

VEHICLE TAXES IN EU COUNTRIES. HOW FAIR IS THEIR CALCULATION?

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Abstract

Existing taxation in EU¹ vehicles is very complex because the systems implemented in the EU member states can be both complex in themselves and quite different from country to country. And not always the taxes levied are calculated efficiently for the most polluting vehicles or for those that could affect the environment or health.

In this paper we present a review of calculation of vehicle taxes in EU countries. This review analyzes three types of taxes: 1) purchase tax (registration tax, fee and VAT²); 2) property tax on vehicle (Annual Tax, Road Tax or Circulation Tax), and 3) taxes on vehicle use (tax on fuel and VAT). We compare taxes of same cars in different EU countries. In addition, some scenarios about the distances that each car may traverse in one year are surveyed. Finally, some suggestions are presented to calculate such taxes on possible more rational ways, including environmental aspects, for a future study.

Keywords: *road tax; registration tax; fuel tax; tax calculation; vehicles; EU*

Resumen

La presión fiscal existente en los vehículos de la UE³ es muy compleja debido a que los sistemas implementados en los estados miembros de la UE pueden ser complejos en sí mismos y muy diferentes de un país a otro. Y no siempre los impuestos que se calculan gravan de forma eficaz y/o justa a los vehículos que más contaminan o que más pueden afectar al medioambiente o a la salud.

En este trabajo se hace un repaso a la forma de calcular los impuestos sobre los vehículos en los países de la UE. Esta revisión analiza tres tipos de impuestos: 1) impuesto de compra (matriculación e IVA⁴), 2) impuestos sobre la propiedad del vehículo (impuesto anual o impuesto de circulación), y 3) los impuestos sobre el uso del vehículo (impuesto sobre el combustible e IVA). Se comparan los impuestos de los mismos vehículos en diferentes países de la UE. Además, se examinan diferentes escenarios sobre las distancias que cada vehículo puede recorrer en un año. Finalmente, se hacen algunas sugerencias sobre posibles formas más racionales, especialmente desde el punto de vista ambiental, de calcular dichos impuestos que pueden ser objeto de investigación futura.

¹ European Union

² Value Added Tax

³ Unión Europea

⁴ Impuesto sobre el Valor Añadido

Palabras clave: *impuesto de circulación; impuesto de matriculación; impuestos de combustibles; vehículos; cálculo; UE*

1. Introduction

Global energy needs are projected to increase over the next 25 years by approximately 50% (DCMNR, 2006). The continuing increase in energy consumption, the mid-depletion point of conventional oil and of the re-concentration of crude oil production in the Near East will compel industrialized as well as developing nations to make more efficient use of energy (De Haan et al., 2007). Technological improvements still are the most important source for energy savings (Berkhout et al., 2007). As there is no doubt that the challenges will increase within the next few decades, and as the re-investment cycles of the passenger fleet, the production capacities, and infrastructures have to be considered, early actions and long-term perspectives by governments and technology producers become increasingly important (De Haan et al., 2007).

The transportation sector accounted for 21.8% of total primary energy consumption worldwide in 2000, and will account for ca. 34% in 2050 (OECD¹ countries: 28.1% and 40%, respectively) (IEA, 2003). In the European Union (EU), road transport at present is the second-largest sector of energy consumption, but is one among the fastest growing sectors regarding CO₂ emissions, with an increase of 20% between 1990 and 2000 (De Haan et al., 2007)

Additionally, passenger cars are a major source of CO₂ emissions and are, therefore, of particular relevance to the EU's environmental objective, namely to meet its environmental commitments under the Kyoto Protocol. Fiscal measures constitute one of the three pillars of the Community's strategy to reduce CO₂ emissions from passenger cars. The optimal use of fiscal measures, together with the commitments made by the car industry (ACEA², JAMA³ and KAMA⁴) and consumer information, is a critical instrument in achieving the Community's target of 120 grams CO₂ per kilometer by 2010 at the latest (COM, 2005).

Also, European countries are committed to overall emission reduction of -20% compared to 1990 levels, under Europe 2020 targets.

To reduce the energy consumption and carbon emissions, the EU has produced a proposal for a Council Directive (COM, 2005) to implement reforms in the vehicle registration taxes and annual circulation taxes (Giblin and McNabola, 2009).

The adjustments of taxes to achieve reductions in CO₂ and other air pollution emissions, harmful to the environment and society have been well established in economic research (Baumol and Oates, 1971; Baumol, 1972). The adjustment of taxes has been shown to be a more effective measure in maintaining a desired minimum standard in air pollution than enforcing direct controls on emissions, as the associated costs of administration, enforcement and litigation of such controls do not exist in adjusting taxes (Baumol, 1972; Parry, 2007).

