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Sustainability-oriented Future EU Funding: A Fuel Tax Surcharge

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Abstract

The paper analyses the potential of a surcharge on national fuel taxes as sustainability-oriented own resource to finance the EU budget. Our estimations show that such a surcharge could yield substantial revenues, ranging between € 12.93 billion (for a surcharge of 0.03 €) and 86.2 billion (for a surcharge of 0.2 €) per year. Besides the contribution an EU fuel tax would make to various sustainability-related EU goals and strategies, it would help to address two specific problems inherent in the current EU system of fuel taxation. An EU fuel tax designed as a surcharge on national fuel taxes would decrease the existing tax bias in favour of diesel, as the surcharge would be levied uniformly on gasoline and diesel, which in most EU Member States is taxed at lower rates, alike. Moreover, by increasing national fuel tax rates, the surcharge would – depending on its level – mitigate or even remove the "under-taxation" of fuel in relation to the minimum fuel tax rates stipulated in the EU Energy Tax Directive in a number of Member States, which is caused by the absence of regular inflation adjustment of nominal fuel tax rates.

Keywords: EU budget, sustainability-oriented taxation, tax-based own resources, fuel tax, EU system of own resources

JEL classification code: F02, F36, F53, H23, H87

1 Introduction and background[1]

Based on an increasing legal basis as well as on expanding international obligations, the European Union (EU) has become a global leader in environmental policy over the last decades (Selin and Van Deveer 2015). As one of the signatory parties of the Kyoto Protocol of 1997 aiming at the reduction of greenhouse gas (GHG) emissions, and by agreeing with the Copenhagen Accord of 2009, the EU committed itself to decrease GHG emissions by 80% against the 1990 emission level by 2050. In addition, by signing the 2015 Paris Agreement, the EU undertakes to cut its GHG emissions by 40% compared with 1990 levels by 2030. Most recently, the legal and governance framework for environmental policy at the EU level was complemented by the Sustainable Development Goals and the 2030 Agenda for Sustainable Development adopted by world leaders in 2015. Goal 13 of the altogether 17 Sustainable Development Goals demands to "Take urgent action to combat climate change and its impacts".

One element of a comprehensive strategy to enable the EU to live up to these commitments is to review all EU policies with respect to their actual and potential contributions to the EU's sustainable development goals. The post-2020 Multiannual Financial Framework (MFF) of the EU is one of the issues which are intensely debated currently. The European Commission's proposals published in May 2018 indeed aim at strengthening the EU budget's sustainability orientation, inter alia by proposing to introduce two "green" new own resources – a plastic tax and a share in revenues from the auctioning of emission certificates – to partially replace Member States' contributions to the EU budget. Member States' reactions, however, to these proposals are dominated by the budgetary implications of the imminent Brexit, while the issue of making EU expenditures as well as the EU system of own resources more sustainable features by far less prominently in the debate (Schratzenstaller 2017 and 2019).

While the European Commission's proposals are an important first step towards a larger contribution of the EU budget to the EU's sustainable development goals, the paper departs from the conviction that a more systematic and comprehensive approach to a reform of the EU system of own resources is indispensable. Departing from an innovative sustainability-oriented perspective for a fundamental reform of EU revenues comprising the environmental, social, economic, and cultural/institutional dimensions of sustainability developed by Schratzenstaller

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et al. (2017), we suggest to make use of sustainability-oriented tax-based own resources as alternative revenue sources to partially replace current Member States' contributions to the EU budget to a much larger extent than proposed by the European Commission. Such sustainability-oriented tax-based own resources would establish the link between the EU system of own resources and the EU sustainability strategy and its climate goals which is completely absent currently. They are typically based on taxes that cannot be implemented effectively at the national level (Hudetz et al. 2017): in particular green taxes (e.g., Krenek and Schratzenstaller 2017, Luptacik and Luptacik 2017, Krenek, Sommer and Schratzenstaller 2018), or taxes on wealth (Krenek and Schratzenstaller 2018), corporate profits (Nerudová, Solilová and Dobranschi 2016), and financial transactions (Nerudová, Schratzenstaller and Solilová, 2017). This paper elaborates another green tax option, namely an EU fuel tax imposed as a surcharge on top of the gasoline and diesel excise duties already levied in all EU Member States.

The role of environmental taxation, and especially of carbon taxes, as key market-based instrument is widely acknowledged in the literature (e.g. Kosonen and Nicodème 2009; Milne and Andersen 2014; Goulder et al. 2018). In the EU context, carbon taxes are of special relevance for the sectors not covered by the European Emission Trading System (ETS). Among these sectors is transport, where GHG emissions have been rising continuously in the past and are now making up for more than 20% of overall EU GHG emissions (Kettner-Marx and Kletzan-Slamanig 2018). Various strategic documents issued at the EU level stress the role of environmental taxes and particularly of fuel taxes as important tools to support the transition to sustainable transport[2] and as one element of tax shifts making European tax systems more growth- and environmentally-friendly (e.g. European Commission 2017). This is the background against which we attempt at exploring the potential of fuel taxation as one sustainability-oriented tax-based own resource to finance EU expenditures.

The paper starts with some basic remarks on fuel taxes from a sustainability perspective (chapter 2). After providing an overview of the current situation of fuel taxation in the EU (chapter 3), we estimate the potential revenues of a surcharge on existing fuel taxes levied in EU Member States (chapter 4). Chapter 5 concludes.

[2] See for an overview European Environmental Agency (2017).

2 Fuel taxes from a comprehensive sustainability perspective

Originally fuel taxes were levied as an additional revenue source for the public budget, in some cases earmarked to finance, among others, the construction and maintenance of the road infrastructure (Hines 2007, Pirog 2009). The corrective aspect of fuel taxes, based on Arthur Pigou's (1932) concept of corrective taxation according to which taxes can and should be used to internalise negative externalities, and thus to reduce the associated social costs, was recognised much later only. Social costs associated with fossil fuel consumption comprise noise costs, congestion costs, road damage costs and traffic accidents social costs (Leicester 2005, Parry, Walls and Harrington 2007, Johnson, Leicester and Stoye 2012, Williams 2016). More specifically, with a focus on the environmental elements of the social costs of fuel consumption, Nordhaus and Boyer (2000), Nordhaus (2006), Sallee (2010) and Stern et al. (2006) argue that fuel taxes may contribute to the decrease of local air pollutants and to reduce GHG emissions causing global climate change. Empirical work demonstrates that fuel taxes can be an effective instrument within abatement policies (e.g. Fullerton and West 2000, Sterner 2007, Johnson, Leicester and Stoye 2012).

Furthermore, fuel taxes – and a European approach to fuel taxation – are of interest from the perspective of the above-mentioned comprehensive framework of sustainability-oriented taxation developed by Schratzenstaller et al. (2017), which besides the environmental pillar also comprises the economic, the social and the institutional dimension of sustainability.

