Taxation Futures for Sustainable Mobility: final report to the ESRC

Other

Taxation Futures for Sustainable Mobility

FINAL REPORT

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1. Background

This project focuses upon the EHB programme theme of 'what public policy approaches might persuade people to change their behaviour to reduce environmental impacts'. Changes to the pricing signals within the existing transport tax and charging regime have stimulated limited behavioural change and have proved politically problematic (as demonstrated by the September 2000 fuel duty protests). This project was designed to explore if a different car taxation regime would be more amenable to policy needs. Economics-based studies advocating social marginal cost pricing for transport users have not particularly examined the structural context in which it is applied. This research links to such concepts as Ecological Taxation Reform (ETR), which appears more relevant to the aims of the EHB programme. Central to ETR is the notion of a taxation regime shift from a system where taxation is based on wealth to the taxation of environmental impacts (Whitelegg, 1992).

The project proposal was to synthesise work that had begun to identify crucial factors stimulating a tax regime shift, explore what form this might take and provide a forward-looking agenda. The existing work included:

Revenue changes from adopted of cleaner and more fuel efficient cars (Graham Parkhurst)

This study showed if the ten-year plan is moderately successful, government revenues from motoring taxation will decline as the rate of traffic growth falls and motorists choose more energy efficient cars and tax efficient fuels.

Revenue Support needed for Fuel Cell Cars (Ben Lane)

This research showed that a substantial tax concession on fuel and purchase subsidies would be needed for around 10 years to successfully establish low carbon vehicles in the UK.

Distance Charge Systems (Stephen Potter, James Warren and Barry Ubbels)

A replacement of VED and Fuel Duty with a distance charging system had been explored by Stephen Potter and James Warren at the OU and in the Netherlands by Barry Ubbels, Piet Rietveld and Paul Peeters. Ubbels, Rietveld and Peeters (2002) explored the car use and environmental impacts of replacing car purchase, annual and fuel taxes in the Netherlands with four variations of a fiscally-neutral kilometre charge using the *Scenario Explorer* model. Their results suggested that a different tax regime would be more effective in stimulating behavioural change than reforms to existing car taxation measures. Additionally, this study indicated that growing frontier effects in the EU are now a factor in the effectiveness of the traditional car taxation regime.

At the time of applying to the ESRC, the concept of replacing the existing car taxation regime was a fringe transport policy issue. The applicants felt it was a subject that would eventually emerge as of key importance and were thankful that the ESRC supported this research. However, throughout 2003 the subject achieved a remarkably sudden prominence.

Although government had already planned to change the tax regime for heavy goods vehicles (HGVs) (with a Road User Charge replacing HGV Vehicle Excise Duty from 2008[1]), there was no indication that such an approach was being considered for the car sector. But, in June 2003, Transport Secretary of State, Alistair Darling, announced that replacing car Fuel Excise Duty (FED) and Vehicle (VED) with an area-wide road user charging was a key policy tool to deal with 'pressures over the next 20-30 years'. A Department for Transport (DfT) working party has been set up to explore the form of the new system, timescales and implementation.

Prior to this, the idea of a national (or 'area-based') road user charge featured as a 'possible development' in the February 2002 Commission for Integrated Transport report, (Dodgson, Young, and Van der Veer, 2002). Coinciding with Alistair Darling's road demand management seminar was the Independent Transport Commission's report, *Transport Pricing* (Glaister and Graham, 2003). This modelled how a congestion road user charge could produce substantial user benefits and cuts to congestion. However the report also raised the issue that a fiscally-neutral redistribution of VED and FED could have detrimental results. This was followed by the October 2003 IPPR study, (Foley and Fergusson, 2003), partly based on Glaister's model, which concluded that national road user charging would need to be combined with a revenue increase of £16bn per annum to manage CO_2 emissions. In November 2003, the All Party Parliamentary Rail Group's report (Goodwin, 2003) highlighted the implications to rail of a national road user charging scheme.

This upsurge of interest in replacing the car taxation regime of necessity became an issue for the project (and is reported in the *Results* section below). The team therefore paid careful attention to further network building and the involvement of other key researchers.

2. Objectives

In the research proposal there were five objectives:

1. To synthesise existing research by a number of people who have explored ways in which the taxation and charging regime could be structurally altered to be more amenable to the effects of pricing signals.

The project was intended to largely synthesise existing research by the project team members, but during the project key new researchers entered the field, as reported in section 4 below. We established good working relations with these other groups and have been able to synthesise a wider range of research than originally envisaged. In addition our topic review also identified a distance

[1] Postponed from 2006 in the 2004 Budget.

charging scheme in Oregon, USA, which we have also reviewed. As more relevant studies emerged, these replaced examining the analogous situation of car clubs.

2. To provide a framework in which alternative transport taxation and charging regimes can be explored.

This has been addressed by the use of a scenario method and the use of the *Mobility Explorer* model. In practice, as noted in section 4, the model was not able to investigate the full range of scenarios we developed. However, the use of a scenario modelling approach was vindicated.

3. To identify what conditions, supporting measures and technologies would be needed for the alternative regimes.

These were identified as part of the scenario development and emerged as key factor in the modelling work. In particular we identified that it is possible to design policy measures to stimulate the adoption of supporting clean car technologies as well as promote travel behavioural change. This was an important issue for some users and has not been addressed in other studies.