Various duties and taxes on cars are an important source of tax revenue in Europe. Tax revenue from registration fees, ownership taxes, energy taxes and related value added tax accounts for up to 5% of GDP¹ (OECD, 2008). In addition to its significance for tax revenue, the taxation of ownership and use of cars is also increasingly designed to pursue environmental objectives. Whereas environmental objectives were initially pursued by

¹ Organization for Economic Co-operation and Development

² Association des Constructeurs Européens d'Automobiles (European Automobile Manufacturers Association)

³ Japan Automobile Manufacturers Association

⁴ Korea Automobile Manufacturers Association

promoting compliance with EU emission standards, the focus has now shifted to the promotion of fuel efficiency and thus reduced emission of carbon dioxide (Kalinowska et al., 2009).

2. EU countries vehicle tax information

This report tries to present the taxes on new vehicles in European Union countries. List of these countries and their Value Added Tax, Registration Tax (include Registration Tax and Registration Fee), and Road Tax (Circulation Tax) are presented in Table 1. In addition, it shows fuel prices and energy taxes in the area of study.

The registration duties, such as VAT (Value Added Tax), Registration Tax and Registration Fee, are payable in all EU countries. In this way all countries have VAT, 19 countries have registration tax and 18 countries have registration fee. Only 12 countries have both registration tax and registration fee. At least Circulation Tax or Road Tax (Tax on Ownership) is applicable in 19 countries. In addition, only 9 countries have all vehicles tax items (VAT, Registration Tax, Registration Fee and Road Tax) together (Table 1).

Also, Denmark, Hungary and Sweden with 25% have the highest VAT, and Cyprus and Luxembourg with 15% have the least VAT in EU. Most common rate for VAT is 20%, which is applied in 8 countries.

Globally, at least nine factors plus fixed taxes are served as a basis for taxes on vehicles. As it shown in Table 1, 15 countries use CO₂ emissions, 8 ones use cylinder capacity, 7 countries use fuel type, and 7 ones use vehicle price for their calculations. Other factors such as Euro standards, vehicle power, weight, fuel consumption, and length of vehicles are used by 14 countries. All these factors are used either in a single or combined way. Some EU countries, which were inattentive to environmental aspects in vehicles taxes, started to choose CO₂ emissions for registration tax after the European Council Directive in 2005.

On the other hand, Fuel Price (Gasoline and Diesel) in EU countries and related Fuel Tax in year 2011 are shown in Table 2. Moreover, this table shows that 9 countries (Italy, Greece, Netherlands, Denmark, United Kingdom, Sweden, Ireland, Germany, and France) have higher fuel price, fuel tax percentage, and fuel tax cost, than other EU countries.

Table1: List of European Union countries and their vehicle related tax summary**

Country Name	CC [*]	ILP C	VAT (%)	Registration Duties		CT
				RT	RF	
Austria	AT	A	20	Fuel consumption and Fuel type	Fixed	KW
Belgium	BE	B	21	CC	-	CC
Bulgaria	BG	BG	20	-	Fixed	KW
Cyprus	CY	CY	15	CC + CO ₂	CC	CC
Czech Republic	CZ	CZ	20	Euro Standard	Fixed	-
Denmark	DK	DK	25	Price and Technical options	Fixed	Fuel consumption
Estonia	EE	EST	20	-	Fixed	-
Finland	FI	FIN	23	CO ₂ and Price	-	Weight

¹ Gross Domestic Product

France	FR	D	19.6	CO ₂ and Fiscal power	Fixed	Fixed
Germany	DE	D	19	-	Fixed	CC + CO ₂
Greece	EL	GR	23	CC + Euro Standard + Price + CO ₂	-	CC
Hungary	HU	H	25	CC + Fuel Type + Wealth Tax	-	Fixed
Ireland	IE	IRL	21	CO ₂ and Price	-	CO ₂
Italy	IT	I	20	KW	Fixed	KW and Euro Standard
Latvia	LV	LV	22	CO ₂	Fixed (Fuel type)	Weight
Lithuania	LT	LT	21	-	Fixed	-
Luxembourg	LU	L	15	-	Fixed	CO ₂ + Fuel Type
Malta	MT	M	18	CO ₂ and Length	-	CO ₂
Netherlands	NL	N	19	CO ₂ and Price and Fuel type	Fixed	Weight and Fuel type
Poland	PL	PL	23	CC	Fixed	-
Portugal	PT	P	23	CC + Fuel Type + CC	Fixed	CC + CO ₂
Romania	RO	RO	24	CC + CO ₂ and Euro Standard	Fixed	CC
Slovakia	SK	SK	20	-	Fixed	-
Slovenia	SL	SLO	20	Price	-	-
Spain	ES	E	18	Price and CO ₂	Fixed	HP
Sweden	SE	S	25	-	-	CO ₂ + Fuel type
United Kingdom	UK	GB	20	-	Fixed	CO ₂

*CC: Country Code; ILPC: International License Plate Code; VAT: Value Added Tax; RT: Registration Tax; RF: Registration Fee; CT: Circulation Tax; KW: Kilowatt; CC: Cylinder Capacity.