The "double dividend hypothesis" brings together the economic and the environmental dimension of sustainability. Such a double dividend may be expected if revenues collected from fuel taxation are used to decrease taxes on labour (Goulder 1994, 2000, 2013, Bovenberg and Goulder 1996), thus reducing existing distortions caused by labour taxation. A more critical assessment of the double dividend hypothesis has been put forward by Fullerton and Metcalf (1997) and Barrios, Pycroft and Saveyn (2013). The latter argue that the main weakness of fuel taxation consists in its decreasing revenues due to its shrinking tax base. This concern has been addressed by Dahl (1993), who finds a price elasticity for gasoline consumption of -0.13 in the short and of -0.33 in the long run (2011) and for diesel consumption of -0.13 in the short and of -0.38 in the long run (Dahl 2012). The meta-analysis by Havranek and Kokes (2015) yields a short-run price elasticity of -0.1 and a long-run price elasticity of -0.23 for gasoline. In their meta study, Labandeira, Labeaga and Lopez-Otero (2017) find a short-term price elasticity -

0.153 and a long-term price elasticity of -0.443 for diesel. While price elasticities of demand for diesel and gasoline are rather similar in the short run, diesel demand is significantly more price-sensitive than gasoline demand in the long run. Altogether, the existing empirical evidence suggests that the demand for fuel is highly inelastic particularly in the short run, but that also in the longer run price elasticity is limited, thus ensuring substantial tax revenues also in the long run.

From the perspective of economic sustainability, their incentive-enhancing effects towards green innovation are another benefit of fuel taxes. Acemoglu et al. (2013, 2014) and Popp, Newell and Jaffe (2010) conclude that fuel taxation coupled with state subsidies can effectively redirect innovation towards environmental friendly technologies and energy efficient innovation.

With regard to the social dimension of sustainability, potential negative distributional effects of fuel taxation have been widely debated in the literature. Analysing the distributional impact of fuel taxes based on annual expenditures of individuals instead of annual income, Poterba (1991) finds that fuel taxes have a less regressive impact on low-income households since these devote a smaller share of their expenditure to transport fuels. This finding somewhat contradicts conventional theory, which argues that fuel taxation tends to be highly regressive. In the same line, West (2004) finds that a gasoline tax affects middle-income households more than low- or high-income households. Meanwhile, a rather broad consensus has emerged in the literature that fuel taxes are less regressive than other environmental taxes (Kosonen 2012).

An EU-wide approach to fuel taxation may also strengthen institutional sustainability of taxation in the EU, by contributing to the harmonisation of excise duties across the EU and by reducing fuel tax competition among EU Member States. Evers, de Mooij and Vollerbergh (2004) find evidence for aggressive diesel tax competition between the high-tax EU Member States. According to their estimations, the tax competitor country will raise its diesel tax rate by 2% to 3% only when a neighbour country increases its diesel tax rate by 10%. The authors also find that the minimum tax rates policy adopted in the EU in 1980 for transport fuel taxes has significantly decreased fuel tax competition. In this context, Fergusson (2000), Transport and Environment (2011) and Thöne (2016) point out the existing anomalies in fuel taxation across the EU, especially regarding the Luxembourg case. Luxembourg manages to attract non-resident consumers from its neighbouring countries by offering low fuel tax rates, thereby increasing its own tax revenues at the expense of its neighbours. This practice leaves Luxembourg's neighbouring countries with less revenue collected from fuel taxes and less

flexibility regarding tax rates increases, thus restricting the opportunities to fully use the potential of fuel taxes as instruments of environmental policy. Moreover, the "tank tourism" induced by the existing fuel tax rate differentials generates additional traffic, thereby hampering the achievement of the climate goals. EU-wide coordination of fuel taxation would limit such harmful tax competition and the negative environmental effects associated with it.

Most recently, such an EU-wide coordination of fuel taxation has been repeatedly discussed in the context of exploring options for own resources, especially tax-based own resources, to finance the EU budget. Thöne (2016) analyses a full transfer of fuel taxes from the national to the EU level to replace the current contributions from national budgets to the EU budget. The author points out that such a transfer, which would imply the introduction of a uniform fuel tax rate across the EU, would effectively address the issues of fuel tax competition and cross-border fuel shopping.

Also, the High Level Group on Own Resources (HLGOR 2016) examines fuel taxation as a possible future EU own resource in two scenarios: a full transfer of fuel tax revenues from EU Member States to the EU budget, and a transfer of a share of fuel tax revenues from national budgets to the EU level. The HLGOR (2016) argues that a full transfer of fuel tax revenues would eliminate fuel tax competition among EU Member States and produce a European public good through environmental protection, thus creating EU added value. The HLGOR (2016) also underlines that fuel taxes are efficient, equitable and transparent and would secure a stable and sufficient stream of revenues to the EU budget. As main obstacle for the adoption fuel taxes as future EU own resource the HLGOR (2016) identifies a lack of political acceptance, as Member States would have to give up a relevant revenue source. The European Commission's recent proposal for a reform of the EU system of own resources mentioned above do not include the option to use fuel taxation as future own resource.

3 The current situation of fuel taxation in the EU

The excise duties on transport fuels imposed in EU Member States are levied as specific taxes on the consumption of gasoline and diesel. They are harmonized based on minimum tax rates according to the EU Energy Taxation Directive (ETD) introduced in 2003, amounting to 0.359 EUR for gasoline and 0.33 € for road diesel (Kettner-Marx and Kletzan-Slamanig 2018). Fuel taxes correspond to the "polluter pays-principle" stipulated in Art. 191(2) of the Treaty on the Functioning of the European Union (TFEU) in 2007 (Thöne 2016) and detailed further in the Environmental Liability Directive passed in 2004.

The current system of fuel taxation in the EU has, among others, two shortcomings, which will be addressed in more detail in this chapter: first, the tax bias in favour of diesel vis-à-vis gasoline existing in almost all EU Member States; and second, the absence of regular inflation adjustment of the minimum tax rates stipulated in the EU ETD.