4. To identify an agenda for future research on the issue of appropriate taxation regimes for use with sustainable transport technologies and behaviour patterns.

The project identified a number of policy and research issues, summarised in section 8.

5. To undertake this research in a way that actively involves policymakers and implementation agencies.

Close consultation and involvement of policymakers and other user groups has been maintained throughout this project and are set to continue. Specific activities are reported in section 5 of this report.

Overall, the project objectives remained robust and relevant, and have been achieved. They have proved to be more comprehensive than the often rather narrow and technical objectives used by others to research this subject.

3. Methods

Like other projects in the EHB programme, the intention was to synthesise existing research and not the substantial gathering of new material. The method adopted first identified 'drivers' of tax regime change, which included extending Dr. Parkhurst's modelling of car taxation income. To integrate research findings, a series of transport tax reform scenarios were developed, which were assessed for their tax income and ability to deliver effective environmental signals to car users. This was undertaken by inputting the scenarios into an adapted version of the Dutch Mobility Explorer model.

As in this low-resource project it was not possible to develop a new model, the opportunity was taken to adapt one already used by the VU partners in the project. Mobility Explorer (ME) is a strategic, medium term transport forecasting model with the ability to calculate government revenues and to input both cordon charges and kilometre charges. This project was the first application of the ME outside of the Netherlands and the results provided a useful verification exercise with the modelling work of Glaister and Graham. A full description of the project's methodology is contained in Potter, Lane, Ubbels, Peeters and Parkhurst (2004).

4. Results

Overview

The added value of this synthesis project has been to refine the modelling approach started by team members and a deepening of the scenario development, through interaction between members of the study team and with the user community. Depth has been added to the contextual analysis through the understandings developed from the UK comparison with The Netherlands.

One of the most important benefits has been the dissemination opportunities the project has 'opened up' with user groups. The project has caught the attention of all of the relevant Government departments, the UK media, and international interest[2].

As the project closes the thesis that government will need to respond to the problem of declining revenues by reforming the motoring taxation regime has gained tacit acceptance as another stimulant for introducing some kind of general road pricing system. Whilst by no means the sole motivator of this change of policy, it is likely that the present work has contributed to a 'reframing' of the problem.

Drivers for Reform

The research has highlighted the social, policy and economic drivers that have resulted in the rapid ascendancy of the concept of national road user charging. We have identified a combination of four key factors, and in doing so have built upon the analysis contained in our project proposal. These are:

- The ongoing failure of transport policy measures to stimulate sufficient behavioural change to cut congestion and reduce emissions.
- The rise in the cost of transport policy interventions (including significant costs rises for rail and expenditure in the motorway widening programme).
- The reduction in Treasury income of eco-reforms to the current tax regime and policies to promote cleaner vehicle technologies.
- The difficulties and equity issues of taxing fuel in a future multi-fuel transport sector.

The first is the ongoing failure of transport policy, particularly the recognition that even the revised *10 Year Transport Plan* will not cut congestion, reduce emissions or provide Britain with the sort of transport system that the electorate demands. The professional, research-based argument that Britain cannot build its way out of congestion has never been refuted. But progress has been painfully slow. With a few local exceptions, effective mobility management has not filled the transport policy gap and there is little acceptance among the general public and media that mobility management is required. In consequence a politically pragmatic compromise between mobility management and roadbuilding has emerged. Yet this can only be a short term holding position before effective mobility management is faced.

The second key factor is cost. For rail alone, privatisation has quadrupled revenue subsidies with multi-billion state investment needed for capital projects. Added to this, bus subsidies are rising, plus the cost of a return to a road building programme. In the last year the politicians have realised that current transport policies are not only failing, but that failure is now more costly.

The third key factor, and a major focus of this project, is that the eco-reforms to the current tax regime and policies to promote cleaner vehicle technologies are starting to cut Treasury income. In the wake of the September 2000 fuel duty protests, policy has essentially been to provide a series of tax concessions to cleaner-fuel vehicles, without any compensating tax increases for the most polluting

2 Including a forthcoming presentation on the project at a conference in Switzerland (Parkhurst, 2004).

vehicles. Dr. Parkhurst has developed his work as part of this study showing that within the next two years, tax yield is set to drop by at least £1.5 billion per annum and decline steadily thereafter (Fig. 1).

