

TAXATION OF PASSENGER MOTOR VEHICLES WITH ENVIRONMENTAL ASPECT

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Abstract

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The article deals with the issue of taxation of passenger motor vehicles in the Czech Republic and European Union member countries. It focuses on the topic of integrating environmental aspects into taxation systems of passenger motor vehicles with the aim of reducing production and releasing harmful substances into the air. CO₂ emissions produced by combustion of hydrocarbon fuels by motor vehicles is described as the most harmful substance, and it is used as a tool for ecological taxation reforms in individual European Union member countries. With regards to taxation, the article deals with mechanisms of registration tax and road tax and defines relation between the two tax mechanisms and their positive and negative aspects.

The article briefly defines individual taxation systems of motor vehicles in European Union member countries. In addition, it includes classification of those member countries which use CO₂ emission-based registration tax and road tax. The article focuses in detail on road tax systems in Germany, Finland and the United Kingdom. The United Kingdom became the first member country to apply CO₂ emissions-based rates of road tax. The conclusion of the article suggests a discussion over this issue in terms of the Czech Republic and modification of road tax based on reducing CO₂ emissions.

road tax, property tax, negative externality, Czech Republic

Motor vehicles have a considerable impact on people's lives, both positive and negative. They undoubtedly rise the living standard and contribute to economic development of market economies. However, they produce a wide range of environmental pollutants the highest portion of which is made up of CO₂ emissions. This fact carries negative externalities caused by road traffic. Road traffic is the principal producer of CO₂ emissions, which considerably contribute to global warming. As stated by the Ministry of Traffic (2011), road traffic produces 15% of the total amount of CO₂ out of which individual road traffic is responsible for 53.7% of this production. Other externalities of road traffic include traffic jams, noise, local pollution and climate change, and remedy measures need to be taken by the state.

In general, the longer time the motor vehicle is in use, the greater amount of CO₂ emissions it produces. The main focus of this article is CO₂ emissions

which are used as a tool for environmental tax reforms in the individual European Union member countries. A whole range of studies has proved that the age of vehicle fleet has an impact on the quality of environment. The latest study of this kind titled 'The influence of vehicle fleet on environment' published by SDA-CIA on March 27, 2012 was written by Ing. František Horák, CSc. According to SDA-CIA (2012), burning of hydrocarbon fuel produces two basic types of emissions:

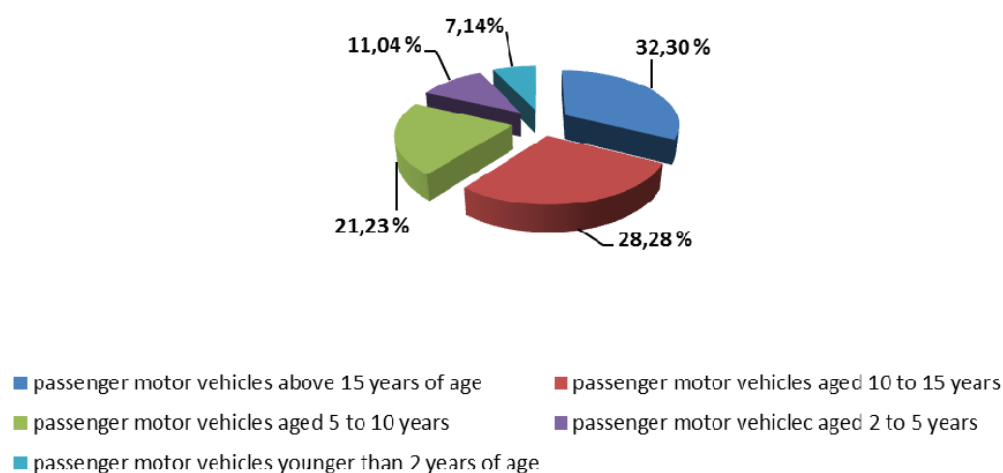
- Directly limited substances – carbon monoxide, hydrocarbon, and nitrogen oxides, CI engine-producing substances which cling to dust in the air. These substances are limited by regulations EHK R15 from 1971 and regulations ES. These limits are gradually tightened to reduce the levels of the above mentioned substances. The limits are the widely known limits EURO 1 and higher.
- Indirectly limited substances – CO₂, sulphur oxides. The average age of passenger motor

vehicles in the Czech Republic is 14 years and this trend has not significantly changed for the last few years. As stated by The Automobile Industry Association (2012), based on the data prior to June 30, 2012, there are 4,638,372 registered passenger motor vehicles aged 13.9 years on average, out of these more than 60% are cars older than 10 and almost 33% older than 15 years of age. The specific division of registered passenger motor vehicles based on age is illustrated in Fig. 1.

