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**Working Party on National Environmental Policies Working Group on Transport** 

THE SCOPE FOR CO2-BASED DIFFERENTIATION IN MOTOR VEHICLE TAXES

In equilibrium and in the context of the current global recession

This paper, prepared by Rana Roy, Consulting Economist, London, UK, addresses the scope for CO2-based differentiation in motor vehicle taxes, both under conditions of equilibrium and in the context of the current global recession.

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#### **FOREWORD**

This paper, prepared by Rana Roy, Consulting Economist, London, UK, addresses the scope for CO<sub>2</sub>-based differentiation in motor vehicle taxes, both under conditions of equilibrium and in the context of the current global recession. It was prepared as part of the work of the Working group on Transport under the OECD's Environment Policy Committee.

The paper should be read in conjunction with the paper Incentives for CO<sub>2</sub> Emission Reductions in Current Motor Vehicle Taxes, available at <a href="https://www.oecd.org/env/transport">www.oecd.org/env/transport</a> and <a href="https://www.oecd.org/env/transport">www.oecd.org/env/tra

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## ENV/EPOC/WPNEP/T(2009)1/FINAL

# THE SCOPE FOR CO<sub>2</sub>-BASED DIFFERENTIATION IN MOTOR VEHICLE TAXES – IN EQUILIBRIUM AND IN THE CONTEXT OF THE CURRENT GLOBAL RECESSION

#### 1. Introduction

- 1. The year 2009 is likely to witness the worst outcome for global economic growth since the Second World War the first actual contraction in world GDP in the last 60 years. From its commencement to its conclusion, the current global recession is likely to be "by far" the most severe global recession in the post-war period.<sup>1</sup>
- 2. This is the context in which the member-countries of the OECD need to re-assess the role of CO<sub>2</sub>-based differentiation in motor vehicle taxes as an instrument of internalisation. And this is the context in which this discussion paper, an intended contribution to that re-assessment, has been prepared.
- 3. The present paper should be read as a complement to the OECD paper, "Incentives for CO<sub>2</sub> emission reductions in motor vehicle taxes", which provides a survey of taxes on motor vehicles currently applied in OECD member-countries and the extent to which these taxes are structured to provide incentives for the purchase and use of vehicles that are thought likely to yield a lower level of CO<sub>2</sub> emissions.<sup>2</sup>
- 4. The purpose of the present paper is to explore what is and what is not advisable as policy in this field from the perspective of economic theory both in the general case and in the context of the current recession. The main arguments, conclusions and recommendations are meant to be applicable to most of the OECD world. But this is not to suggest that they will necessarily apply to each and every OECD member-country such a comprehensive report of country-specific conclusions and recommendations would require country-specific investigations at a much greater level of detail than is possible within the limits of the present paper.
- 5. The structure of the paper is as follows. Chapter 2 presents a general analysis of the subject grounded in conditions of equilibrium, and beginning with an explanation of why this is indeed the appropriate starting point for analysis. Chapter 3 identifies the relevant features of the current global recession and of government interventions to counteract it. Chapter 4 then presents a customised analysis geared to the current conditions of disequilibrium.
- 6. As is argued in Chapter 2, under conditions of equilibrium, or more precisely, in moving from a sub-optimal equilibrium to a more optimal equilibrium, theoretical first principles as well as sector-specific considerations suggest a relatively limited role for CO<sub>2</sub>-based differentiation in motor vehicle taxes prior to full internalisation and no obvious role thereafter.
- 7. The principles for efficient taxation mandate the minimal use of the most welfare-reducing taxes in raising revenues for general government functions, in particular, differential taxes on products and

See in particular OECD (2009a) and IMF (2009c), published in March 2009 and April 2009, respectively, and which form the main evidence base for the macroeconomic assumptions employed in the present paper.

<sup>&</sup>lt;sup>2</sup> See OECD (2009b).

production inputs which have the effect of distorting relative prices. They also mandate the fullest use of the taxes required to correct externalities, and which are by definition welfare-enhancing.

- 8. When coupled with the specific characteristics of the transport sector, in which the use of motor vehicles generates significant external costs, but in which new vehicles represent less than 10% of the total vehicle fleet in OECD member countries, this suggests the need to prioritise externality taxes levied *at*, or close to, the point of use rather than at the point of purchase. These include, principally, fuel taxes to target CO<sub>2</sub> emissions, and distance charges, differentiated by vehicle type, route of travel and time-of-day, to target other significant external costs, including local pollution and congestion.
- 9. Governments in several OECD member countries are now agreed on the full internalisation of the external costs of the transport sector as a long-term policy objective one that is amply justified by the evidence on the scale of the problem and the size of the gains available from correcting it. But once external costs have been fully internalised through a re-calibration of fuel taxes and the introduction of differentiated distance charges, there is no obvious role for any additional taxes on motor vehicles, over and above the standard rate of Value Added Tax (VAT) and hence for the differentiation thereof.
- 10. Of course, so long as external costs have not been fully internalised, no existing instrument should be neglected. And so long as taxes on motor vehicles taxes on the purchase price, over and the above the standard rate of VAT, and recurrent annual charges thereafter continue to be levied, these taxes should be re-calibrated to target external costs and differentiated accordingly.
- 11. That said, the role of CO<sub>2</sub>-based differentiation in motor vehicle taxes as an instrument of internalisation is limited by several considerations. Since taxes levied at the point of use remain the best instrument for targeting external costs, and fuel taxes the best instrument for targeting CO<sub>2</sub>-emissions, there is no uniquely optimal level of a differentiated tax on motor vehicles: it will depend on the pace at which governments can make fuller use of the better instruments. Insofar as governments are able to make fuller use of the better instruments, taxes on motor vehicles *per se* should be reduced. Hence, the level of any differentiated tax on motor vehicles, as distinct from the level of differentiation, would also be reduced.
- 12. Moreover, the level of differentiation advisable is limited by the need to avoid an aggressive use of rebates whilst road use in most cases remains significantly under-priced; the differentiation of motor vehicle taxes should not be based solely on CO<sub>2</sub> emissions; and governments will need to experiment with a mix of differentiated purchase taxes and differentiated recurrent charges in order to arrive at a position to make an informed choice on the correct mix.
- 13. This is the conclusion that follows from an analysis grounded in conditions of equilibrium. The point, however, is that we are *not* living in conditions of equilibrium.
- 14. As is shown in Chapter 3, the current global recession has created a massive disequilibrium in the macro-economy. This involves *inter alia* a severe contraction in aggregate demand and output, more so in some sectors than others, escalating losses for firms in the worst-hit sectors and an increasing risk of bankruptcy, magnified by the contraction in credit. Governments have responded to the fact of disequilibrium by an unprecedented level of counter-cyclical intervention, aimed at arresting the contraction in demand and output and preventing widespread bankruptcies. Policy in any particular field needs to be mindful of this overall thrust of government policy in response to the recession and mindful, too, of its consequences in the post-recession period.
- 15. Moreover, the recession has taken a disproportionately heavy toll on the motor vehicle industry. Government intervention here has taken the form of direct grants to manufacturers, as well as specific

measures aimed at increasing demand for their products, including in particular "car scrappage" schemes that provide consumers with rebates for trading in old cars for new. In the US, it is also likely to include government ownership of major manufacturing firms. As a result, the industry is now in the process of moving from one equilibrium to another – with government support but quite independently of any government intervention aimed at the correction of externalities.

