

Time To Excise Fuel Duty?

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by

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Executive Summary

- Taxes comprise 60 per cent of the cost of a litre of petrol or diesel. Fuel duty will contribute about £33 billion to the Treasury in 2012.¹
- Currently, revenues from fuel duty and road tax exceed expenditure on roads by £30 billion per annum. Investment in road improvements has collapsed over the last twenty years.
- Fuel duty is higher in the UK than in any other major economy. Taxes on diesel for commercial use are particularly high, over 50 per cent higher than in France and Germany and over 500 per cent higher than in the USA. Industries heavily dependent on road transport in the UK are therefore at a major competitive disadvantage.
- High fuel prices hamper just about every economic activity by raising the costs of trade.
- Fuel duty will tend to reduce economic output by lowering labour mobility, preventing economies of scale, and hindering competition and specialisation.
- Motoring taxes may also increase welfare dependency by raising travel-to-work costs, meaning many potential workers may be better off on welfare benefits than entering employment.
- Fuel duty discriminates against residents and businesses in rural, semi-rural and suburban areas. It represents a transfer of resources to those inner city areas which receive a disproportionate amount of the general government spending funded by motoring taxes.
- Poorer motorists are hit particularly hard by fuel duty. Road fuel accounts for almost 10 per cent of spending by car-owning households in the bottom decile.
- Motorists and hauliers are treated unfairly by the tax system. Other activities with negative environmental effects are taxed at much lower rates than private road transport. Trains and buses – which also produce significant noise and air pollution – benefit from tax breaks and subsidies.
- Fuel duty is a very inefficient way of addressing the wider costs associated with road transport. The amount paid bears little relation to congestion levels, accidents, infrastructure costs and local environmental impacts.

¹ Including the VAT charged on the fuel duty (see HM Treasury, 2012).

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- Many of the economic costs associated with road transport are in reality the result of a long history of misguided government interventions in transport and land markets. For example, planning policies continue to encourage the development of brownfield sites close to busy roads, despite the obvious implications for exposure to noise and air pollution.
 - A number of policy measures should be implemented to reduce fuel duty:
 - In the short term, the planned 3p increase in fuel duty should be cancelled.
 - In the medium term, a fuel duty 'downward escalator' should be introduced, to bring about gradual reductions in the tax over a number of years. The EU-imposed minimum price, currently 29p a litre for petrol, would be a realistic target.²
 - In the longer term, the government should aim to abolish fuel duty.
 - These measures could be financed as follows:
 - To cancel the planned 3p rise, about £1.5 billion per annum should be cut from government spending on counterproductive traffic management schemes and loss-making public transport services.
 - To halve duty to 29p per litre, over a longer period, uneconomic projects such as High Speed 2 should be cancelled and train/bus operating subsidies phased out (saving in total about £11 billion p.a.). In addition, limited peak-time road pricing should be introduced in congestion hotspots with part of the revenues used for road improvements. A consistent approach to environmental taxation could also be considered, raising £5.5 billion p.a. from charging full-rate VAT on domestic heating and power.³
 - The privatisation of the road network would facilitate the abolition of fuel duty. The flotation of motorways and trunk roads would raise approximately £150 billion, which would be used to make large cuts in fuel duty. Government spending on transport would then be phased out, saving about £20 billion p.a. Finally, general tax revenues would increase markedly due to substantial efficiency gains, including much lower levels of congestion.⁴

² Minimum tax rates are imposed by the EU Energy Taxation Directive: http://ec.europa.eu/taxation_customs/resources/documents/taxation/minima_explained_en.pdf

An alternative target, in the absence of EU regulation and in the context of current climate change targets, would be to set fuel duty according to 'social cost' of carbon estimates contained in the Stern Review or other studies.

³ Deregulation of the energy sector would mitigate the impact on consumers (see Wellings, 2011b).

⁴ This process is set out in much more detail in Knipping and Wellings (2012). Abolishing fuel duty would require the EU Energy Taxation Directive to be rescinded.

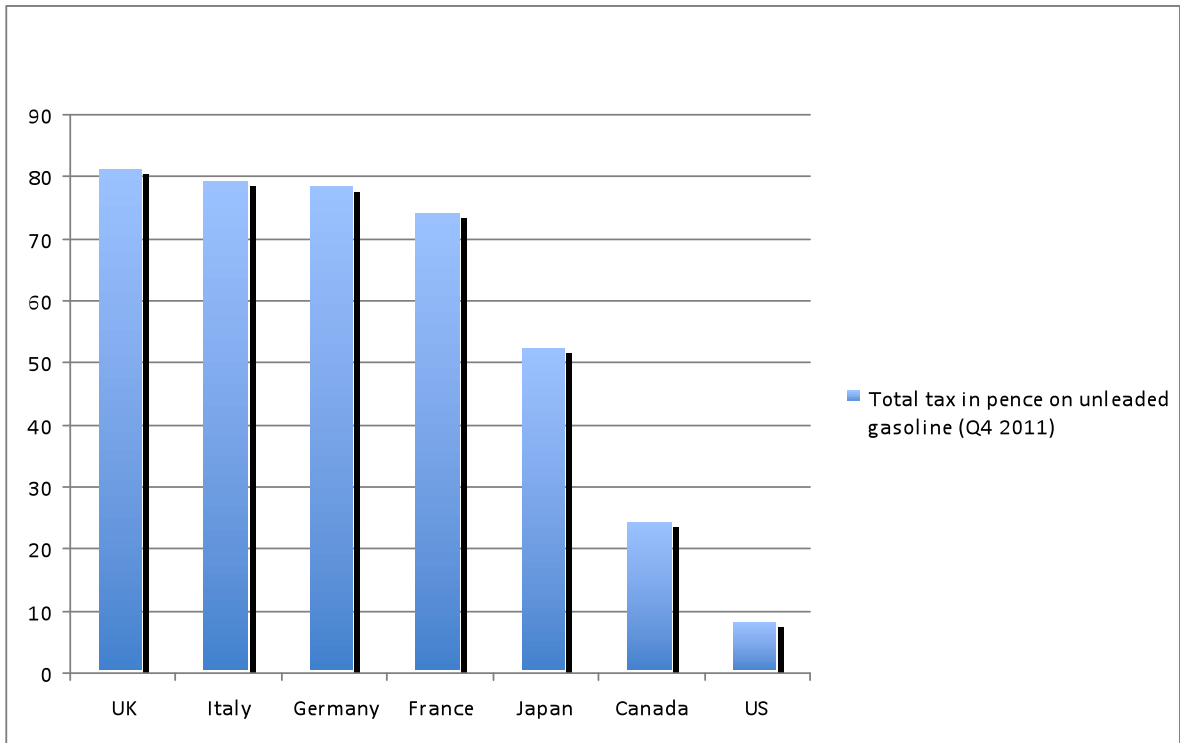
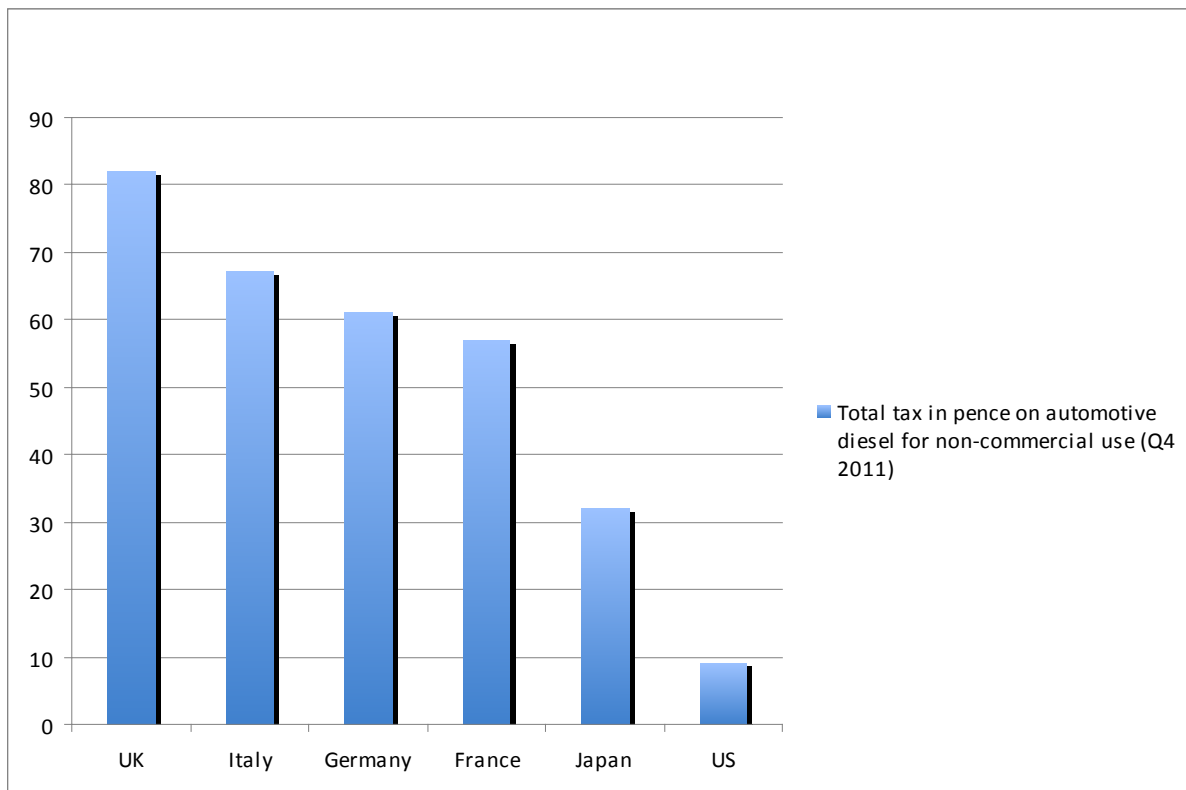
Introduction

