Fiscal measures to Reduce CO_2 emissions from new passenger cars

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Abstract

The fuel efficiency of passenger cars is often emphasised as one of the most significant areas of action in terms of limiting the transport sector's CO_2 emission levels. This could be achieved either on the supply side through the technological development of cars, or through demand-side measures such as influencing first time buyers' choice of car.

The aim of this article is to present a model for analysis of the demand side, more specifically the relation between the CO_2 emissions from new cars and the car taxation related to new car purchases in EU. The purpose of the model is twofold. Firstly, it should be used to analyse the CO_2 efficiency of the car taxation in each member state. Secondly, results from model calculations should be used to illustrate what are the possibilities for the individual member states to reduce their CO_2 emissions from new cars.

The major conclusions from the study are:

- It is essential to apply a tax scheme, which is directly or indirectly CO_2 related in order to provide for significant reductions in the average CO_2 emissions from new cars.
- It is essential to differentiate the taxes in such a way that taxes for very energy effective cars are significantly lower than taxes for cars with poor energy efficiency.
- Fuel tax increases provide only very small reductions of the average CO_2 emissions of new cars compared to vehicle taxes.

The model is based on a revised and enhanced version of the Danish Car Choice model from 1997 combined with car characteristics, socio-economic data and car taxation data from the EU member states.

Introduction

Background

The European Council and the European Parliament have adopted a target of reducing CO_2 emissions from new passenger cars to 120 gram per kilometre by 2005, or by 2010 at the latest. An important step in this process is the agreements between the Commission and ACE, KAMA and JAMA respectively. The agreement aims to reduce average CO_2 emissions from new cars to 140 g/km by 2008/2009. This is to be achieved mainly through technical developments and market changes linked to these developments.

Still, the quantitative target of the agreement with the industry on achieving 140 g/km for new cars by 2008/09 does leave a “gap” of 20 g/km in order to accomplish the EU target of 120 g/km. The purpose of this study is to assist the Commission (Expert Group on Fiscal Framework Measures) in considering the potentials of fiscal measures in achieving the target of 120 g/km.

The CO_2 efficiency of the national taxation system is studied with a view to support the demand for (more) CO_2 efficient cars while at the same time taking into consideration certain specified boundary conditions:

- Revenue neutrality (motivated in concerns expressed by Member States)
- The proportion of diesel cars (applied for environmental purposes in order to avoid that CO_2 reductions are achieved at the expense of increased emissions of particles and of NO_x)
- Fleet composition neutrality (i.e. downsizing) (requested by the car manufacturing industry in order to minimise market distortions)

Study contents

Study approach

In meeting the study objectives, and to produce the requested outputs, a model-based approach is applied. The model is a "what-if" model. It is thus *not* a projection model.

The model is used to assess the CO_2 effectiveness of current tax systems and to analyse the implications of scenarios, which introduce changes to the current tax systems. The effectiveness of existing systems and the scenarios are analysed with a particular view to the possible impact on the above mentioned pre-defined boundary conditions. Furthermore, sensitivity analyses are carried out for selected key assumptions.

The ultimate output of the analyses is a set of country specific model-based analyses, one for each of the nine Member States for whom the analyses are conducted. The analyses are conducted according to a common and pre-defined structure. Based on these analyses, the study identifies key conclusions in regard to the feasibility of accomplishing the EU target by means of vehicle related fiscal measures.

The model

The COWI Cross Country Car Choice Model is used for the model-based calculations. This model is a further development of the already existing Danish Car Choice Model. The model can be termed a "what if" model in the sense that it does not perform projections nor forecasts. It is thus *not* a prognostic model. Rather, the model merely calculates what would happen to today's car demand if certain characteristics of today's tax systems were changed, all other things being equal.

Car purchase decisions are based on a number of parameters. Apart from those that relate to the car (technical and financial including taxes) the model also considers the income, household structure and age of the purchaser of the car. These socio-economic features of the population or car purchasers in the individual Member States are accounted for at the model calibration stage. The model however does not consider aspects that relate to for example, weather conditions, urbanisation, overall road quality, landscape features or other external factors that may influence the car choice of individual EU citizens. To some extent though, these features are captured indirectly by the country specific model calibrations that have been done, but only at the very aggregated level. The model does not take into account that demand patterns may change in the future as a result of for example, changes in fashion, changes in production costs and pricing policies of manufacturers and innovation.