This trend has not dramatically changed in the last few years and the average age of passenger motor vehicles in the Czech Republic moves around 13.8 years. From a long-term point of view, the stated average age is below the European Union average. The European Union average age, as stated by ACEA

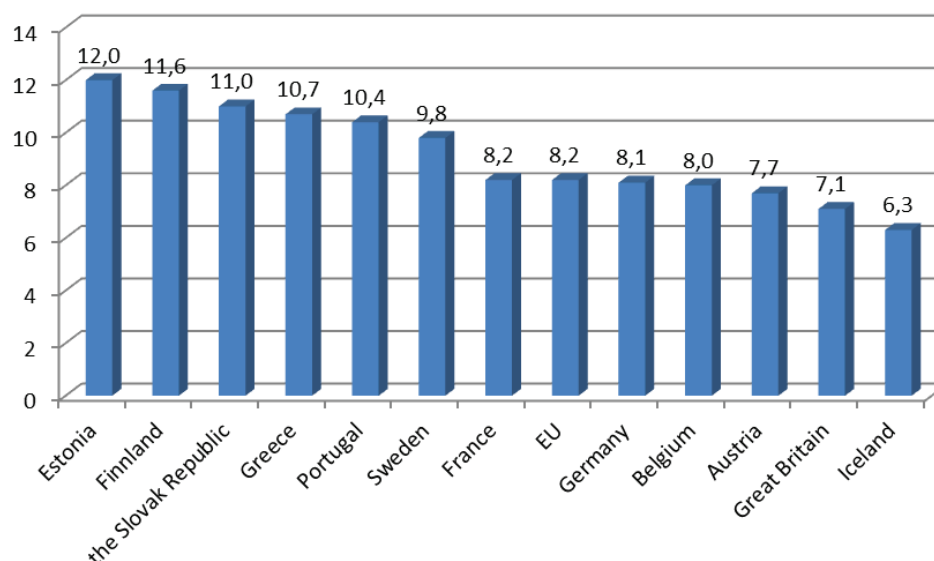
(2011), is 8.2 years (this number is based on the data provided by 18 European Union member countries).

It is therefore important that the Czech Republic gets involved in programs and systems that will improve the current state of affairs and form a tax tool that will motivate consumers to exchange their old cars for environment- friendlier ones. These steps will reduce the negative impact of road traffic on environment. Despite the unfavourable statistics on the current state of affairs of vehicle fleet, the Czech Republic does not have any tax tool for motivating its citizens to improve the current situation. The so called Pigouova tax seems to be an ideal tool for eliminating negative externalities of road traffic. A Pigouova tax is a tax applied to a market activity that generates negative externalities. This correction



1: Structure of passenger motor vehicles in the Czech Republic prior to June 30, 2012

Source: Sdružení automobilového průmyslu (2012), author's work



2: The average age of passenger cars in the selected European Union member countries Source: ACEA (2011), author's work

tax is applied to a generator of a tax externality which amounts to a company's cost and this cost could not be taken into account without this correction (Polluters Pays Principle). However, the main drawback of this idea is that in order to realize this concept, it is necessary to value all negative externalities produced by motor vehicles which is not an easy process to do, if not impossible and even costly. This is the reason why not very suitable tools are used in the field of fiscal measures in road traffic. These tools include consumption tax for fuels, registration tax and annual road tax.

MATERIALS AND METHODS

The main goal of this article is to provide a description and analysis of the current road tax system of passenger motor vehicles in the Czech Republic and selected European Union member countries which integrated environmental aspect in their road tax systems in order to reduce harmful emissions released into the atmosphere. Based on the results of this description and analysis, the article further discusses options for integrating environmental aspect into tax system of passenger motor vehicles registered in the Czech Republic.

To reach the goal, it is necessary to study a range of materials, especially legal documents that deal with this topic. All the sources used in this article are listed in the bibliography section at the back of the article. This article is built on an analysis method based on decomposition of a complex into elementary units. The aim of the analysis is identification of the characteristic qualities of the elementary units of the complex, their structure and nature. The article also contains a description of qualities of a particular process. Methods of deduction and synthesis are used to form a conclusion and recommendations.

The basic data for road tax system in the Czech Republic is used from the law No. 16/1993 on road tax according to later law. Data for European Union member countries is used from the sources by European Commission a European Automobile Manufacturers Association (ACEA).

