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Structural Fiscal Measures and Electronic Tolling
The German Experience

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I would like to thank you for the invitation and for the opportunity to speak about the German experience of fiscal control mechanisms in the transport sector.

How can the public sector support and expedite the introduction of improved technologies and the implementation of the demands for more environmentally compatible transport?

One option involves regulatory requirements that have a direct impact on automotive engineering with the specific aim of reducing exhaust emissions or energy consumption. On the other hand, there is the tool of fiscal control incentives, which can be used to speed up the introduction of improved or new technologies, especially in conjunction with the regulatory requirements.

In Germany, fiscal control incentives have proved successful in the past because of their particular compatibility with market mechanisms, and have met with a high level of political acceptance among those affected. The fiscal policy does work. As examples, I would like to mention here the differential in duty between leaded and unleaded petrol. Today, leaded petrol is no longer available in Germany, although it has not yet been banned; and the fiscal promotion of the introduction of the three-way catalytic converter. In 1991, 97% of all newly registered vehicles were fitted with a catalytic converter, although this did not become mandatory until 1993.

I would now like to focus on the so-called emission-oriented restructuring of motor vehicle tax.

This topic involves - at least in Germany - a politically highly sensitive set of tools, not least because of my compatriots’ love affair with the car. The fact that motor vehicle tax affects more than 40 million vehicle owners in Germany and the psychological effect, in particular, of this tax is extremely great means that this is an especially suitable tool for creating politically intended control incentives with a view to achieving ecological objectives and aims.

What were the motives for restructuring motor vehicle tax in 1997 to make it emission-related?

First, an incentive was to be created for the manufacture and purchase of passenger cars with emission levels as low as possible. In addition, motorists were to be induced to retrofit high-pollution cars with a three-way catalytic converter - provided this was possible and economically advisable - or to withdraw them from the road as soon as possible. The declared objective was thus to convert the German vehicle fleet as quickly as possible to an emission level that was as low as possible.

In this context, I do not wish to conceal the fact that the passing of this bill was preceded by difficult and protracted negotiations within the legislative bodies and with the European Commission.

Domestically, there was fierce controversy and a heated debate surrounding the issue of emission-oriented motor vehicle tax restructuring versus apportionment of motor vehicle tax to fuel tax.
The principal arguments for an apportionment of motor vehicle tax was a reduction in fuel consumption and thus also in CO₂ emissions and the argument that it would simplify administration.

However, if motor vehicle tax is apportioned to fuel tax, it should be noted that, under EC law, Member States are obliged to apply minimum rates of motor vehicle tax to heavy goods vehicles. For these vehicles, which run on diesel fuel, motor vehicle tax can therefore not be apportioned to fuel tax. The same goes for diesel passenger cars, because just for this group of vehicles, an increase in the duty on diesel fuel would be scarcely conceivable, for practical reasons alone.

Moreover, there would be the following drawbacks and difficult-to-solve problems:

- The only control effect that could be achieved via fuel tax would be on carbon dioxide emissions. A fiscal incentive to reduce the emissions of carbon monoxide, hydrocarbons and nitrogen oxides from passenger cars, as well as particulate emissions from diesel cars, would not be possible.
- A disproportionately high extra burden would be imposed on motorists in structurally weak areas who are not able to switch to public transport and on motorists who run up high mileages because of their jobs.

These material considerations ultimately resulted in a political decision being taken in favour of an emission-oriented motor vehicle tax. Nevertheless, when these regulations are revised in 2002, consideration is also to be given to the aspect of apportioning motor vehicle tax to fuel tax.

Let us now look at the individual rules of the emission-oriented tax reform. I will confine myself to a brief outline.

To put it in simple terms, motor vehicle tax for state-of-the-art low-pollution and low-consumption passenger cars is reduced. These cars are also granted a temporary tax exemption. The tax burden on other cars that are allowed to operate during ozone alerts - these are primarily cars with three-way catalytic converters - remains unchanged for the time being. On the other hand, there is a significantly greater tax burden to cars with a higher level of pollutant emission.