Important outputs of the model are the demand for new passenger cars in each of nine selected Member States and the associated average energy consumption and CO_2-emissions. New fiscal measures can be introduced into the model and the consequential effects on the demand for new cars can be calculated acknowledging the above limitations. The nine selected countries are Belgium; Denmark; Finland; Germany; Italy; Netherlands; Portugal; Sweden and UK. These countries represent a wide range of various regimes for vehicle taxation both with regard to types, design and levels. Additionally, the countries were selected to provide a wide representation of important geographical and economic features characterising EU Member States.

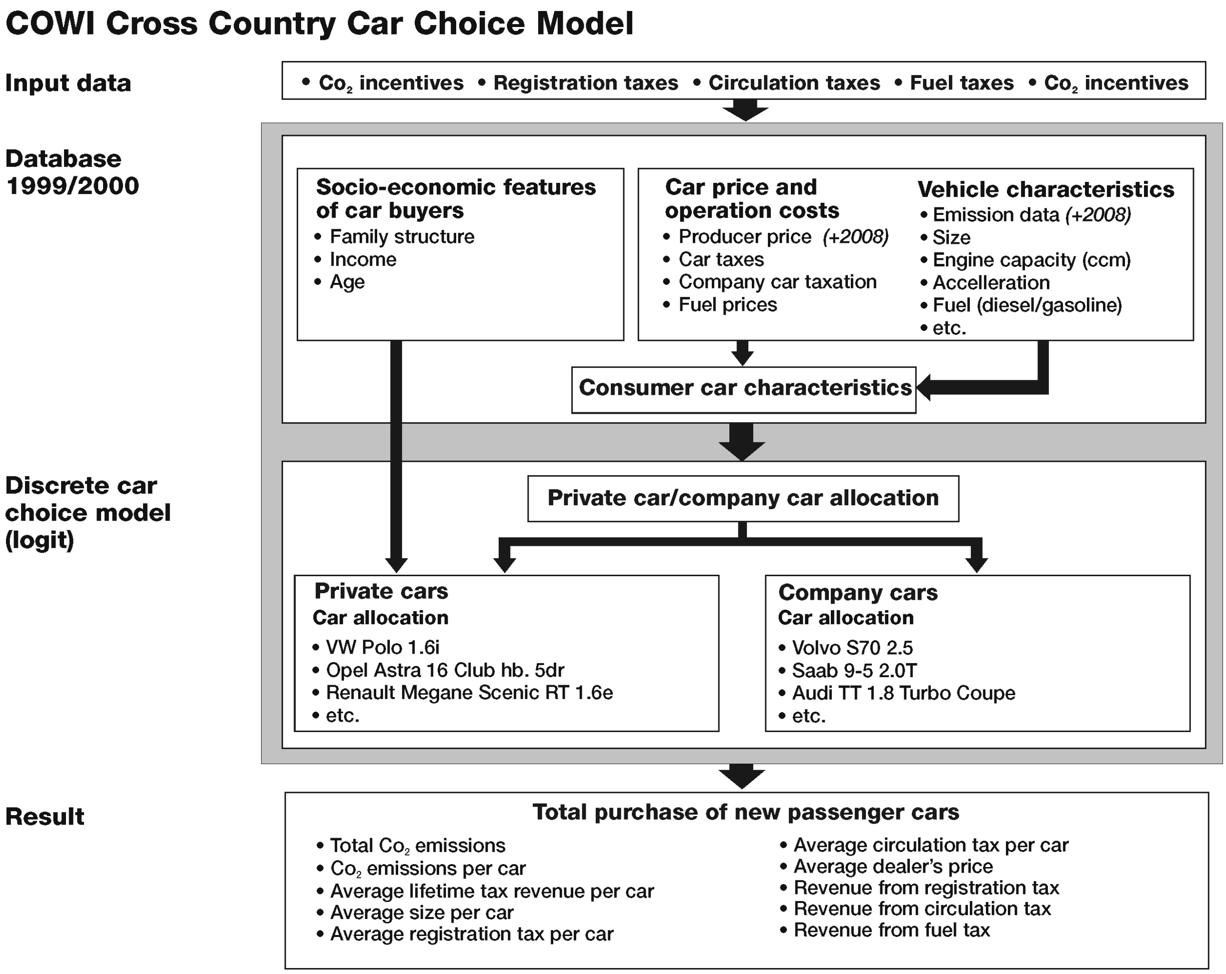
The structure of the model is illustrated in the figure below. The input data are the variables to be analysed (i.e. vehicle related taxes and taxation systems)[1]. The baseline is based on existing taxes and tax structures for 2000 including those that are planned for implementation in the period up to 2008. This part of the database is constructed mainly on basis of the information contained in ACEA's tax guides for 1999 and 2000 supplemented with additional information provided by the countries themselves.