- 16. As is detailed in Chapter 4, taxation policy under conditions of disequilibrium must differ in at least some respects from what theoretical first principles would recommend under conditions of equilibrium. Thus, there is a strong case for avoiding pro-cyclical impacts in implementing internalisation. This entails avoiding measures that reduce aggregate demand during the duration of the recession as well as measures that augment demand in the full upswing of the recovery.
- 17. Now the evidence on this point is clear: full internalisation is likely to entail a net increase in government revenues, and a corresponding reduction in consumers' disposable incomes, as road users are charged for the external costs imposed by their activity. Indeed, although the aim here is to maximise welfare rather than to maximise revenues, the result is likely to be strongly revenue-positive.
- 18. Hence, it would be doubly advantageous to timetable the next major steps toward full internalisation for the period of the recovery rather than the period of the recession. It would avoid the risk of reducing aggregate demand today when demand needs to be supported; and it would help to moderate demand when moderation will be needed. In the meantime, however, there is now an expanded scope for the use of instruments that need not be pro-cyclical in their impact.
- 19. At the same time, there is an urgent need to amend the current intervention in the motor vehicle industry so as to ensure that the long-term commitment to reducing external costs is not vitiated by short-term actions aimed simply at increasing demand for motor vehicles. And if government intervention and support to restructure the industry is now a *fait accompli*, government has a responsibility to ensure that the new equilibrium delivers a better result, for the environment and for society, than the old.
- 20. In the current conditions of disequilibrium and intervention, in the macro-economy and in the motor vehicle industry, differentiated taxes on motor vehicles becomes, *temporarily*, a preferred instrument preferred, that is, to taxes levied at the point of use and aimed at increasing the price of use. Differentiation can serve to achieve some reduction in external costs whilst avoiding the risk of reducing aggregate demand. And it can serve to mitigate the risk of increasing external costs inherent in government actions to increase the demand for motor vehicles.
- 21. Moreover, each of the three more specific considerations limiting the role of CO<sub>2</sub>-based differentiation ceases, temporarily, to apply in the current conditions.
- 22. First, there is a case for a far higher level of differentiation in motor vehicle taxes, and related rebates and feebates, than would otherwise be appropriate. The normal presumption against rebates is not of practical relevance in the present context: rebates that are generous to a fault *are* being applied today and the point is to ensure that they are applied to better ends.
- 23. Second, although the differentiation in motor vehicle taxes should not normally be based solely on  $CO_2$  emissions, there is a case for doing just that in the present context. The high priority that is now assigned to policy action on climate change should help to facilitate speedy action on  $CO_2$ -based differentiation more readily than differentiation based on a wider range of externalities.
- 24. Third, although the differentiation of recurrent annual charges, being recurrent, would normally be more likely to induce changes in behaviour, there is a case for relying overwhelmingly, if not exclusively, on differentiated purchase taxes. The immediate visibility of a change in purchase taxes,

publicised by government and industry, is likely to have the more powerful impact over the period in question – the duration of the current recession.

- 25. Hence, this analysis supports the case for concentrating the focus, *temporarily*, on a high level of CO<sub>2</sub>-based differentiation applied to the purchase price a differentiation embracing both taxes and subsidies and rebates at the point of purchase. Thus concentrated, differentiation is likely to have a more than negligible impact and one that is much larger than would otherwise obtain.
- 26. That said, the analysis presented in Chapter 4 concludes with a strong caveat. The context of the current recession permits an expanded scope for CO<sub>2</sub>-based differentiation in motor vehicle taxes. And this is an opportunity that should be seized. But policy geared to this immediate context is not the right policy for the long term. That policy remains as it was: full internalisation. Equally urgent therefore is the need to explore the scope for progress to full internalisation in the post-recession period.

### 2. Taxation policy under conditions of equilibrium

## 2.1 The function of the concept of equilibrium as a guide to policy

- 27. In the economic literature on the design of taxation policy, or at least in much of the literature designed for governments of the member countries of the OECD and the OECD itself, it is customary to begin with an analysis of what is required of policy under conditions of *equilibrium*. Equilibrium assumes a given set of initial endowments, including the factors of production and the technology to combine them, and entails the full employment of these available factors, with efficient use of the available technology, and a market-clearing balance in product and factor markets.
- 28. But since the present analysis has been prepared under evident conditions of *disequilibrium* and is designed in part to address these conditions of disequilibrium, it would be as well to begin by restating briefly why the concept of equilibrium is indeed the appropriate starting point for this analysis.
- 29. From Walras (1877) to Arrow and Debreu (1954), the major economists in the neo-classical theoretical tradition have developed models of an economy-wide competitive equilibrium in which the decisions of producers and consumers generate an *optimal* allocation of resources that maximises the welfare of society relative to its initial endowments. In this equilibrium, the price of each good is equal to its marginal social cost. It is this equality of price to marginal social cost that delivers the welfare optimum. For when prices rise either above this point or below it, the gain to the winner the producer in the former case, the consumer in the latter is less than the loss to the rest of society.
- 30. And from Walras to Arrow and Debreu, the major neo-classical economists have developed these models in the full knowledge that real-world economies do not, and cannot, conform precisely to such models. They do not conform because, for a variety of identifiable reasons, real-world markets can and do fail, and fail significantly. And they cannot conform precisely because, in a world of incomplete information and uncertainty, all real-world markets will fail to at least some extent if only because the attainment of the welfare optimum in any one market requires that it be attained simultaneously in all markets, including all forward markets.
- 31. In short, the concept of an optimal equilibrium is not meant to be a description of the real world as it is. Rather, as was argued in Roy (2008), at the recent OECD Global Forum on Sustainable Development, it is best understood as a heuristic device and a guide to policy. Thus understood, it can discover and specify for science the meaning and measure of social welfare and the circumstances in which markets, unaided, cannot deliver the welfare optimum and can discover and specify for governments when and how to intervene in order to move markets from a *sub-optimal* equilibrium closer to the welfare-optimal equilibrium.

- 32. The point cannot be emphasised too strongly. Economic theory does *not* assume that markets will deliver an optimal equilibrium independently of government intervention. On the contrary, it argues that an optimal equilibrium, insofar as it is feasible, requires government intervention.
- 33. Importantly, when markets deliver an equilibrium in which prices are significantly at variance with marginal social costs, economic theory calls on government to intervene, including by means of taxation policy, to bring prices back into line with marginal social costs.<sup>3</sup>
- 34. Markets, unaided, can sometimes deliver not only a sub-optimal equilibrium but also conditions of disequilibrium. Two cases especially are relevant to the present discussion.
- 35. The first is a by-product of one of the great achievements of the modern market economy. A distinguishing feature of the modern era from the time of the Industrial Revolution has been a more or less continuous development of the factors of production, of land, labour and capital, of the technology to combine them, and of their actual combinations, resulting in a more or less continuous progress in the development of human productivity. And, as was argued forcefully in Schumpeter (1911) and again in Schumpeter (1942) development is necessarily a disturbance of equilibrium, with major innovations disrupting an existing equilibrium until their diffusion establishes a new and higher equilibrium.
- 36. Government policy on taxation, competition, trade and industry, education and skills needs to be mindful of this insight. Nonetheless, sound policy cannot be based on the assumption that the economy is in a perpetual state of innovative disequilibrium. For the better part of any decade or period of greater length, the process of development proceeds by incremental change, punctuated by waves of innovation and diffusion. Moreover, insofar as government is properly concerned not with the rate of innovation *per se* but with its rapid and widespread diffusion, so as to generate higher levels of economy-wide productivity and social welfare, the concept of an optimal equilibrium remains an essential guide to policy.
- 37. The second case of disequilibrium is one of the great failures of the market economy, from its pre-industrial origins to the present day: the case of recessions. As observed by many through the last several centuries and as argued most seminally in Keynes (1936): at regular intervals, aggregate demand by private-sector producers and consumers can be insufficient to absorb the supply of investment and consumer goods, leading to a contraction in output, which in turn leads to a further contraction in demand, and a continuing downward spiral toward an equilibrium at far below the level of full employment.
- 38. Government fiscal and monetary policy has indeed been mindful of this insight in the period since the Second World War which is perhaps one reason why we have not experienced an actual contraction in world GDP for the last 60 years. The scale of the present recession has quite rightly triggered an intensive debate on the adequacy of policy. Nonetheless, sound policy cannot be based on the assumption that the macro-economy is permanently in a state of recessionary disequilibrium or at imminent risk of it. Throughout the post-war period, for the better part of any decade or period of greater length, the condition of the macro-economy of most countries, and of the world as a whole, has been one of growth, not recession. Moreover, insofar as government is properly concerned both with minimising the risk of disequilibrium in the period of growth and with responding to its outbreak by means of *counter-cyclical* intervention, here too the concept of an optimal equilibrium remains an essential guide to policy.
- 39. Hence, the present discussion also begins with an analysis grounded in conditions of equilibrium.

For a fuller statement of the argument and its application to the transport sector, see Roy (2008) and the extensive literature cited therein. The present paper focuses on a relatively narrow component of this application.