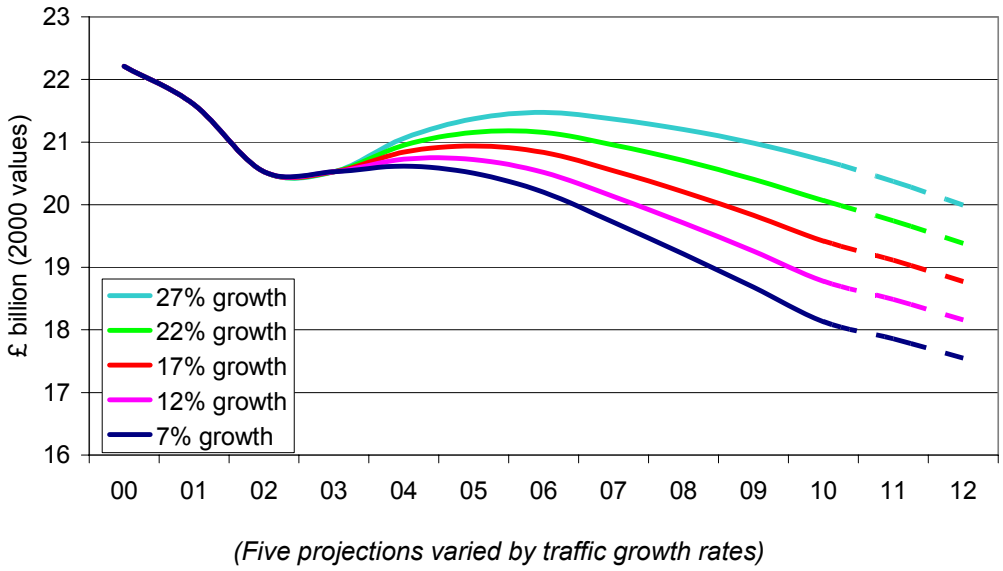


Figure 1: Effect of existing policies on UK car tax revenue 2000-2012

Finally there are practical tax problems of emerging transport technologies. This relates to issues of equity. Were hydrogen or electricity to become a major road fuel how could these be taxed at a different rate for transport as opposed to domestic or industrial use? Traditional road fuel taxation is going to get harder and costlier to collect and enforce.

A result from the project's topic review supports the above analysis. This revealed that the State of Oregon in the USA is in the process of implementing a 'Road User Fee' for introduction in 2007. The main motivation for this is the decline in fuel tax revenues. This scheme will also use a charging method not considered in the UK that permits an 'opt in' to distance charging, which interested our policy users. The charge is made at filling stations where, if an on-board distance-charging unit is detected, fuel tax is substituted by a distance charge (Oregon Department of Transport, 2003).

Overall, a key output of this project is the identification that the replacement of the current car taxation regime has long-term structural causes. This is shown by our work identifying that tax regime change towards a car road user charge has occurred, or is being considered, in societies as contrasting as a rural state in the USA, the Netherlands, Switzerland and the UK.

Scenario Development and Exploration

Having identified the drivers behind tax regime change, a further set of findings relate to the design of policy measures. As explained in section 3 of this report, a scenario approach was used. The scenarios were developed in conjunction with our user group and a review of existing research. This suggests that the UK government working party and other UK modelling exercises were concentrating on too narrow range of policy options. These centre on a GPS-based congestion charge that cannot be introduced for at least 10 years. Our review of other charging systems indicated a wider range of options were possible, some of which could be implemented quickly. The issue of a transitional path to a longer-term solution was also identified as important and users were interested in interim 'opt-in' policy measures. All this encouraged the research team to consider a wide range of scenarios.

Five scenarios were eventually explored using the Mobility Explorer (ME) program:

1. **GB1: Business as Usual**: retaining the current tax regime of annual Vehicle Excise Duty (VED) and fuel duties.
2. **GB2: VED replacement:** A distance charge replacing VED weighted by CO_2 and fuel type for car model bands
3. **GB3(£0): Fiscally-neutral Car Distance Charging:** Replacing VED and fuel duty by a distance charge weighted by a CO_2, NO_x and particulates for the car model type.
4. **GB4(£3) Car Distance Charging raising an additional £3 billion** As for GB3, but with a transition to raise £3bn additional revenue.
5. **GB4(£6) Car Distance Charging raising an additional £6 billion** As for GB 4, but with a transition to raise £6bn additional revenue.

The revenue raising scenarios sought to counter historical tax losses. They also allowed a comparison to other revenue neutral and revenue raising modelling undertaken by other researchers. Three other scenarios were proposed but could not be investigated using ME. These were:

6. **Company Car Distance Charging:** with Company Car Tax replaced by an annual distance-based charge weighted by CO_2.
7. **GPS-based congestion charging:** Varied by area, road, time of travel, (possibly direction of travel - peak flow and contra-peak).
8. **GPS-based congestion and emission charging:** Varied area/time/road weighted by car model emissions.

The model could have run scenario 6, but there were difficulties in obtaining input data. Attempts were made to run scenarios 7 and 8, but it became clear that the model was behaving in an unstable way and producing invalid results. It was also difficult to satisfactorily mimic a congestion charge using cordon-based input data. For these reasons, it was decided to concentrate on the GB 3 and 4 scenarios. We had probably found the limit of adapting ME to the UK context.

GB1: The Baseline Scenario

The first task was to adapt the ME Model to provide a UK base scenario. This involved team meetings in the UK, the production by the VU of a methodology working paper on data requirements for Mobility Explorer and a two day visit to the VU in Amsterdam. The Mobility Explorer model has been designed for the Netherlands, including Dutch data on transport elasticities, mode choice, public transport quality etc. Consequently there is an issue of the validity of attempting to enter UK data into Mobility Explorer. We needed to establish if this model could be adapted to provide useful results outside of its national context. In working through the adaptations to the UK, it also helped highlight crucial differences between the policy context of the Netherlands and the UK as both explore similar road user charging proposals.