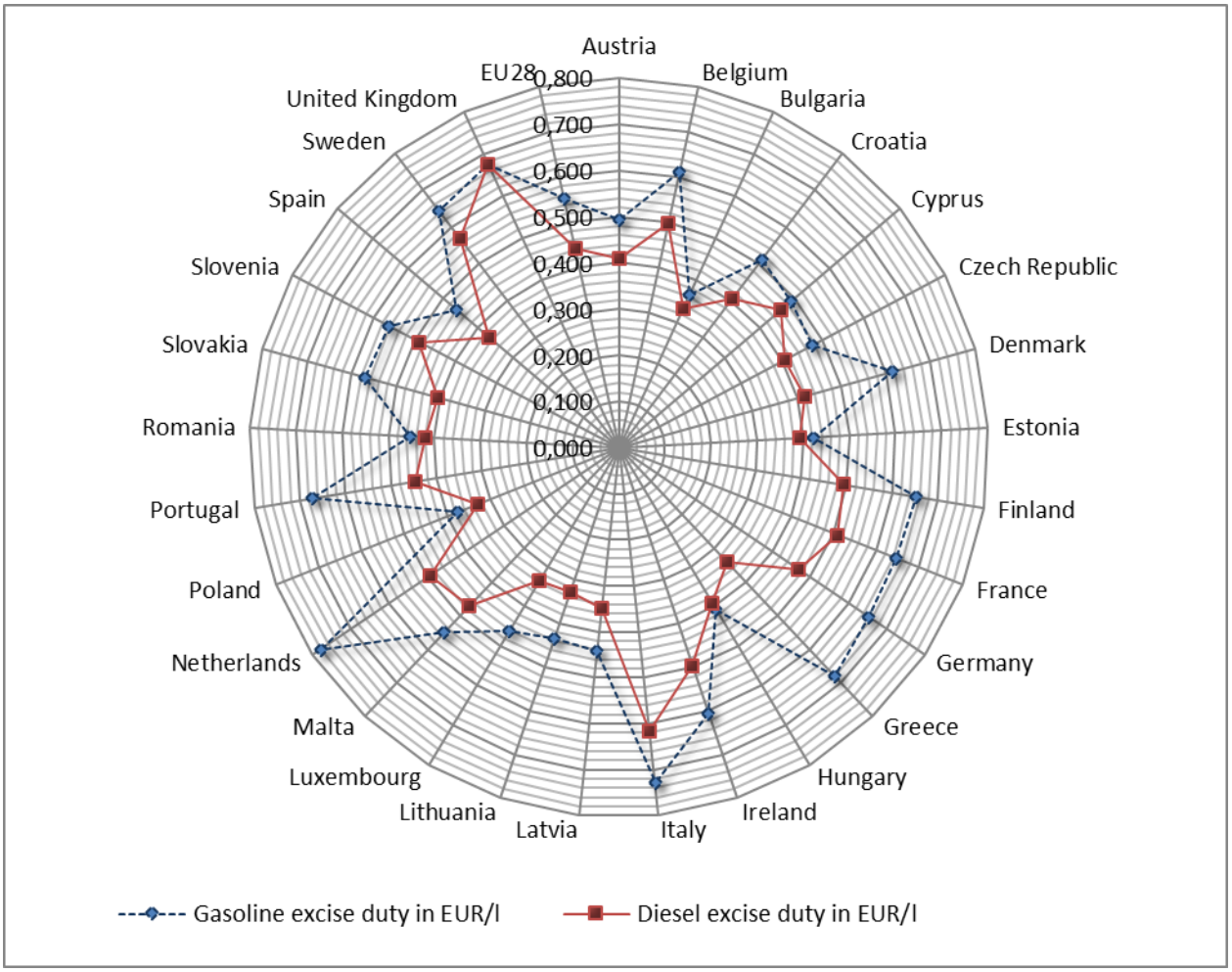
3.1 The bias within fuel taxation towards diesel vis-à-vis gasoline

Most EU Member States' fuel tax rate structures contain a bias towards diesel compared to gasoline. Except for the UK and Belgium, having aligned the tax rate on diesel and gasoline in 2011 and 2018, respectively, all EU Member States apply lower diesel tax rates compared to gasoline, thus impairing the environmental effectiveness of fuel taxation (Evers, de Mooij and Vollerbergh 2004; Schipper and Fulton 2012). Figure 1 shows gasoline and diesel excise duties in € per liter including value added tax (VAT) for all 28 EU Member States. It is obvious that fuel tax rates in the EU28 Member States are lying within a rather broad range[3]. On EU28 average, the excise tax rate amounts to € 0.551 per liter gasoline and to € 0.44 per liter diesel. The highest gasoline excise tax rate is imposed in The Netherlands at € 0.778 per liter, the highest diesel excise tax rate can be found in the UK at € 0.676 per liter. Hereby the country-specific differences between fuel tax rates are mitigated by the VAT as additional indirect tax imposed on fuel. Including VAT, the EU28 average share of total taxation in the final fuel price amounts to 62.1% for gasoline and to 56.5 % for diesel. Figure 1 also illustrates the tax privilege diesel is enjoying compared to gasoline in almost all EU Member States. Comparing the

[3] For a detailed description of fuel taxation, tax-inclusive prices and share of taxation in total fuel price see Table A.1 in the Appendix.

unadjusted nominal tax rates (including VAT) between gasoline and diesel in the EU in 2016, we find an average difference of 0.111 € per liter in favour of diesel.

Figure 1: Gasoline and diesel excise duties (fuel tax and VAT) in the EU member states in €/l, 2016



Source: Own presentation using the data provided by Weekly Oil Bulletin.

The highest difference between the tax rates for diesel and gasoline can be found in The Netherlands, where the tax rate for diesel is 0.285 € lower than that on gasoline.

Table 1 shows transport fuel consumption for each EU Member State for 2014. Gasoline consumption amounted to 107.94 billion liters, diesel consumption to 323.07 billion liters. This consumption pattern, with diesel consumption exceeding gasoline consumption by far, among others is caused by the tax bias in favour of diesel combined with rebates for diesel consuming

companies (hauliers[4]) granted in several EU Member States, leading to environmentally counterproductive rebound effects (Schipper and Fulton 2013). Table 1 also underpins the unfair tax competition in which Luxembourg is involved. In 2014, Luxembourg has consumed 2.32 billion liters of diesel. Being the second smallest EU Member State in terms of land and population, Luxembourg's diesel consumption reaches the diesel consumption of Malta, Estonia, Cyprus and Lithuania taken together.

Table 1: Transport fuel consumption in the EU Member States, 2014

Country	Diesel Consumption		Gasoline Consumption		Total transport fuel consumption	
	billion liters	liter/capita	billion liters	liter/capita	billion liters	liter/capita
EU28	**323.072**	**636**	**107.936**	**213**	**431.008**	**849**
Austria	8.821	1 032	2.205	258	11.026	1 290
Belgium	*13.057*	*1 165*	*1.741*	*155*	*14.798*	*1 320*
Bulgaria	1.915	265	0.580	80	2.495	345
Croatia	1.915	452	0.754	178	2.669	630
Cyprus	*0.754*	*884*	*0.470*	*551*	*1.224*	*1 436*
Czech Republic	5.165	491	2.089	198	7.254	689
Denmark	4.584	812	1.799	319	6.383	1 131
Estonia	0.870	661	0.325	247	1.195	909
Finland	4.758	871	2.031	372	6.790	1 243
France	**55.071**	**832**	**9.401**	**142**	**64.472**	**974**
Germany	**62.673**	**774**	**24.895**	**307**	**87.568**	**1 081**
Greece	4.933	453	3.366	309	8.298	762
Hungary	3.424	347	1.741	176	5.165	523
Ireland	3.888	835	1.567	336	5.455	1 171
Italy	**32.961**	**542**	**11.896**	**196**	**44.857**	**738**
Latvia	1.103	553	0.279	140	1.381	693
Lithuania	0.453	154	0.267	91	0.720	246
Luxembourg	***2.321***	***4 172***	***0.418***	***751***	***2.739***	***4 923***
Malta	0.435	1 001	0.099	228	0.534	1 229
Netherlands	9.807	582	5.107	303	14.914	884
Poland	14.159	372	4.817	127	18.976	499
Portugal	5.571	536	1.451	140	7.022	675
Romania	5.281	265	1.741	87	7.022	353
Slovakia	1.857	343	0.754	139	2.611	482
Slovenia	1.915	929	0.580	281	2.495	1 210
Spain	**33.600**	**723**	**6.209**	**134**	**39.809**	**856**
Sweden	6.209	640	3.946	407	10.155	1 047
United Kingdom	**35.573**	**551**	**17.409**	**269**	**52.982**	**820**

Source: Own calculation based on IEA and Eurostat data.