A key principle of good tax policy is that governments should raise revenues in ways that minimise the negative impact on the economy. Generally this means keeping tax rates low. There is substantial economic evidence that high tax rates suppress economic activity, for example by reducing incentives to work, trade, save and invest (see, for example, Minford and Wang, 2011).

Another important component of good tax policy is adopting a neutral approach by treating all economic activities similarly. As the *Mirrlees Review* states, 'In a non-neutral tax system, people and firms have an incentive to devote socially wasteful effort to reducing their tax payments by changing the form or substance of their activities' (Mirrlees et al., 2011: 40). In a system that discriminates against some activities while favouring others, resources will tend to be diverted away from uses with the highest returns as economic actors adjust their behaviour to reduce their tax liabilities.

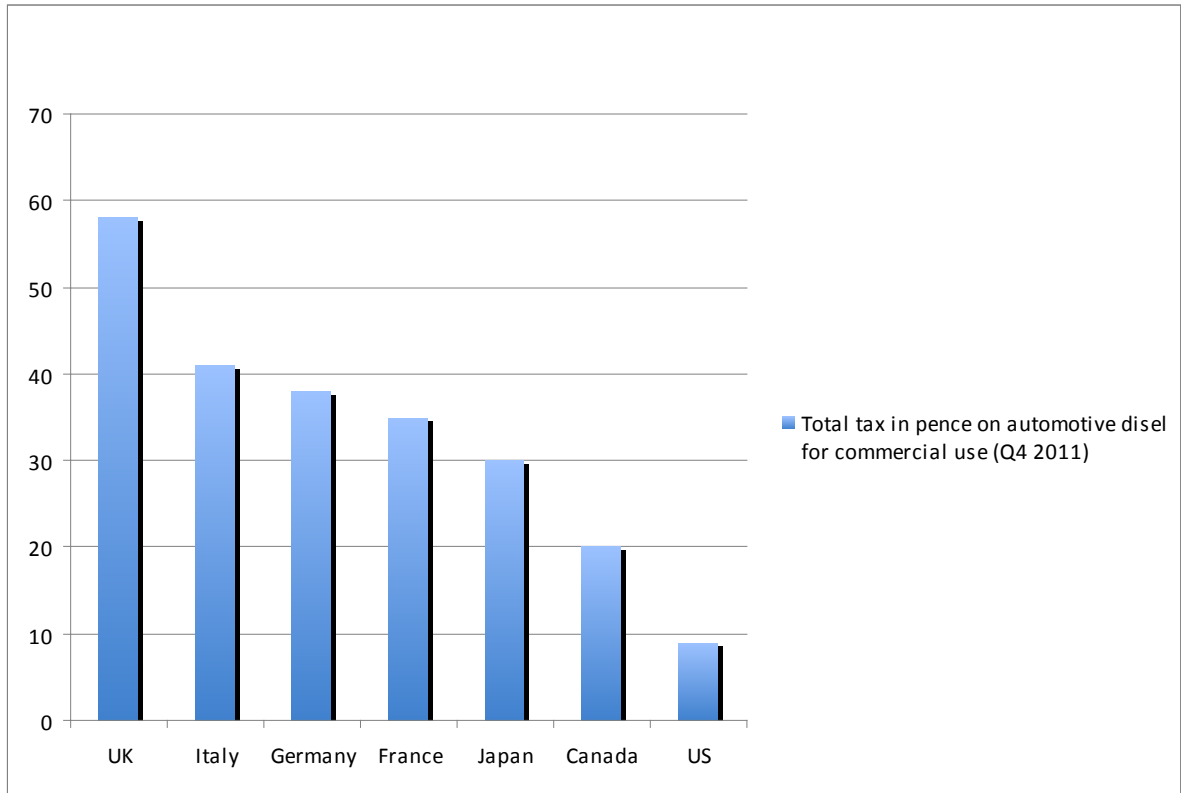
Fuel duty appears to violate the principles of keeping tax rates low and applying taxes in a neutral manner. At the time of writing (November 2012), duty is charged at 58p per litre of petrol or diesel, which, when VAT is included, means that tax makes up about 60 per cent of the retail price. Thus road fuel is taxed at a much higher rate than many other goods. VAT is charged at 20 per cent on many products, while others, such as domestic fuel, attract a reduced rate, and some, such as basic foodstuffs, benefit from zero rating. Additional duty is charged on a relatively small number of products, including tobacco and alcohol.

Taxes on road fuel are not just exceptional compared with taxes on other products. Figures 1 to 3 show that taxes are higher in the UK than in other developed economies. Fuel taxes are particularly high compared with other countries in the case of diesel for commercial use (see Figure 3), putting industries heavily dependent on road transport at a major competitive disadvantage.