As regards taxation systems and taxes that apply especially to company cars, the ACEA guide is less informative. Therefore, this information derives from other sources. This includes a questionnaire survey among the EU countries[2].

[1] For this project it was decided not to analyse the effects of changing fuel taxes and EEV incentives. While these data are inputs to the model with their country specific values, they are thus kept fixed within the analysis. Sensitivity analyses however do illustrate the implications of fuel tax increases.

[2] This information proved not to be available in some countries, and in others it proved impossible to obtain all the requested data. The methods used to derive estimates in these cases are further described in chapter 2.

The database includes observed data on sales of new vehicles (prices, numbers and technical features). This part of the database consists solely of observed data, with the sole exemption of the proportion made up by company cars. In the existing database it is not possible to distinguish between company cars and private cars. This information was provided separately for some countries. For the rest, estimates are applied. The database also includes the socio-economic features of car buyers. This information could only be fully obtained for a few countries. For the remaining countries, the socio-economic features of car buyers were estimated from the overall socio-economic data that could be obtained for the country in question combined with other relevant and available information on the country as well as on other relevant countries.



Technically, the model is constructed as a logit-model. The model estimates its country-specific parameters based on elasticities derived from the original Danish model, and through a calibration and validation process, which takes into account the above socio-economic features and other country specific aspects disclosed during the process. The model uses these parameters to calculate the vehicle sales that will result from a certain set of input data and assuming that the 140 g/km target has been met. This is done by means of a two-step procedure. First, a distribution is performed of the car sales to allocate it between company cars and private cars. Secondly, the model calculates the specific allocation of the sales in these two groups. It should be noted that the total number of cars sold remains unaltered, i.e. the model does not allow for the total car sales to increase or decline as a result of the fiscal measures. This feature has no implications in relation to the ultimate objective of the study, which is concerned with the average CO_2 emissions from new cars. However, if the boundary conditions are substantially violated, in particular the one that requires no downsizing, this may have implications for such results as the average dealer's price, the total turnover of the car manufacturing sector, and the average taxation of cars.

Assessing the CO_2 effectiveness of national taxation systems

The table below provides an illustration of the operational approach that is used to assess the CO_2 effectiveness of national taxation systems. Inherent in the approach is a movement away from the existing system and into scenarios that involve more radical changes.
All calculations are subject to the boundary conditions:

- **Budget neutrality** which implies that any changes should be budget neutral compared to the base scenario for 1999, i.e. the scenario which assumes no changes in taxes and tax structures. Budget neutrality is assessed in terms of an indicator of the total revenue from the new vehicles, which includes registration tax revenue, circulation tax revenue and fuel tax revenue. The revenues are calculated for the average life time of the vehicle.

- **Unchanged proportion of diesel cars,** which means that the proportion of diesel cars in the total sales of new cars should not change. However, alternative calculations illustrate the implications of allowing for a doubling of the diesel proportion with an upper limit though of 50%.

- **No downsizing**, which implies that the CO_2 reductions should be achieved without major implications for the demand structure in terms of moving demand downwards towards smaller, and hence, more energy effective cars. As an indicator of compliance with this condition, the study has developed a size indicator based on a grouping of the cars into eight categories.