Thus, for instance, the owner of a petrol-engine car with a capacity of 1,600 cm³ pays DM 665 in motor vehicle tax per annum if the vehicle does not meet any stringent emission standard. If, however, the vehicle meets Euro 3, the owner only has to pay DM 160 per annum.

In addition to the new structure of emission-related tax rates, passenger cars with especially low levels of pollutant emission and fuel consumption are also granted temporary tax exemptions.

Passenger cars that comply with at least the pollutant limits for "Euro 3" and "Euro 4" receive a temporary tax exemption up to 31 December 2005. For Euro 3 cars, this means DM 250 in the case of petrol-engine cars and DM 500 in the case of diesel-engine cars. For Euro 4 cars, it is DM 600 in the case of petrol-engine cars and DM 1,200 in the case of diesel-engine cars.

The level of tax exemption for diesel cars is higher than that for petrol cars because the technical effort involved in reducing the emission of pollutants compared with current levels is considerably higher on diesel cars than on petrol cars, and thus the costs are also higher.

Fiscal incentives also have an impact on passenger cars with an especially low level of consumption. So-called three-litre or five-litre vehicles are granted temporary tax exemptions. The three-litre car is defined as a vehicle whose carbon dioxide emissions do not exceed 90 g/km; in the case of the five-litre car, the figure is 120 g/km.
The tax exemption is DM 1,000 for three-litre cars and DM 500 for five-litre cars.

The higher tax burden affects especially older cars with single oxidation catalytic converters and corresponding diesel vehicles. Such vehicles are frequently kept by people in lower-income groups. These vehicle owners often feel that the higher tax burden is a social hardship. Nevertheless, for environmental reasons, the decision was taken to increase the rate of tax for these vehicle owners too. To ensure that the reform of motor vehicle taxation does not lead to a reduction in total tax revenue, the higher rate of tax for old vehicles was also necessary from a fiscal point of view, in order to offset the temporary tax exemptions and the lower rates of tax for passenger cars with especially low levels of emissions. Over a period of ten years, the tax reform will result in neither an increase nor a decrease in revenue. The political conflict between environmental and social policy has thus been resolved in favour of the environment.

What impact have had the fiscal control incentives to date?

The impact can be illustrated impressively by the way in which the number of vehicles has developed in Germany. From mid-1997 to mid-1999 - i.e. within only two years - it was possible to bring down the number of old passenger cars not complying with any stringent emission standards to 3.6 million vehicles, thereby almost halving it. By mid-1999, they accounted for a mere 8.5% of the total number of passenger cars in Germany.

In the same period, the number of passenger cars complying with the European Euro 2 to Euro 4 emission standards more than doubled, rising from 6.2 million to over 14.2 million vehicles. This means that, of the total number of around 42 million passenger cars in Germany, around one third already comply with the most stringent emission standards.

If the 20.7 million passenger cars that satisfy the Euro 1 emission level are also counted, the result is that in Germany, by mid-1999, over 82% of the total number of passenger cars complied with stringent emission standards. This also includes those vehicles that were brought up to the Euro 1 level by being retrofitted with exhaust emission control systems.

The picture becomes even more impressive if we look at the statistics relating to the registration of new cars. According to these statistics, around 85% of newly registered passenger cars already meet the Euro 3 or Euro 4 emission limits. I think I can say that this success would not have been possible without political control incentives.

If one bears in mind that old vehicles not complying with any stringent emission standards often emit up to ten times more pollutants than Euro 1 passenger cars, it becomes clear just how great the reduction in pollution achieved by the emission-related motor vehicle tax is in Germany.

It just remains to be said that the granting of tax relief for low-consumption passenger cars is also beginning to bear fruit. Admittedly, the number of so-called three- or five-litre cars as a percentage of the total number of vehicles is not yet very high - they account for just under 2% of newly registered vehicles. Nevertheless, I would like to claim that, without the pressure of the financial incentive mechanism, we would not yet have a so-called three-litre car on the market.