** ACEA, 2010

Table 2: EU fuel prices and fuel taxes

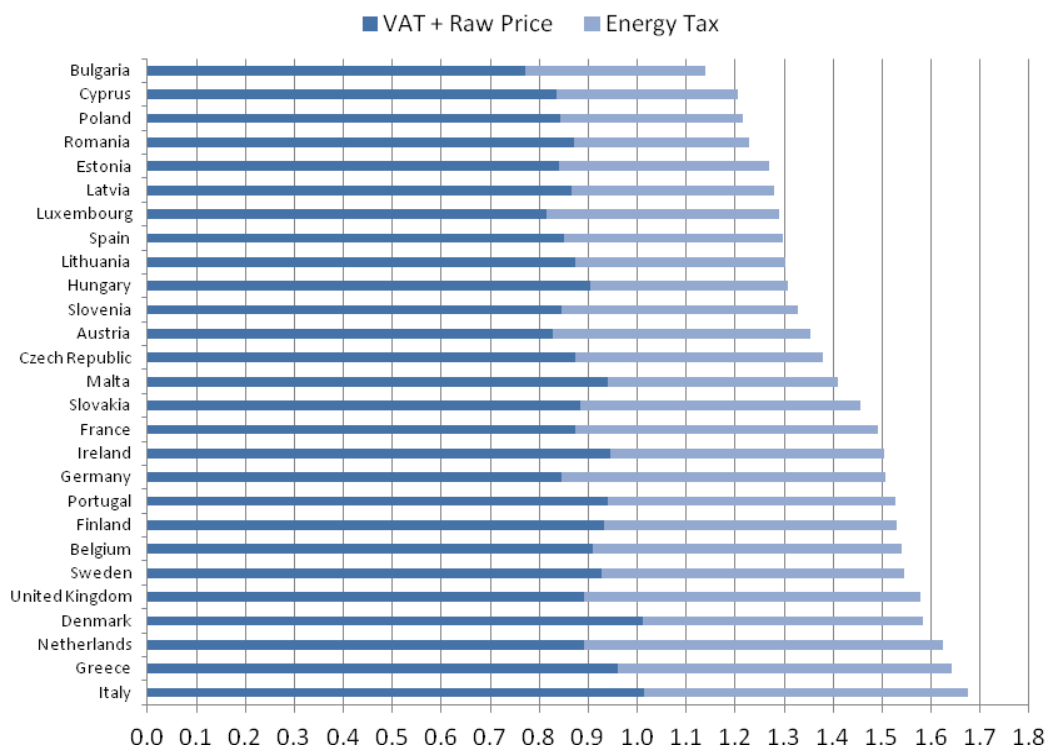
Country Name	CC	Fuel Price* (Euro)		Fuel Tax (% on final price)	
		Gasoline	Diesel	Gasoline	Diesel
Austria	AT	1.352	1.366	38.8	31.7
Belgium	BE	1.540	1.427	41.0	30.9
Bulgaria	BG	1.139	1.197	32.2	25.8
Cyprus	CY	1.205	1.306	30.7	26.5
Czech Republic	CZ	1.379	1.405	36.6	30.7
Denmark	DK	1.584	1.422	36.2	27.1
Estonia	EE	1.270	1.363	33.8	28.8
Finland	FI	1.529	1.407	39.1	25.7
France	FR	1.491	1.368	41.5	31.8
Germany	DE	1.507	1.399	44.0	33.4
Greece	EL	1.643	1.514	41.5	28.0
Hungary	HU	1.307	1.410	30.9	26.0
Ireland	IE	1.504	1.447	37.2	32.8