[4] According to Transport and Environment (2015), 8 EU Member States grant tax rebates to hauliers.

The largest fuel consumers in absolute terms are Germany, France, and the UK, followed by Italy and Spain. Fuel consumption per capita is highest in Luxembourg, followed by Cyprus and Belgium.

Table 2: Gasoline and diesel tax revenues and the GNI and VAT contributions of each EU member state to the EU budget in billion €, 2014

Country	Gasoline tax revenues	Diesel tax revenues	Total tax revenues from transport fuels	VAT-based own resource	GNI-based own resource	Total Own Resources
EU28	**45.07**	**126.33**	**171.40**	**17.66**	**99.07**	**116.730**
Austria	0.827	3.308	4.135	0.453	2.196	2.649
Belgium	1.038	3.504	4.542	0.509	2.862	3.371
Bulgaria	0.215	0.684	0.899	0.059	0.315	0.374
Croatia	0.260	0.66	0.920	0.063	0.295	0.358
Cyprus	0.220	0.144	0.364	0.023	0.108	0.131
Czech Republic	0.912	1.984	2.896	0.184	1.023	1.207
Denmark	0.912	1.291	2.203	0.279	1.743	2.022
Estonia	0.138	0.251	0.389	0.026	0.138	0.164
Finland	1.298	1.246	2.544	0.271	1.364	1.635
France	5.697	17.84	23.537	2.956	15.01	17.966
Germany	10.44	26.28	36.720	3.699	21.72	25.419
Greece	2.251	1.38	3.631	0.286	1.410	1.696
Hungary	0.659	1.295	1.954	0.118	0.700	0.818
Ireland	0.865	1.459	2.324	0.203	1.111	1.314
Italy	6.654	18.43	25.091	1.760	11.43	13.190
Latvia	0.110	0.280	0.390	0.032	0.193	0.225
Lithuania	0.119	0.419	0.538	0.040	0.254	0.294
Luxembourg	0.192	0.699	0.891	0.038	0.171	0.209
Malta	0.087	0.091	0.178	0.011	0.049	0.060
Netherlands	3.968	3.281	7.249	0.819	5.490	6.309
Poland	1.619	4.759	6.378	0.445	2.785	3.230
Portugal	0.700	1.310	2.010	0.242	1.270	1.512
Romania	0.73	2.135	2.865	0.161	1.090	1.251
Slovakia	0.354	0.716	1.070	0.069	0.502	0.571
Slovenia	0.304	0.715	1.019	0.053	0.247	0.300
Spain	2.478	9.201	11.679	1.382	7.845	9.227
Sweden	2.022	2.157	4.179	0.553	3.217	3.770
United Kingdom	13.12	20.79	33.91	2.933	14.52	17.453

Source: Eurostat.

Table 2 shows fuel tax revenues for all 28 EU Member States for 2014. Mirroring the dominating share of diesel consumption in overall fuel consumption, diesel taxation despite lower diesel tax

rates yields substantially higher tax revenues than gasoline taxation. Overall revenues from fuel taxation for the EU28 amounted to 171.4 billion € in 2014; whereby 45.07 billion € or 26.3% of overall fuel tax revenues stemmed from gasoline taxation and 126.33 billion € (73.7%) from diesel taxation. Thus, overall fuel tax revenues significantly exceeded the total of VAT- and GNI-based contributions to the EU budget, which amounted to 116.7 billion € in 2014 (see Table 2).

3.2 The absence of regular inflation-adjustment of ETD minimum tax rates

Taking up the criticism raised by Transport and Environment (2011, 2015) and Thöne (2016) that the minimum tax rates stipulated in the ETD have not been adjusted to inflation since 2003, we calculate the value of excise duties for unleaded gasoline and road diesel in real terms[5]. For the EU28 average we find that the real value of the gasoline excise duty per liter was 0.1 € lower than its nominal value in 2014 (see Table 3). The lowest difference between nominal and inflation adjusted gasoline excise tax rates per liter could be observed in Ireland with 0.053 €, the highest difference existed in Latvia (0.144 €) and Romania (0.16 €). Comparing the real value of the gasoline excise tax rate with the minimum tax rate established by the ETD in 2003, we find that 7 out of 28 EU countries fall below the minimum gasoline tax rate of 0.365 €. Not surprisingly, all of them are "new" EU Member States (Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland and Romania). The difference between the real gasoline tax rate and the minimum gasoline tax rate determined by the ETD can reach as much as 0.074 €[6].

For diesel tax rates the average difference between the real and the nominal diesel tax rate of reached 0.076 € for the EU28 in 2014. The lowest difference between nominal and inflation adjusted diesel tax rate could be found in Ireland at 0.044 €, the highest one could be observed in the UK and Romania at 0.142 € and 0.149 €, respectively (see Table 4).

[5] The formula to calculate the inflation adjusted excise duties in real terms is $Real\ excise\ duty = \frac{Excise\ duty_t}{(\frac{CPI_t}{100})}$; where the baseline year for CPI is 2005=100.
[6] For details see Table A.2. and Table A.3. in the Appendix.

Table 3: Nominal, real and minimum ETD gasoline excise tax rates in € in the EU28, 2014

Country	Nominal gasoline excise tax rate	Real gasoline excise tax rate	Difference between real and nominal gasoline tax rate	Difference between real gasoline tax rate and minimum EDT tax rate
EU28	**0.551**	**0.456**	**0.095**	**0.097**
Austria	0.493	0.409	0.084	0.050
Belgium	0.610	0.507	0.103	0.148
Bulgaria	0.363	0.254	0.109	-0.105
Croatia	0.514	0.409	0.105	0.050
Cyprus	0.490	0.409	0.080	0.050
Czech Republic	0.475	0.388	0.087	0.029
Denmark	0.614	0.523	0.091	0.164
Estonia	0.423	0.293	0.130	-0.066
Finland	0.653	0.536	0.117	0.177
France	0.648	0.560	0.087	0.201
Germany	0.655	0.563	0.091	0.204
Greece	0.680	0.567	0.113	0.208
Hungary	0.413	0.285	0.128	-0.**074**
Ireland	0.608	0.555	0.**053**	0.196
Italy	0.728	0.611	0.118	0.252
Latvia	0.443	0.299	0.**144**	-0.060
Lithuania	0.434	0.310	0.124	-0.049
Luxembourg	0.462	0.374	0.088	0.015
Malta	0.549	0.454	0.095	0.095
Netherlands	0.778	0.667	0.111	0.308
Poland	0.386	0.307	0.079	-0.052
Portugal	0.671	0.578	0.093	0.219
Romania	0.452	0.292	0.**160**	-0.067
Slovakia	0.570	0.464	0.106	0.105
Slovenia	0.564	0.454	0.110	0.095
Spain	0.462	0.382	0.079	0.023
Sweden	0.632	0.554	0.078	0.195
United Kingdom	0.651	0.509	0.142	0.150

Source: Authors calculation using the data provided by Weekly Oil Bulletin.