Figure 1: Petrol taxes in G7 countries⁵**Figure 2: Diesel taxes in G7 countries (excluding Canada)**

⁵ Data for Figures 1-3 from International Energy Agency.

Figure 3: Tax on diesel for commercial use in G7 countries



Arguments for imposing fuel duty

British governments have given a number of different reasons for the imposition of fuel duty and increases in its rate. Petrol tax was introduced by Lloyd George in 1909, together with new taxes on vehicles, in order to make the roads system self-financing (Plowden, 1971: 78). Revenues were used to maintain and improve roads through the creation of the 'Road Fund', lifting the financial burden on local authorities.

Over time the justifications for motoring taxes expanded. In 1937, the Treasury succeeded in ending the hypothecation of revenues and subsequently, as traffic grew, fuel taxes became a major source of general funds. By the year 2000, fuel and vehicle excise duties were producing 8% of UK tax revenues and tax comprised about 70% of the cost of a gallon of petrol (HM Treasury, 2000). Following protests by farmers and hauliers about high tax rates on road fuel, Prime Minister Tony Blair commented, 'We could, of course, cut more off the fuel duty if we reversed the extra investment we have announced on schools, hospitals, transport and the police. Government is about choice.'⁶

By this stage road-user taxation had clearly moved a long way from the principle embodied in the Road Fund. Motoring taxes were being used to fund general public expenditure, primarily on the welfare state. Spending on roads was only equivalent to about a fifth of the motoring tax take and a significant proportion was devoted to 'anti-car' schemes. Nevertheless, successive governments have also justified the imposition of high rates of fuel duty on other grounds.

In particular, fuel duty is argued to improve economic efficiency by reflecting the 'external costs' of road use (see Mirrlees et al., 2011: 269-276). Driving may produce several negative effects on third parties, including congestion and pollution. It is postulated that fuel duty and other taxes help ensure motorists face the wider social costs of their actions when they decide to travel by car. In the absence of such taxes, motoring would be 'overproduced' beyond its efficient level, since drivers would not be paying the full costs of their journeys.

In summary, the current system of road-user taxation has developed as the result of four main arguments:

- Road-users should pay for the upkeep and improvement of the road network
- Road-users should contribute substantial additional funds for general government expenditure
- Road-user taxation should reflect the external costs of road-use
- Transport taxes should encourage modal shift to public transport and cuts in carbon emissions

The remainder of this paper examines both the validity of these arguments and whether the current

⁶ Interview with the BBC, 5 November 2000.

tax framework is an efficient way of achieving these policy aims. It then briefly explores the wider economic impact of transport taxes before explaining how the negative effects of motoring taxation could be addressed by policy-makers.

Infrastructure costs

There are several problems with using motoring taxes such as fuel duty as methods of financing road infrastructure costs. As mentioned above, revenues are paid into general government funds and bear no relation to the amount spent on roads. Indeed, investment in road improvements has collapsed over the last twenty years (Knipping and Wellings, 2012: 17). But even if the hypothecation of the Road Fund had been retained, the decision on how much to spend and where to spend it would lie with politicians and officials. Accordingly, it is highly unlikely such funds would be allocated efficiently due to knowledge and incentive problems (ibid: 23-25). Moreover, the amount of taxation paid by users is likely to bear little relation to the infrastructure costs associated with their individual road-use. Vehicle Excise Duty (VED) rates depend on the type of vehicle rather than the amount it is used. Low-mileage motorists pay the same as high-mileage motorists. By contrast, fuel duty payments are broadly related to usage. Nevertheless, a motorist on a rarely maintained country road dating back decades will pay a similar amount to one using a high-cost urban motorway. And although heavy goods vehicles will pay far more duty than cars, due to their higher fuel consumption, the difference does not reflect the extent to which heavy vehicles are disproportionately responsible for damage to the roads. In summary, even if revenues were hypothecated, VED and fuel duty would represent a very crude and deeply unfair method of paying for the maintenance and improvement of the road network.

Contribution to general government spending

Currently, revenues from fuel duty and VED exceed expenditure on roads by approximately £30 billion per annum (HM Treasury, 2012; DfT, 2011a). In addition it should be acknowledged that a significant proportion of road spending is for the benefit of bus passengers, cyclists and pedestrians rather than motorists. Indeed, much of it is deliberately designed to disincentivise car travel (see DETR, 1998). In any case, the Treasury has long enjoyed a huge surplus from motoring taxes that is redistributed to general spending (much of which is directed to elements of the welfare state).

Most sectors of the economy are expected to contribute to general expenditure through general taxes such as VAT. The key question is why motorists should be subject to special taxes on top of the general taxes they already pay. Historically the roots of the current system perhaps lie in the notion that motoring was an unnecessary activity indulged in by the wealthy – and thus should be subject to ‘sumptuary taxation’ (Plowden, 1971). This assumption no longer holds given the wide distribution of car ownership and the importance of road transport to journeys to work and the distribution of goods. Indeed, if the intention were to redistribute resources from rich to poor, motoring taxes would be a bad way of targeting the wealthiest. Households in the top decile spend a lower proportion of their total expenditure on motoring taxes than middle deciles (ONS, 2011). And while the lowest two deciles spend the lowest proportion of their incomes on road fuel, this partly reflects low levels of car ownership, which are associated with artificially high motoring costs (see below for a more detailed discussion of these issues). Within the aggregate figures, residents of rural areas will typically face a higher tax burden than residents of large cities where extensive, subsidised public transport networks may be available.⁷ In conclusion, given the distribution of motoring taxation, it is difficult to justify them on redistributive grounds. However, over the last two decades, motoring taxes have increasingly been justified on environmental grounds, which are discussed in the next section.

Road transport does of course produce significant spillover effects that harm third parties.⁸ Under some circumstances, a road user’s decision to make a journey may contribute to congestion to other users. Road accidents may impose wider costs, for example through additional expenditure on health care and lost working time. Then there are the various environmental impacts of road transport such as vibration, noise and air pollution. The latter includes carbon dioxide emissions that are thought to contribute to global climate change. The remainder of this section examines whether the current regime of motoring taxation is a suitable means of addressing the externality issue.

⁷ This problem is recognised by the government, which is piloting a rural fuel duty rebate scheme.

⁸ There are also positive externalities such as network benefits, which, like negative externalities are typically difficult to quantify.

Congestion costs

The geographical and temporal distribution of congestion is highly variable. Moreover, the causes of congestion are complex. While the simple cause may be road users' decisions to travel at particular times and locations, levels of congestion are also the result of long-term policy decisions on road investment, land-use planning and methods of charging. If the supply of road capacity had been more closely related to patterns of demand and settlements had been allowed to adapt to the growth in motoring, it seems likely that the costs of congestion would be far lower.

As it stands, congestion is a major economic burden, thought to impose costs of around £20 billion per annum in the UK (Blythe, 2005). It is estimated to be by far the largest external cost of motoring (Johnson et al., 2012: 11). Congestion is heavily concentrated in particular bottlenecks and densely populated urban areas at peak hours of the day. Motoring taxes do not reflect this. VED is charged even when people are not using their vehicle. Fuel duty is also widely distributed, and is paid by users of uncongested roads at off-peak times as well as users of busy roads, although the latter will pay more duty for a given journey when delayed in jams. Nevertheless, motoring taxes are clearly a very crude way of managing demand to decrease the costs of congestion. By raising the cost of travel they will indeed price people off the roads, but this also has negative effects, for example on employment (see below). Clearly, the introduction of road pricing on congested routes would be a far more efficient way of reducing costly delays. Tolls could be set at different levels at different locations and at different times. In other words, they could be tailored precisely to specific conditions, in marked contrast to the current tax regime. In this way, drivers contributing to congestion would be faced with the full costs of their travel decisions. At the same time, drivers not contributing to congestion would not be forced to bear an unfair tax burden.

