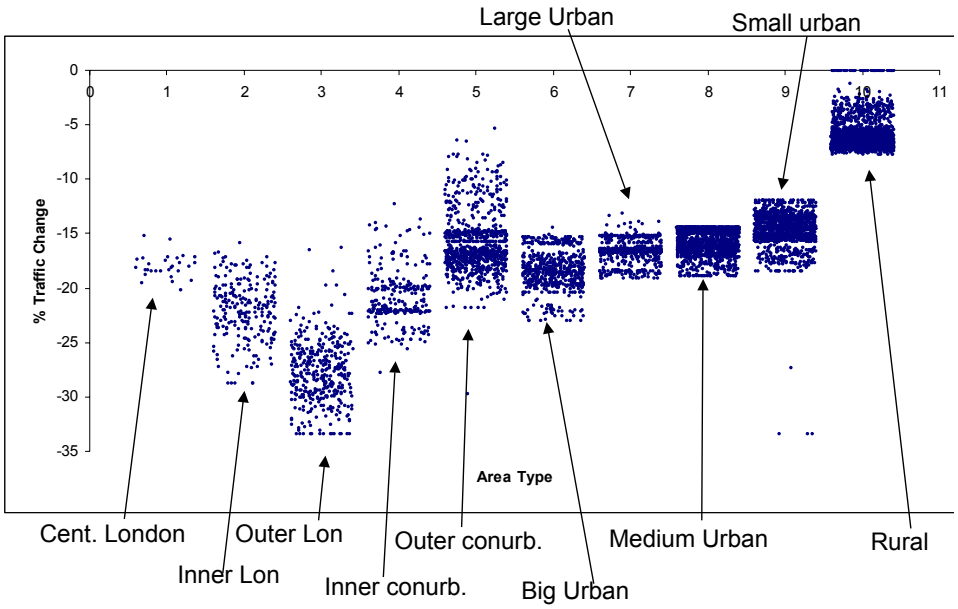

FIGURE 2. HOW TRAFFIC COULD CHANGE BY 2010 IN DIFFERENT TYPES OF AREA IN GREAT BRITAIN. BY CENSUS WARDS AND WITH £16 BN ADDED REVENUE.

The suburbs

The two scenarios have very different implications for suburbs. If no additional revenue is raised, traffic in counties such as Surrey, Hertfordshire and Buckinghamshire, which abut Greater London, would fall by about 8 per cent. But if revenue is added, traffic would be cut by about 20 per cent. The same reductions would apply to the suburbs and 'home counties' of Manchester, Birmingham and Leeds. Furthermore, as Professor Marcial Echenique has shown in other work for the ITC, it is precisely such places as these that will see substantial population growth over the coming two decades[3].

In other respects the effects of the two scenarios are similar. In other cases, for instance, the outer boroughs of London, places such as Croydon and Hillingdon would see the greatest reductions in traffic found anywhere in Britain. The suburban parts of the metropolitan areas such as Greater Manchester and the West Midlands would also see significant reductions

Scotland and Wales

In Scotland and Wales cities such as Glasgow, Cardiff and Edinburgh would, as elsewhere, see substantial reductions in congestion under both scenarios. But in both countries the more notable effects would be in their many small country towns and in their extensive open and mountainous landscapes. Under the first scenario, in which surplus revenue was returned to drivers on uncongested roads, such districts would see motoring costs fall. Road pricing regimes which transferred some revenue from city to country could, therefore, have significant economic benefits for the Scottish Highlands and the Welsh uplands.

London

As in so much else, Greater London would be a special case under any scheme of road user charging. Already traffic speeds are lower in the capital than elsewhere: and because drivers are 'paying' heavily to sit in queues, what they pay for fuel and taxes is a smaller proportion of their total cash+time costs. Compared with elsewhere, road charges would therefore have to be much higher to secure a given reduction in traffic. London would become, as Mayor Livingston's £8 congestion charge already demonstrates for the small central area, a very expensive place in which to drive.

Greater Londoners are, however, the least car dependent people in Britain and, for the one in two households which do not have cars, the advantages of lower goods delivery costs, faster and more reliable bus services and cleaner air would be without a downside. Drivers too would benefit – in their case from quicker and more dependable driving – but at an out-of-pocket cost.