Table ***Fejl! Ukendt argument for parameter.*** Fiscal measures scenarios

Scenario types	Specific assumptions	Registration tax	Circulation tax	CO_2 - incentive	Comments
CO_2 effectiveness of the existing national taxation systems	Differentiated registration tax based on national parameters	variable	constant	constant	Existing national tax system will be held constant. Relevant for countries with registration tax.
	Differentiated circulation tax based on national parameters	constant	variable	constant	Existing national tax system will be held constant
Adding CO_2 differentiation	Existing national tax system plus differentiated CO_2 element into registration tax	variable	constant	constant	Existing national tax system will be held constant. Relevant for countries with registration tax.
	Existing national tax system plus differentiated CO_2 element into circulation tax	constant	variable	constant	Existing national tax system will be held constant
CO_2 based tax structure	CO_2 differentiated registration tax	variable	constant	constant	Relevant for countries with registration tax
	CO_2 differentiated circulation tax	constant	variable	constant	
	Mixed CO_2 differentiated scenario	variable	variable	(variable)	

Results from model calculation

Prior to presenting the results from the scenario analyses, the table below summarises the key features of the base scenario. The table also shows the values of the boundary conditions for the nine countries. These values are shown in bold.

The table illustrates the substantial variation that can be observed when comparing the various countries. For example, some countries do not have registration taxes, while others have very high registration taxes. The average circulation tax also exhibits substantial variation among countries. The average size provides a rough indication of the average size of the new cars in the nine countries. This indicator varies substantially: from a level of 2.28 in Italy and up to 3.69 in Sweden. The values of the size indicator also illustrate that diesel cars are typically larger than petrol cars on average. This observation applies in all countries except Sweden. Similarly, the proportion of diesel vehicles also exhibits substantial variation ranging from below 10% and up above 50% in Belgium where the proportion is 54.5%. In this regard, it should be noted that there is currently a general trend of increasing diesel proportions in most countries. For example Germany has experienced significant increases since 1999/2000. The average lifetime revenue contribution per car also varies quite a lot from one country to the other. This revenue consists of the total taxes that are paid on average per car during the whole lifetime of the car and it includes fuel taxes, registration taxes and circulation taxes. The lifetime tax revenue range from more than 30,000 EUR and down to around 5,000 EUR.

Table ***Fejl! Ukendt argument for parameter.*** *Overview of base scenario values*

Base scenario values. 1999/2000	B	D	DK	I	NL	P	S	SF	UK
Average life time tax revenue per car									
- petrol, EUR/car	**7,845**	**6,950**	**29,286**	**5,696**	**16,661**	**5.348**	**7.814**	**13,539**	**11,824**
- diesel, EUR/car	**9,916**	**7,845**	**34,753**	**6,545**	**23,248**	**9,200**	**12,248**	**19,920**	**12,248**
Average value of size indicator									
- petrol	**2.78**	**3.18**	**2.98**	**2.28**	**2.82**	**2.54**	**3.69**	**3.26**	**3.10**
- diesel	**3.42**	**3.62**	**3.29**	**3.32**	**3.43**	**3.67**	**3.60**	**3.45**	**3.60**
Average registration tax									
- petrol, EUR/car	208	-3	16,025	151	3,726	2.236	-	7,863	-
- diesel, EUR/car	291	-11	22,530	151	6,032	6.583	-	10,410	-
Average circulation tax									
- petrol, EUR/car/year	177	88	404	151	433	35	150	118	231
- diesel, EUR/car/year	384	282	574	190	986	31	236	572	236
Proportion of diesel cars, %	**54.5**	**21.2**	**10.6**	**29.3**	**22.9**	**22.6**	**7.1**	**7.4**	**13.9**

Scenario analyses

The model-based calculations show that the largest CO_2 reductions can be achieved when the existing system is replaced by a CO_2 dependent registration tax and circulation tax. The calculations that have been undertaken follow the steps shown in Table **Fejl! Ukendt argument for parameter.**.

The table below summarises the reductions in average CO_2 emissions from new passenger cars that can be achieved in each of the above scenarios by year 2008. The results shown in the table are all within the boundary conditions.

The table illustrates the conclusion that the replacement of existing taxes by purely CO_2 dependent taxes in most cases provides the largest CO_2 reduction. It is however noteworthy also that in the UK a simple enhancement of the differentiation of the current circulation tax performs even better. This is due to the recently implemented CO_2 dependency into the UK tax system. Thus, the calculations indicate that UK can actually provide a reduction in the order of 5.7% simply by means of further enhancing this differentiation.