## 2.2 Principles for efficient taxation

- 40. There obtains today a wide-ranging consensus both on the theoretical principles for efficient taxation, that is, taxation aimed at achieving a welfare-optimal outcome, and on the appropriate application of these principles to the transport sector. In the recent past, European Transport Ministers have twice been presented with, and twice endorsed, a full statement of these principles: in ECMT (2001) and ECMT (2003). Hence, it is possible to restate these principles here with reasonable confidence.
- 41. In order to fulfil its legitimate functions, all governments must levy taxes to a greater or lesser degree. These functions include, pre-eminently:
  - the provision of public services;
  - the redistribution of incomes in accordance with some norm of equity, and often by means of the provision of additional public services;
  - the correction of market failures, principally by means of internalising the often significant external costs that the market fails to register.
- 42. In the case of the last function, there is indeed a unique answer to the question of how much tax should be levied. Where an externality obtains, the tax should be large enough to realign prices to marginal social costs and thereby internalise the hitherto unpaid external costs. Of course, the aim here is not raise revenues *per se*, but rather to induce the requisite behavioural changes by obliging producers and consumers to face the true costs of their choices. Hence, in the new equilibrium, marginal social costs will be lower than in the old; and it is the new level of costs to which the new level of prices needs to be aligned. Nonetheless, since the taxes required to correct externalities are by definition welfare-enhancing, the answer to the question entails the fullest use of accurately calculated externality taxes.
- 43. In the case of the first two functions, which may be grouped together as general government functions, there is no settled consensus on precisely how much tax should be levied. Rather, the theoretical principle involved may be stated thus. Assuming that the aim of delivering general government functions is to raise rather than reduce overall social welfare, and given that many taxes do reduce welfare to a lesser or greater extent, governments should seek to raise the revenues required to finance these functions in ways that are least damaging to welfare. This entails the minimal use of the most welfare-reducing taxes.
- 44. Modified only slightly from its original presentation in ECMT (2003), we can derive a tripartite classification of the full range of taxes as follows:
  - Taxes that are welfare-enhancing taxes on externalities;
  - Taxes that are welfare-neutral taxes on economic rents, in particular, the sizeable rents available from the ownership of scarce land and other natural resources;
  - Taxes that are welfare-reducing to a lesser or greater extent broad-based taxes on final consumption, which have a relatively low negative impact on welfare; taxes on capital and labour incomes, which can impact more aggressively on individual incentives, income generation and hence social welfare; and, *a fortiori*, differential taxes on products and production inputs (intermediate goods) which have the effect of distorting relative prices.
- 45. In relation to this classification, the principles for efficient taxation therefore mandate the minimal use of the most welfare-reducing taxes, in particular, taxes that distort relative prices; the fullest

See Chapter 1 of ECMT (2001) and Chapter 1 of ECMT (2003), respectively.

use of welfare-enhancing taxes on externalities and welfare-neutral taxes on economic rents; and, with it, the use of revenues from all taxes that do not reduce welfare to reduce reliance on all taxes that do.

#### 2.3 The prioritisation of externality taxes levied at the point of use

- 46. The transport sector is a sector that offers abundant scope for the use of welfare-enhancing taxes. Transport, and in particular the road sub-sector, generates significant external costs. These include accidents, congestion and hence delays imposed by road users on other users, local pollution effects caused by a range of emissions from motor vehicles, and the immediate subject of the present paper a major contribution to global pollution caused by motor vehicles' CO<sub>2</sub> emissions. At the same time, several and various taxes are in fact levied on this sector, which prompts the need for a programme of "reforming transport taxes", as embodied in the title of ECMT (2003).
- 47. At first sight, however, it may appear that the application of our theoretical first principles to the transport sector must entail their immediate and radical modification in at least one respect. In this sector, the range of products ("clean" versus "dirty" cars) and production inputs ("clean" versus "dirty" fuels) appears to "embody" a wide range of external costs. Hence, the application of differential taxes to these products and production inputs is, arguably, not a distortion of relative prices but rather a correction to a pre-existing distortion.
- 48. This appearance is misleading. The recommendations and strictures of these principles remain relevant. They can be applied to the problem at hand with little modification. And so they should be.
- 49. Transport's external costs, including its  $CO_2$  emissions, occur not at the point of *purchase* of the vehicle, or even the fuel, but at the point of *use*. It is the trip that imposes external costs, by virtue of the distance driven and the conditions under which it is driven, and it is the trip itself that needs to be priced correctly that is, taxed differentially so as to align its price with the marginal social cost that it imposes.
- 50. Now the quantum of fuel consumed is a good proxy for the quantum of CO<sub>2</sub> emissions generated. Hence, taxes on fuel do indeed constitute a good instrument to tackle CO<sub>2</sub> emissions.<sup>5</sup> But neither the type of vehicle nor the type of fuel, *considered independently of the distance driven and the conditions under which it is driven*, is a good proxy for the quantitative level of the external costs of CO<sub>2</sub> emissions or any other external cost. Hence, the two principal instruments required to achieve full internalisation of external costs are *fuel taxes* to target CO<sub>2</sub> emissions, and *distance charges*, differentiated by vehicle type, route of travel and time-of-day, to target other significant external costs, including local pollution and congestion.
- 51. A second reason for prioritising the point of use over the point of purchase is that, in any given year, the latter affects a relatively small segment of the market. New vehicles represent less than 10% of the total vehicle fleet in OECD member countries and no more than around 7% in the most mature markets, in the US and Canada. In the normal course of events, an alteration of the consumer's choice in the purchase of a new vehicle, without any alteration in the pattern of use, will have a relatively limited impact on the quantum of  $CO_2$  emissions or the incidence of other external costs.
- 52. Over the longer term, it is true that the production and purchase of cleaner and more fuel-efficient vehicles will have a larger impact. In several OECD member countries, and especially so in Europe and Japan, regulation and voluntary industry agreements have proved to be effective in delivering higher standards of emissions reductions and fuel efficiency in the production of new vehicles.<sup>7</sup> But it does not

As ECMT (2006) reports: "They have the highest impact of any of the reported CO<sub>2</sub> abatement measures."

See Gordon (2005) and Figure 16, *ibid*.

<sup>7</sup> Inter alia, see ibid.

follow that differentiated taxes at the point of purchase will be more effective than differentiated taxes at the point of use in prompting the purchase of the relatively cleanest and most fuel-efficient vehicles.

- 53. The deductive reasoning here is simple. In most cases, a correctly calculated externality tax on the purchase price of a new vehicle is likely to be a small fraction of that purchase price whereas a correctly calculated externality tax at the point of use is likely to be a relatively larger fraction of the price of use. Hence, the latter is likely to have a greater impact on the consumer's decision than the former.
- Relevant here is the evidence from Switzerland, where the introduction of the distance-charging scheme for heavy goods vehicles prompted a more thorough-going renewal of the vehicle fleet than that achieved elsewhere by means of differentiated taxes on the purchase price. To be sure, the criteria for purchase decisions in passenger road transport are not identical to those in commercial road transport. Hence, the outcomes of the Swiss Heavy Vehicle Fee need to be interpreted with care. Nonetheless, commercial road transport is a critically important part of the problem under discussion; and for commercial road transport, the Swiss experience is indeed relevant.
- 55. On the other hand, in regard to passenger road transport, there is evidence to suggest that the average motorist tends to under-value fuel economy savings. Greene, Patterson, Singh and Li (2005) report that consumers tend to count only the first 3 years of fuel savings and remark: "This would understate the true economic value of fuel savings over the typical 14-year life of a vehicle by about 60 percent." And if consumers' myopia in respect of fuel-economy savings is indeed a separate and distinct market failure, then it does suggest that differentially taxing the purchase price of vehicles rather than taxing the price of fuel may be a more effective instrument in correcting this one particular problem.
- 56. The evidence on this last point is not conclusive. It is drawn largely from data from the US rather than across the world. And the phenomenon itself remains in need of explanation. Moreover, the existence of this market failure does not necessarily entail the use of taxation as the sole means of addressing it mandatory information made available at the point of purchase is an obvious alternative. Nonetheless, consumers' myopia, insofar as it is a distinct problem, is indeed a counter-argument to the prioritisation of externality taxes at the point of use.
- More fundamentally, however, it needs to be emphasised that the aim of internalisation is to reduce CO<sub>2</sub> emissions and other external costs, rather than induce the purchase of cleaner vehicles *per se*. And internalisation at the point of use can achieve this effect simply by reducing the sum of vehicle miles/kilometres driven as a result of road users choosing to reduce their trips in response to the new price, to plan better, to car-share, and to mode-shift. Relevant here is the evidence from London, where the Central London Congestion Charge delivered a *circa* 20% reduction in CO<sub>2</sub> emissions in line with a *circa* 20% reduction in traffic.
- 58. The abiding importance of this "simple" means of reducing  $CO_2$  emissions reducing traffic! is underlined by the sheer difficulty in achieving significant reductions in  $CO_2$  emissions in the transport sector through new technology, embodied in new vehicles and fuels that is to say, significant at the economy-wide level. Until and unless we arrive at zero emissions in the primary energy source used, even

<sup>9</sup> See Greene, Patterson, Singh and Li (2005).