[3]'Suburban Future' ITC 2004 and technical report 'The Future of Suburbs and Exurbs', Professor Marcial Echenique & Mr Rob Homewood, ITC 2003.

7. LOW INCOME DRIVERS

Glaister and Graham went through many modeling exercises to try relate the effects of road pricing to people with low incomes or other indications of poverty. They did this by examining the effect on all drivers, irrespective of income, of travelling in wards with different levels of deprivation. Their underlying assumption was that, because most journeys are short, most drivers on the roads in deprived wards would be poorer than those on the roads in wealthier wards.

Somewhat to the researchers surprise they found no clear correlation between deprivation and traffic levels. While some urban wards combine heavy traffic and low incomes, others combine heavy traffic with high incomes. What this means is that, although poor people may be concentrated in some places, they are also spread widely throughout the country. This finding could have significance for the design of road charging schemes. It underlines too the need for further investigation of this impact.

8. CHARGES IN DIFFERENT PARTS OF BRITAIN

The point has already been made that London would experience road charges higher than anywhere else in Britain. But how would levels vary in other regions? Glaister & Graham used data from the 1996-97 Family Expenditure Survey, inflated to May 2005 prices, to answer this question. The Survey, which distinguishes families which do or do not spend money on motor fuel, enabled them to explore the financial effects of road pricing on families with and without cars.

One finding is that about half of all households in Greater London would not be affected by road pricing compared with only 28 per cent in, for instance, south-west England. Furthermore even households which do buy motor fuel in London spend less (£21 per week) than those in all other regions. At £26 per week, households in Wales spend most on motor fuel.

London is, furthermore, the most fuel efficient place (per capita) in Britain. This is partly because so many people do not have cars but even households that do spend less on fuel than those in other regions – thirty per cent less than in East Anglia, Wales, the WM, Scotland and the North East.

Table 2 sets out the details for 2010 under an added revenue scenario. It shows, for average households in all regions, their weekly expenditure, what they might spend on fuel, and what their weekly bill for road charges could be.

Greater London comes out as far the most affected place with weekly motoring costs going up from £21 to £41. In the London Home Counties, by contrast, although incomes are the highest in Britain, average weekly household costs would go up by only £2.

Wales and the North East region come next after London in expensiveness with motoring costs going up to £29. The part of Britain where total motoring costs would be least would be the North West where weekly spending would go up from £21 to £23.

	Cost of road charges p.w. £	Spending on motor fuels p.w. £	Spending on fuel and road charges £	Total weekly expenditure £
Rest of South East	2	25	27	446
Greater London	20	21	41	424
East Anglia	2	25	27	390
UK	4	24	28	388
North West	2	21	23	376
South West	2	23	25	376
Humber & Yorks	2	22	24	372
Wales	3	26	29	368
East Midlands	3	23	26	368
West Midlands	3	25	28	363
Scotland	2	24	26	361
North East	6	23	29	342

TABLE 2. COSTS OF ROAD PRICING FOR CAR-OWNING HOUSEHOLDS IN BRITISH REGIONS IN 2010 UNDER AN ADDITIONAL REVENUE SCENARIO

These findings relate, of course, to cash outgoings. Those paying the extra would also save time. Their journeys would become more dependable. Haulage would become more efficient. Air quality would improve. And all those travelling by bus would have quicker and more reliable journeys too.

9. CHANGES IN DRIVER BEHAVIOUR

Some drivers would change their departure times

It is well established that drivers change their times of departure to avoid the 'cost' of congestion. In Los Angeles, for instance, the morning peak on the freeways begins at about 5.30 am as a result of drivers having, over the years, left home earlier and earlier. Glaister & Graham found a way to model the extent to which road charges would prompt drivers to switch and so save money. This enabled them to show that the more drivers switched the more money they would save, and that the greater the number of individual drivers willing to switch, the lower could be the charge needed to achieve any given reduction in congestion. The researchers concluded by saying that 'time of day switching could be a significant – though not an overwhelming – factor in designing road pricing schemes'.