There are a number of additional benefits from the adoption of pricing to tackle congestion. Firstly, it would encourage more intensive use of existing capacity, thereby reducing the requirement for expensive new infrastructure. Flexible pricing allows road use to be spread over longer periods to maximise throughput, for example through the deployment of cheaper off-peak tolls to encourage drivers to shift their journeys to quieter times. Secondly, pricing encourages a spatial shift in economic activity. Faced with high peak-time tolls, some businesses in busy locations such as city centres might choose to move to the suburbs where tolls are lower. By contrast, other businesses, perhaps those with strong agglomeration benefits and whose staff's time is particularly valuable, might move into high-toll locations once pricing has eliminated congestion delays. In this way, pricing may contribute to a more efficient temporal and spatial distribution of economic activity, in marked contrast to the current system of motoring taxation. Since greater use of existing capacity is facilitated and new investment avoided, this also helps undermine justifications for motoring taxes on grounds of infrastructure costs.

Accident costs

The case for using fuel duty as a means of charging motorists for the wider costs of accidents is particularly weak. The amount of tax paid depends on numerous factors, including the type of vehicle used, driving habits and the length of journeys. In many instances there is likely to be a poor relationship between the amount of tax paid and the risk of accidents. A safe driver may pay a similar amount of fuel duty to a reckless driver, for example. By contrast, insurance provides a much more efficient method of charging that better reflects varying levels of risk.

Indeed, a high proportion of accident costs are currently covered by insurance policies. (This includes costs borne by the National Health Service, through the Injury Costs Recovery Scheme.) In fact, the current insurance system is biased against motorists in the sense that while the costs of accidents are largely borne by motor insurance premiums, the economic benefits of accidents are not factored in. While the discussion may seem callous, it is the case that some road fatalities save the government significant sums of money, for example in future health and pension expenditure. Another issue is the extent to which the courts 'gold plate' compensation claims for certain injuries by specifying very high awards.

Accident costs are of course dependent on a number of factors outside the control of road users. There are a number of examples. The availability of motorways and dual carriageways will affect how much traffic uses single carriageway roads and thus affect the probability of accidents caused by overtaking. Speed limits, such as the 40mph limit for heavy goods vehicles on single carriageway roads, will also affect risky activity such as overtaking. In urban areas, town planning policies will influence the extent to which vehicles and pedestrians interact. These policies may greatly increase the risk of pedestrian casualties if they prevent settlements from adapting to widespread car ownership. Under current arrangements, motorists are forced to bear the costs of accidents generated by various government interventions. Incorporating accident costs in the calculation of fuel duty rates would only exacerbate the injustice.

Climate change costs

Environmental costs are an important rationale given for the imposition of fuel duty. Road users produce numerous environmental externalities such as noise and air pollution. Perhaps the greatest area of concern is road transport's contribution to climate change. The sector accounts for approximately one quarter of UK greenhouse gas emissions.⁹ The first part of this section therefore examines the deployment of fuel duty as a mechanism to address climate change.

At first sight, the imposition of fuel duty would seem to be an effective way of reducing emissions. This is because carbon emissions are obviously closely correlated with fuel consumption. Fuel duty therefore provides strong incentives to reduce emissions, for example by buying more fuel efficient vehicles.

There are a number of problems, however, with using fuel duty as a means of addressing climate change. Firstly there is the issue of scientific uncertainty. While the concentration of CO₂ and other greenhouse gases in the atmosphere has increased, it is far from certain to what extent this has led to an increase in global temperatures. It is also highly uncertain to what extent rising CO₂ levels will increase temperatures in the future, and a wide range of estimates have been provided. The situation is further complicated by large natural variations in the climate (see Robinson et al., 2008).

Assessing the economic impact of climate change is perhaps even more problematic. For example, many parts of the world would benefit from higher temperatures through longer growing seasons and lower heating bills. Higher CO₂ concentrations may boost crop yields. In the context of wide geographical variations in the impacts, it is problematic to determine economically optimal climate conditions.

Environmental costs are also subjective in nature. Individuals will value them differently (see Cordato, 2004). Moreover, they will often struggle to quantify them in financial terms, although individuals will typically be able to rank different environmental goods on an ordinal scale. In other fields, subjective preferences may be revealed by market exchanges, but in the case of the global atmosphere there is no market. Attempts to use surveys to produce such data face significant methodological problems (Graves, 1991). If scenarios are hypothetical and – in the absence of markets – individual's choices don't involve them committing their own resources, there are good reasons to expect that responses will often be inaccurate and/or dishonest.

Even if the economically optimal climate could be determined, implementing policies to effectively and efficiently achieve that goal would present perhaps insurmountable difficulties. Policymakers

⁹ For an overview, see: <http://assets.dft.gov.uk/statistics/series/energy-and-environment/climatechangefactsheets.pdf>

do not have access to the knowledge required to achieve their goals at minimum cost (for example, how individuals will respond to changes in tax rates etc.).¹⁰ Moreover, they will inevitably be influenced by special interest groups with much higher incentives to engage in lobbying behaviour than the general public (Olson, 1965). The well known flaws in political decision making raise the possibility that the costs of climate change mitigation policies will exceed the costs of climate change itself.

The knowledge limitations associated with the costs and benefits of climate change - combined with the near certainty that policy will be captured by special interest groups - make it difficult for policymakers to set an appropriate rate of fuel duty to address the problem.

The taxation and subsidy of different emissions sources

The efficient reduction of greenhouse gas emissions would also require that measures were applied consistently, such that emissions were reduced by the lowest cost means. If taxation were used as the primary instrument of policy, this might involve applying some sort of carbon tax equally across all sectors of the economy. Current tax arrangements clearly do not treat different sources of emissions equally. Indeed, it would appear that motorists and hauliers are unfairly discriminated against by the tax system. Public transport, for example, receives substantial subsidies from the taxpayer, amounting to around £11 billion in 2011 (DfT, 2011a). Moreover, bus and train passengers do not pay VAT, and operators benefit from fuel duty rebates.¹¹ The government therefore applies a supertax (fuel duty) to one source of greenhouse gas emissions but grants tax breaks and subsidies to another source of pollution.

It is typically argued that such support for public transport is justified since an increased market share for buses, trains and trams reduces car use, thereby reducing overall emissions. This argument can be challenged on a number of grounds. Firstly, a high proportion of public transport journeys are into or out of central London (ORR, 2011) and therefore could not practically be undertaken by car given current road infrastructure and employment locations. In this context, removing subsidies and equalising the tax treatment seem unlikely to increase emissions. One effect might be a transfer of passengers from relatively expensive forms of public transport (e.g. trains) to cheaper modes (e.g. coaches), the latter generally producing less CO₂ per passenger mile.¹² Faced with higher fares, commuters might also choose to live closer to work, which once again would tend to reduce emissions. Indeed, to the extent that subsidies and tax breaks for public transport encourage commuters to live further from work, they may actually be increasing overall emissions. While emissions per passenger mile from rail commuting are relatively low, long-distance commuters may have high-emission lifestyles. It is not just that low per-mile emissions may be negated by longer distances. Commuters may trade off longer travel times for larger housing in less densely populated areas. While they may travel to work by train, other activities, such as taking children to school or shopping, may involve much longer car journeys than if they lived close to work in the city. The wider environmental impact of subsidising long-distance commuting deserves further analysis.