<sup>8</sup> See ARE (2004).

Indeed, there is some evidence from Europe to suggest that consumers' propensity to calculate life-cycle costs, and hence the effectiveness of fuel taxes and other taxes at the point of use, is stronger than credited in some of the recent literature: see Vance and Mehling (2009).

<sup>&</sup>lt;sup>11</sup> See TfL (2006).

the most ambitious conversions to the most ambitious technologies will have a relatively limited impact. Thus, according to Pike's (2009) estimate for the UK, "if all internal combustion engines were replaced" and electric cars came to constitute 100% of the car fleet, then, given the current fuel mix for generating electricity, car emissions would fall by a seventh, and the contribution of cars to the UK's CO<sub>2</sub> emissions would fall from 12% of the total to 10%. And to achieve this outcome would require a subsidy of around GBP 150 billion – a sum which is "comparable with the cost of replacing all our electric generating capacity with photovoltaic solar cells ... and reducing our carbon footprint by a third." <sup>12</sup>

- 59. Finally, the general presumption against differential taxes on products and production inputs derived from theoretical first principles retains a modified relevance. In the presence of externalities, the stricture cannot be absolute: it is not improper to apply differential taxes to "clean" and "dirty" vehicles and fuels at the point of purchase (even if it is more efficacious to apply differential taxes at the point of use). But there are serious risks in attempting to "pick winners" and governments are well-advised to proceed with caution.
- 60. Thus, even when a particular technology seems to be superior to its current alternatives, its widespread adoption as a result of government support can lead *willeth nilleth* to "locking-in" a solution that is inferior to one that becomes available at a later date in the not too distant future. As OECD (2005) observes, the history of environmental subsidies and taxes occasions many examples of such an outcome. In contrast, maintaining a level playing field whilst raising the price of entry for all that is, by taxing the externality at the point of use is more likely to encourage the emergence of new and competing solutions without locking-in any one of these.
- 61. Moreover, picking winners carries an important political-economic risk: governments can be led into investing considerable political capital, as well as fiscal support, in sponsoring particular technologies, thereby making the task of unlocking what proves to be an inferior solution doubly difficult. The previous US Administration's sponsorship of biofuels, with its far-reaching consequences for US agriculture and international trade, is perhaps the most salient example. This is one more reason why governments are best advised to avoid picking winners. As the *Financial Times* puts it in a recent editorial: "The umpire should not choose sides".<sup>13</sup>

## 2.4 Motor vehicle taxes at full internalisation and in the path toward it

62. On the basis of the principles and sector-specific considerations noted above – and following upon the massive research effort undertaken in the recent past to measure and target external costs to a high degree of accuracy – governments in several OECD member-countries are now agreed on the full internalisation of the external costs of the transport sector as a long-term policy objective.

See Pike (2009). See also ECMT (2006) for a wide-ranging review of the various policies aimed at achieving reductions in transport-sector CO<sub>2</sub> emissions – and a critique of the poorly cost-effective policies that have been adopted in several instances. It should be noted here that Pike's (2009) calculation is based without reference to the European Union's "cap-and-trade" emissions trading system (ETS). The operation of the ETS, with its cap on total CO<sub>2</sub> emissions, complicates the story. It means *inter alia* that, for any given period over which the cap remains unchanged, an increase in electricity use as a result of new electric vehicles will not lead to an increase in overall emissions – just as a reduction in electricity use as a result of greater energy efficiency will not lead to a reduction in overall emissions, either. But Pike's principal argument stands – and it is the same argument as that made in ECMT (2006) – the pursuit of high-tech, high-cost efforts to reduce transport-sector CO<sub>2</sub> emissions is most certainly not a cost-effective means of achieving economy-wide reductions in CO<sub>2</sub> emissions.

See FT (2009b). The editorial continues: "The UK should adopt a carbon price. That way, it need not adopt a technology."

- 63. The commitment to this objective is perhaps most explicit in Europe, though it is by no means confined to Europe. Here, as early as 1998, the European Commission recommended to the member states of the European Union the principle of marginal social cost pricing as a guide to transport pricing policy.<sup>14</sup> In 2003, the Transport Ministers of the ECMT member countries endorsed the long-term aim of instituting marginal social cost pricing. Importantly, they also agreed that, in the interim, changes "should always move in the direction of improving efficiency." <sup>15</sup> In 2004, the UK Government announced its intention to commence preparatory work for a future national road pricing system<sup>16</sup> – an intention confirmed, albeit modified in respect of timetables and transition paths, in successive policy statements on "sustainable transport" in 2007 and 2008. 17 In 2005, the Netherlands Government announced a provisional decision to introduce nation-wide kilometre charging for road use<sup>18</sup> – a decision confirmed in 2007.
- Given the scale of the problem of external costs, there are, unsurprisingly, sizeable gains available from fully correcting it. ECMT (2003), modelling for the year 2000, reported welfare gains of EUR 13 billion<sup>19</sup>, EUR 10 billion and EUR 9 billion per year for Britain, France and Germany, respectively. And as external costs rise over time – in particular, the external costs of congestion and CO<sub>2</sub> emissions – so too do the gains from full internalisation. Thus, modelling for the UK for the year 2025, with a carbon cost of GBP 95 per tonne, Eddington (2006) reported a welfare gain of GBP 28 billion per year.
- 65. The point, however, is that these gains are available only from full internalisation.
- 66. Now full internalisation entails replacing all existing taxes and charges to which the transport sector is a legatee and *substituting* two new and accurately calculated externality taxes:
  - Recalibrated fuel taxes to target CO<sub>2</sub> emissions, and designed to reflect the social cost of carbon;
  - Distance charges, differentiated by vehicle type, route of travel and time-of-day, to target other significant external costs, including local pollution and congestion, and designed to realign the price of each trip with its marginal social cost as accurately as possible.
- 67. If any or all of these existing taxes were to be retained, the inevitable result would be either a failure to make maximum use of the most welfare-enhancing taxes or else an over-charging of road users (assuming that such over-charging were indeed possible). Hence, the welfare gains from full internalisation would not be fully realised.
- It follows that, once external costs have been fully internalised, there is no obvious role for any additional taxes on motor vehicles. The purchase price should of course incorporate the standard rate of

<sup>14</sup> See EC (1998). In preceding and subsequent EC publications - including EC (1995) and EC (2006) - the principle was somewhat more qualified. But its latest communication – EC (2008) – represents a return to the point of departure marked in EC (1998).

<sup>15</sup> ECMT (2003). See also the subsequent re-affirmations of the policy position in ECMT (2004) and ECMT (2005).

<sup>16</sup> See DfT (2004a) and its companion report, DfT (2004b), the feasibility study on national road pricing.

<sup>17</sup> DfT (2007c) and DfT (2008).

<sup>18</sup> See Werther (2006).

More accurately described, the result was GBP 11 billion, converted at the then prevailing exchange rate and reported as EUR 17 billion in ECMT (2003). At the current exchange rate, GBP 11 billion converts to EUR 13 billion.

Value Added Tax (VAT) applied to most other goods and services for the purpose of raising revenues for general government functions – but no more.