Italy	IT	1.674	1.654	39.4	31.5
Latvia	LV	1.279	1.321	32.3	24.8
Lithuania	LT	1.301	1.284	32.8	23.1
Luxembourg	LU	1.289	1.202	36.8	26.4
Malta	MT	1.410	1.340	33.3	29.0
Netherlands	NL	1.623	1.375	45.1	30.9
Poland	PL	1.216	1.242	30.8	23.3
Portugal	PT	1.527	1.398	38.5	25.8
Romania	RO	1.227	1.273	29.0	23.5
Slovakia	SK	1.456	1.402	39.3	29.3
Slovenia	SL	1.328	1.277	36.3	27.4
Spain	ES	1.296	1.285	34.4	26.6
Sweden	SE	1.544	1.545	39.9	32.2
United Kingdom	UK	1.578	1.678	43.5	41.1

* (EC Energy, 2011)

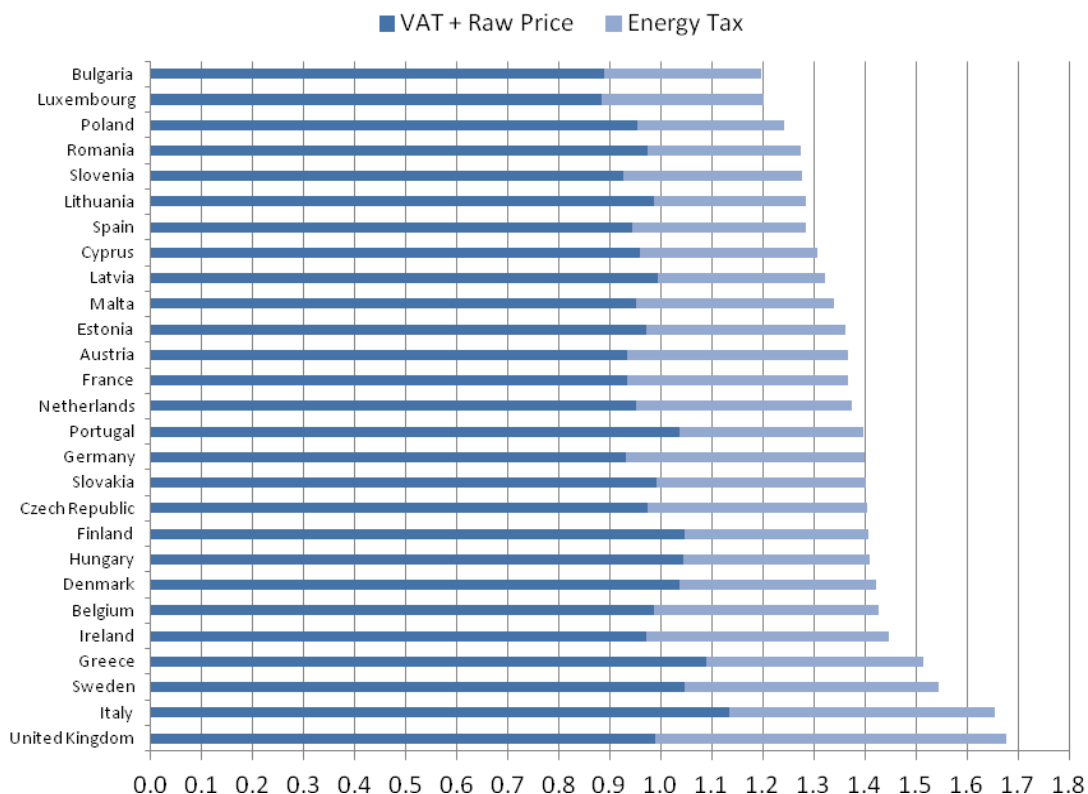
Fuel price combinations for gasoline and diesel are charted in Figures 1 and 2. Average gasoline price in 27 countries is 1,415 €/l; average tax percentage on gasoline is 36.8%; average diesel price is 1,382 €/l, and average tax percentage on diesel is 28.7%. As shown, 14 countries in both fuel types are below the average prices, and 13 countries are above the average.

Figure 1: EU gasoline (petrol) price combination



Also, Figures 1 and 2 show that generally energy tax on gasoline is higher than diesel in most of the countries, thus vehicles with gasoline engine have to pay more fuel tax than diesel engine vehicles. This means that, for a fixed range of fuel consumption, vehicles with gasoline engine pay more fuel tax.

Figure 2: EU diesel price combination



3. Sample vehicles comparison

In this report 6 vehicles are selected to compare. The specifications of these vehicles are presented in Table 3. They are categorized in three emission efficiency levels according to their CO₂ emission. As it shows, 2 vehicles are in level A (under 100 g/km CO₂ emissions), one of them is in level D (between 121 to 130 g/km CO₂ emissions), and three of them are in level E (between 121 to 130 g/km CO₂ emissions). Also, three ones have gasoline engine and three of them have diesel engine. Afterwards, they will be compared with each other.