Table ***Fejl! Ukendt argument for parameter.*** Summary of main results

	B	D	DK	I	NL	P	S	SF	UK
Calculated reductions, %	10.8	10.5	9.9	11.4	10.2	10.8	10.2	10.7	10.3
Enhanced differentiation of existing taxes									
- registration tax	2.5	-	3.3	-	3.6	1.8	-	2.5	-
- circulation tax	2.4	4.4	5.4	2.7	3.6	1.9	2.4	0.1	4.8
Adding a CO_2 element to existing taxes									
- registration tax	3.3	-	4.6	3.0	3.4	2.1	-	2.8	-
- circulation tax	2.9	4.4	5.0	3.3	4.0	2.1	3.2	3.1	4.6
Purely CO_2 differentiated taxes									
- registration tax	3.5	-	8.4	1.8	5.5	3.2	-	4.3	-
- circulation tax	4.2	5.0	5.5	4.1	6.0	2.3	3.9	3.5	4.7
- combination	5.1	4.9	8.5	4.0	7.0	3.3	3.8	4.3	4.5

Comparing the results from the table, it can be seen that the potentials of fiscal measures to provide the requested CO_2 reductions are largest in Denmark and the Netherlands. Purely CO_2 differentiated circulation *and* registration taxes would provide 8.5% and 7% reductions respectively. For Belgium, Germany and the UK, the potentials lie in the range of 4.5%-5%, whereas between 4% and 4.5% could be provided in Italy, Sweden and Finland. Portugal has the smallest reduction potentials from fiscal measures, namely 3.3% at the maximum. One should note that part of the explanation for the small reduction potentials in Portugal are likely to lie in the small average size of vehicles in Portugal. While a similar feature applies in Italy, the variation is likely to be much larger in Italy than in Portugal.

Denmark, Portugal and Finland are all countries with a relatively high registration tax. In all these countries, the replacement of taxes by CO_2 dependent taxes provides significant results in the cases where this replacement involves the registration tax. In the case of the Netherlands where the registration tax is also significant, both of the existing taxes are not originally very CO_2 related. Therefore, the replacement of both taxes with a purely CO_2 differentiated tax performs better than the individual cases. Similarly, in Belgium there is a large increase when comparing the replacement of the registration tax alone (3.5%) to the situation where both taxes are replaced (5.1%). In the latter case, the counterproductive effect from the circulation tax is removed. The effect from modifying only the registration tax is namely reduced due to the large impact from the circulation tax, which is relatively weakly related to CO_2 emissions.

Calculations have also been undertaken to assess the extent to which results would be affected by alternative formulations of the budget boundary condition. Two alternatives are investigated. First, it is assumed that the revenue from fuel taxes is not to be included in the definition of the constraint, and second, it is assumed that the constraint is only to consider the revenue from the tax in question, i.e. the one that is subject to modification. These calculations show only little sensitivity of results to such changed formulations of the budget. In the majority of cases, the effect is between 0.1 and 0.3 percentage points.

Furthermore, the implications of allowing for an increase in the fuel tax of 25% have been analysed. The calculations show that fuel tax increases alone will only provide for reductions of the average CO_2 emissions from new cars in the order of less than 1%. Only in a very few cases is the reduction more than 1%, and never above 2%. Combining the fuel tax increase with the scenario that changes the progression of the taxes, involves very small changes to the original results, typically in the order of 0.1% to 0.5%.

Purely CO_2 differentiated taxes

The table below illustrates the achievable reduction from Purely CO_2 differentiated taxes. It should be noted that the country specific targets that are contained in all of the tables are purely hypothetically defined targets[3]. The calculations thus relate to a situation, where all countries are assumed to provide the same relative reduction compared to 1995. As mentioned, this assumption is purely hypothetical and presumably not very realistic given the fact that such a similar relative reduction could be claimed to impose very strict and difficult requirements onto the countries that already in 1995 had small average emissions compared to the EU average.

Table **Fejl! Ukendt argument for parameter.** Calculated maximum CO_2 reduction from a replacement of existing taxes [1)]