RESULTS AND DISCUSSION

Applying road tax in the Czech republic, as we know it today, dates back to when the new tax system protected by the law No. 212/1992 Coll. on the tax system from January 1, 1993 was established. This type of tax system corresponds with its concept and structure to tax systems of Western European countries. It has an initial position for classification into taxes direct and indirect. In the Czech Republic, road tax is part of property taxes, although based on OECD classification, it belongs to consumption taxes. Neither expert literature considers road tax a property tax, or at least a typical property tax. As stated by Boněk (2001), despite all the aspects of road tax classification it is counted among property taxes as it has a similar character, especially due

to the tax technique it uses. The purpose of road tax is taxation of using road networks by motor vehicles. Within this general thesis, road tax is limited to those vehicles that are used for carrying out economic activities of business entities. Road tax is regulated by the law No. 16/ 1993 Coll. (the 19th amendment of the law) and its creators intended to solve a problem of raising funds for maintenance and development of road infrastructure in the Czech Republic.

Taxation of motor vehicles should correspond with requirements the fulfilling of which taxation entails. Šíroký (2008) sums up requirements for a good tax system and classifies taxes based on four basic principles – effectiveness, administrative simpleness, flexibility and fairness. The principals of fairness and effectiveness are considered the top principals. The names of each principle may differ in various literature sources, according to Peková (2008) for instance. However, their meanings stay the same, according to Musgrave and Musgrave (1994). Contribution by Andrlík (2012a) pays attention to these theoretically defined requirements for road tax, especially to effectiveness of the choice of road tax in the Czech Republic.

The main subject of road tax according to § 2 ZDS is motor vehicles and connecting vehicles if they are operated and registered in the Czech Republic and used for business purposes, self-employment or in close association with these. This limitation in passenger motor vehicles to vehicles used for business purposes only provides, in Andrlík's opinion (2012b), reserve collection income. Introducing and applying blanket tax to all motor vehicles with no regard to the business criterion could result in rise in public budget income, or rather the state fund of traffic infrastructure, which is, based on § 5 of law No. 243/2000 Coll., the recipient of gross income of this tax.

For setting tax base based on § 5 ZDS it is necessary to provide data from the vehicle's registration document – swept volume (measured in cm³), the maximum weight limit (measured in tons) and a number of axles, or a sum of maximum weight limit of axles (measured in tons) and a number of axles. The tax rate listed in § 6 ZDS depends on the vehicle category – passenger or freight vehicles, and the above mentioned technical parameters. The tax rate can be reduced depending on the moment of the vehicle's first registration. Reduction of the basic tax rate is based on a 36-month cycle, after the first 36 months the tax is reduced by 48%, after another 36 months by 40%, another 36 months by 25%. Currently, annual tax rates in dependence on swept volume are from 1,200 CZK to 4,200 CZK, in dependence on weight and a number of axles from 1,800 CZK to 44,100 CZK. Under specific conditions there is also an opportunity to use the so called daily tax rate – 25 CZK per day. Annual tax rates or final tax obligation can further be regulated by means of tax rate reduction, either up or down, with regards to the age of a vehicle or its use in combined road

traffic. Road tax is built as an annual tax and the tax period is calendar year. Taxpayer is obliged to file a tax return by January 31 after the tax period has ended, according to § 15 ZDS. Specific purpose motor vehicles are exempted from road tax based on § 3.

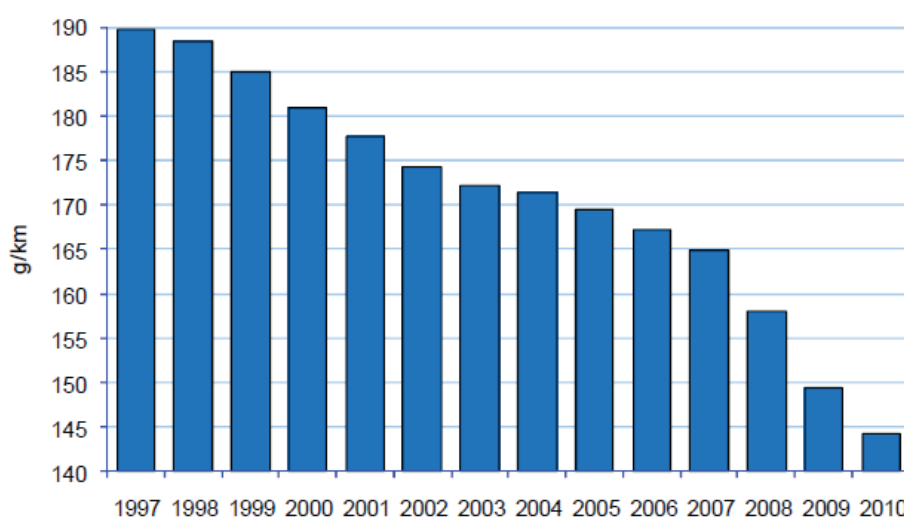
The road tax law No. 16/1993 Coll. applies to motor vehicles used for business purposes only. All freight vehicles (over 3.5 tons of weight) are subject to road tax, with a few defined exceptions. Generally, road tax in the Czech setting applies to all those who use motor vehicles on roads and motorways. Financial resources for public budget from this source are used for road construction and maintenance. The ecological aspect – negative externality – harmful emissions produced by vehicles – is not an issue being solved at the moment. Road tax or registration tax based on CO₂ emissions could be the means for eliminating the negative impacts of road traffic. This type of motor vehicle taxation is a common tax tool in European Union member countries. The CO₂ emission aspect can be included in one-time registration taxes which have a direct influence on the buyer as this tax is reflected in the purchase cost of an older motor vehicle (older motor vehicle means more CO₂ emissions and higher registration tax). This tax tool is used by 19 European Union member countries.