In practice we found that much of the base data of ME was quite similar to that used for modelling in the UK. For example: Table 1 shows a comparison of elasticities in ME and the recent UK NERA report (Dodgson et al, 2002):

Table 1: Comparison of elasticities of ME and as published by the NERA report

Elasticity	NERA short	ME
Car traffic/variable car cost[3]	-0.6	-0.44
Car traffic/income	0.35-0.55[4]	0.50
Car-rail/var. car cost	~-0.3	-0.2
Car-urban PT/var. car cost	-0.08	-0.1
Car-regional PT/var. car cost	-0.05	-0.0

Source: Dodgson et al. (2002)

Data for use in the ME model involved a wide range of sources, including Transport Statistics GB, National Statistics, Labour Force Survey, Family Expenditure Survey, Vehicle Certification Agency, Inland Revenue, Strategic Rail Authority, Department for Transport, Ten Year Transport Plan, Transport for London, Commission for Integrated Transport, Transport & General Workers Union, National Travel Survey and the Department for Trade and Industry. This permitted entries for:

- demographic input table per year, divided by age and gender
- number of cars and business cars
- data on employment (full time and part-time), GNP and disposable personal income
- data on car ownership, car variable costs, parking costs and public transport fares
- transport taxes
- length of roads
- infrastructure investment
- average speed of car, rail and urban and regional public transport
- number of paid parking spaces

Using this model to forecast UK effects required a redefinition of many of the data fields and inputs. In some cases it was simply a matter of inputting data using the appropriate unit (e.g. fuel costs for petrol, diesel and LPG were entered as Euros per litre or using British National Travel Survey information on distances travelled). The figures for mean speeds were enlightening. In the Netherlands, mean car travel speed is 44km/h and in Britain it is 41km/h. For rail it is almost identical (Britain 33 km/h and 34km/h in the Netherlands), despite Britain having more long distance rail.

However, many of the input fields were structured according to Dutch definitions. In some cases these were omitted, as they did not apply to Britain (e.g. Dutch commuters can claim tax relief on commuting, which does not apply in Britain). However some Dutch definitions did not map on to British data. For example, for annual car ownership taxes (equivalent to UK VED) the Dutch charge according to weight and fuel bands whereas Britain has its CO_2 emissions-based charging categories. We therefore took a sample of British cars categorised by our emissions bands and allocated them to the Dutch weight categories to estimate an average VED charge for the each type.

Transport use data produced a similar problem. The Dutch have categories of rail, urban public transport and regional public transport that do not map easily onto how Britain categorises its public

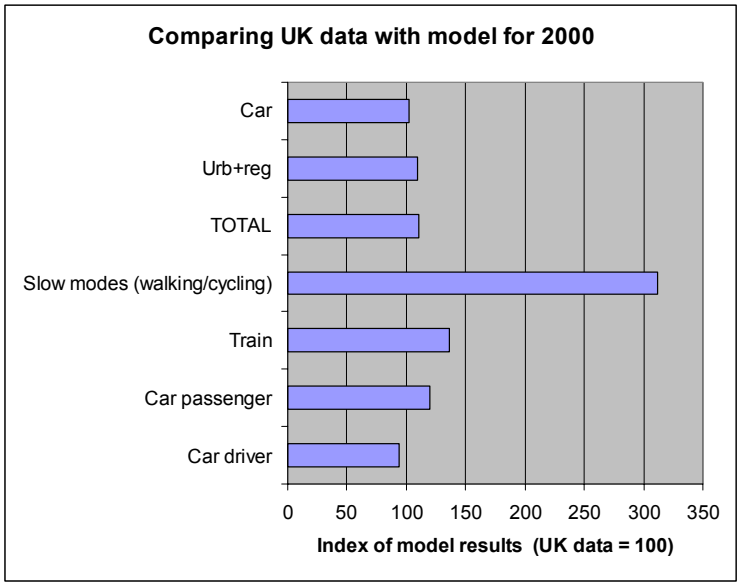
[3] The NERA report gives elasticities for petrol price, but assumes petrol price to be 25% of total variable car costs; the values given by NERA therefore have been multiplied by four.

[4] NERA value for petrol consumption.

transport operations. Again a redistribution of British data was undertaken that in the verification of the model produced acceptable results.

A validation of the model was undertaken by comparing results to actual 2000 data and a reasonable correlation was obtained. However, the ME appeared to be vulnerable to large deviations from Dutch input figures. This particularly affected the low UK input for 'slow modes' (walk and cycling) and high input for local and regional public transport, which had to be adjusted by shifting part of the slow mode output to local and regional public transport. With this correction the model results compare well with the measured data (Figure 2), though still over estimating slow modes.

Figure 2: Comparing UK real data with corrected ME model output for UK Base 2000 scenario



Specifically the match for total car travel was close (+2%), which is important with regard to the purpose of this study. The miss match for rail may be due to the large differences in rail ticket prices between the countries, putting the calculation beyond the validity of the model. The student railcard scheme in the Netherlands may result in a too large rail travel share calculated by the model for the UK.

Overall, once adjustments had been made, the baseline model was viewed to robustly reflect UK conditions, with some inaccuracies that were understood and could be accepted.