Table 4: Nominal, real value and minimum ETD diesel excise tax rates in € in the EU28, 2014

Country	Nominal diesel excise tax rate	Real diesel tax rate	Difference between nominal and real diesel tax rate	Difference between real diesel tax rate and minimum EDT tax rate
EU28	**0.440**	**0.364**	**0.076**	**0.034**
Austria	0.410	0.340	0.070	0.010
Belgium	0.497	0.413	0.084	0.083
Bulgaria	0.330	0.231	0.099	-0.099
Croatia	0.407	0.324	0.083	-0.006
Cyprus	0.461	0.385	0.076	0.055
Czech Republic	0.405	0.331	0.074	0.001
Denmark	0.418	0.356	0.062	0.026
Estonia	0.393	0.272	0.120	-0.058
Finland	0.493	0.405	0.088	0.075
France	0.511	0.442	0.069	0.112
Germany	0.470	0.405	0.066	0.075
Greece	0.339	0.283	0.056	-0.047
Hungary	0.398	0.275	0.123	-0.055
Ireland	0.499	0.455	0.044	0.125
Italy	0.617	0.518	0.100	0.188
Latvia	0.349	0.236	0.113	-0.094
Lithuania	0.330	0.236	0.094	-0.094
Luxembourg	0.335	0.271	0.064	-0.059
Malta	0.472	0.390	0.082	0.060
Netherlands	0.492	0.422	0.070	0.092
Poland	0.337	0.268	0.069	-0.062
Portugal	0.456	0.392	0.063	0.062
Romania	0.422	0.273	0.149	-0.057
Slovakia	0.406	0.331	0.075	0.001
Slovenia	0.489	0.394	0.095	0.064
Spain	0.368	0.305	0.063	-0.025
Sweden	0.559	0.490	0.069	0.160
United Kingdom	0.651	0.509	0.142	0.179

Source: Authors' calculations using the data provided by Weekly Oil Bulletin.

The difference between the inflation adjusted and the ETD minimum diesel tax rate amounted to 0.034 € for the EU28 average. In 11 Member States real diesel tax rates fall below the minimum diesel tax rate; with three exceptions (Greece, Luxembourg and Spain) these are all "new" Member States (Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland and Romania). Of course, when addressing these differences country-specific differences in purchasing power need to be considered.

4 An EU fuel tax as tax-based own resource for the EU budget

Besides the general potential sustainability-enhancing effects of fuel taxation identified in chapter 2, a coordination of fuel taxation in the EU through using fuel taxes as tax-based own resource for the EU could address the two shortcomings of the EU system of fuel taxation addressed in chapter 3: the tax bias in favour of diesel, and the "under-taxation" of fuel compared to the nominal minimum tax rates stipulated in the ETD which is caused by the lack of regular inflation adjustment. In this chapter we specify the design of an EU fuel tax as tax-based own resource suitable to act as a remedy to these two structural deficits of current fuel taxation in the EU and estimate the potential revenues of such an EU fuel tax.

4.1 Design of an EU fuel tax as tax-based own resource

In principle, there are various design options for tax-based own resources to finance the EU budget (Raddatz and Schick 2003, HLGOR 2016). Raddatz and Schick (2003) discuss three possible designs. Under the so-called linked system, the tax would be levied on the EU level based on full harmonisation of both tax bases and tax rates, with the direct participation of the EU in the tax revenues. The surcharge system would require the harmonisation of the tax base only; the EU would levy a surcharge in addition to the existing national tax rates, which would not be harmonised, and would receive the revenues from this surcharge. The separation system would allow the EU to introduce a specific tax, which would not be applied by any of the EU Member States, and to collect its revenues.

Departing from this classification, we suggest the EU fuel tax to be implemented under a surcharge system – i.e. on top of the existing gasoline and diesel excise duties imposed in all EU Member States. Such a scheme would avoid additional administrative costs of creating a new tax authority at the EU level. Moreover, an EU fuel tax imposed as a surcharge can be levied on an already established and harmonized tax base. Not least, considering the fact that all Member States are levying fuel taxes at rather diverse tax rates yielding considerable revenues, neither a linked system nor a separation system appears politically acceptable for Member States. A surcharge would avoid the necessity of compensation payments for EU Member States stressed by Thöne (2016). Obviously, the downside of such a surcharge model is that it would not be able to completely solve the issue of tax competition between EU Member States, as cross-country tax rate differentials would remain. However, a uniform surcharge levied in all EU Member States would lead to a relatively higher tax rate increase in low tax countries and would thus

cause national fuel tax rates to converge in relative terms. Moreover, a uniform fuel tax surcharge would address the two structural problems of fuel taxation in the EU addressed in chapter 3. First, it would be lead to a relatively convergence of diesel and gasoline tax rates, as the relative increase of the diesel tax rate would be higher compared to the gasoline tax rate. Second, an EU fuel tax surcharge imposed on top of the existing fuel taxes would be tantamount to compensate for failing to increase the real value of transport fuel taxes in the past fifteen years and could thus raise the inflation adjusted tax rates above the ETD minimum rates for gasoline and diesel excise duties in all EU Member States.

4.2 Estimation of the revenue potential of an EU fuel tax

Our estimations of the revenue potential of an EU fuel tax are based on four different levels of surcharges imposed on top of the existing fuel excise duties levied in the EU Member States: 0.03 €, 0.05 €, 0.1 € and 0.2 € per liter of transport fuel. The simulated surcharges are applied on total transport fuel consumed in the EU using data from the IEA for 2014. As discussed above, fuel demand is rather inelastic in the short run, while long-term elasticity of fuel and particularly of diesel demand can be expected to be somewhat larger.

In a first step, we use the latest estimates for the price elasticities of demand derived in the meta analyses by Havranek and Kokes (2015) for gasoline and by Labandeira, Labeaga and Lopez-Otero (2017) for diesel to estimate the reductions of fuel demand caused by the price changes resulting from an EU-wide uniform fuel tax surcharge.