¹⁰ On the knowledge limitations facing policy-makers see Hayek (1945).

¹¹ For example, through the Bus Service Operators Grant.

¹² See: <http://assets.dft.gov.uk/statistics/series/energy-and-environment/climatechangefactsheets.pdf>

Secondly, a disproportionate share of operating subsidies are directed to relatively poorly used public transport services often serving areas with relatively low population densities. Taking rail as an example, operating subsidies per passenger mile are low for busy London commuter services but very high for rural services (see Table 1). While the carbon emissions of public transport per passenger mile are relatively low overall, the figures vary enormously between services depending on ridership levels. Well used services will clearly emit much less per passenger mile than poorly used services that are mostly 'carting around fresh air'. Operating subsidies, however, are disproportionately distributed to those poorly used public transport services that perform badly in terms of CO2 emissions per passenger mile, and which may often emit more than car travel. If subsidies and tax breaks were reduced, it is these services that would tend to cease first, mitigating any potential effect on overall emissions.

Table 1: Subsidies to train operating companies (2008-09)

Operating Company	Passenger km (millions)	Subsidy (£ millions)	Subsidy per passenger km (pence)
Arriva Trains Wales	1014	115	11.3
C2C Rail	919	1	0.1
The Chiltern Railway Company	968	11	1.1
Cross Country Trains	1841	119	6.5
East Midland Trains	1972	46	2.3
First Capital Connect	3261	-112	-3.4
First Great Western	5229	-71	-1.4
First/Keolis Transpennine	1278	83	3.2
First ScotRail	2601	222	8.6
Gatwick Express	-	-4	-
National Express East Coast	4695	-185	-3.9
London and Birmingham Rly	1575	114	7.3
London and South Eastern Rly	3896	36	0.9
London Eastern Railway Company	3968	-98	-2.5
New Southern Rly	3793	12	0.3
Northern Rail	1970	79	4.0
Stagecoach South Western Trains	5346	-42	-0.8
West Coast Trains	4452	-72	-1.6

Source: ORR (2010: 64)

Thirdly, a significant proportion of public transport users either do not have driving licences or are unable to drive for various reasons.¹³ Clearly the removal of subsidies and tax breaks would be unlikely to result in many of these users shifting to cars, though some might rely more heavily on lifts from friends and relatives. Since such people tend to have relatively low incomes, it seems unlikely there would be significant growth in taxi ridership. Thus a reduction of public transport services used by this group would seem highly unlikely to result in a significant increase in emissions. Such an outcome may be objectionable to policymakers on egalitarian grounds, however.

Finally, there are some forms of heavily subsidised public transport that generally consume more energy per passenger mile than alternative modes. One example is high-speed rail, which, with the planned construction of a high-speed line to Birmingham and then Leeds and Manchester, now forms a core component of British transport policy. Empirical evidence suggests that the relationship between train speed and energy use is roughly linear, so that doubling the speed roughly doubles energy consumption. Given realistic ridership levels, this means travel on HS2 may well be more energy intensive than inter-city journeys by car (see Kemp, 2004). The relative carbon emissions depend, of course, on how the electricity used by the trains is generated. Low estimates assume that it comes from renewable or nuclear sources. In reality, however, the additional consumption required by high-speed rail displaces 'green' energy from other end users rather than creating extra 'green' generation capacity. Thus, *ceteris paribus*, fossil-fuel based generation is likely to increase.

In conclusion, the current regime of subsidies and tax breaks for public transport is very difficult to justify on climate change grounds. The discrimination in the tax system against motorists and hauliers is further demonstrated by the treatment of other sectors, including energy, which is responsible for the majority of UK emissions. Domestic gas and electricity users, for example, benefit from a reduced VAT rate of just 5 per cent, in marked contrast to the very high tax rates imposed on road fuel.¹⁴ Clearly the picture is more complex than this, since government energy policy has tended to encourage climate change mitigation through market interventions such as the Renewables Obligation and the EU Emissions Trading System. According to one government estimate, climate change mitigation policies will be inflating electricity prices by 26 per cent and gas prices by 10 per cent by 2015 (DECC, 2010), although international evidence suggests the overall impact of green policies may be much greater than this.¹⁵ Nevertheless, even using high-end estimates, it is clear that road users face a much higher burden from tax and regulation than energy users, particularly domestic gas consumers. On top of fuel duty and VED, motorists and hauliers also face significant regulatory costs associated with climate change mitigation, such as fuel economy standards and biofuels requirements.

The Stern Review and the 'social cost' of carbon

Some of the shortcomings of Pigovian welfare economics have been discussed above. Nevertheless it is telling to compare current rates of fuel duty with estimates of the social cost of

¹³ For example, in 2010, 59 per cent of females over 70 did not hold a driving licence (DfT, 2011b).

¹⁴ <http://www.hmrc.gov.uk/vat/forms-rates/rates/goods-services.htm>

¹⁵ See, for example: http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_06_b

carbon emissions provided by various studies such as the *Stern Review* (2006). Despite using questionable assumptions and producing much higher estimates than most other studies, Stern's mean estimate of the social cost of carbon (\$312 per tonne) equates to a fuel duty rate of about 12p per litre. Factoring in rising external costs and inflation means the rate would be somewhat higher by 2012, but still very much lower than the current fuel duty rate of 58p per litre. Hope and Newbery (2007) produce a wide range of estimates of the social cost of carbon by varying the assumptions used. Plausible assumptions produce a mean figure for 2012 of around \$100 per tonne of carbon, equating to about 4p per litre of petrol (*ibid.*: 17). Clearly it is difficult to justify the current rate of fuel duty on climate change mitigation grounds alone.

Local air pollution

There are of course other forms of air pollution from road transport apart from CO₂, including carbon monoxide, ozone, sulphur dioxide, nitrogen dioxide and particulates. These pollutants are also said to produce significant external costs, in particular through their negative effects on health. In practice the quantification of such costs is problematic. Individuals with high time preferences and unhealthy lifestyles may be more likely to live in areas with relatively high air pollution levels such as inner cities. It may be difficult to assess all the relevant factors. And, as discussed with regard to accidents, attempts to quantify social costs may not properly account for all the costs and benefits. This makes calculating appropriate tax rates highly problematic. Nevertheless, it can be seen that fuel duty is a particularly unsuitable method of charging motorists for highly variable local pollution costs - that are likely to be negligible in rural areas.

Moreover, since the impact of these forms of air pollution tends to be localised, exposure levels are affected by land use patterns as well as emissions. This is a major weakness for the argument that fuel duty rates should incorporate such external costs. Since 1947 land use in the Britain has been very tightly regulated. The spatial expansion of cities has been restricted by measures such as green belts. Settlements have not been able to evolve spontaneously to accommodate mass car ownership, as would have happened under a more liberal policy environment. Instead, planners have attempted to adapt largely pre-war urban patterns to the needs of the car, for example through the compulsory purchase and demolition of residential streets for the construction of urban motorways.