Applying registration tax plays an important role for those consumers for whom the current purchase cost is crucial and makes them buy a vehicle with lower tax. Registration tax can be very effective from a society-wide point of view if it is based on reduction of negative externalities. From the perspective of public budget, registration tax is an unstable part of incomes as it is more liable to economic cycles than road tax, which is paid every year. Weakening of a motive for passenger vehicle restoration can occur in case of road tax based on CO₂ emissions, as this tax can be paid in parts within several years and consumers do not realize the total costs connected with high levels of CO₂ emissions produced by their vehicles. However, a rational consumer can view it as an additional cost connected with a passenger motor vehicle purchase depending on CO₂ emissions, while registration tax may not be noticed because it is included in the purchase cost of the motor vehicle. This may be the reason why the effect of registration tax on a consumer's choice and intensity of CO₂ emissions is weaker than their being considered in regular annual road tax which, if it is properly differentiated based on CO₂ emissions, is viewed as an annual additional cost connected with a motor vehicle purchase depending on the amount of CO₂ emissions produced. Registration tax must be high enough to be effective in reducing CO₂ emissions. An extreme example is the Danish registration tax system in which tax rate, as stated by European Commission (2012), can account for 180% of a vehicle's regulated cost (the usual price including VAT). The result may be that some people can not afford to buy an environment-friendly

motor vehicle. A typical example can be a young family. They need a spacious passenger motor vehicle which, however, has a specific type of engine that releases higher levels of CO₂ emissions. This effect on a consumer produced by registration tax can cause a negative impact in slowing down the process of vehicle fleet restoration in the particular country. Purchase costs of new passenger motor vehicles are high and if they are burdened with high registration tax, many people will be forced to keep older and less environment-friendly motor vehicles.

Road tax is defined as a regular tax applied to an owner and user of a motor vehicle. As discussed above, in the Czech Republic road tax applies only to motor vehicles that are used for business purposes while in the European Union road tax applies even to privately owned motor vehicles. According to ACEA (2012), road tax is not at all applied in Estonia, Lithuania, Poland and Slovenia. Privately owned passenger motor vehicles are not subject to road tax in France, the Czech Republic and the Slovak Republic, only business entities are obliged to pay road tax. Negative effects of registration tax can be eliminated by means of road tax which can influence the consumer in his/her choice of a motor vehicle and motivate him/her to exchange his/her older motor vehicle for a newer one and thus lower the average age of vehicle fleet in the particular country. Road tax needs to be structured in a way to motivate to buy an environment-friendly motor vehicle. Road tax base in many European Union member countries is either cylinder volume or vehicle weight. European Union member countries which have road tax based on CO₂ emissions often receive criticism for the taxes being too low to encourage vehicle fleet restoration. This criticism met with response and a typical example is Great Britain where incorporating environmental aspect into the road tax system led to higher tax rates and increasing the number of tax zones (see Tab. III). Currently, the Czech Republic has a tool to produce behaviour based on environmental aspect. The tool is a fee for collection, processing, use and disposing of collected vehicle wrecks based on § 37e of law No. 185/2001 Coll. on waste, which applies to the first registration of vehicles which meet emission limits EURO 0, 1, and 2. However, this tool does not present a proper tool for restoring vehicle fleet of private owners mainly because of the fact that the fee applies to the first registration only. If a vehicle that meets emission limits EURO 0 and 2 is resold, another registration fee does not apply to it. The main drawback of the fee then is that an owner of a used motor vehicle is not motivated to exchange his motor vehicle for a newer one and bears no burden for buying and operating the used vehicle. This is the reason why introducing road tax with the aim to reduce CO₂ emissions could be effective and what is more, it could speed up restoration of vehicle fleet in the Czech Republic.