In this study, the vehicle prices have been selected in all countries (BUYACAR, 2012). These prices are end user prices and they are VAT included.

3.1 Registration Tax of sample vehicles

Registration tax is a one-off duty related to the purchase and registration of vehicles (value added tax, registration tax, registration fees) (Kalinowska et al, 2009). We have calculated the registration tax in EU for 6 sample vehicles.

Denmark, Netherlands, Greece, Malta, and Finland have higher registration tax than average. Herein Denmark has the highest registration tax. On the other hand, nine countries (Romania, United Kingdom, Luxembourg, Bulgaria, Slovakia, Czech Republic, Germany,

Lithuania, and Sweden) have less than 100 € for registration tax. Among them, Sweden does not have any registration tax or fee. Table 4 shows the result of calculation.

Table 3: Technical specifications of sample vehicles

	Ford		Fiat		Audi	
Model	Fiesta (2011)	Mondeo (2.0 TDCi Titanium X Sport)	500 (0.9 TwinAir BlackJack 3dr)	Punto Evo (Hatch 5Dr 1.3 Multijet DPF SS 75)	A1(1.4 TFSI S Line S Tronic)	A6 (2011)
Abbreviated Name	Fiesta	Mondeo	500	Punto Evo	A1	A6
Number of Doors	4+1	4+1	3	4+1	4+1	4
Class	M1	M1	M1	M1	M1	M1
Engine Capacity (CC)	1,596	1,997	875	1,284	1,390	1,968
Power BHP*	120	161	85	75	185	177
KW	88	118.5	63	55	136	130
MPG range (combine)	48.7	36.7	68.9	78.5	47.9	47.1
L/km (combine)	5.8	7.7	4.1	3.6	5.9	6
Engine Capacity (liter)	1.6	2.0	0.9	1.3	1.4	2.0
CO₂ Emission (g/km)	134	139	92	95	139	129
Weight (kg)	1,100	1,569	930	1,090	1,145	1,575
Length (mm)	3,950	4,778	3,546	4,065	4,065	4,915
Euro Standard	5	5	5	5	5	5
Price Pound (£)	13,500	22,000	13,000	13,000	21,000	26,500
Euro (€)	16,159	26,333	15,560	15,560	25,136	31,720
Fuel Type	Petrol	Diesel	Petrol	Diesel	Petrol	Diesel
Gearbox	Manual	Manual	Semi-Auto	Manual	Semi-Auto	Manual
Emission Efficiency	E	E	A	A	E	D

* BHP: Brake Horse Power; MPG: Miles per Gallon

Table 4: EU Registration Tax of sample vehicles

		Registration Tax (Euro)					
		Fiesta	Mondeo	500	Punto Evo	A1	A6
Austria	AT	1,076.5	3,173.6	513.9	669.5	1,629.5	2,709.1
Belgium	BE	123	495	61.5	61.5	61.5	495
Bulgaria	BG	40.9	40.9	40.9	40.9	40.9	40.9
Cyprus	CY	383.04	3,195.2	183.75	262.08	333.60	3,148.80
Czech Republic	CZ	32.14	32.14	32.14	32.14	32.14	32.14
Denmark	DK	15,321	15,925	16,351	32,511	35,872	45,568
Estonia	EE	178.95	178.95	178.95	178.95	178.95	178.95
Finland	FI	3,430.3	5,750.7	2,505.9	2,562.8	5,489.3	6,540.0
France	FR	306.5	411.5	196.5	180.5	475.5	443.5
Germany	DE	26.3	26.3	26.3	26.3	26.3	26.3
Greece	EL	2,627.5	10,704.6	632.5	1,518.1	4,495.9	18,051.9
Hungary	HU	1,778.5	2,776.7	931.1	952.1	1,354.1	2,774.5
Ireland	IE	2,585.5	4,213.3	2,178.5	2,178.5	4,021.8	5,075.2

Italy	IT	470.86	599.39	365.5	331.79	673.14	647.86
Latvia	LV	220.21	227.38	67.66	68.95	227.38	213.05
Lithuania	LT	14.48	14.48	14.48	14.48	14.48	14.48
Luxembourg	LU	50	50	50	50	50	50
Malta	MT	4,525.9	8,898.7	2,848.5	3,380.1	7,458.3	9,693.6
Netherlands	NL	7,080.7	11,977.2	2,385.7	4,749.7	9,335.3	12,887.9
Poland	PL	562.26	877.67	543.71	543.71	840.56	1044.64
Portugal	PT	2,645.1	7,331.0	160.4	1,021.1	1,932.7	6,117.6
Romania	RO	86.57	88.07	46.37	46.37	88.07	85.07
Slovakia	SK	33	33	33	33	33	33
Slovenia	SL	1,131.1	2,423.3	1,089.2	1,089.2	3,267.7	4,123.6
Spain	ES	858.5	1,341.7	90.9	90.9	1,284.9	1,597.6
Sweden	SE	0	0	0	0	0	0
United Kingdom	UK	65.83	65.83	65.83	65.83	65.83	65.83