The Scenario Results

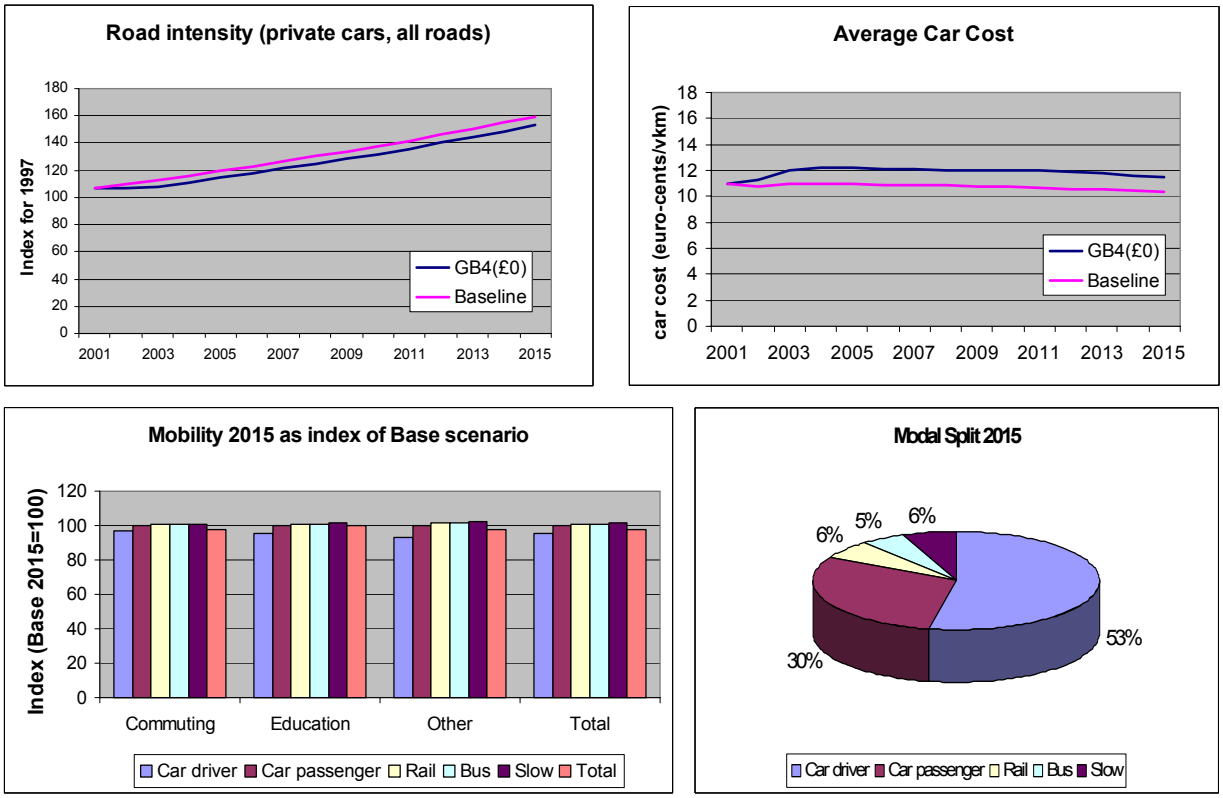
The GB2 scenario involved an 'opt-in' transitional policy mechanism with VED replaced by a small flat-rate kilometre charge for cars of 0.77 p/km. The model suggested it would have little policy impact, but could be used to familiarise car drivers with the concept of a distance charge (which is largely what the Oregon USA scheme seems likely to achieve).

The fiscally-neutral GB3(£0) scenario involved a banded kilometre charge for cars of 2.3/5.2/8.5 p/km. (varied by the environmental performance of the vehicle type, represented in the model by the three vehicle weight categories). This would replace VED and FED. This, and all other scenario outcomes, were compared to the baseline GB1 scenario. Hence cuts in, for example, traffic, are compared to the baseline and are not absolute cuts on 2000 levels.

The effect of the GB3 scenario included a reduction compared to GB1 in road intensity of 4%, total mobility was reduced by around 2% and car driver mobility by 4%. Non-car modes increased by up to

2%. A comparison of modal spilt indicated a 2% reduction in the proportion car driver and a 1% increase in car passenger km travelled, with a small increase in vehicle occupancy (Figure 3).

Figure 3: Results of Scenario GB3(£0)