The model also shows how complex are the ways in which drivers would react to road charges. For instance, if road costs on Saturday mornings were increased by 20% car traffic would fall by 5.8%. But if the same charge was applied during weekday peaks, when congestion is more severe, the fall in traffic would be less. Why? Because some drivers, who would be deterred by the high cost from travelling during the peak, would be replaced by others who, though they previously drove earlier or later in order to avoid congestion, would be willing to pay to go in the peak. This would not apply to Saturdays.

But the key finding is that some drivers would change their time of driving in order to save money; this would reduce the charges paid by others; and this would also minimise the number of people obliged to travel by other means.

Some drivers would share rides

Another finding is that 'increasing (road) charges would give an incentive to increase average occupancies'. In other words some car commuters would begin to share rides with neighbours at home or work. Like time switching, this has important side effects. Even a small propensity to car share would, by enabling more people to benefit from travelling at times most convenient to them, generate greater benefits from a lower level of charge and increase the net benefit of the pricing regime. As Glaister & Graham add: 'This could be an important phenomenon because increased occupancies mean that the same number of people would be carried while consuming less road space and therefore causing less congestion.' In the absence of evidence of how much sharing would be caused by charges, the researchers are, however, cautious about the strength of such an effect.

10. DISCUSSION

The two scenarios and their effects

The research underlyng this report, which is about some of the effects and side-effects of national road user charging, prompts the question 'what are we trying to achieve?'

If the aim is to cut traffic congestion in order to increase the efficiency of road transport in cities, suburbs and on main roads, the first scenario demonstrates the economic benefits of collecting current levels of taxation in a new way. It suggests too that in countries with huge rural hinterlands such as Scotland and Wales, a pricing regime which transferred some revenue from city to country drivers merits further study. If it was successful in offsetting expensive fuel and transport costs, it could be a useful tool for rural economic development.

If the aim is to 'cut traffic congestion, increase productivity and reduce urban ***and rural*** environmental damage', Professor Glaister's second scenario shows that collecting an additional £16 bn a year and allocating it to general public expenditure has merits.

Both scenarios promise environmental benefits but the first would be most effective in cities and suburbs. In such places the first would smooth traffic flows, increase speeds, reduce fuel consumption and help to improve air quality. But it would also lead to additional rural traffic and fuel consumption and, to some extent, environmental damage. The additional revenue scenario, by contrast, while smoothing traffic flow and protecting the environment everywhere, would deliver greater economic benefits even though it would penalise rural economies.

Other ways of distributing the financial benefits

The two scenarios described in this report distribute surplus revenue either to drivers on uncongested roads or to the Exchequer. The former leads to some of the money raised in urban areas being redistributed to rural areas. If this is thought to be unfair or unwise, other actions could be taken. One could be to pay rebates on Council tax to households in the most heavily charged urban and suburban districts. The productivity, environmental and climate change benefits of the first scenario would thus be retained without penalising those living in cities and suburbs. Rural drivers would, however, still pay more to drive than could be justified on economic and environment grounds.

Who manages the revenue?

Ever since Winston Churchill raided the Road Fund for general expenditure after the First World War, drivers have been suspicious of how politicians handle transport revenues. Fuel taxes that are high by international standards, have not helped to abate such feeling and they will have to be faced by any government seeking to introduce road charges.

One test of this trust will be when the public gets a first sight of the city or regional charging schemes being encouraged by the government through the Transport Innovation Fund. It is expected that in every case, whatever happens to the revenue, substantial funds will be allocated from the Fund to expand the capacity of roads and public transport in the trial locations. If, later on, a national scheme is introduced that does not raise additional revenue then some, but not all, of the heat will be taken out of this issue. Even so someone will still have to be given the all important task of setting the level of the charges. Who should do it?

The Commission itself has already published a discussion paper making a case for the future management of the roads to be based on a public utility model. In it Simon Linnett suggested that, just as electricity supply in Britain is managed by a national grid and a group of regional distributors, why not have a national trunk road company serving local operators based on rural regions such as the South West and the major metropolitan areas plus their hinterlands? And again just as electricity has its regulator, why not have one for roads utilities too?