3.2 Circulation Tax (Road Tax) of sample vehicles

Duties are imposed periodically in relation to ownership and tenure of vehicles (road tax, insurance tax) (Kalinowska et al., 2009). We have calculated the circulation tax in EU for 6 sample vehicles, the result of this calculation is shown in Table 5.

Netherlands, Denmark, Austria, Bulgaria, and Italy have higher than average. Among these, Netherlands has the highest circulation tax. On the other side, the circulation tax in 12 countries (SE, LU, LV, RO, HU, CZ, EE, LT, PL, SK, SL, and UK) costs less than 100 € per year. Among them, 6 countries (CZ, EE, LT, PL, SK, and SL) do not have any circulation tax for these vehicles.

Table 5: EU Circulation Tax of sample vehicles

		Circulation Tax (Road Tax) in Euro					
		Fiesta	Mondeo	500	Punto Evo	A1	A6
Austria	AT	422.4	623.7	257.4	204.6	739.2	699.6
Belgium	BE	248.29	373.3	89.23	168.56	208.43	373.3
Bulgaria	BG	416.42	627.1	146.41	127.82	719.71	687.96
Cyprus	CY	81.4	203.69	29.75	42.43	47.26	200.74
Czech Republic	CZ	0	0	0	0	0	0
Denmark	DK	203.76	1083.12	69.71	311	203.76	737.28
Estonia	EE	0	0	0	0	0	0
Finland	FI	268.95	383.62	227.39	266.51	297.07	385.09
France	FR	160	160	160	160	160	160
Germany	DE	299.92	467.72	17.5	118.56	305.08	444.96
Greece	EL	184	578	94	94	184	578
Hungary	HU	30.02	30.02	30.02	30.02	30.02	30.02
Ireland	IE	156	156	104	104	156	156
Italy	IT	227.04	458.6	162.54	141.9	526.32	503.1
Latvia	LV	34.41	68.82	34.41	34.41	34.41	68.82
Lithuania	LT	0	0	0	0	0	0
Luxembourg	LU	80.4	125.1	33.12	51.3	83.4	104.49
Malta	MT	120	120	100	100	120	110
Netherlands	NL	444	1632	356	972	528	1632
Poland	PL	0	0	0	0	0	0
Portugal	PT	212.29	212.29	182.05	182.05	212.29	212.29
Romania	RO	34.73	56.21	28.96	31.95	33.08	55.71
Slovakia	SK	0	0	0	0	0	0
Slovenia	SL	0	0	0	0	0	0
Spain	ES	64	137	137	64	64	137

Sweden	SE	71.95	240.25	0	0	83.19	182.91
United Kingdom	UK	131.67	131.67	0	0	131.67	0

4. First year vehicle tax cost for sample vehicles

First year vehicle taxes are related to these three items: 1) Registration tax (VAT, registration tax and registration fee), 2) Circulation tax, and 3) Fuel Tax (VAT and Fuel Tax).

In this study VAT on vehicle price is dissembled and other taxes are calculated, as shown in Tables 4 and 5. Registration and circulation taxes are calculated for EU countries. Calculation of the fuel tax is related to the distance that each vehicle can traverse, to the fuel price, and also related to the vehicle's fuel consumption. In this way, we have defined some scenarios in order to survey the current tax systems and to know their relationship with environmental aspects.

4.1 First scenario: 15,000 kilometers a year

Let us assume that all the samples vehicles travel 15,000 kilometers in the first year. Key factors such as driving distances, average fuel cost, CO₂ emission, and average fuel tax are presented in Table 6.

As shown, Ford Mondeo has a higher-than-average fuel cost, and Fiat Punto Evo is the lesser one. Audi A1 and Ford Mondeo produce more CO₂ than others, while Fiat 500 is the lesser one. The fuel tax results are closely similar to CO₂ emission results. This means that with a fixed distance, the vehicles that produce more CO₂ use more fuel and pay more fuel tax.