	B	D	DK	I	NL	P	S	SF	UK
Target CO_2 reduction, %	10.8	10.5	9.9	11.4	10.2	10.8	10.2	10.7	10.3
Reduction for petrol cars, %	*5.4*	*5.5*	*8.6*	*4.3*	*6.5*	*2.9*	*3.9*	*4.1*	*4.9*
Reduction for diesel cars, %	*4.8*	*3.4*	*7.7*	*3.7*	*4.3*	*4.6*	*4.4*	*7.0*	*4.5*
Total CO_2 reduction achieved, %	5.1	5.0	8.5	4.1	6.0	3.3	3.9	4.3	4.8
Distance from target, percentage points	5.7	5.5	1.4	7.3	4.2	7.5	6.3	6.4	5.5
Average registration tax									
petrol cars, '000 EUR/car	*323*	-	*21,113*	*151*	*4,629*	*2,868*	-	*9,086*	-
diesel cars, '000 EUR/car	*3,287*	*-6*	*25,324*	*241*	*6,554*	*7095*	-	*10,260*	-
Average circulation tax									
petrol cars, '000 EUR/car/year	*304*	*232*	*188*	*151*	*556*	*44*	*300*	*118*	*451*
diesel cars, '000 EUR/car/year	*231*	*369*	*451*	*269*	*1,062*	*33*	*415*	*646*	*415*
Diesel share, %	54.5	21.2	10.6	29.3	22.9	22.6	7.1	7.4	13.9

[1)] The maximum CO_2 reduction is generally obtained by combining purely CO_2 differentiated registration and circulation taxes. Exceptions from this rule are D, I and S (purely CO_2 circulation tax) and UK (circulation, increased progression).

In interpreting the results, it should be noted that the UK circulation tax is already explicitly related to CO_2 emissions. Therefore, the results provided from the calculations serve to illustrate the order-of-magnitude additional CO_2 reductions that could be provided by

[3] The strategy to reduce average CO_2 emissions from new cars does not define national targets. The theoretical targets listed in all the tables were calculated as points of comparison. They assume that the reduction from 1995 to 2008 is to be of the same relative size in all Member States. The resulting theoretical targets that are contained in the tables divert a little from each other. The reason for this is the development in specific emissions is the development of the proportion of diesel cars in the period from 1995 to 2000.

strengthening the relation and the progression of the tax in the UK. Given the existing CO_2 relation of the tax system in the UK, the results from the various scenarios for the UK simply presents the implications of applying the three different underlying functional relations.

The table shows that significant CO_2 reductions could be achieved within the boundary conditions if the national taxation systems were modified in such a way that CO_2 specific aspects were better considered. This conclusion applies to all the Member States that were analysed. The table however also shows that it is not possible to achieve the theoretically defined targeted CO_2 reduction *and* at the same time avoid violating the boundary conditions. In this regard it should be noted that there are some possible effects that have not been included in the calculations. Thus, there is likely to be a synergy effect from a combined launching of changes to the tax schemes and supporting other measures. For example the combination of information campaigns, labelling of cars according to CO_2 performance and a tax system that relates liable taxes to the CO_2 performance. Furthermore, an increase of the proportion of alternatively fuelled vehicles (such as LGP or CNG) can reduce the target that must be fulfilled by the petrol and diesel vehicles in order to achieve the overall target of 120 g/km. In addition, the calculations have not involved any changes to the existing company car taxation schemes. Such modifications may also lead to reductions in the average CO_2 emissions from new cars, in particular if they involve more CO_2 dependency of the taxes and abolishment of schemes that provide for free fuel. In this regard, it is important to note though that company cars are typically bought on behalf of the more affluent parts of the population. If they were to replace the company car by a private car, the private car would probably continue to be larger than average. Company cars are 8-10% bigger than private cars, and while modifications to company car tax systems may reduce their size somewhat, the replacement cars are still likely to remain above average. Lastly, diesel fuelled vehicles emit about 10% less of CO_2 than petrol fuelled vehicles.

The table below provides rough estimates of the possible further reductions, compared to the above results that could be achieved if the proportion of diesel vehicles was allowed to increase.

Table ***Fejl! Ukendt argument for parameter.*** Calculated CO_2 reduction from a replacement of existing taxes with purely CO_2 differentiated registration and circulation taxes. Allowing diesel share to increase.

Doubling of diesel share (maximum share: 50%)									
	B	D	DK	I	NL	P	S	SF	UK
CO_2 reduction	5.1	6.6	9.4	6.0	7.6	5.8	5.2	5.2	6.1
Difference from target	5.7	3.9	0.5	5.4	2.6	5.0	5.0	5.5	4.2
New diesel share, %	54.5	42.4	21.2	50.0	45.8	45.2	14.2	14.8	27.8
Diesel share = 50%									
	B	D	DK	I	NL	P	S	SF	UK
CO_2 reduction		7.2	11.8		7.9	6.4	8.2	9.5	8.1
Difference from target		3.3			2.3	4.4	2.0	1.2	2.2
New diesel share	54.5	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

The first part of the table shows the results from a mere doubling of the current diesel proportion applying however an upper limit of 50%. This can be seen to bring further reductions in all cases. In relative terms, the additional reduction in Portugal would be the largest comparing the original 3.3% to the 5.8% that could be provided if the diesel share was allowed to double.