Others argue that if the medical or legal professions can be self-regulating, why not have the roads and their charges regulated in some way by a board of hauliers, motorists, bus and coach operators and the Police? A third option could be to build on the experience of the M6 Toll and the London Congestion Charge and assign both the management of roads and charging for their use to bidders for franchises.

The introduction of road charging thus raises profoundly important issues of governance and public trust. The Independent Transport Commission is convinced that, for road charging to become a practical proposition, such issues must be addressed and resolved to the satisfaction of commercial and private road users. In the meantime, as the Transport Secretary has urged, they need to be widely debated.

Exemptions

In considering road charging, it is reasonable to assume that some drivers would qualify for mitigation. Examples include low income drivers who, for want of practical alternatives, may have to drive to work on highly congested roads or disabled people whose only mode of travel is a car. The question to be faced is whether the needs of such groups should be met by exempting them from road charges (which would be open to abuse) or other means. The same questions apply to social polarisation but, as it is caused by many factors other than transport, it would seem prudent to keep exemptions to a minimum.

SUMMARY AND CONCLUSIONS

A. Summary

Background

The Independent Transport Commission, in previous work with Professor Stephen Glaister and Dr Daniel Graham, looked at the implications of continuing with existing transport policies and of introducing, throughout England, a regime of road charges that would vary with the level of congestion and the polluting characteristics of individual vehicles.

Projecting current trends suggested that, by 2010, with traffic in England growing by 25 per cent, congestion and environmental damage would be substantially worse. When pay-as-you-drive charges were added to the same trends all the scenarios showed, particularly in the conurbations and large cities, substantial traffic reductions and speed increases.

New work

Why has the Commission undertaken further work? The simple answer is that travel and transport matter. Roads, like shops, factories or computers are economic assets and everyone benefits if they can be managed to get the most out of them. If road pricing could ensure faster and more dependable journeys the British economy would benefit. Journeys for deliveries, service engineers, 'white van man' and people on business would all become more reliable. Costs would fall. UK plc, faced by challenges from India, China and elsewhere, would be that much more competitive. Taking the car to the shops or to see friends could become less stressful and more enjoyable.

If this is the promise it is also the case that there are many unknowns. Not only are the roads themselves, with 32 million vehicles in use, a very complex social and economic system but what happens on them affects business, patterns of land use and the lives of everyone.

The ITC therefore asked Professor Glaister and Dr Graham to expand their model to cover Wales and Scotland and to take into account the latest information about, for instance, traffic growth and infrastructure investment. The scenarios in this report accordingly cover the whole of Great Britain and are more up-to-date than the earlier ones. They are still only indicative exercises but, in giving internally consistent pictures of possible national regimes of road pricing, they are full of valuable insights.

Scenario 1

This scenario, which involves the redistribution of charges collected mostly from drivers on congested urban roads to those on free-flowing ones, demonstrates how, without collecting of any additional revenue, pay-as-you-drive could deliver improved road travel. Drivers on roads in suburbs and cities would see the most noticeable improvements while drivers on country roads, and on urban ones at slack times, would see a fall in their costs per mile.

Not all the news is good. Added traffic in rural districts would have environmental implications. However the scenario does show that changing flat rate fuel tax into a variable road charge, ***and doing nothing else,*** would create national economic benefits.

Scenario 2

This run of the model, which involves the theoretical collection of £16 bn. more revenue than would be collected by fuel tax and the 'disc', shows not only greater reductions in traffic in suburbs and cities, but reductions in rural areas too. Perhaps surprisingly the economic benefits for this scenario are the greatest.

Questions

Notwithstanding the valuable insights provided by these scenarios the possibility of road pricing raises many questions that have yet to be answered. These include:

- How would road pricing affect travel to work?
- How might it affect housing markets if people, for instance, sought to move closer to their jobs?
- How would it affect company location? Would firms move from regions with high charges, such as Greater London, to ones with lower charges? Might they also move from suburbs where people are so car-dependent, to city centres where walking and public transport are widely used choices?
- How, in the long term, would patterns of land use be affected? Would charges support an urban renaissance or give a boost to moves to suburbs and to rural districts? Could they do both?
- How would pricing affect low-paid, essential workers? Would such people seek to have their charges paid by their employers? Might some give up working altogether?
- Finally, what would pricing mean for hauliers. Would faster travel enable them to do more rounds per week and reduce their costs? Would they find that if they sought to change their delivery times to avoid peak hour charges, this would be found unacceptable?