- 69. It also follows that, once external costs have been fully internalised, there is no obvious role for the use of CO<sub>2</sub>-based differentiation in motor vehicle taxes for the simple reason that there is no obvious role for *any* additional taxes on motor vehicles.
- 70. In turn, this suggests that the apparent market failure in respect of the average motorist's undervaluation of fuel-economy savings may need to be left unattended in order to protect the integrity of the full internalisation equilibrium. The result might well be imperfect but it would be closer to the optimal than an attempt to solve this one outstanding problem at the cost of sacrificing the coherence and acceptability, and hence the sustainability, of the switch to taxes on use.
- 71. Of course, so long as external costs have not been fully internalised, no existing instrument should be neglected. More precisely, the potential role of each existing tax to serve as an instrument of partial internalisation in the path toward full internalisation should be fully explored.<sup>20</sup>
- Now external costs are not only far from fully internalised, but are in fact increasing. Transport-sector CO<sub>2</sub> emissions have increased steadily in OECD member countries since the last recession in the early 1990s. So too have the external costs of congestion. Fuel taxes have not kept pace with the increase in external costs: they have remained low in historically low-tax countries such as the US and Canada, and since 2000, the year of widespread protests against allegedly "excessive" fuel taxes, increased at a much reduced pace in many of the historically higher-tax countries, such as the larger member states of the European Union. Road pricing, in the form of differentiated distance charges, has yet to be introduced on an extensive scale.
- 73. Hence, the price of road use remains far below its marginal social cost and the gap has increased over time. In the UK, for example, a benchmark study for the Department for Transport in 2001<sup>22</sup> found that, in 1998, the ratio of revenues to marginal social costs for all road transport (cars, trucks, buses), was in the range of 0.36-0.5. Evidence published by the Department for Transport in 2007 found that, in 2004, the ratio of revenues to marginal social costs for car travel was as low as 0.15.<sup>23</sup>
- 74. At the same time, taxes on motor vehicles taxes on the purchase price, over and above the standard rate of VAT, and recurrent annual charges thereafter continue to be levied in all OECD member countries. Historically, these taxes have served as a means of revenue-raising rather than as instruments of internalisation; they were not designed to target external costs or differentiated accordingly.

Per contra, if we were to rule out the option of full internalisation, the exploration would need to take a very different trajectory, beginning with Lipsey and Lancaster's (1956-57) work on "the general theory of second best". Thus, in any given system, if there is a binding constraint that prevents the application of first-best values in some part of the system but not in others, there will be a set of correct departures from first-best values in the unconstrained parts of the system, a set of second-best values, that will deliver a better overall result than the application of the theoretically first-best values in these unconstrained parts. But given that transport taxes are overwhelmingly the prerogative of national governments, it does not make obvious sense for a government to ask which second-best values it should adopt for a given transport tax if it were to choose to constrain itself from adopting first-best values for transport taxation as a whole.

ECMT (2006).

Sansom, Nash, Mackie and Shires (2001).

<sup>&</sup>lt;sup>23</sup> DfT (2007a) and DfT (2007b).

- 75. It follows from first principles and the discussion to date that, so long as external costs have not been fully internalised, and so long as taxes on motor vehicles do continue to be levied, these taxes should be re-calibrated to target external costs and differentiated accordingly.
- 76. Hence, the answer that emerges from this analysis is the same as that advanced in ECMT (2006) and evident in recent policy-initiatives on the part of several OECD member countries: there is indeed a role for differentiation, including CO<sub>2</sub>-based differentiation, in motor vehicle taxes.
- 77. That said, if the question is posed as it should be, not in a policy vacuum but rather in the context of a commitment to full internalisation as a long-term policy objective, the answer that emerges is that the role of CO<sub>2</sub>-based differentiation in motor vehicle taxes as an instrument of internalisation is limited by several considerations.
- As a general rule, taxes levied at the point of use remain the best instrument for targeting external costs and fuel taxes remain the best instrument for targeting CO<sub>2</sub> emissions.<sup>24</sup> It follows that there is no uniquely optimal level of a differentiated tax on motor vehicles. Rather, the answer will vary from country to country and from year to year depending on the initial starting point of the countries in question, on their governments' perception of the temporary constraints to making fuller use of the better instruments, and on the pace at which these constraints can be overcome. Insofar as governments are able to make fuller use of the better instruments, taxes on motor vehicles *per se* should be reduced. Hence, the level of any differentiated tax on motor vehicles, as distinct from the level of differentiation, would also be reduced.
- 79. Second, in a context in which road use remains significantly under-priced, and in relation to which European Transport Ministers have agreed that changes to taxes and charges "should always move in the direction of improving efficiency", it is difficult to justify an aggressive use of *subsidies* for road use, even in its cleaner forms. But the evidence suggests that the greatest benefits from differentiation are obtained not from a system of positive taxes of greater or lesser severity but rather from a system of feebates, combining fees, that is, positive taxes for vehicles below a chosen standard, with rebates, that is, subsidies for vehicles above that standard. Hence, a more comprehensive cost-benefit analysis is likely to recommend a less aggressive use of differentiation than the level which delivers the greatest benefits, considered independently of its own costs and the costs of alternative instruments.
- 80. Third, it is difficult to justify the prescription that the differentiation in motor vehicle taxes should be based *solely* on CO<sub>2</sub> emissions. As noted earlier, the exception to the general rule in favour of taxes levied at the point of use relates to fuel efficiency standards rather than CO<sub>2</sub> emissions: it supports the case for differentiating taxes on the purchase price of vehicles so as to correct the apparent market failure in respect of the average motorist's under-valuation of fuel-economy savings.<sup>27</sup> In regard to CO<sub>2</sub> emissions, taxes on fuel remain the best instrument for tackling this problem and governments are already in possession of this instrument it needs only to be used more aggressively than it is at present.
- 81. Now given the political sensitivities that discourage governments from making more aggressive use of this instrument and given the high priority that is now assigned to policy action on climate change it is appropriate that any differentiation in motor vehicle taxes should include  $CO_2$ -based differentiation. Nonetheless, in the normal course of events, it should not be based solely on  $CO_2$  emissions.

See ECMT (2006) for a restatement of this key point alongside the recommendation to differentiate motor vehicle taxes.

See ECMT (2003).

See Greene, Patterson, Singh and Li (2005).

Once more: see ibid.

- 82. Finally, there remains the question of whether to apply the differentiation to the tax on the purchase price or to the recurrent annual charges thereafter or a mix of both. Here too there is no unique answer. Recurrent annual charges, being recurrent, would normally be more likely to induce changes in behaviour. The user is forced to confront the question annually rather than, say, once in a decade at the point of purchase. On the other hand, the (relatively limited) experience to date of the application of differentiation does not as yet provide a firm empirical foundation for the deductive reasoning in favour of applying differentiation to recurrent annual charges rather than to purchase taxes.
- 83. In view of this, any government choosing to differentiate motor vehicle taxes on the basis of CO<sub>2</sub> emissions is best advised to differentiate both purchase taxes and recurrent annual charges, with the exact mix depending on the initial starting point and then to learn from the evidence of the impact over time, both in its own jurisdiction and in the jurisdiction of others. The plurality of mixes that would follow from such a course would provide a larger evidence-base from which to make an informed choice on the correct mix of differentiated purchase taxes and differentiated recurrent charges.
- 84. To sum up: given that there is no uniquely optimal level of a differentiated tax on motor vehicles, given that the level of differentiation advisable is limited by the need to avoid an aggressive use of rebates whilst road use remains significantly under-priced, given that the differentiation of motor vehicle taxes should not be based solely on CO<sub>2</sub> emissions, and given that governments will need to experiment with a mix of differentiated purchase taxes and differentiated recurrent charges in order to arrive at a position to make an informed choice on the correct mix, it can be concluded that CO<sub>2</sub>-based differentiation in motor vehicle taxes has a relatively limited role to play as an instrument of internalisation.
- 85. This is the conclusion that follows from an analysis grounded in conditions of equilibrium. The point, however, is that we are *not* living in conditions of equilibrium. Therefore, the analysis must now turn to the nature of the current disequilibrium and its implications for taxation.

#### 3. The current global recession

#### 3.1 Disequilibrium – and intervention – in the macro-economy

86. The current global recession is likely to be "by far" the most severe global recession in the postwar period. Both the OECD and the IMF forecast a contraction in world GDP for the year 2009 – the first such contraction in the last 60 years.