The above provided analysis of positive and negative aspects of individually applied registration



3: Development of average levels of CO₂ emissions produced by new motor vehicles registered in Great Britain
Source: Muray (2011)

tax or road tax with environmental aspect has produced the following outcome. A reasonable combination of both the taxes (road and registration) can provide an effective tool of tax policy focused on eliminating levels of harmful CO₂ emissions released into the atmosphere. Nevertheless, the main goal of this article is not suggesting an ideal model of tax ratio but discussing the fact that passenger motor vehicle taxation based on CO₂ emission production is the right step to reduce impact of negative externalities produced by operating motor vehicles. Introducing taxation systems of passenger motor vehicles based on CO₂ emissions has provable results in countries where this system has already

existed for some time. As cited by Low Carbon Vehicle Partnership (2012), in Great Britain the number of vehicles with low levels of CO₂ emissions doubled in 2010 to more than 57,000 compared to 2009. It is case of the lowest road tax rates in zone A (see Tab. III), where CO₂ emission levels are less than 100 g/km. Also, average emission levels in new motor vehicles registered in 2010 fell to 144.2 g/km, which is reduction by 4% compared to 2009. These numbers prove that the trend of reducing average levels of CO₂ emissions in newly registered motor vehicles continues well. Fig. 3 shows development of reducing average levels of CO₂ emissions in Great Britain and shows long-term provability of the trend of reducing average levels of CO₂ emissions since 1997.

Taxation of motor vehicles in European Union member countries is done by two tax systems – road tax and registration tax. Registration tax is defined as one-time tax applied at the moment of purchase to a company or an individual who buys a motor vehicle. The main meaning of registration tax is motivating the buyer to buy an environment-friendlier type of motor vehicle. The Czech Republic, together with seven other European Union member countries – Bulgaria, Germany, Estonia, Luxembourg, Sweden, the Slovak Republic and Great Britain do not apply registration tax. In case of 12 other European Union member countries that apply registration tax to passenger motor vehicles, registration tax is influenced by CO₂ emissions. In the rest of European Union member countries the tax base is formed by price of the passenger vehicle, age of the vehicle, fuel consumption, cylinder capacity, vehicle weight or vehicle length. Environmental aspect in combination with for example cylinder capacity form one of the criteria determining the final tax obligation in the first passenger motor vehicle registration see Tab. I.

I: Member countries with registration tax based on CO₂ emissions

Country	Registration tax
BELGIUM	Based on cc + age CO ₂ emissions (Wallonia) CO ₂ + Euro standards + fuel + age (Flanders)
FINLAND	Based on price + CO ₂ emissions
FRANCE	Based on CO ₂ emissions From € 200 (141 to 145 g/km) to € 3,600 (above 250 g/km)
IRELAND	Based on CO ₂ emissions
CYPRUS	Based on cc + CO ₂
LATVIA	Based on CO ₂ emissions
MALTA	Based on price, CO ₂ emissions, vehicle length
NETHERLANDS	Based on price + CO ₂ emissions
PORTUGAL	Based on cc + CO ₂ emissions
ROMANIA	Based on cc + emissions + CO ₂
SLOVENIA	Based on price + CO ₂ emissions
SPAIN	Based on CO ₂ emissions From 4.75% (121–159 g/km) to 14.75% (200 g/km or more)

Source: ACEA (2012), author's work

Another part of the article contains analysis of road tax. It has been part of the tax system of the Czech Republic since January 1, 1993, however, it does not take environmental aspect in consideration. In 10 European Union member countries, CO₂ emissions produced by passenger motor vehicles used by private owners have impact on the amount of road tax (see Tab. II).

II: EU member countries with CO₂ based road tax

Country	Road tax – passenger motor vehicles
FINLAND	CO ₂ emissions/ Weight x days
IRELAND	CO ₂ emissions/ cylinder capacity
CYPRUS	Cylinder capacity, CO ₂ emissions
LUXEMBOURG	CO ₂ emissions
NETHERLAND	CO ₂ emissions, weight
GERMANY	CO ₂ emissions
PORTUGAL	Cylinder capacity, CO ₂ emissions
GREECE	CO ₂ emissions
SWEDEN	CO ₂ emissions/ weight
UNITED KINGDOM	CO ₂ emissions/ cylinder capacity

Source: ACEA (2012), author's work

As Tab. II shows, the mentioned member countries use CO₂ emissions produced by passenger motor vehicles as one of the criteria for determining the amount of road tax. CO₂ emission is used by all the member countries as a unit of harmful substances released into the atmosphere for ecologisation of road tax. CO₂ emission can be measured in all new motor vehicles and is a convenient tool for ecologisation of road traffic. The reason for CO₂ emission being the key criterion is evident. A study provided by Ministry of Traffic (2011) shows that

individual road traffic is responsible for 53.7% of CO₂ production. Tax systems based on CO₂ emissions applied in Great Britain, Germany and Finland are subject of the following part of this article.