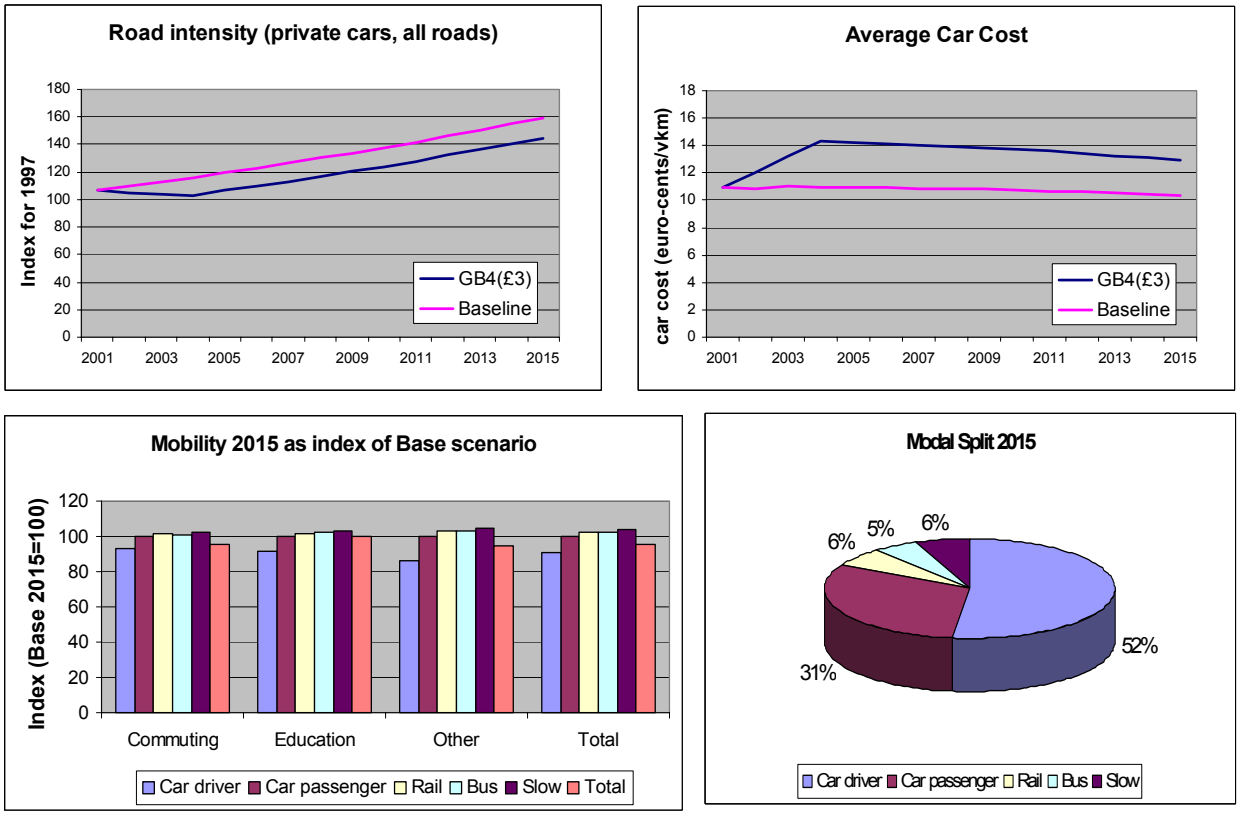


The GB4(£3) scenario restored the revenues lost from post 2000 tax changes, generating an additional £3 billion per annum. The model used a banded kilometre charge for cars of 3.3/6.5/10.4 p/km, increasing average car cost by 2.2 p/km.

The effect of this scenario included a significant reduction (compared to GB1) in road intensity of 9%. Total mobility was reduced by around 5% and car driver mobility by 9%. Non-car modes increased slightly by up to 4%. A comparison of modal spilt indicated a 3% reduction in the proportion of car driver mode and a 2% increase in car passenger km travelled. There was a small increase in vehicle occupancy compared to the base scenario.

Based on the mobility data results for 2015, total CO_2 emissions were predicted to reduce by 6% as compared to the base scenario (Figure 4).

Figure 4: Results of Scenario GB4(£3)