87. For the OECD member countries, the OECD forecasts a contraction of 4.3%; for the IMF-defined group of "advanced economies", the IMF forecasts a contraction of 3.8%. And for both groups of countries, the OECD and the IMF record a contraction of over 7% for the final quarter of 2008 and predict much the same for the first quarter of 2009. These numbers and all other relevant indicators dwarf those from the previous major recessions of the post-war period, the recession of 1975 and the recessions of the early 1980s and the early 1990s.

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See in particular OECD (2009a) and IMF (2009c). These two reports, published in March 2009 and April 2009 respectively, form the main evidence base for the macro-economic assumptions employed in the present paper. But see also IMF's World Economic Outlook (WEO) reports and updates from April 2008 to April 2009 as well as its Staff Note for the G20 Ministerial meeting in March 2009 – IMF (2008a), IMF (2008b), IMF (2009a) and IMF (2009b) – as a testament to the dramatic deterioration from quarter to quarter, with each report being obliged to revise downward the forecasts of its predecessor. Finally, see the lead editorial in the 23 April issue of *The Economist* newspaper – Economist (2009e) – which provides a useful antidote to some of the more complacent commentaries that have surfaced in the second quarter of 2009.

- 88. Originating in late 2007, in the world's leading financial centres, the US and the UK, and as a multiple crisis in the financial sector (a collapse in interbank trust and interbank lending, in liquidity, in solvency, and in banks' ability and willingness to lend to firms and households), the crisis spread from the financial sector to the wider economy, and from the US and the UK to the world as a whole, in 2008.
- 89. By late 2008, most advanced economies were in the grip of recession, with its attendant symptoms, including inter alia a severe contraction in aggregate demand and output, more so in some sectors than others, escalating losses for firms in the worst-hit sectors and an increasing risk of bankruptcy. magnified by the contraction in credit. Positive growth is unlikely to resume until the latter half of 2010. For the full year 2010, the OECD forecasts growth of 1.1% for its member countries; for the IMF-defined advanced economies, the IMF forecasts zero growth.
- 90. Three features of the current recession are especially relevant for the present discussion.
- 91. First, the crisis has prompted an unprecedented level of counter-cyclical intervention by governments around the world – what the *Economist* calls "the most ambitious policy response in history". <sup>29</sup> Indeed, it is "thanks to the quality and intensity of government policies that are currently being undertaken" that the OECD remains confident that the "great recession" of today will not become a repeat of the Great Depression of the 1930s.<sup>30</sup>
- Apart from committing well over a trillion dollars in interventions in the financial sector, governments have injected several trillions of dollars into the macro-economy by means of both monetary and fiscal stimuli. Central banks in several major advanced economies, including the US, Canada, the UK and Japan, have reduced policy interest rates to near-zero – and then turned to unconventional measures to expand the money supply. Most national governments have expanded their budget deficits, with some concentrating on giving free play to the "automatic stabilisers" of falling tax revenues and increased social security payments and others on new discretionary spending. The aim, everywhere, is to counter the cycle: to arrest the contraction in demand and output and prevent widespread bankruptcies.
- Such intervention also carries significant consequences for the macro-economy and for fiscal policy in the post-recession period. The exceptional monetary policy now being pursued risks triggering higher inflation over the medium term: both monetary and fiscal policy will need to be tightened in order to contain the risk of inflation. And fiscal policy will need to be tightened in any case. Government budget deficits in the OECD world are forecast to rise to 9% of GDP in 2010 and public debt to almost 100%. Of course, it can be argued that advanced economies can afford to maintain public debt at 100% of GDP: indeed, one of the consequences of the current crisis may well be an enduring shift in investor preferences toward government bonds as an asset class. But to stabilise public debt, governments will need to reduce their budget deficits.
- 94. It follows that, in each country, policy in any particular field needs to be mindful of this overall thrust of government policy in response to the recession – and mindful too of the need to attend to its consequences in the post-recession period.
- Second, and partly because of its origins in the finance sector, the recession has taken a disproportionately heavy toll on manufacturing firms, manufacturing exports and the leading manufacturing-exporting countries of the world, including especially Japan and Germany, as well as non-OECD Asia. The severe contraction in credit, including trade finance, has led firms to cut output at a faster pace than the fall in demand by means of running down inventories. International trade in manufactured

OECD (2009a).

<sup>29</sup> Economist (2009e).

goods has registered a decline unprecedented in the post-war period. The Japanese economy is forecast to contract by more than 6% in 2009 and the Germany economy by more than 5% – a greater contraction than for the OECD group as a whole.

- 96. And, as is detailed below, one of the manufacturing industries hardest hit in this recession, partly because of its own pre-existing problems, is indeed the motor vehicle industry.
- 97. Third, the response of governments to the current recession has included not only counter-cyclical intervention on a broad front to support *aggregate* demand and output, but also direct and detailed intervention to support demand and output in selected *specific* sectors, including motor vehicles. As is explored below, such intervention has a direct and detailed impact on the design of taxes on motor vehicles.

#### 3.2 Disequilibrium – and intervention – in the motor vehicle industry

- 98. The global motor vehicle industry is in the grip of a severe crisis.<sup>31</sup>
- 99. Prior to government aid and intervention, sales and production volumes of cars and commercial vehicles were collapsing in all major markets. In the UK, where intervention occurred relatively late in the day (much of it not until the Budget announced in late April 2009), car production fell by 57% in the first quarter of 2009 compared to the first quarter of 2008. Across the world, major and minor firms manufacturers and suppliers and dealers have experienced escalating losses, an increasing risk of bankruptcy, and the preparation of bankruptcy proceedings if not bankruptcy itself. These include two of the largest and most long-established firms in the industry: General Motors and Chrysler. Tens of thousands of workers have lost employment, tens of thousands more are on reduced hours.
- 100. To be sure, the industry was beset by severe pre-existing problems, with evidence of global overcapacity, rapid changes in market shares, and several rounds of mergers and de-mergers: it was not in a stable equilibrium. Nonetheless, given the extent and rapidity of its decline in the latter half of 2008, and given its abiding importance in employment as well as in output and exports, governments in most major vehicle manufacturing countries have felt compelled to choose the route of direct intervention to support the demand for, and the output of, motor vehicles, and to forestall widespread and disorderly bankruptcies.
- 101. To date, government intervention has taken the form of direct grants to manufacturers including more than USD 20 billion in the first tranche of aid to General Motors and Chrysler announced in January 2009 as well as specific measures aimed at increasing demand for their products, including in particular "car scrappage" schemes that provide consumers with rebates for trading in old cars for new.
- 102. In the US, and also albeit to a lesser extent in Canada, intervention is also likely to include government ownership of major manufacturing firms, with the US Government now set to take a majority stake in General Motors and a minority stake in Chrysler. In any case, the US Government is now committed to participating directly, albeit temporarily, in the imminent restructuring of the industry in its mergers and de-mergers, in decisions on capacity reduction and closures, and in the business plans of individual firms, including their product strategies and choice of vehicle types for future development and production.

(2009) on the US.

The *Economist* and the *Financial Times* have reported regularly and accurately on the unfolding crisis and on government responses to it. See *inter alia* Economist (2009a), Economist (2009b) and Economist (2009c) for reports on the US, the UK and Germany, respectively, and the following articles in the *Financial Times*: Reed (2009) on the UK, Smith and Johnson (2009) on Germany, and Simon and Reed

- 103. In Europe, car scrappage schemes seem to have become the instrument of choice in government interventions to support the industry. The German scheme, offering a rebate of 2,500 EUR and budgeted at 1.5 billion EUR, was set to expire at the end of May this year. But the take-up was far greater than expected car sales in Germany rose by 40% in March 2009 compared to March 2008. The scheme has now been extended to the end of the year and its budget has been increased to 5 billion EUR.
- 104. Schemes of this type have now been adopted by the five largest EU member states, most recently the UK. The British scheme offers a rebate of GBP 2,000, of which half is to be funded by government and half by industry, at a cost to government of GBP 300 million. But it cannot be ruled out that the British scheme too will be extended and expanded in due course.
- 105. The potential of such schemes to generate inter- and intra-sectoral distortions has been noted with concern by the OECD and other international organisations and by responsible economic commentators outside government.<sup>32</sup> For whether or not they do succeed in augmenting aggregate demand, these schemes necessarily displace demand from other products to cars and from some car firms to others.
- 106. For the purpose of the present discussion, however, car scrappage and other forms of intervention to support the industry that have already been implemented must be accepted as data. The relevant point is that the industry is now in the process of moving from one equilibrium to another with government support, but quite independently of any government intervention aimed at the correction of externalities. The task of correcting externalities must now proceed on the basis of new facts on the ground.