Great Britain is considered a pioneer of this type of road tax ecologisation. The taxation system with environmental aspect – CO₂ emissions – has been applied in Great Britain since March 1, 2001. According to HM Treasury (1998), British Ministry of Finance considers the tax rate based on CO₂ emissions more reliable a way of measuring the impact on environment than tax rate based on swept volume measured in cm³. Passenger motor vehicles first registered before the given date are subject to the original tax system, which corresponds with the current road tax system for passenger motor vehicles in the Czech Republic. Taxation based on swept volume of the passenger motor vehicle. The original tax system distinguished between two basic road tax rates:

- for cylinder volume up to 1,549 cm³ road tax rate is 135 GBP per year,
- for cylinder volume over 1,549 cm³ road tax rate is 220 GBP per year.

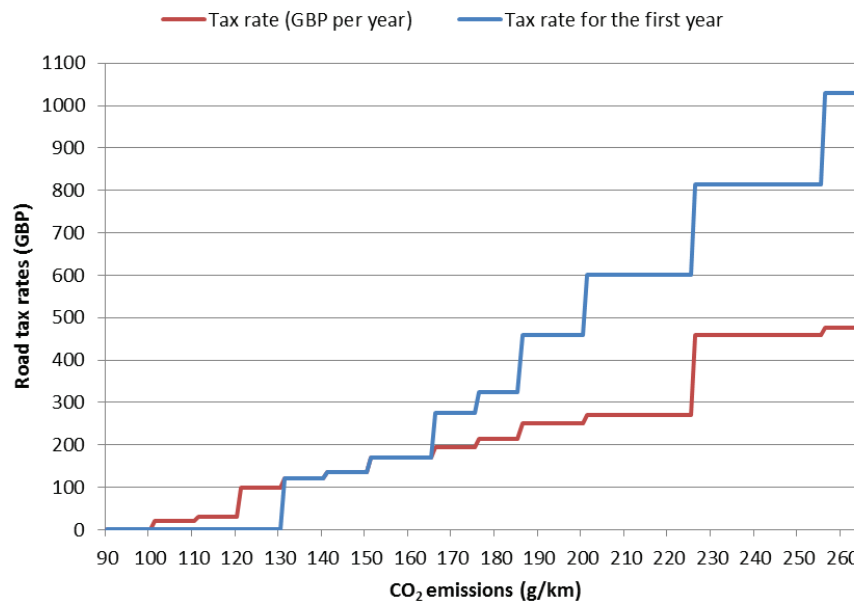
Beginning on March 1, 2001 all newly registered passenger motor vehicles are subject to road tax based on CO₂ emissions. Murray (2011) shows in his presentation how the number of emission zones and road tax rates has risen since incorporation of CO₂ emissions into taxation.

Tab. III shows that in 2001 there were only four zones which combined CO₂ emissions (g/km). This system proved to be unfair especially for owners of motor vehicles with border levels of CO₂ emissions. This was reason for creating seven zones in 2005, but the border levels remained unchanged (under 100 g/km and over 255 g/km). The result was creating more tax rates. In 2010, there were 13 tax zones and the same applies to 2012 when tax rate is between 0

III: Development of tax zones and tax rates in Great Britain

	2001		2005		2010			2012		
CO ₂ g/km	Zone	GBP/ year	Zone	GBP/ year	Zone	GBP/ year	1st year	Zone	GBP/ year	1st year
< 100	A	100	A	65	A	0	0	A	0	0
101–110			B	75	B	20	0	B	20	0
111–120					C	30	0	C	30	0
121–130			C	105	D	90	0	D	100	0
131–140					E	110	110	E	120	120
141–150					F	125	125	F	135	135
151–165	B	120	D	125	G	155	155	G	170	170
166–175	C	140			H	180	250	H	195	275
176–185			E	145	I	200	300	I	215	325
186–200	J	235			425	J	250	460		
201–225	D	155			F	190	K	245	550	K
226–255			G	210	L	425	750	L	460	815
> 255					M	435	950	M	475	1030

Source: Murray (2011), European Commission (2012), author's work



4: Road tax rates in the 1st year and following years for 2012
Source: Tab. III, author's work

GBP and 475 GBP per year. In 2010, in connection with the general requirement for removing old cars from road traffic, a new system of different tax rates for the year of vehicle purchase and the following years was incorporated into the system of determining road tax. This division can be viewed as a type of registration tax. Tab. III also indicates that environment-friendlier motor vehicles are subject to the same tax rates in the first year and the following years. However, if CO₂ emission levels exceed 166 g/km (data valid for 2012), tax rate is 80 GBP higher in the first year. In the last emission zone it is even 555 GBP higher. The highest road tax rate in the first year reaches 1,030 GBP per year. Introducing a different tax rate in the first year of motor vehicle purchase is very practical because people think twice about buying a used motor vehicle with higher levels of emissions and that increases purchase costs of passenger motor vehicles.