A fuel tax surcharge between 0.03 € and 0.20 € would have increased the gasoline price in the EU, which amounted to an average of 1.29 € in 2014, within a range between 2.36% (for a surcharge of 0.03 €) and 15.5% (for a surcharge of 20%). Assuming the elasticity of demand for gasoline to be -0.1 in the short run and -0.23 in the long run (Havranek and Kokes 2015), the quantities of gasoline consumed in the EU will be reduced by between 0.3% (for a surcharge of 0.03 €) and 2% (for a surcharge of 0.20 €) in the short run, and by between 0,69% (for a surcharge of 0.03 €) and 4.6% (for a surcharge of 0.20 €) in the long run (see Table 5).

Altogether, the decrease of gasoline demand due to a price increase via imposing an EU fuel tax surcharge would be rather moderate in the short as well as in the long run. Accordingly, the revenue potential of an EU fuel tax surcharge would be considerable also in the longer run (see Table A.7 in the Appendix).

Table 5: Estimation of gasoline consumption decrease in the EU due to a tax-induced price increase

	Gasoline average price in the EU (2014) in €	**price elasticity of demand for gasoline**	
		Short-term	Long-term
	1.29	-0.1	-0.23
Simulated fuel tax surcharges in €	Tax-induced price increase in %	**Decrease in quantity consumed in %**	
0.03	2.326	-0.3	-0.69
0.05	3.876	-0.5	-1.15
0.10	7.752	-1	-2.3
0.20	15.504	-2	-4.6

Source: Own calculations using data provided by Weekly Oil Bulletin and estimates from Havranek and Kokes (2015).

A fuel tax surcharge on diesel would have raised the average EU diesel price of 1.20 € in 2014 by between 2.5% (for a surcharge of 0.03 €) and 16.7% (for a surcharge of 0.20 €) (table 6). Based on the estimates for short and long run price elasticities of demand for diesel obtained in the meta study by Labandeira, Labeaga and Lopez-Otero (2017), the demand for diesel would have been decreased by between 0.46% (for a surcharge of 0.03 €) and 3.06% (for a surcharge of 0.20 €) in the short run and by between 1.3% (for a surcharge of 0.03%) and 8.9% (for a surcharge of 0.20 €) in the long run.

Table 6: Estimation of diesel consumption decrease in the EU due to a tax-induced price increase

	Diesel average price in the EU (2014) in €	**price elasticity of demand for gasoline**	
		Short-term	Long-term
	1.20	-0.153	-0.443
Simulated fuel tax surcharges in €	Tax-induced price increase in %	**Decrease in quantity consumed in %**	
0.03	2.500	-0.459	-1.329
0.05	4.167	-0.765	-2.215
0.10	8.333	-1.53	-4.43
0.20	16.667	-3.06	-8.86

Source: Own calculations using data provided by Weekly Oil Bulletin and estimates from Labandeira, Labeaga and Lopez-Otero (2017).

An EU fuel tax surcharge would raise revenues between € 12.93 billion (for a surcharge of 0.03 €) and € 86.2 billion per year (for a surcharge of 0.2 €) (table 6). It is obvious that the largest consumers of fuel in the EU, particularly the large "old" EU Member States, would be the largest contributors (for more details see Tables A.4, A.5 and A.6 in the Appendix).

In table 7 we compare the potential revenues of an EU fuel tax surcharge with the revenues from the EU's own resources in 2014. We find that the lowest fuel tax surcharge of 0.03 € would have covered 73% of VAT-based own resources, 13% of GNI-based own resources and 9% of total EU revenues. A surcharge of 0.2 € could have replaced 64.8% of total own resources. A full replacement of total own resources would have required a fuel tax surcharge of 0.31 €, of total national contributions of 0.27 €, and of total EU revenues of 0.33 €.

To fully replace total EU revenues, the EU fuel tax surcharge would have to be increased to 0.33 € per liter (see table 7). Table 8 shows the impact of a surcharge of 0.33 € on the gasoline and diesel excise duty rates levied in 2014. A surcharge of 0.33 € would increase the average gasoline excise duty rate in the EU28 by 62.41% and the average diesel excise duty rate by 77.57%.

Table 7: Revenue potential of an EU fuel tax surcharge, 2014

EU28	Total Amount	Full replacement of EU own resources would require fuel tax surcharge of…	EU fuel tax surcharge €				Revenue potential of diesel tax rates aligning diesel and gasoline tax
			0.03	0.05	0.1	0.2	
	Bn. €	€	Revenue potential in bn. €				Bn. €
			12.93	**21.55**	**43.10**	**86.20**	**35.83**
			%				%
VAT-based own resource	17.667	0.04	73.19	121.98	243.96	487.91	202.82
GNI-based own resource	99.076	0.23	13.05	21.75	43.50	87.01	36.17
Traditional own resources (TOR) (75%)	16.429	0.04	78.70	131.17	262.34	524.68	218.10
Customs duties (100%)	21.998	0.05	58.78	97.97	195.93	391.86	162.89
Amounts (25%) retained as TOR collection costs (-)	5.543	0.01	233.26	388.76	777.53	1555.06	646.41
Other revenue	9.973	0.02	129.65	216.08	432.16	864.32	359.28
TOTAL own resources	132.961	0.31	9.72	16.21	32.42	64.83	26.95
TOTAL national contribution	116.532	0.27	11.10	18.49	36.99	73.97	30.75
TOTAL REVENUE	**143.940**	**0.33**	**8.98**	**14.97**	**29.94**	**59.89**	**24.89**

Source: Own calculations using the data provided by Eurostat and IEA.

Aligning gasoline and diesel tax rates by increasing diesel tax rates accordingly, to remove the tax bias in favour of diesel, would raise 35.83 billion € (see table A.8 in the Appendix).

Table 8: The impact on gasoline and diesel excise duty rates of a full replacement of EU revenues by a EU fuel tax surcharge of 0.33 €

Country	Gasoline taxation		Diesel taxation	
	Gasoline excise duty rate in 2014 in €	Increase in percentage of excise duty due to an imposition of EU fuel tax of 0.33 €	Diesel excise duty rate in 2014 in €	Increase in percentage of excise duty due to an imposition of EU fuel tax of 0.33 €
EU28	**0.55**	**62.41**	**0.44**	**77.57**
Austria	0.49	66.89	0.41	80.56
Belgium	0.61	54.10	0.50	66.41
Bulgaria	0.36	**90.90**	0.33	**99.91**
Croatia	0.51	64.24	0.41	81.03
Cyprus	0.49	67.39	0.46	71.63
Czech Republic	0.48	69.45	0.41	81.43
Denmark	0.61	53.74	0.42	78.88
Estonia	0.42	78.06	0.39	83.99
Finland	0.65	50.55	0.49	66.89
France	0.65	50.96	0.51	64.63
Germany	0.65	50.42	0.47	70.15
Greece	0.68	48.55	0.34	**97.30**
Hungary	0.41	79.84	0.40	82.95
Ireland	0.61	54.30	0.50	66.13
Italy	0.73	45.30	0.62	53.45
Latvia	0.44	74.43	0.35	**94.55**
Lithuania	0.43	75.96	0.33	**99.95**
Luxembourg	0.46	71.41	0.34	**98.51**
Malta	0.55	60.07	0.47	69.86
Netherlands	0.78	42.42	0.49	67.01
Poland	0.39	**85.60**	0.34	**97.94**
Portugal	0.67	49.17	0.46	72.38
Romania	0.45	72.94	0.42	78.26
Slovakia	0.57	57.88	0.41	81.27
Slovenia	0.56	58.54	0.49	67.53
Spain	0.46	71.45	0.37	**89.69**
Sweden	0.63	52.21	0.56	59.03
United Kingdom	0.65	50.70	0.65	50.70

Source: Own calculations using data provided by Eurostat and IEA.