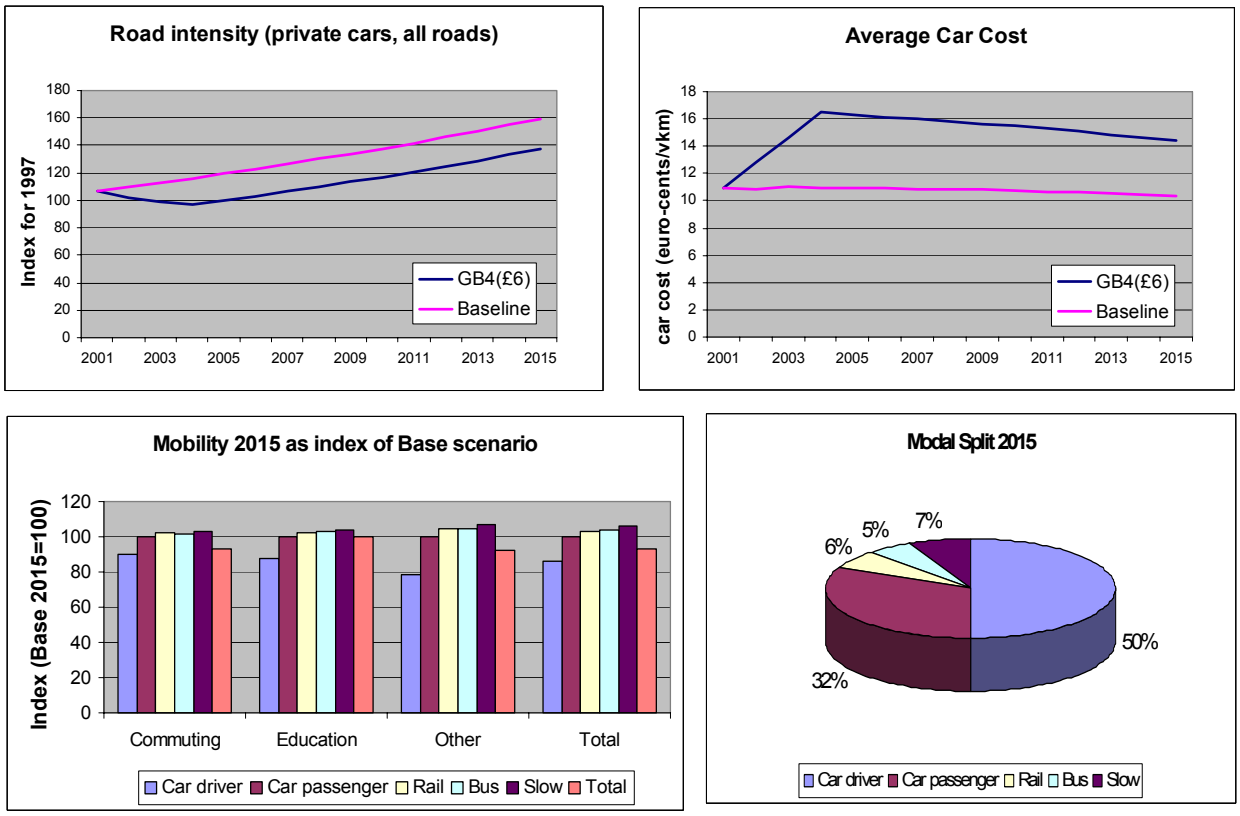


The GB4(£6) scenario generated an additional £6 billion revenue per annum using a banded kilometre charge for cars of 4.1/7.2/13.7 p/km increasing average car cost per km by 3.6 p/km. This revenue-raising scenario is considerably lower than the additional £16 billion increase considered in the comparative British studies.

The effect of this scenario included a significant reduction in road intensity (compared to GB1) of 14%. Total mobility was reduced by 7% and car driver mobility by 14%. Non-car modes increased by up to 4%. There was a 5% reduction in the proportion of car driver mode and a 3% increase in car passenger km travelled. Again there was a small increase in vehicle occupancy as compared to the base scenario.

Based on the mobility data results for 2015, total CO_2 emissions were predicted to reduce by 9% as compared to the base scenario (Figure 5).

Figure 5: Results of Scenario GB4(£6))



The results of the modelling study suggested that the creation of a new, fiscally-neutral, tax regime would have little (but positive) impact on behavioural change. The £3b and £6b revenue raising scenarios would have increasing impact, with the latter promoting useful behavioural change. The type of change involved is significant. There would be only a small increase in the use of public transport, with the predominant response being the better utilisation of cars with higher occupancy and more trip-linking to cut distances driven. Carbon emissions would also be reduced – comparing the revenue neutral with the revenue raising scenarios, the results suggest that for each billion raised, CO_2 is cut by approximately one per cent.

The results provide an important comparison to the Glaister-based congestion charge modelling, which suggests that a fiscally-neutral reform would have adverse environmental impacts and that a large (£16 billion) revenue raising reform would be needed to effect significant behavioural change. This contrast led to a consideration of the differences of the policy measures being modelled. The Glaister model is of a congestion charge and not a distance charge. A congestion charge would result in *reducing* motoring costs in areas and times of low congestion (particularly rural areas and off-peak periods). A distance charge, used in our scenarios, would not do this. The comparison between models and the type of road user charging scheme involved thus highlights an important different in the design of policy instruments.

Although not modelled by ME, it is likely that the CO_2 banding charges involved in our scenarios (and not used in the congestion charging modelling) would incentivise car drivers to purchase less polluting cars so increasing the positive impacts of the scenarios, above the results shown.

5. Activities

There have been regular activities with a series of users, including members of the Department for Transport Working Group on National Road User Charging and government officers serving this group. In addition, two user project seminars were organised and papers delivered at two other key seminars. Members of the research team have also taken part in other relevant seminars (e.g. the Institute for Public Policy Research's seminar on Road User Tolls). The specific user events were:

Mid Project Seminar held on July 3rd 2003 attended by user groups including representatives from the Department for Transport's Transport, Environment and Taxation Division and the Science and Technology Policy Division, Strategic Rail Authority, Transport 2000, Inland Revenue and the Institute for Public Policy Research. This was to obtain input upon the scenarios to be explored by the ME model.

Paper: The Impacts of Taxation and Charging on Social Division delivered to the ***Transport Seminar on Social Exclusion,*** 11th December 2003. This was organised by Transport 2000 in conjunction with the Department for Transport as part of a series of seminars to feed into the revision of the Ten Year Transport Plan. Various government departments, NGOs, researchers and other user bodies were represented.

Dr Potter gave a further version of this paper, *Social Inclusion and Road User Charging*, at the ***National Transport Activists Round-table Seminar on Road User Charging*** in January 2004. Dr. Parkhurst also gave a presentation based on the results of the project*, Why we need Congestion Charging – falling motoring revenues*. This seminar was organised by Transport 2000 and the Energy Savings Trust and attended by a large number of key NGO users.