#### 4. Taxation policy under conditions of equilibrium

#### 4.1 Avoiding pro-cyclical impacts

- 107. Taxation policy under conditions of disequilibrium must differ in at least some respects from what theoretical first principles would recommend under conditions of equilibrium if only because the welfare impact of a given tax change will not be identical in the two contexts.
- 108. Thus, as a matter of principle, it is best to avoid measures that are *pro-cyclical* in their impact: that is, measures that reduce aggregate demand during the duration of a recession as well as during the first, uncertain phase of the recovery from it.
- 109. Equally, as a matter of principle, it is best to avoid measures that augment aggregate demand in the full upswing of the recovery. Indeed, the period of recovery may require specific and additional measures to moderate demand.
- 110. As a matter of practice, it may in any case prove impossible for government decision-makers in any particular field to implement pro-cyclical measures when the overall thrust of government policy is strongly counter-cyclical.
- 111. Each of these considerations applies *a fortiori* in the context of the current recession. The severity of the recession makes it inappropriate to implement internalisation policies that risk reducing aggregate demand. In any case, the unprecedented level of counter-cyclical intervention now being undertaken makes it highly unlikely that any such measure would be permitted. Equally, internalisation measures that serve to moderate demand will be especially welcome in the period of recovery from this particular recession when

See OECD (2009a). The UK's *Financial Times*, citing Bastiat, does not hesitate to remind the Government that "there is no economic problem to which the solution is smashing a window" – see FT (2009a).

fiscal policy will need to be tightened substantially – both in order to contain the risk of inflation and in order to stabilise public debt at a sustainable level.

- Now the evidence on this point is clear; as a general rule, full internalisation is likely to entail a 112. net increase in government revenues, and a corresponding reduction in consumers' disposable incomes, as road users are charged fully for the external costs imposed by their activity. Indeed, although the aim here is to maximise welfare rather than to maximise revenues, the result is likely to be strongly revenuepositive. And since the evidence is drawn largely from those countries that already impose relatively high levels of taxation on road transport – in particular, the larger member states of the EU – the result is likely to apply a fortiori to those countries that impose relatively lower levels of taxation, including especially the United States.<sup>33</sup>
- 113. In the UK, for example, modelling by the Department of Transport in 2004 reported a revenue gain of GBP 9 billion per year from a comprehensive national road pricing scheme if prices were designed to maximise welfare - pari passu with a welfare gain of GBP 10-12 billion per year. Compared like for like, these results closely matched the equivalent estimates for the UK reported in ECMT (2003).<sup>34</sup> Modelling today with a higher social cost of carbon would yield an even higher level of revenue gain, as well as a higher level of welfare gain.
- 114. Irrespective of the exact numbers, the argument applies not only to full internalisation, but also to all major steps toward it. These entail making fuller use of taxes on externalities levied at the point of use: urban congestion charging such as in London and Stockholm, distance charging for heavy goods vehicles such as in Switzerland, or an absolute increase in the level of fuel taxes (ahead of combining re-calibrated fuel taxes with fully differentiated distance charging). All such major steps are likely to raise the price of road use – and inadvertently reduce disposable incomes and aggregate demand.<sup>35</sup>
- 115. Hence, it would be doubly advantageous to timetable the next major steps toward full internalisation for the period of the recovery rather than the period of the recession. It would avoid the risk of reducing aggregate demand today when demand needs to be supported; and it would help to moderate demand when moderation will be needed.
- 116. Moreover, such steps would not only help to moderate demand but also, and more specifically, generate new streams of revenues at a time when all OECD governments will be confronted with the need

See DfT (2004b) and ECMT (2003), respectively, and see Roy (2007) for a comparison of these two sets of estimates as well as others.

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will not be offset by an increase in demand resulting from a reduction in other taxes in sufficient time to prevent a reduction in aggregate demand. This is why the massive increase in spending in the current period is being funded not by tax increases of any kind but rather by means of increased borrowing.

<sup>33</sup> There are some exceptions to the rule. ECMT (2003) reported such an exception in the case of Finland where modelled results for full marginal social cost pricing show a small reduction in revenues relative to the current situation. Doubtless, one or two other OECD member-countries will exhibit a Finland-like scenario. But these exceptions do not disprove the rule.

To be sure, this increase in taxes on externalities could be offset by equivalent reductions in other taxes (or equivalent increases in spending). Indeed, under normal conditions, and other things being equal, internalisation should permit precisely such a switch from welfare-reducing taxes to welfare-increasing taxes, with an ultimately neutral effect on aggregate demand. Under conditions of disequilibrium, however, there is a clear risk that the immediate reduction in demand resulting from an increase in externality taxes

to raise additional revenues – assuming that no government will want to rely exclusively on reductions to public spending in order to achieve the requisite reductions in budget deficits and public debt.<sup>36</sup>

- 117. In practice, acting on the argument above would not entail any delay in the progress toward full internalisation. Major steps in this programme tend to be the outcome of a more or less lengthy gestation period. And the next major steps in the calendar such as the proposed introduction of road pricing in the Netherlands<sup>37</sup> are scheduled for a date well beyond the anticipated recovery from the current recession.
- 118. Rather, what the argument does suggest is that there is, temporarily, an expanded scope for the use of instruments that need not be pro-cyclical in their impact. The task at hand is to achieve some reduction in external costs to "move in the direction of improving efficiency" but without risking a reduction in aggregate demand. The differentiation of existing motor vehicle taxes in a revenue-neutral or even revenue-negative form can do just that.

### 4.2 Amending the current intervention in the motor vehicle industry

- 119. If the overall thrust of the current intervention in the macro-economy supports the case for a greater use of differentiated taxes on motor vehicles as an instrument of internalisation, the current intervention in the motor vehicle industry makes the case all the more compelling.
- 120. There are two quite separate issues that need to be addressed here.
- 121. First, there is an urgent need to amend the current intervention in the motor vehicle industry so as to ensure that the long-term commitment to reducing external costs is not vitiated by short-term actions aimed simply at increasing demand for motor vehicles.
- 122. The current intervention, at least in part, *is* aimed simply at increasing demand for motor vehicles. This is particularly true of the car scrappage schemes that are now in operation in several OECD member-countries. As noted earlier, such schemes may or may not succeed in augmenting aggregate demand. But they will necessarily displace demand from other products to cars.
- 123. Now this induced increase in the demand for cars does not automatically result in either an increase or a reduction in the incidence of external costs. That result will depend on several factors, including the vehicle type chosen as well as the distance driven and the conditions under which it is driven. But there is good reason to suppose that the result is unlikely be a net reduction in external costs.
- 124. The reasoning here is as follows. If there are no criteria required for the rebate other than the age of the old car which is traded in against the new neither CO<sub>2</sub> emission standards nor any other emission standards nor fuel efficiency nor any other criteria there is no reason to suppose that the new cars purchased will always be environmentally superior to the old. On average, new cars are but this is largely the result of regulation and voluntary industry agreements rather than consumers' preferences. And since there are several new vehicle types that are not environmentally superior, consumers' preferences, unguided, will not necessarily change the composition of the fleet in the right direction. At the same time,

In the UK, the Budget announced in April 2009 – see HMT (2009) – provides an early warning on the consequences of relying on spending reductions rather than revenue increases. Given the political difficulties in achieving deep and sustained reductions in current spending, the Government proposes to reduce *by half* the level of capital spending in the post-recession period – a solution that is deeply damaging to the long-term performance of the economy, and one which the Government's own fiscal rules were designed to prevent. On this point, see also Economist (2009d).

See Werther (2006). On present plans, the scheme is scheduled to be introduced in 2013.

the rebate provides a strong incentive for the owners of old cars to keep driving rather than to switch from the old car to public transport – consumers are unlikely to purchase the new asset only to keep it idle.