What, then, is the impact of the fiscal incentives on the medium-term reduction in pollutants emitted by road traffic in Germany?

A special computing model, developed on behalf of the Federal Environmental Agency, was used for the calculations and scenarios relating to the development of pollutant emissions.
By 2005 - i.e. when tax incentives for vehicles with Euro 3 and Euro 4 emission levels come to an end - the pollutants emitted by road traffic will have been reduced as follows:

- carbon monoxide by 8%,
- hydrocarbons by 7%,
- nitrogen oxides by 4.6%, and
- particulates by 4.2%.

I would just like to add that since 1994 there have been emission-related control incentives in the sphere of motor vehicle tax for lorries in Germany. Here, too, the results are impressive. Although, in the case of heavy lorries, it has been mandatory for new vehicles to comply with the European Euro 2 emission standard only since October 1996, more than one fifth of the total number of vehicles already met this standard by the end of 1997. By mid-1999, this figure had risen to 40% of the total number of heavy goods vehicles in Germany.

I would now like to leave the topic of the conversion of motor vehicle taxation to an emission-related scheme, and move on to a different subject. This topic is closely related to the just-mentioned pollutant emissions and concerns the quality of fuel.

A major challenge for the future is the reduction of CO\(_2\) emissions from motor vehicles. In this context, an essential element is a further reduction in the sulphur content of fuel.

However, the objective of reducing CO\(_2\) emissions from motor vehicles, while at the same time meeting stringent emission standards, cannot yet be achieved satisfactorily and in a cost-efficient manner with the planned sulphur content in fuel of 50 ppm. Nor is it really possible to achieve a further reduction in emissions from diesel engines beyond the Euro 4 standard. To enable full use to be made of the potential for pollutant and CO\(_2\) reduction, it is necessary that in the forthcoming updating of Directive 98/70/EC beyond 2005, provision be made for the introduction of sulphur-free fuel - i.e. with a sulphur content below 10 ppm for petrol and diesel fuel.

Sulphur-free fuel is necessary to enable optimum conditions to be created for the marketing of motor vehicles with innovative drive technologies. Modern diesel engines with new exhaust emission control systems and direct-injection petrol engines are such innovative technologies.

Since low-sulphur and sulphur-free fuels can be used without technical conversion of vehicles, be they diesel or petrol-engine, their use will lead to a significant reduction in pollutant emissions from all vehicles. In addition, the new fuels will make it possible to deploy new engines and exhaust emission control technologies. In conjunction with low-sulphur fuel, the conversion of the vehicle fleet to these new technologies will, between 2000 and 2010, result in the emission of particulates being reduced by 62 per cent and in the emission of nitrogen oxides and hydrocarbons being reduced by 55 per cent in each case, despite the fact that the volume of traffic is forecast to rise. Moreover, the petrol engine with direct fuel injection will make it possible to reduce fuel consumption by 15 per cent compared with conventional petrol engines. However, this engine concept, too, can only make its valuable contribution to a reduction in CO\(_2\) emissions if sulphur-free fuels are used.

The Federal Government attaches enormous importance to the early introduction of low-sulphur and sulphur-free fuel. Thus, on 25 August 1999, it was decided to provide a fiscal incentive for the early introduction of fuels with a low sulphur content. To give the oil industry time to convert its refineries, the incentive for low-sulphur fuels - meaning diesel and petrol with a maximum sulphur content of 50 ppm - will take effect on 1 November 2001. On this date, the duty on fuels with a higher sulphur content will be increased by 3 pfennigs per litre.
As a further measure, the Federal Government has decided to introduce, on 1 January 2003, a fiscal incentive for sulphur-free fuels, i.e. diesel and petrol with a maximum sulphur content of 10 ppm. Here, too, it is intended to increase the duty on fuels with a higher sulphur content by 3 pfennigs per litre. These regulations have since been adopted by parliament.