More recently, modern forms of environmentalism have come to dominate planning policy. The focus has been on creating 'compact cities' of neighbourhoods with high population densities based around public transport. The redevelopment of brownfield sites within existing settlements has been a key aspect of this policy, together with the related 'regeneration' of inner-cities and central business districts. In practice, this means that developers have effectively been forced to build in locations with relatively high levels of air and noise pollution, indeed in many cases immediately next to major roads and railways.

A simplistic 'polluter pays' approach to taxation might seek to charge motorists and hauliers for the external costs affecting residents of new developments adjacent to roads. Yet the magnitude of those costs is the result of planning policies that encourage high density housing in urban locations with relatively high pollution levels. Planners may face a difficult trade-off here. High density settlements may well decrease overall carbon emissions from road transport and housing, but at the same time may increase exposure to local pollution and noise, as populations are packed into a much smaller area. It would be unjust, however, to expect road users to pay extra

tax for the consequences of such policies. Moreover, liberalised land markets are clearly capable of adjusting prices according to exposure levels, a process still discernible, though distorted, in current regulated markets. Thus property buyers would expect to pay less for land badly affected by air pollution and noise, while tenants would expect to pay less rent. In this way individuals would be free to trade-off lower prices with health risks, disturbance and so on, according to their own subjective valuations. Indeed, under liberal planning arrangements based on voluntary agreements, entrepreneurs would be free to develop 'proprietary communities', private settlements in which pollution levels could be part of a package of amenities designed to attract residents and businesses (see Beito et al., 2004). Individuals holding particularly strong preferences against the localised external effects of road transport would be free to live in neighbourhoods that placed heavy restrictions on road users, while those unconcerned by such effects could choose to live in communities with few restrictions. Freed land markets thus enable environmental regulation to be far better tailored to individual preferences, in marked contrast to the crude, one-size-fits-all approach represented by fuel duty.

The wider economic impact of fuel duty

The above analysis suggests that fuel duty is not an appropriate mechanism of charging motorists for infrastructure costs, congestion, accidents and environmental externalities. This in itself provides a strong case for reform. But the imposition of fuel duty also has negative effects on the wider economy. The following discussion makes some tentative steps towards analysing the impact of fuel duty on economic activity.

Economic history certainly suggests that artificially high transport costs are likely to hamper the creation of wealth. Reductions in transport costs played an instrumental role in the economic development of the UK. The construction of networks such as the canals, railways and motorways reduced the costs of trade. It also facilitated a greater division of labour, as firms were able to supply a much larger geographical area. In turn this created huge economies of scale. For example, the construction of the motorway network enabled major retailers to replace numerous small warehouses with a handful of large, super-efficient distribution centres. With lower transport costs, a business can serve more customers. Firms in different areas are thus able to compete with one another, with the more efficient growing as they displace the less efficient. Better transport also makes workers more mobile, further promoting greater specialisation and economies of scale. Labour can move to where it is most productive. Finally, transport facilitates the clustering of symbiotic businesses in the same location, creating agglomeration benefits (see Graham et al., 2009).

The transport sector therefore contributes directly to several related processes that are major drivers of productivity growth. By artificially raising costs, transport taxes will hamper transport-related productivity improvements and the spatial redeployment of resources (for example through the negative impact on labour mobility and work incentives), thereby retarding growth in the economy in general. Fuel duty has similar effects to tariffs on trade and leads to significant distortions to patterns of economic activity.

Although difficult to quantify, the negative economic effects of fuel duty are likely to pervade large parts of the UK economy. Road transport accounts for 90% of surface passenger journeys in Britain and also transports 70% of surface freight (DfT, 2011a). This means that individuals do not just pay the cost of fuel duty directly at the petrol pump. The tax increases the costs of delivering goods and services, which are passed on to consumers.

Road transport is also one of the largest areas of household expenditure, with the average household spending an estimated £3,500 a year on motoring costs alone.¹⁶ Of this sum, about one third, or £1,200 a year, is spent on petrol and diesel, suggesting the average household is

¹⁶ Based on ONS (2011: 78); adjusted to provide 2012 estimates.

paying about £600 a year in fuel duty.¹⁷ The financial impact of fuel duty on poorer households is a particular concern, as this is likely to affect access to labour markets and work incentives and therefore levels of welfare dependency, with major implications for overall levels of government spending and taxation.

Table 2 suggests that fuel duty is a particularly high burden on for car-owning households in the poorest income decile. It is estimated that road fuel accounts for almost ten per cent of their household expenditure compared with less than four per cent for the richest decile. When all households, including those not owning cars, are considered, the picture changes, however. The greatest burden of fuel duty falls on households in the middle-upper income deciles, a large proportion of which are working families. This pattern reflects low levels of car ownership in the bottom quintile.

Table 2: Spending on road fuel as a percentage of total expenditure by car-owning households in different income deciles¹⁸

Household gross income decile (1=poorest; 10=richest)	Car ownership (%)	Expenditure by car-owning households on road fuel (% of total spending)
1	32	9.1
2	46	5.7
3	60	5.8
4	70	5.7
5	80	5.3
6	88	5.3
7	89	5.2
8	93	5.5
9	96	5.3
10	95	3.8

There are several reasons for these low levels of car ownership among poorer groups. Many elderly females never learnt to drive, for example. Nevertheless, the high cost of running a car is also a major factor. Fuel duty and VED comprise around 20 per cent of the cost for a typical motorist (AA, 2012), though for many low-income drivers the proportion is likely to be higher, since they will tend to buy older and cheaper vehicles with lower than average depreciation costs. This implies that motoring taxes are likely to have a significant impact on car ownership among poorer groups, although quantifying the effect is beyond the scope of this paper. There is certainly a strong case for policymakers to consider the effect of motoring taxes on car ownership for low-income individuals and how this affects their mobility, including access to employment opportunities.

¹⁷ Including the VAT charged on the duty.

¹⁸ Car ownership figures from ONS (2011: Table A47); spending on road fuel from ONS (2010: Table A8).

Travel-to-work costs

A study commissioned by the Department of Social Security concluded that ‘the costs of travelling to work will ... be a factor in some people’s decisions about whether to look for or accept employment’ (Sainsbury, 1999: 12). Indeed, one survey found that 50 per cent of unemployed people cited ‘extra costs such as travel’ as a major cause for concern about leaving benefits (Bottomley et al., 1997). Moreover, ‘travelling costs will also be a regular expense which may influence decisions about whether to remain in a particular job’ (Sainsbury, 1999: 12). Studies of low-income families suggest that earnings from low-paid employment are significantly reduced by the travel-to-work costs, with a particularly acute problem in rural areas (ibid.). Since around two-thirds of working adults who travel to work do so by car or van, it is clear that motoring taxes, and fuel duty in particular, have a significant impact on travel-to-work costs.

The impact of travelling costs on work incentives is likely to be most pronounced for those individuals that already experience very high effective marginal tax rates (EMTRs). Within certain income ranges, some workers face EMTRs as high as 96 per cent. This means that for every extra £1 earned, the person is better off by just four pence. High EMTRs reflect the withdrawal of welfare payments such as housing benefit and tax credits, as well as the imposition of income tax and national insurance. While EMTRs of over 90 per cent are experienced in quite narrow income bands, EMTRs of 70 per cent or over affect a large number of employees on relatively low incomes (DWP, 2009).