If these questions reflect some of the unknowns about road pricing, a mixture of research and experience alone will answer them. In the case of experience some can be found abroad in places such as Germany and in Stockholm. The local and regional pricing experiments being financed by the Government through the Transport Innovation Fund may provide more.

Regional variations

One point that emerges clearly from the Glaister/Graham work is that, if charges were set at levels designed to abate congestion, they would differ from place to place. This is illustrated today by the way that it costs £2 to take a car into the middle of Durham and £8 to do the same in London.

Pay-as-you-drive charges would, of course, be different from the arrangements in Durham and London. They would be clocked up all the time but by how much might they vary from region to region? Professor Glaister made estimates based on the 'additional revenue' scenario. These show that car-owning households in Lancashire, Cheshire and Greater Manchester, with a average weekly household expenditure of about £380, could see their £21 expenditure on fuel go up to £23 for fuel plus road charges. Such a £2 per week increase would apply as well to East Anglia, the South West, Yorkshire and Humber and Scotland.

At the other extreme would be Greater London where average weekly household expenditure is £420. There, although spending on fuel is low (because driving distances are short), the seriousness of congestion means that road charges would be high and the average car-owning household, which now spends £21 a week on fuel, would pay £41 on fuel plus charges. That is a £20 increase.

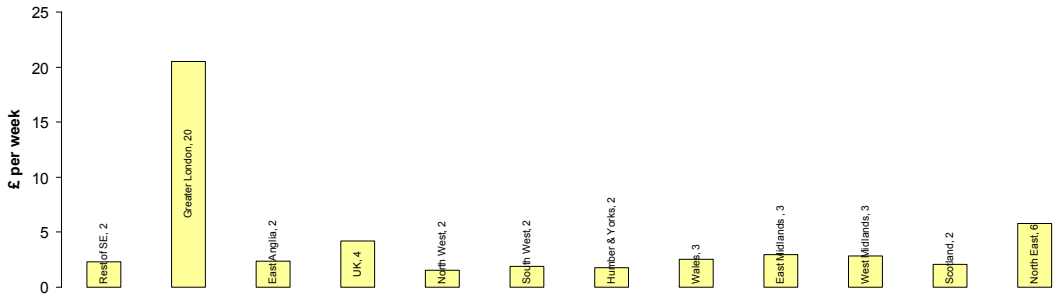

FIGURE 3. AVERAGE WEEKLY SPENDING ON ROAD CHARGES BY CAR-OWNING HOUSEHOLDS IN SCOTLAND, WALES AND THE REGIONS OF ENGLAND IN 2010. (SCENARIO 2 WITH £16 BN ADDED TO CURRENT MOTORING TAXES.)

The prospect of national charging starting off as a series of local regional schemes raises another issue. Will drivers who use their vehicles in more than one of the initial charging zones have to carry several pieces of technology and pay more than one account? Or could the equipment for the different schemes, and the related billing systems, share a basic protocol? An alternative would be to have a manual payment option – as is the case for lorries on the autobahnen in Germany. This is just one example of the important co-ordinating role to be played by the Department for Transport.

Choices to be made

Even if an ***average*** household in East Anglia were to pay only £2 a week in pay-as-you-drive charges, others would inevitably pay more. This guarantees that any scheme of road charges would be of the greatest public, and therefore political, interest. It follows, as Professor Glaister notes, that who decides on the level of charges is an issue of paramount importance.

If road charges are, as their name suggests, not taxes but charges for services supplied, drivers will want to see value for money. They will want transparency. And they will want to see how charging revenue is spent. In 'Beyond Congestion Charging'[4], Simon Linnett, a Member of the Commission, proposed one way in which the roads of the future might be managed. His models were the national grid and the gas companies, both of them public utilities overseen by regulators. Is this the way ahead or would a more democratic regime be preferable? Or might the collection of charges and their investment be offered as franchises? The Commission regards this as a key area for public debate.