Table 6: First scenario. Key factors

		Fiesta	Mondeo	500	Punto Evo	A1	A6
First Scenario	km	15,000	15,000	15,000	15,000	15,000	15,000
	Fuel consumption (l)	870	1,155	615	540	885	915
	Avg*. fuel cost (€)	1,230.8	1,595.5	870.1	746.1	1,252.0	1,264.3
	CO ₂ (g)	2,010,000	2,085,000	1,380,000	1,425,000	2,085,000	1,935,000
	Avg. fuel tax (€)	458.3	461.2	324	215.6	466.2	365.4

* Avg: Average.

4.2 Second scenario: 1,500,000 g CO₂ a year

If all these vehicles produce 1,500,000 gram CO₂ a year, they would drive, consume fuel, pay fuel cost and fuel tax according to Table 7. A little difference is emerged compared to the first scenario. Fiat 500 should pay more fuel tax than others.

Table 7: Second scenario. Key factors

		Fiesta	Mondeo	500	Punto Evo	A1	A6
Second Scenario	km	11,194	10,791	16,304	15,789	10,791	11,628
	Fuel consumption (l)	649	831	668	568	637	709
	Avg. fuel cost (€)	918.5	1,148.1	945.7	785.4	900.8	980.1
	CO ₂ (g)	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
	Avg. fuel tax (€)	342	331.8	352.2	227	335.4	283.2

4.3 Third scenario: 500 liters of fuel a year

In this case, we have assumed that all the sample vehicles use only 500 liters of fuel a year. According to this assumption, driving distance, fuel cost, fuel tax, and CO₂ production are presented in Table 8.

As result, this scenario has a little difference with the two others. Fiat Punto Evo would allow to travel more distance and produce more CO₂, but pay less fuel tax than others.

Table 8: Third scenario. Key factors

		Fiesta	Mondeo	500	Punto Evo	A1	A6
Third Scenario	km	8,620.7	6,493.5	12,195.1	13,888.9	8,474.6	8,196.7
	Fuel consumption (l)	500	500	500	500	500	500
	Avg. fuel cost (€)	707.4	690.9	707.4	690.9	707.4	690.9
	CO ₂ (g)	1,155,172	902,597	1,121,951	1,319,444	1,177,966	1,057,377
	Avg. fuel tax (€)	263.4	199.7	263.4	199.7	263.4	199.7

5. Conclusions

Yearly vehicles taxes of introduced scenarios are shown in Figures 3, 4 and 5. Because of wide variance and high registration tax in some countries (DK, NL, EL, MT, FI, IE, PT, and SL), only circulation tax and fuel tax are presented, and registration tax is kept out from this comparison. Netherlands, Austria, Denmark, Bulgaria, Greece, and Italy have more yearly vehicle taxes (Circulation Tax and Fuel Tax) than other countries in all scenarios.

Figure 3: Circulation Tax + Fuel Tax (Scenario 1) (€/year)

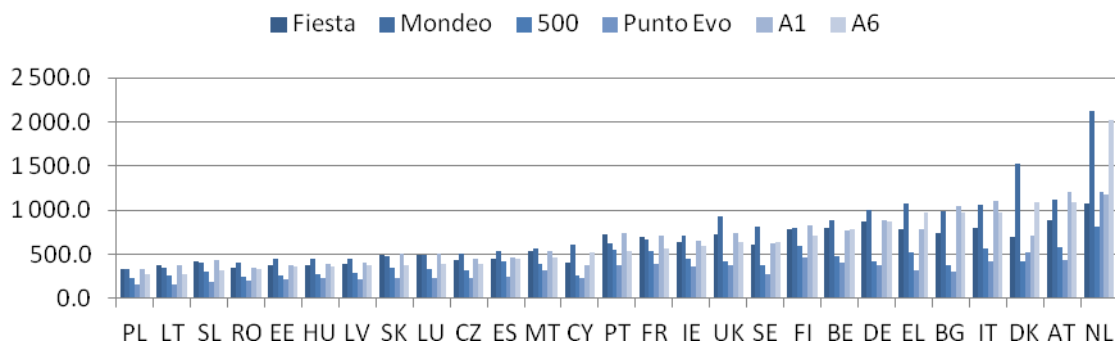


Figure 4: Circulation Tax + Fuel Tax (Scenario 2) (€/year)