A doubling, however, still results in very large discrepancies between the various countries, with respect to the proportion of diesel vehicles of the total vehicle sales. Therefore, the second part of the table illustrates the implications of having a diesel proportion of 50% in all countries. This calculation is purely theoretical and highly hypothetical as it involves very substantial increases in some countries. Nevertheless it serves to illustrate that even in this case the target cannot be achieved, with the exception of Denmark. In most of the cases where the assumed increase up to 50% constitutes a substantial change to the current situation, it does result in significant additional CO_2 reductions. It should be noted that the above calculations assume that any replacement is effectuated as a pure fuel replacement. Thus any other features of the cars in question are assumed to remain unaltered.

Conclusions

The calculations assess the extent to which vehicle related taxes (mainly acquisition taxes and ownership taxes) can be effective means to reduce CO_2 emissions from new cars. More specifically, the model calculations have assessed the ability of vehicle taxes to support the target to reduce average CO_2 emissions from new cars down to a level of 120 g/km. The calculations point to the following conclusions:

- It is essential to apply a tax scheme, which is directly or indirectly CO_2 related in order to provide for significant reductions in the average CO_2 emissions from new cars.
- It is essential to differentiate the taxes in such a way that taxes for very energy effective cars are significantly lower than taxes for cars with poor energy efficiency.
- Replacing the existing taxes with purely and directly CO_2 related taxes that are sufficiently differentiated provide the largest reductions.
- Adding a differentiated CO_2 element to existing taxes provides smaller, but still quite large, CO2 reductions. If allowance were made for a subsidy to the most energy efficient vehicles, this would however increase the rate of progression and thus lead to even more CO_2 reduction.
- Merely enhancing the differentiation of existing taxes also provides significant CO_2 reductions, although the reductions are smaller than in the above two cases.
- The level of the potential CO_2 reductions does not depend on the type of taxes, e.g. registration or circulation tax, but more on the CO_2 specificality and the level of the tax differentiation.
- Simple increases of the tax that do not involve changes to neither the tax base, i.e. the parameter(s), which determine the tax, nor the differentiation schemes provide only very small CO_2 reductions.

- It is essential to modify national taxes that are of a significant size and where there is scope for improving the CO_2 relation of that tax in order to harvest the full potentials of CO_2 reductions within the boundary conditions.
- Fuel tax increases provide only very small reductions of the average CO_2 emissions of new cars compared to vehicle taxes. Fuel taxes may however still be a very effective means of controlling the total CO_2 emissions that are attributable to passenger car transport.

The model calculations have been subject to three important boundary conditions. All model-based assessments are thus done under the condition that there should be no downsizing of the vehicle sales. Furthermore, there should be no change to the overall revenue from vehicle related taxes from new cars (i.e. the total of registration taxes, circulation taxes and fuel taxes). Lastly, the proportion of diesel vehicles should remain constant at today's level. Respecting these conditions, the calculations show that:

- While it is possible to reduce the average emissions of new passenger cars in EU by about 5% on average, it is not possible to achieve the target of 120 g/km on average and avoid an increase of the proportion of diesel cars and/or downsizing of vehicle sales. The accomplishment of the target would require an additional 5.5%. The picture would look different, if increases of the proportion of diesel vehicles and/or downsizing were accepted. Moreover, it might be possible to achieve additional reductions if the fiscal measures are closely linked to the labelling scheme established under Directive 1999/24/EC. Increasing the proportion of diesel vehicles brings the estimated CO_2 emissions closer to the target. Nevertheless, it needs to be combined with downsizing if the model calculations are to result in a reduction down to 120 g/km.
- On the other hand though, the calculations show that budget neutrality is not the binding constraint in most cases. Thus, the requirement about unchanged revenue can be fulfilled without major implications for the achieved reductions in most cases.
- The achieved reductions depend on the particular conditions that apply in the individual Member State and are affected by for example the existing tax systems and the existing composition of vehicle sales.

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