[4] 'Beyond Congestion Charging' (2004) ITC Occasional Paper No. 1. www.trg.soton.ac.uk/itc

Public transport

It is widely assumed that charging would lead to increased travel by public transport and that expansion of bus and rail services is an essential part of road pricing. Opinion polls suggest, furthermore, that people would be more sympathetic to road charges if they were preceded by improved bus and train services.

Putting aside whether or not those who respond to such polls see themselves or others leaving their cars at home, most trains in the main cities are full at peak times. This suggests that, as is the case in central London, the introduction of road charges would generally be associated with the expansion and upgrading of bus services. Additional buses and new routes can be put into operation quickly. Railways take much longer to expand.

Low income car owners

The effect of road charging on low income car owners is another great unknown. Those with low incomes but without cars could be expected to benefit provided they were living in places with good bus services. Those living without cars in the country, where public transport is at best sparse, would probably be neither better nor worse off although their aspirations to own cars might be affected.

But what about low income car owners? In order to answer this question, Professor Glaister and Dr Graham found ways to relate transport and deprivation data. What they expected to find was an association between wards with high levels of traffic, which would have high road charges, and poverty. However no such association was found. Deprived people, like the well-to-do, live in wards with heavy and light traffic. They are everywhere – a significant finding for the designers of charging regimes.

Driver behaviour

Driver behaviour is at the heart of road charging. Commuters could, in the short term, change in several ways. They could leave earlier or later; go at their usual times but share rides with other drivers; go by bus, train or other means; or work from home. (In the longer term road pricing could be expected to persuade some employers and householders to change location.) A central feature of road pricing is that it would leave it to individual drivers to choose how to adapt. Therein lies part of its claim to efficiency.

Glaister & Graham looked at two particular kinds of behavioural change: switching time of travel and sharing rides. They are confident that, as both would save drivers money, both would happen but, in the absence of measured experience, uncertain how much. They note, however, that the more drivers do change their behaviour and move away from peak times, or share rides, the lower would be the level of charge needed to bring about any given reduction in congestion. This is an important finding. Sharing rides could have an additional benefit. To the extent that it cut car use it would help to cut CO_2 emissions.

B. Conclusions

- What kind of a Britain do we want to look forward to? How do we hope to be able to drive 10 to 20 years hence? If the answer is in a country that is more productive and in which arriving by car on time is less of a lottery, then pay-as-you-drive road charges promise to be part of the answer. Many other changes will be needed too.

- Collecting the same revenue as is gathered by fuel tax in the form of a charge varying with congestion and environmental damage would transform travel in suburbs and cities and generate significant economic benefits. But it would lead to more traffic and environmental damage on country roads.

- A national charging regime that raised additional revenue would reduce traffic everywhere and generate even greater economic benefits.

- Modelling can throw some light on how road charging might work but it paints a simplified picture. Many important questions about how pay-as-you-drive motoring would affect different kinds of people remain unanswered.

- Just as levels of congestion vary from place to place in Britain, so, even after taking environmental costs into account, would road charges. The average cost per car-owning household in Greater London, including its suburbs, would be high and could be ten times as high as in regions such as the North West and East Anglia.

- Who would decide the level of charges? Should it be the politicians or could it, as in the case of public utilities such as the electricity grid, be a regulator? The ITC believes that, if road charging is to proceed, this is the single most important issue to be debated by the public and decided by the government.

- Low income car owners and places where road charges would be high do not seem to coincide. Poor car owners live everywhere.

- Two of the many ways in which car commuters might respond to road charges are leaving home earlier and sharing rides with neighbours. How many drivers would change their behaviour in such ways is unclear but, the more they did, the lower could road charges be.

- Charging would lead to some shift in travel from cars to public transport. The shift would be greatest in metropolitan regions such as Greater Manchester, the West Midlands and south east England. As the commuter trains in such conurbations are already full, buses would have to take most of the strain.

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