Accordingly, travel-to-work costs can make a large difference to the financial incentives to enter work. Case studies illustrate the magnitude of the effect. A single person over 25 in low-cost rented accommodation¹⁹ would typically be around £70 per week better off in a full-time job paying the minimum wage than on benefits, which works out at £1.75 an hour. However, if average costs for those driving to work (about £20 per week) are applied, this means the person is now only £50 per week better off, or £1.25 an hour. When a realistic estimate of the time spent travelling is incorporated, the effective hourly rate falls further to around £1.10 an hour. Thus, in this case study, under plausible assumptions, travel-to-work costs reduce the returns from entering work by almost 40 per cent. A significant proportion of motorists, such as many in rural areas, face very much higher costs. Travel-to-work costs of £40 per week would reduce the benefit of working to just £30 per week, equivalent to just 75p per hour, a drop of almost 60 per cent. At this point the financial incentives for entering employment are extremely weak, particularly since there are likely to be additional in-work costs such as food and clothing. Worse still, several groups, such as single-earner families or households in private rented accommodation receiving large housing benefit payments, face even weaker incentives to enter relatively low-paid work. In such cases, travel-to-work costs may mean work does not pay or even makes the household worse off.

¹⁹ Rent estimated at £60 per week.

The AA estimates that fuel accounts for approximately two-thirds of car running costs (AA, 2012).²⁰ This suggests fuel duty accounts for roughly one third of the costs of those travelling to work by car or van. Given the strong evidence that travel-to-work costs have a significant impact on work incentives for those on low incomes, and that work incentives affect levels of worklessness, it follows that fuel duty is likely to have a negative effect on employment. It is beyond the scope of this paper to attempt to quantify the impact. Nevertheless, as the government introduces welfare reforms designed to improve work incentives, there is a strong case for policy-makers to consider in detail the effect of travel-to-work costs, of which motoring taxes form a major component.

²⁰ Running costs do not include standing charges such as insurance and VED.

Reforming motoring taxation

Fuel duty is not only inappropriate for charging road users for infrastructure costs, congestion, accidents and environmental effects; the tax also distorts patterns of economic activity and has a negative effect on growth and employment. There is therefore a strong case for either abolishing fuel duty or, at the very least, significantly reducing the rate.

The tax remains attractive to predatory politicians and officials, however. It is relatively cheap and simple to collect, and difficult to avoid. Policymakers interpret the relatively low elasticity of demand in relation to fuel prices to mean that rates can be raised further without exceeding the revenue-maximising point. But this narrow interpretation ignores the wider negative effects of fuel duty on economic output and employment.

Notwithstanding the substantial economic benefits from reducing fuel duty, there are severe practical problems. The sheer scale of fuel duty receipts, at over £30 billion per annum²¹, means a large rate cut would mean a significant loss in overall revenue to the Treasury, at least initially in the period before the wider economic benefits of the tax cut fed through.

Cancelling the proposed increase and introducing a 'downward escalator'

A modest proposal in the short term would be to cancel the proposed 3p increase in fuel duty scheduled for early 2013. This could be a first step in the introduction of a 'downward escalator' which set out a longer term programme of cuts in the real-terms rate of the tax. The 3p rise is likely to raise approximately £1.5 billion for the Treasury (if one discounts the difficult-to-quantify negative effects on the wider economy and general tax revenues). There might be a case for raising other taxes to make up the shortfall on the grounds that this would represent a move towards tax neutrality (see below), although there is some uncertainty around the full economic impact of different tax increases.²²

In any case, the economic gains would be far greater if spending cuts were implemented to compensate for the expected impact on the public finances. To obtain the maximum benefit these savings should be focused on those areas where government spending produces the largest economic losses. Within the roads budget, this might include grants to local authorities for counterproductive traffic management measures that increase delays for road users (see Wellings, 2011a).

The scope for economies in the broader transport budget is far greater. Loss-making rail projects

²¹ Including the VAT charged on the duty.

²² There is an extensive literature on the pros and cons of different forms of taxation.

could be cancelled, with savings used to moderate the burden of fuel duty. The High Speed 2 scheme, for example, will cost taxpayers approximately £2 billion per year from 2017 to 2033. Many other rail projects are likely to have negative returns, including recently announced plans to electrify branch lines in South Wales. Moreover, there is also a strong economic case for reducing operating subsidies to train services which in many instances are carrying few passengers. Reductions in the £11 billion per annum public transport budget would enable the government to cut fuel duty in the short term while at the same time reducing distortions to the transport sector.

Delivering deeper reductions: limited road pricing and a consistent approach to environmental taxation

A policy of fuel duty reductions would create a more positive political and fiscal context for the medium-term introduction of more extensive road-user charging, which would enable a fuel duty 'downward escalator' to be extended over a much longer period. Peak-time pricing could be commenced in those locations most severely affected by congestion, which might include bottlenecks on the strategic network and roads in large conurbations. This strategy would address a high proportion of congestion costs while affecting a small proportion of total road traffic (see Glaister and Graham, 2004: 94-104).²³

The limited nature of such a pricing strategy could help reduce political opposition as well as administration costs. In some locations, there could be a strong economic case for using at least part of the toll income to increase capacity, for example by widening motorways. A programme of improvements could also help make the introduction of some pricing more acceptable to drivers. The case for capacity enhancements may, however, be weak in many urban locations where new construction is likely to be prohibitively expensive. A proportion of toll receipts could therefore be used to reduce fuel duty. A combination of congestion pricing and duty cuts would raise the efficiency of the network by ensuring that those motorists imposing delays on others paid more, while those not contributing to congestion paid less. It is important to remember that those drivers paying tolls would nevertheless benefit from faster and more predictable journeys. Lower congestion levels would also translate into higher general tax revenues.

The introduction of limited road pricing could be combined with a more consistent approach to environmental taxation to deliver still larger reductions in the fuel duty rate. If the government remains committed to achieve its emissions reductions targets - despite the very heavy economic cost²⁴ - then different sources of greenhouse gases should be treated equally by the tax system to help ensure that emissions are cut at the lowest possible economic cost. Such an approach would imply imposing full-rate VAT on domestic fuel and power, which would raise approximately £5.5 billion, enough to reduce fuel duty by about 10p per litre.

From this perspective there is also a case for charging VAT on public transport and even food (since agriculture is a major source of greenhouse gas emissions), raising perhaps £2.5 billion and £16 billion for the Treasury respectively (HMRC, 2012). Combined with lower public transport

²³ In their 2004 study, Glaister and Graham (2004) estimated that under plausible assumptions a charging scheme covering London, conurbations and big urban areas could produce over £4 billion in revenue, but only 8 per cent of national traffic would experience charging.

²⁴ For a critique of current energy and climate change policy, see Wellings (2011b).

subsidies and revenue from limited road-user charging, a consistent approach to environmental taxation would enable fuel duty to be reduced to the kind of levels suggested by the Stern Review and other high-end estimates of the social cost of carbon (see above). The EU Energy Taxation Directive imposes a minimum fuel tax rate, however, which currently equates to 29p per litre of petrol.²⁵ This figure, half the current rate of duty, may therefore provide a more realistic medium-term policy goal.