We would appreciate it very much if other countries would support the approach we have adopted to encourage the use of environmentally friendly fuels.

We consider the complementary interaction between an emission-related motor vehicle tax and the promotion of environmentally friendly fuels to be an effective set of tools for ensuring sustainable mobility. I have no doubt that the future can only belong to the environmentally friendly car.

On the whole, it can be said that European exhaust emission legislation is heading in the right direction. It is likely to be so successful that, in the future, pollutant emissions from motor cars will no longer have to be an issue of air quality management.

To conclude, I would like to say a few words about road user charges in Germany.

Since January 1995, heavy lorries have had to pay a time-related charge for the use of Germany motorways. Since then, lorries weighing 12 tonnes or more have had to pay up to a maximum of around 2,500 DM per year in Germany, Denmark, Belgium and Luxembourg.

Since 1996 and 1998, the same has also applied in the Netherlands and Sweden respectively. Below this maximum rate, the charge varies according to the size of the vehicle and the period of validity of the certificate. The existing time-related system has been agreed internationally with the above-mentioned countries within the framework of a common agreement. It is accepted by all users.

However, since the time-related charge has a number of disadvantages, it is to be replaced by a distance-related charge for lorries before the end of 2002. On the whole, the distance-related charge would seem to be a more suitable instrument for achieving our transport policy and environmental objectives:

- It facilitates a fairer allocation of infrastructure costs according to the "user pays" principle, because it is based on the intensity of use, that is on the actual mileage of the vehicle that is subject to the charge.
- It allows flexible pricing depending on time and place and thus makes it possible to influence the traffic situation with the aim of improving the flow of traffic in general.
- It provides an incentive for an even better capacity utilisation in road haulage. The number of empty lorry journeys is still too high.
- And, finally, it is a better basis for private-sector financing of transport infrastructure within the framework of the operator model, which might be extended in the future.

Back in 1994/95, the Federal Ministry of Transport therefore had a field test carried out on a highway in order to find out whether the fully automatic collection of general distance-related road user charges would be possible on Germany motorways. The results of the field test showed that, for passenger cars, fee collection as such is technically feasible but that, under the conditions prevailing on German motorways, there are still shortcomings in the enforcement technology and that, above all, fully satisfactory solutions to data protection problems have not yet been found. Moreover, it has become obvious that there is a risk of traffic being shifted from highways to the secondary road network. In contrast, these problems have turned out to be solvable for heavy lorries. Due to the smaller number of these vehicles, the enforcement problems are regarded as manageable, while the data protection requirements for commercial goods transport are considerably lower anyhow. The problem of traffic being shifted to the secondary road network, too, is believed to be of comparatively low significance due to the
Against this background, and on the basis of other studies, the Federal Ministry of Transport has decided to establish a so-called dual fee collection system for the introduction of distance-related motorway user charges for heavy lorries. The dual fee collection system is characterised by the fact that the user can choose between two different methods of payment. It consists of a manual component enabling motorists to acquire the right to use a certain motorway section before setting out on their journey. Target groups for the manual payment of motorway user charges are occasional users and users from abroad. The main focus should, however, be on the second method of payment, namely the automatic component. It requires an on-board unit in the lorry facilitating electronic fee collection while the lorry is in motion. That means that this kind of fee collection requires the vehicle neither to use a specific lane nor to reduce speed.

The technical and organisational details of the overall fee collection system are to be determined by means of a tender procedure. This invitation to tender will not contain detailed requirements for industry but concentrate on the main objectives of the fee collection system. Thus, as much scope as possible is to be given to the creativity and capacity for innovation of the companies submitting a bid. The main aim is to have a fee collection system that is as economically efficient and user-friendly as possible, represents state-of-the-art technology and will eventually make use of new developments in the field of telematics.

The invitation for tenders was published last December. Negotiations with six bidders will finally lead - this is our hope - to a decision on the best and a most suitable charging system in Germany.