- 125. It is therefore difficult to see why such a rebate should be called an "environment bonus" as it is in Germany. In the UK, the Government acknowledged that its scheme would have only "a neutral or modestly positive environmental impact". <sup>38</sup> But it is entirely possible that the impact will be negative.
- 126. In view of this, and on the safe assumption that the existing car scrappage schemes will continue to be extended and expanded, and new schemes adopted elsewhere, there is a strong case for amending the form of the rebate from an undifferentiated rebate aimed simply at increasing demand for motor vehicles to a differentiated rebate, aimed at altering the composition of demand in favour of environmentally superior vehicles. Just the same principle could be applied to other forms of government intervention, besides car scrappage schemes, that are also aimed simply at increasing demand for motor vehicles.
- 127. The second issue is more complex. Partly as a function of actions to increase demand, but more so as a result of more direct and detailed interventions, governments have now become actors in the industry's movement from one equilibrium to another. This is most evident in the US, where the crisis is likely to lead to the part-nationalisation of General Motors and Chrysler. But it is also evident in Europe by virtue of the presence here of General Motors Europe, if nothing else. And the globalised nature of the industry makes it likely that governments across the OECD world will also become actors in this process.
- 128. Given this, government has a responsibility to ensure that the new equilibrium delivers a better result, for the environment and for society, than the old. More precisely, government must now assume a specific responsibility for the new equilibrium position of this specific industry as distinct from a general responsibility to move the transport sector, and the wider economy, to a more optimal equilibrium.
- 129. This entails setting aside, albeit temporarily, several of the recommendations and strictures identified in the analysis in Chapter 2. Thus, government cannot be indifferent to the industry's rate of innovation or specific innovations, concentrating solely on the general responsibility to ensure the diffusion of innovations so as to generate higher levels of economy-wide productivity and social welfare. Rather, it becomes, in effect, a co-decision maker in several relevant areas, including the selection of vehicle types for future development and production. Nor can it now refrain from "picking winners". Rather, it becomes responsible for the success of the decisions which it has backed with taxpayers' funds.
- 130. It also entails, as is detailed below, setting aside temporarily several of the recommendations and strictures that limit the scope for the use for differentiated taxes on motor vehicles.

#### 4.3 The expanded scope for $CO_2$ -based differentiation in motor vehicle taxes

- 131. The analysis in Chapter 2 concluded that CO<sub>2</sub>-based differentiation in motor vehicle taxes has a role to play as an instrument of internalisation, but one that is limited by several considerations.
- 132. It is not the best instrument available. As governments make fuller use of the better instruments, its role becomes reduced.
- 133. Moreover, and more specifically:
  - the level of differentiation advisable is limited by the need to avoid an aggressive use of rebates;
  - the differentiation of motor vehicle taxes should not be based solely on CO<sub>2</sub> emissions;

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<sup>&</sup>lt;sup>38</sup> See Reed (2009).

- and governments will need to experiment with a mix of differentiated purchase taxes and differentiated recurrent charges, in order to arrive at a position to make an informed choice on the correct mix.
- 134. The analysis above shows that, in the current conditions of disequilibrium and intervention, in the macro-economy and in the motor vehicle industry, differentiated taxes on motor vehicles becomes, temporarily, a preferred instrument preferred, that is, to taxes levied at the point of use and aimed at increasing the price of use.
- 135. Differentiation, applied in a revenue-neutral or revenue-negative form, can serve to achieve some reduction in external costs whilst avoiding the risk of reducing aggregate demand. And, by transforming undifferentiated rebates into differentiated rebates, it can serve to mitigate the risk of increasing external costs inherent in government actions to increase the demand for motor vehicles.
- 136. Moreover, each of the three more specific considerations limiting the role of CO<sub>2</sub>-based differentiation ceases, temporarily, to apply in the current conditions.
- 137. First, there is a case for a far higher level of differentiation in motor vehicle taxes, and related rebates and feebates, than would otherwise be appropriate. The normal presumption against rebates is not of practical relevance in the present context: rebates that are generous to a fault *are* being applied today and the point is to ensure that they are applied to better ends.
- 138. The point has already been noted in regard to the current car scrappage schemes. If a rebate of 2,500 EUR is to be made available for the purchase of a new car, it is best that it is made conditional on environmental criteria. But the point applies more generally and not only in regard to these schemes. In a context in which rebates are permissible, the level of differentiation applied need not be limited by the upper bound of the existing tax.
- 139. Increasing the level of differentiation will increase its impact on consumer choices and the consequent benefits. Under normal conditions, the cost of securing these benefits would make alternative instruments preferable. But under the special conditions in which the fuller use of the better instruments is temporarily unavailable, the benefits available from a high level of differentiation should not be scorned.
- 140. Secondly, although the differentiation in motor vehicle taxes should not normally be based solely on  $CO_2$  emissions, there is a case for doing just that in the present context. The high priority that is now assigned to policy action on climate change should help to facilitate speedy action on  $CO_2$ -based differentiation more readily than differentiation based on a wider range of externalities.
- 141. The point being made here concerns the speed of the response rather than the urgency of the problem. In the transport sector, the urgency of the need to reduce CO<sub>2</sub> emissions suggests above all the urgency of action on fuel taxes: to ensure that the price of use reflects the social cost of carbon. But to agree and implement that critical change during the current recession is neither feasible nor desirable.<sup>39</sup>

To be sure, the choice of instruments with which to pursue reductions in transport's CO<sub>2</sub> emissions is not reducible to increased fuel taxes and CO<sub>2</sub>-based differentiation of motor vehicle taxes – see ECMT (2006) for a fuller survey of actual and potential instruments. But the fact of it does not affect nor is affected by the present analysis. By and large, it makes sense to continue pursuing the many other sensible policy options identified *ibid.* – both through the current conditions and beyond. Moreover, insofar as these options do not carry the risk of reducing aggregate demand, they are preferable to differentiated rebates insofar as they are make effective in achieving the aim of reductions in CO<sub>2</sub> emissions. The present discussion is concerned solely with the analysis of the choice between fuel taxes and differentiated motor

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- 142. What is both feasible and desirable is speedy action on CO<sub>2</sub>-based differentiation in motor vehicle taxes and more especially the motor vehicle rebates that are being applied today. Here, speed of action is essential preferably before the date at which the current car scrappage schemes become due for possible renewal (thus, January 2010 in Germany, April 2010 in the UK, and so on).
- 143. Third, although the differentiation of recurrent annual charges, being recurrent, would normally be more likely to induce changes in behaviour, there is a case for relying overwhelmingly, if not exclusively, on differentiated purchase taxes. The immediate visibility of a change in purchase taxes, publicised by government and industry, is likely to have the more powerful impact over the period in question the duration of the current recession.
- 144. Once more, the case is strengthened by the nature of the current intervention in the motor vehicle industry whether through the car scrappage schemes or through other measures aiming at increasing demand. In all cases, it is the purchase price that is being subsidised. And it is the purchase price that needs to be differentiated, in order to mitigate the risks of a negative impact on external costs.
- 145. Hence, this analysis supports the case for concentrating the focus, *temporarily*, on a high level of  $CO_2$ -based differentiation applied to the purchase price a differentiation embracing both taxes and subsidies and rebates at the point of purchase. Thus concentrated, differentiation is likely to have a more than negligible impact and one that is much larger than would otherwise obtain.

#### 4.4 The scope for progress to full internalisation in the post-recession period

- 146. It would be as well, however, to conclude this customised analysis with a strong caveat.
- What this analysis suggests is that the context of the current recession permits an expanded scope for CO<sub>2</sub>-based differentiation in motor vehicle taxes. And this is an opportunity that should be seized. But both the policy conclusion and the analysis that supports it are context-bound. Policy geared to this immediate context is not the right policy for the long term. That policy remains as it was, and as derived from the general analysis grounded in conditions of equilibrium: the policy of full internalisation.
- 148. Equally urgent therefore is the need to explore the scope for progress to full internalisation in the post-recession period. In large part, this entails returning to the policy agenda as it was before the current crisis, and with renewed vigour. But it also entails identifying those features of this period that might offer an enlarged scope for accelerating the progress to full internalisation. It will not hurt to recall the brief discussion of the post-recession period in Chapter 4.1 of the need to moderate aggregate demand in the full upswing of the recovery and the need to generate new streams of revenues to strengthen the budget position of the governments of all OECD member-countries as a first step in that task.

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