Road privatisation and the abolition of fuel duty

Despite the economic benefits of the substantial fuel duty reductions advocated above, there are a number of dangers associated with both environmental taxation and government controlled road pricing. Given the incentives facing politicians and officials, tax rates and tolls could be set to satisfy key voter groups and special interests rather than to maximise efficiency.

In the case of environmental taxation, there would clearly be immense political difficulties involved in the application of standard VAT rates to domestic fuel and other sectors. A further difficulty is that such tax changes would be overlaid on regulatory measures that already artificially inflate prices, particularly in the case of electricity.

Limited road pricing would be introduced in the context of ideological hostility to private transport within government. Toll revenues might therefore be used to subsidise uneconomic public transport services or to fund uneconomic projects such as new tram lines. Inflated administration costs are a further danger. Recent government road-pricing schemes, both implemented and proposed, have been characterised by these problems, which have the potential to undermine the economic gains from pricing. There are therefore strong arguments to take road pricing out of political and bureaucratic control by transferring ownership to the private sector (see Knipping and Wellings, 2012).

Receipts from the sale of the strategic network of trunk roads and motorways could be substantial, perhaps in the order of £150 billion, and would provide a large financial buffer for the Treasury to cut fuel duty rates.²⁶ At the same time, the denationalisation of roads would transfer maintenance and new construction costs to the private sector, providing significant savings to the Exchequer. Most importantly, privatisation in a deregulated transport market would lead to substantial efficiency gains which would translate into higher economic output and increase overall tax revenues (ibid.). A combination of higher general tax revenues, much lower public spending on transport and receipts from privatisation would make abolishing fuel duty a practical option.²⁷ This unjust tax, that inflicts so much economic damage, could finally be consigned to history.

²⁵ See: http://ec.europa.eu/taxation_customs/resources/documents/taxation/minima_explained_en.pdf

²⁶ A cast-iron commitment to use privatisation receipts to cut duty would increase the amount raised from the sale of the network (see Knipping and Wellings, 2012: 110).

²⁷ Although a change to the EU Energy Taxation Directive would also be required.

References

- AA (Automobile Association) (2012), 'Motoring Costs 2012', <http://www.theaa.com/resources/Documents/pdf/motoring-advice/running-costs/petrol2012.pdf>
- Beito, D., P. Gordon and A. Tabarrok (eds) (2004), *The Voluntary City: Choice, Community and Civil Society*, Oakland, CA: Independent Institute.
- Blythe, P. T. (2005), 'Congestion charging: technical options for the delivery of future policy', *Transportation Research Part A*, 39: 571-87.
- Bottomley, D., S. McKay and R. Walker (1997) *Unemployment and Jobseeking*, DSS Research Report No. 62, London: HMSO.
- Cordato, R. E. (2004), 'Towards an Austrian theory of environmental economics', *Quarterly Journal of Austrian Economics*, 7(1): 3–16.
- DECC (Department for Energy and Climate Change) (2010), *Estimated Impacts of Energy and Climate Change Policies on Bills*, London: DECC.
- DETR (Department for the Environment, Transport and the Regions) (1998), *A New Deal for Transport: Better for Everyone*, London: TSO.
- DfT (Department for Transport) (2011a), *Transport Statistics Great Britain*, London: TSO.
- DfT (Department of Transport) (2011b), *National Travel Survey: 2010*, London: DfT
- DWP (Department for Work and Pensions) (2009), *Tax Benefit Model Tables, April 2009*, London: DWP.
- HM Treasury (2000), *Budget 2000*, London: HM Treasury.
- HM Treasury (2012), *Budget 2012*, London: HM Treasury.
- Glaister, S. and D. Graham (2004), *Pricing our Roads: Vision and Reality*, London: Institute of Economic Affairs.
- Graham, D., S. Gibbons and R. Martin (2009), 'Transport Investment and the Distance Decay of

Agglomeration Benefits', <http://personal.lse.ac.uk/gibbons/Papers/Agglomeration%20and%20Distance%20Decay%20Jan%202009.pdf>

Graves, P. E. (1991), 'Aesthetics', in J. B. Braden and C. D. Kolstad (eds), *Measuring the Demand for Environmental Quality*, Amsterdam/New York: North Holland.

Hayek, F. A. (1945), 'The Use of Knowledge in Society', *American Economic Review*, 35(5): 519-30.

HMRC (2012), 'Estimated costs of the principal tax expenditure and structural reliefs', http://www.hmrc.gov.uk/stats/tax_expenditures/table1-5.pdf

Hope, C. and D. Newbery (2007), 'Calculating the Social Cost of Carbon', <http://www.eprg.group.cam.ac.uk/wp-content/uploads/2008/11/eprg0720.pdf>

Johnson, P., A. Leicester and G. Stoye (2012), *Fuel for Thought: The what, why and how of motoring taxation*, London: Institute for Fiscal Studies/RAC Foundation.

Kemp, R. (2004), 'Transport energy consumption', Discussion Paper, Lancaster: University of Lancaster, <http://www.lpdu.lancs.ac.uk/research/download/Transport%20Energy%20Consumption%20Discussion%20Paper.pdf>

Knipping, O. and R. Wellings (2012), *Which Road Ahead - Government or Market?*, London: Institute of Economic Affairs.

Minford, P. and J. Wang (2011), 'Public spending, taxation and economic growth – the evidence' in P. Booth (ed.), *Sharper Axes, Lower Taxes: Big Steps to a Smaller State*, London: Institute of Economic Affairs.

Mirrlees, J., S. Adam, T. Besley, R. Blundell, S. Bond, R. Chote, M. Gammie, P. Johnson, G. Myles and J. Poterba (2011), *Tax by Design: the Mirrlees Review*, Oxford: Oxford University Press

Olson, M. (1965), *The Logic of Collective Action: Public Goods and the Theory of Groups*, Cambridge, MA: Harvard University Press.

ONS (Office for National Statistics) (2011), *Family Spending, 2011 Edition*, London: TSO.

ORR (Office of Rail Regulation) (2010), *National Rail Trends, 2009-2010 Yearbook*, London: ORR.

ORR (Office of Rail Regulation) (2011), *National Rail Trends, 2010-2011 Yearbook*, London: ORR.

Plowden, W. (1971), *The Motor Car and Politics in Britain 1896-1970*, London: The Bodley Head.

Robinson, C., I. Byatt, D. Henderson, R. Lewis, J. Morris and A. Peacock (2008), *Climate Change Policy: Challenging the Activists*, London: Institute of Economic Affairs.

Sainsbury, R. (1999), *Costs of being in work: a review of literature and research*, London: TSO.

Stern, N. (2006), *Stern Review on the Economics of Climate Change*, London: TSO.

Wellings, R. and B. Lipson (2008), *Towards Better Transport: Funding new infrastructure with future road-pricing revenue*, London: Policy Exchange.

Wellings, R. (2011a), 'Comprehensive transport reform' in P. Booth (ed.) *Sharper Axes, Lower Taxes: Big Steps to a Smaller State*, London: Institute of Economic Affairs.

Wellings, R. (2011b), 'Growth, Energy and Climate Change' in D. Davis, B. Binley and J. Baron (eds), *The Future of Conservatism: Values Revisited*, London: ConservativeHome.



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