End of Project Seminar held on February 6th 2004. Project results were presented to user groups. There were participants from HM Treasury (Environmental and Transport Taxation), Department for Transport (Transport Environment and Taxation Division, Integrated Transport Economics and Appraisal Division, Road Charging Division), Transport Research Laboratory, Inland Revenue (Road Pricing Analysis and Research), Energy Savings Trust, Institute for Public Policy Research and Transport 2000.

The End of Project Seminar also attracted considerable media attention, with 20 interviews and reports in *The Times, The Financial Times, The Guardian*, specialist transport journals, and local radio and newspapers. The assistance of the ESRC's press office was greatly valued in managing these activities.

A submission was also made to the DfT road fuel gases consultation.

An important part of the EHB programme has been to establish and consolidate networks of researchers and users around key EHB research issues. This has certainly been the case in this project. The research team are now viewed as key players in the field, who produce important results and pose challenging questions. Our network has been very fruitful and is continuing to work together.

6. Outputs

The results of this project have been reported widely. The dissemination strategy of the project team has been to report results across the identified user groups using a wide mix of dissemination methods. The outputs to date include:

Lane, Ben (2003): *Road fuel gases and their contribution to clean low-carbon transport.* A submission to the Department for Transport road fuel gases consultation. 17th September.

Potter, Stephen (2003): Transport Taxation Regime Change? *Town and Country Planning*, September, pp 240-241.

Potter, Stephen (2003): Viewpoint: area-wide road user charging. *Local Transport Today*, 27th November, p 14.

Potter, Stephen, Lane, Ben, Ubbels, Barry, Peeters, Paul and Parkhurst, Graham (2004): Adapting the Dutch 'Mobility Explorer' Program to Investigate possible Car Taxation futures in the UK. *Universities Transport Studies Group Annual Conference Proceedings* Vol 2, January.

Potter, Stephen (2004): UK Long Distance Travel Trends: The modal mix and possible effects of motorway pricing on car users. *1st UK Inter-urban Rail Conference*, Landor Conferences, London, March.

Potter, Stephen, Parkhurst, Graham and Lane, Ben (2004, forthcoming): Towards a new fiscal framework for transport, Chapter in Reggiani, A and Schintler, L (Eds): *Transport and Telecommunications: New Perspectives from Europe and America.*

Parkhurst, G. (2004, forthcoming). Taxation Measures for Sustainable Mobility in the UK Roads Sector: Progress, Problems and Prospects. Paper to "Mendrisio MobiliTI: *Towards the Portrait of a New Urban Mobility*, Mendrisio, Switzerland 14 May 2004.

7. Impacts

As noted in section 5, the project has resulted in regular interaction with user groups. Members of the team are now in regular contact with officials in the Department for Transport, who seek their advice on policy development and research. The impact of this research upon policymaking is thus at a strategic level and is ongoing.

Results from the project are used by NGOs, the media and other key users. This has included research team members being invited to contribute to reports and events by a number of user organisations. The work is also disseminating into transport professional groups. For example the transport consultants JMP asked if the project results could be incorporated in a Transport Planning Society Bursary Paper on road user charging.

The overall impact of the project has been remarkably widespread. Indeed, it was interesting to note that a recent *Observer* article on motoring costs (Sunday March 21, 2004), included a number of NGO mentioning (unattributed!) the project's results. More subtly the article adopted aspects of the project's framework and approach (e.g. the notion that car taxes were dropping rather than the old 'stealth tax rise' assumption).

8. Conclusions and Future Research Priorities

This project has highlighted the following key findings and research priorities:

1. A radical change in the taxation regime to road user charges appears to be more appropriate for modern policy needs than the current structure of ownership and fuel taxes.
2. In the UK there has probably been too much focus on designing an ideal car taxation system that cannot be realised for at least 10-15 years. The transitional path to such a future and the role of transitional reforms are crucial. Of particularly relevance are interim stages that permit learning and adaptation by users to occur. Experience from overseas systems (Switzerland and the USA in particular) suggest that practical systems could be introduced earlier and that it is important to identify appropriate proved in-car technologies.
3. A clarity is needed of the policy goals that a national road user charge would address. The UK has a current policy focus upon congestion reduction, which has led to the proposal for a congestion charge using GPS and in-car technologies. This could have serious negative second order impacts and further research is needed into these. For example, charging in places and times that are more congested would stimulate the transfer of traffic growth to low charge areas. Without strong complementary land use policies, it is likely that a congestion charge could indirectly produce higher traffic growth, worsening environmental impacts and the redistribution of congestion.

4. This project has shown that different road user charging scheme designs have important differences in terms of their transport, social inclusion and economic impacts, which this project has begun to document.
5. It may be that the UK is depending too much on this tax reform, possibly seeing it as a way to avoid the hard political decisions that have dogged transport policy to date. A tax regime change does not lessen this political dilemma.
6. Road transport taxation needs raising to cut congestion, manage traffic and reduce environmental and safety impacts. The amount by which tax needs increasing varies significantly by the design of scheme.

Because of limitations in the ME model, this research was only able to fully explore a limited set of scenarios. In the modelling, a congestion charge could not be made fiscally neutral, but may have large impacts on mobility. Further modelling work capable of exploring a wide range of policy scenarios is appropriate. Adapting the ME model is not practical, but this experience should assist the design of an appropriate UK model.

References (see also 'Outputs')

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