Obviously, a uniform surcharge on national fuel tax rates would ignore the differing levels of economic development and purchasing power of the EU28 Member States. To correct for these differences, we adjust the four potential EU fuel tax surcharges according to Member States' GDP expressed in Purchasing Power Standards relative to the EU average GDP=100 to achieve more equitable surcharges accounting for regional income differences. For example, an average fuel tax surcharge of 0.03 € would be increased by a factor of 2.66 for Luxembourg, whose GDP in PPS is 2.66 higher than the average EU GDP. Accordingly, Luxembourg would apply an EU

fuel tax of 0.0798 € per liter of transport fuel instead of the basic rate of 0.03 €. These adjustments would not change the total revenue potential at the EU level significantly, as total revenues would increase by 6.5% only compared to the first set of simulations.[7]

[7] For details see the Table A.9 and Table A.10 in the Appendix.

5 Conclusions

The aim of this paper was to analyse fuel taxation as one option for sustainability-oriented tax-based own resources to finance the EU budget. Besides the contribution an EU fuel tax would make to various sustainability-related EU goals and strategies, it would help to address two specific problems inherent in the current EU system of fuel taxation. An EU fuel tax designed as a surcharge on national fuel taxes would decrease the existing tax bias in favour of diesel, as the surcharge would be levied uniformly on gasoline and the lower-taxed diesel alike. Moreover, by increasing national fuel tax rates, the surcharge would – depending on its level – mitigate or even remove the "under-taxation" of fuel in relation to the minimum fuel tax rates stipulated in the EU ETD in a number of countries, which is caused by the absence of regular inflation adjustment of nominal fuel tax rates.

An EU fuel tax partially replacing current national contributions to the EU budget would yield at least a double dividend. First, it would create space for Member States' governments to reduce other national taxes, especially the high taxes on labour. Second, it would strengthen the environmental effectiveness of taxation in the EU. Furthermore, an EU fuel tax can be assessed positively from a tax compliance perspective, as fuel taxes are transparent, cost-effective and easy to collect. Not least, a fuel tax surcharge in the design suggested in this paper would address – albeit to a limited extent – the current problem of substantial cross-country fuel tax rate differentials and the undesirable tax competition they cause. Altogether, an EU fuel tax levied as a surcharge on Member States' national fuel tax rates presents itself as an interesting tax-based own resource option.

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7 Appendix

Table A.1: Transport fuel taxation, final fuel price of gasoline and diesel in the EU for 2014

Country	Excise duty		Tax-inclusive price of		Total tax (VAT included)		Share of taxation in price of	
	gasoline	diesel	gasoline	diesel	gasoline	diesel	gasoline	diesel
	In €						**In %**	
EU28	**0.440**	**0.551**	**1.229**	**1.125**	**0.769**	**0.640**	**62.10**	**56.50**
Austria	0.410	0.493	1.118	1.063	0.680	0.587	60.80	55.20
Belgium	0.497	0.610	1.268	1.154	0.830	0.697	65.46	60.43
Bulgaria	0.330	0.363	1.009	0.985	0.531	0.494	52.64	50.20
Croatia	0.406	0.512	1.185	1.099	0.749	0.626	63.21	56.93
Cyprus	0.461	0.490	1.168	1.166	0.676	0.647	57.89	55.49
Czech Republic	0.405	0.475	1.085	1.053	0.663	0.588	61.14	55.82
Denmark	0.418	0.614	1.415	1.212	0.897	0.661	63.39	54.51
Estonia	0.393	0.423	1.079	1.080	0.603	0.573	55.85	53.05
Finland	0.493	0.653	1.391	1.267	0.922	0.739	66.28	58.30
France	0.511	0.648	1.310	1.135	0.866	0.700	66.12	61.64
Germany	0.470	0.655	1.318	1.126	0.865	0.650	65.62	57.74
Greece	0.339	0.680	1.418	1.118	0.954	0.555	67.28	49.69
Hungary	0.394	0.409	1.080	1.123	0.639	0.633	59.16	56.33
Ireland	0.499	0.608	1.299	1.199	0.851	0.723	65.48	60.32
Italy	0.617	0.728	1.458	1.311	0.991	0.854	67.98	65.12
Latvia	0.349	0.443	1.102	1.002	0.635	0.523	57.60	52.18
Lithuania	0.330	0.434	1.078	0.981	0.621	0.500	57.67	51.00
Luxembourg	0.335	0.462	1.106	0.957	0.623	0.474	56.31	49.54
Malta	0.472	0.549	1.270	1.140	0.743	0.646	58.51	56.69
Netherlands	0.492	0.778	1.493	1.177	1.037	0.697	69.46	59.20
Poland	0.329	0.377	1.010	0.978	0.566	0.512	56.01	52.36
Portugal	0.446	0.671	1.371	1.142	0.927	0.659	67.65	57.75
Romania	0.421	0.451	1.093	1.087	0.633	0.602	57.95	55.35
Slovakia	0.406	0.570	1.218	1.072	0.773	0.585	63.48	54.54
Slovenia	0.489	0.564	1.228	1.123	0.785	0.691	63.94	61.55
Spain	0.368	0.462	1.159	1.041	0.663	0.549	57.22	52.69
Sweden	0.569	0.643	1.351	1.346	0.913	0.838	67.59	62.25
United Kingdom	0.676	0.676	1.338	1.370	0.899	0.904	67.19	66.02

Source: Weekly Oil Bulletin.