Fig. 4 shows differences in tax rates for the first year and following years and the general development of tax rates in 2012 based on CO₂ emissions. Fig. 4 further indicates that road tax in Great Britain has a tiered character.

Germany as well as Great Britain use CO₂ emission-based road tax for passenger motor vehicle taxation. Germany started applying CO₂-based tax for new motor vehicles after all federal

countries reached consent, and the tax system came into existence on July 1, 2009. Passenger motor vehicles registered prior to this date are subject to the original road tax system based on cylinder volume measured in cm³ and emission limit EURO. This system also distinguishes between CI engine and fuel engine of a motor vehicle. If a passenger motor vehicle complies with a stricter emission limit EURO, it is subjected to a lower road tax rate. Road tax rates are found in Tab. IV and are set for every 100 cm³ of cylinder volume or its component.

The new taxation system for motor vehicles is valid from July 1, 2009 and according to this system, road tax is based on cylinder volume (measured in cm³) and CO₂ emissions. The system is made up of two components which are counted up to get the amount of road tax rate. The new tax system also considers the type of driving force of the particular motor vehicle and distinguishes between two types of road tax rates based on cylinder volume:

- motor vehicles with petrol engine are subject to 2 Euro tax per 100 cm³ of a cylinder or its component,
- motor vehicles with diesel engine are subject to 9.5 Euro tax per 100 cm³ of a cylinder or its component.

These road tax bases are in dependence on CO₂ emission production added by 2 Euro per gram of CO₂ emissions with no differentiation between

IV: Road tax rates for motor vehicles registered prior to July 1, 2009

type of engine	EURO 1 and comparable emission limits	EURO 2	EURO 3 and better
	for every 100 cm ³ of cylinder volume or its component		
petrol engine	€ 15,13	€ 7,36	€ 6,75
CI engine	€ 27,35	€ 16,05	€ 15,44

Source: European Commission (2012), author's work

V: Road tax rates for vehicles registered prior to 2001

Total weight (kg)	Tax sum	Total weight (kg)	Tax sum
	EUR / 365 days		EUR / 365 days
až 1 300	125,93	2 401–2 500	305,51
1 301–1 400	136,88	2 501–2 600	325,22
1 401–1 500	148,56	2 601–2 700	345,66
1 501–1 600	160,97	2 701–2 800	366,83
1 601–1 700	174,11	2 801–2 900	388,73
1 701–1 800	187,98	2 901–3 000	411,36
1 801–1 900	202,58	3 001–3 100	434,72
1 901–2 000	217,91	3 101–3 200	458,81
2 001–2 100	233,97	3 201–3 300	483,63
2 101–2 200	250,76	3 301–3 400	509,18
2 201–2 300	268,28	3 401 and more	535,46
2 301–2 400	286,53		

Source: FINLEX (2012), author's work

diesel engine and petrol engine. For this part of road tax there is a minimum limit of 120g of CO₂/km. Passenger motor vehicles with lower levels of emissions than 120g CO₂/km, are exempted from this part of tax. The established limit of CO₂ emissions is valid for passenger motor vehicles registered prior to December 31, 2011. The limit is lowered to 110g for before the end of 2013 and finally to 90g as of January 1, 2014. The road tax rate structure is linear and corresponds with the amount of produced CO₂ emissions, unlike the system applied in Great Britain where the original four zone division of CO₂ production led to creating seven zones with the intention of removing unfairness in applying road tax.

The last analysed system of road tax is combination of CO₂ emissions and passenger motor vehicle weight. Finland is chosen here as a representative of European Union member countries. Like in Great Britain and Germany, even in Finland motor vehicles registered prior to 2001 are approached differently. Motor vehicles registered prior to 2001 and even motor vehicles with no data concerning CO₂ emissions are subject to tax based on vehicle weight and the tax rates are from 126 to 535 Euro per year (see Tab. V).

The new road tax system in Finland has been in use since March 2010 and it is based on two different approaches. The first approach is based on taxation of CO₂ emissions only and the other approach sets road tax based on type of driving force of the motor vehicle. The first approach is based on CO₂ emissions set for all passenger motor vehicles of the maximum weight of 3.5 tons. Tax rate is differentiated for each gram of CO₂ emissions. Tab. VI shows only a few road tax rates for 2012 as there is a large number of them. What is specific about Finland is the fact that it has a tax rate even for zero amount of CO₂ emissions and for each new gram there is a daily and annual road tax rate. If the

VI: Examples of road tax rates in Finland

CO ₂ emissions (g/km)	EURO cents per day	EURO per year
0	11,8	43,070
50	15,8	57,670
100	23,3	85,045
150	36,9	134,685
200	58,6	213,890
250	88,0	321,200
300	119,9	437,635
350	147,1	536,915
400 a více	166,1	606,265

Source: FINLEX (2012), author's work

upper limit of 400 g/km is exceeded, a constant tax rate of 606,265 Euro is paid per year.