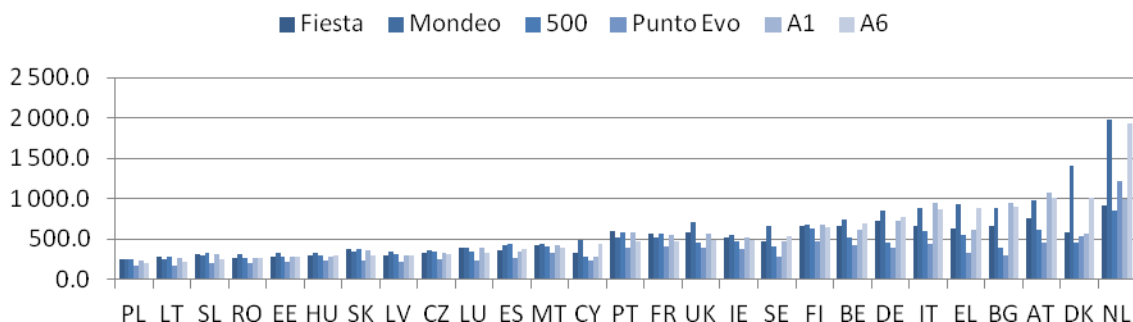
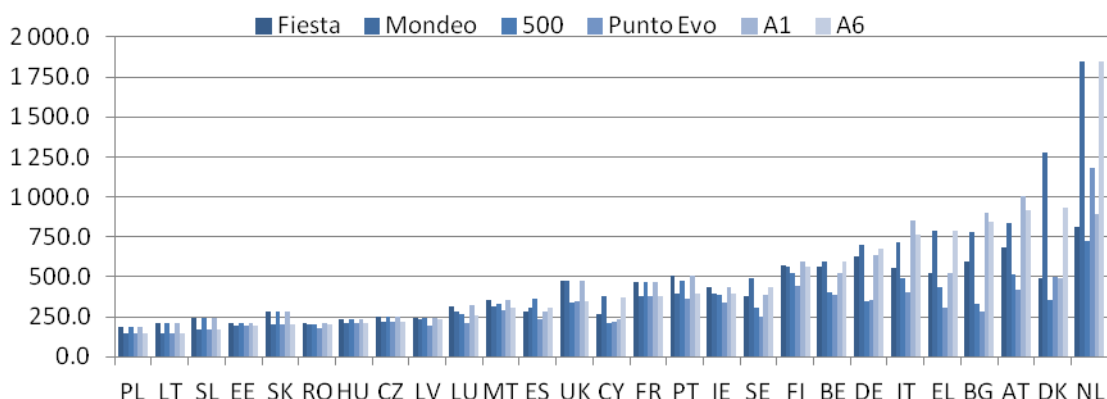
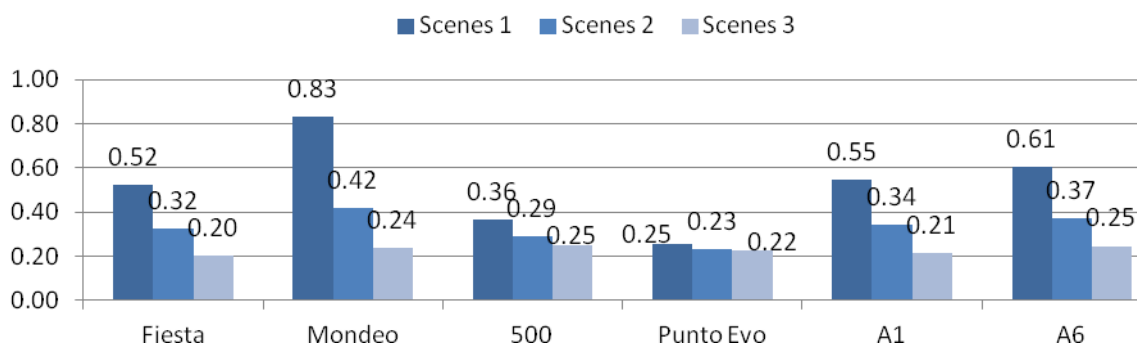


Figure 5: Circulation Tax + Fuel Tax (Scenario 3) (€/year)



Finally, this study shows that in the first scenario the yearly tax per 1000 g CO₂ is higher than the two others. Figure 6 presents the average rate of yearly tax per 1000 g CO₂ for these three scenarios.

Figure 6: Average rate of yearly tax per 1000 g CO₂ (€/year/kg CO₂)



This study has stated that, when vehicles drive the same distance, and CO₂ emissions are fixed, and their annual fuel consumption is similar, about 14 countries in each scenario are above than the average yearly tax. According to the previous calculations, when a low consumption vehicle drives more, uses the roads more and produces more CO₂ emissions than a high consumption vehicle which drives less. Though, fuel tax per 1000 g CO₂ is increasing by more driving, but the rate of increasing is not proportional. For example, in the second scenario Fiat 500 drives 45% more than Ford Fiesta, but only pays 3% more than its average fuel tax.

In conclusion, we suggest that more attention should be paid to some factors such as proportion of yearly tax with road usage and ratio of yearly tax per 1000 g CO₂ in future studies.

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