The other approach to setting road tax base applies to passenger motor vehicles that use other types of fuel but petrol – diesel, paraffin oil, liquefied oil or electricity. This approach is based on the type of driving force and vehicle weight. Road tax is set as tax rate per day in dependence on the total weight of a passenger motor vehicle, specifically every 100kg of total weight of the vehicle or its component if driving force is:

- only electricity 1.5 quintals,
- electricity and petrol 0.5 quintals,
- electricity and diesel 4.9 quintals,
- gas 3.1 quintals,
- other types of driving force (only petrol, for example) 5.5 quintals.

Individual tax systems for passenger motor vehicles in European Union member countries share a number of common features with the common aim of eliminating harmful substances released into the atmosphere by passenger motor vehicles. A specific measurable aspect of negative impact on environment is production of CO₂

emissions produced by a specific motor vehicle. A basic rule is applied here for taxation – the less CO₂ emissions produced, the lower tax rate applies and the more environment-friendly approach.

The tax system that has been used in Finland for passenger motor vehicles registered after 2001 seems to be the most appropriate one out of all the above analysed road tax systems. A partial alteration

should be made there – using only the first system based on taxation of each gram of CO₂ emissions with no regards to the type of engine. In motor vehicles registered prior to 2001 the system based on the vehicle's weight can be applied very easily because in older motor vehicles it is possible to find this data in registration document.

CONCLUSION AND SUMMARY

The article deals with the issue of ecologisation of road tax. It provides analyses of passenger motor vehicle taxation systems by focusing on registration tax system and road tax system. The article further discusses various points of view of applying systems of registration tax and road tax. It shows both positive and negative aspects of applying either of these taxes or both of them combined. Within the practical analysis of road tax system in European Union member countries there is a detailed evaluation of road tax system, which is the type of tax system used also in the Czech Republic. The outcome of the analysis of the taxation system of passenger motor vehicles within the European Union is recommendations for building a proper model of road tax based on production of harmful CO₂ emissions. Generally, if Czech legislators intend to reduce the amount of negative traffic externalities (CO₂ in case of road tax), it should maximise incentives for reducing emissions by both their producers and consumers.

As stated by the Ministry of Traffic (2011), road traffic is responsible for 15% of all CO₂ emissions produced, out of these individual road traffic is responsible for 53.7% of this production. It is also possible to say that the most frequent producers of emissions are passenger motor vehicles that are more than 15 years in use as these do not have catalytic converters or they meet requirements of only EURO 1 emission limit. SDA-CIA (2012) states that there are 844,822 registered motor vehicles with no catalytic converter and 538,798 motor vehicles that comply only to EURO 1 emission limit. For this reason the Czech Republic should consider change of road tax system because of high levels of CO₂ production and its obligation to the Kjøt protocol. By acceding to the Kjøt protocol, the Czech Republic committed to successive reduction of CO₂ emissions in the atmosphere.

CO₂ emissions should be the key criterion for taxation with the aim of motivating customers to buy motor vehicles with lower levels of emissions. In case there is no information about CO₂ emissions available, it is possible to base the policy on fuel use which, using the past and current technologies in automobile industry, strongly correlates with CO₂ emissions. For the future road tax system in the Czech Republic it is further possible to use analysed methods that are used in approach to older motor vehicles in Great Britain, Finland and Germany. Tax policy should encourage reduction of CO₂ emissions. In other words, every single gram of CO₂ emissions should be taken in consideration and there should be no disconnections. Taking a tiered process of rates does not have full effect as with the interval with the same tax producers and customers are not motivated to reduce CO₂ emissions. This problem can be found in the system used in Great Britain and has its drawbacks. Passenger motor vehicles with a different CO₂ emission production that are in the same emission group are subject to the same taxation system and that is viewed as unfair with passenger motor vehicles whose emission level can vary by one gram only. The result is that only a small number of automobile producers who produce cars with emissions close to the tax zone border are motivated to reduce CO₂ emissions.

Change in the tax system of motor vehicles in the Czech Republic should follow other European Union member countries which have already incorporated CO₂ emissions into their tax systems and thus follow the Kjøt protocol. According to EUR-LEX (2009), law no. 443/2009 says that average CO₂ emission levels produced by new motor vehicles in European Union member countries must not be higher than 120g CO₂/km before the end of 2012. In 2006, the Commission moved the limit up to 130g CO₂/km by 2015 and 95g CO₂/km by 2020. If the Czech Republic does not incorporate a motive for reducing the number of motor vehicles with high levels of emissions into road tax, it will definitely not fulfill its goal because of the previously discussed average age of vehicle fleet.

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