Table A.2: Comparison of nominal and real gasoline and diesel tax rates in the EU Member States and the Energy Tax Directive minimum tax rates

Country	Inflation rate in 2014 (2005=100)	Nominal gasoline excise duty	Real gasoline excise duty	Difference between nominal and real gasoline duty	Difference between real and minimum ETD gasoline duty	Nominal diesel excise duty	Real diesel excise duty	Difference between nominal and real diesel duty	Difference between real and minimum ETD diesel duty	Difference between nominal gasoline and diesel excise tax rate	Difference between real gasoline and diesel excise tax rate
		In €									
EU28	**120.88**	**0.551**	**0.456**	**0.095**	**0.097**	**0.440**	**0.364**	**0.076**	**0.034**	**0.111**	**0.092**
Austria	120.54	0.493	0.409	0.084	0.050	0.410	0.340	0.070	0.010	0.084	0.069
Belgium	120.22	0.610	0.507	0.103	0.148	0.497	0.413	0.084	0.083	0.113	0.094
Bulgaria	142.81	0.363	0.254	0.109	**-0.105**	0.330	0.231	0.099	**-0.099**	0.033	0.023
Croatia	125.59	0.514	0.409	0.105	0.050	0.407	0.324	0.083	**-0.006**	0.106	0.085
Cyprus	119.66	0.490	0.409	0.080	0.050	0.461	0.385	0.076	0.055	0.029	0.024
Czech	122.44	0.475	0.388	0.087	0.029	0.405	0.331	0.074	0.001	0.070	0.057
Denmark	117.43	0.614	0.523	0.091	0.164	0.418	0.356	0.062	0.026	0.196	0.167
Estonia	144.22	0.423	0.293	0.130	**-0.066**	0.393	0.272	0.120	**-0.058**	0.030	0.021
Finland	121.84	0.653	0.536	0.117	0.177	0.493	0.405	0.088	0.075	0.159	0.131
France	115.55	0.648	0.560	0.087	0.201	0.511	0.442	0.069	0.112	0.137	0.119
Germany	116.21	0.655	0.563	0.091	0.204	0.470	0.405	0.066	0.075	0.184	0.158
Greece	119.87	0.680	0.567	0.113	0.208	0.339	0.283	0.056	**-0.047**	0.341	0.284
Hungary	144.88	0.413	0.285	0.128	**-0.074**	0.398	0.275	0.123	**-0.055**	0.016	0.011
Ireland	**109.58**	**0.608**	**0.555**	**0.053**	**0.196**	**0.499**	**0.455**	**0.044**	**0.125**	**0.109**	**0.099**
Italy	119.29	0.728	0.611	0.118	0.252	0.617	0.518	0.100	0.188	0.111	0.093
Latvia	**148.05**	**0.443**	**0.299**	**0.144**	**-0.060**	**0.349**	**0.236**	**0.113**	**-0.094**	**0.094**	**0.064**
Lithuania	140.04	0.434	0.310	0.124	**-0.049**	0.330	0.236	0.094	**-0.094**	0.104	0.074
Luxembourg	123.62	0.462	0.374	0.088	0.015	0.335	0.271	0.064	**-0.059**	0.127	0.103
Malta	121.00	0.549	0.454	0.095	0.095	0.472	0.390	0.082	0.060	0.077	0.064
Netherlands	116.61	0.778	0.667	0.111	0.308	0.492	0.422	0.070	0.092	0.285	0.245

Source: Own calculations using the data provided by Eurostat and Weekly Oil Bulletin.

Table A.3: Comparison of nominal and real gasoline and diesel tax rates in the EU Member States and the Energy Tax Directive minimum tax rates

Country	Inflation rate in 2014 (2005=100)	Nominal gasoline excise duty	Real gasoline excise duty	Difference between nominal and real gasoline duty	Difference between real and minimum ETD gasoline duty	Nominal gasoline excise duty	Real gasoline excise duty	Difference between nominal and real gasoline duty	Difference between real and minimum ETD gasoline duty	Difference between nominal gasoline and diesel excise tax rate	Difference between real gasoline and diesel excise tax rate
		In €									
Poland	125.63	0.386	0.307	0.079	**-0.052**	0.337	0.268	0.069	**-0.062**	0.049	0.039
Portugal	116.18	0.671	0.578	0.093	0.219	0.456	0.392	0.063	0.062	0.215	0.185
Romania	**154.71**	**0.452**	**0.292**	**0.160**	**-0.067**	**0.422**	**0.273**	**0.149**	**-0.057**	**0.031**	**0.020**
Slovakia	122.81	0.570	0.464	0.106	0.105	0.406	0.331	0.075	0.001	0.164	0.134
Slovenia	124.14	0.564	0.454	0.110	0.095	0.489	0.394	0.095	0.064	0.075	0.060
Spain	120.77	0.462	0.382	0.079	0.023	0.368	0.305	0.063	**-0.025**	0.094	0.078
Sweden	114.10	0.632	0.554	0.078	0.195	0.559	0.490	0.069	0.160	0.073	0.064
United Kingdom	127.97	0.651	0.509	0.142	0.150	0.651	0.509	0.142	0.179	0.000	0.000

Source: Own calculations using the data provided by Eurostat and Weekly Oil Bulletin.

Table A.4: Road diesel consumption in the EU 28 countries and the revenue potential of an EU fuel tax surcharge on diesel

Country	Diesel consumption in 2014	EU fuel tax surcharge			
		0.03 €	0.05 €	0.10 €	0.20 €
	Bn. liters	Bn. €			
EU28	**323.072**	**9.692**	**16.154**	**32.307**	**64.614**
Austria	8.821	0.265	0.441	0.882	1.764
Belgium	13.057	0.392	0.653	1.306	2.611
Bulgaria	1.915	0.057	0.096	0.191	0.383
Croatia	1.915	0.057	0.096	0.191	0.383
Cyprus	0.754	0.023	0.038	0.075	0.151
Czech Republic	5.165	0.155	0.258	0.516	1.033
Denmark	4.584	0.138	0.229	0.458	0.917
Estonia	0.870	0.026	0.044	0.087	0.174
Finland	4.758	0.143	0.238	0.476	0.952
France	**55.071**	**1.652**	**2.754**	**5.507**	**11.014**
Germany	**62.673**	**1.880**	**3.134**	**6.267**	**12.535**
Greece	4.933	0.148	0.247	0.493	0.987
Hungary	3.424	0.103	0.171	0.342	0.685
Ireland	3.888	0.117	0.194	0.389	0.778
Italy	**32.961**	**0.989**	**1.648**	**3.296**	**6.592**
Latvia	1.103	0.033	0.055	0.110	0.221
Lithuania	0.453	0.014	0.023	0.045	0.091
Luxembourg	2.321	0.070	0.116	0.232	0.464
Malta	0.435	0.013	0.022	0.044	0.087
Netherlands	9.807	0.294	0.490	0.981	1.961
Poland	14.159	0.425	0.708	1.416	2.832
Portugal	5.571	0.167	0.279	0.557	1.114
Romania	5.281	0.158	0.264	0.528	1.056
Slovakia	1.857	0.056	0.093	0.186	0.371
Slovenia	1.915	0.057	0.096	0.191	0.383
Spain	**33.600**	**1.008**	**1.680**	**3.360**	**6.720**
Sweden	6.209	0.186	0.310	0.621	1.242
United Kingdom	**35.573**	**1.067**	**1.779**	**3.557**	**7.115**

Source: Own calculations using the data from IEA.

Table A.5: Unleaded gasoline consumption in the EU 28 countries and the revenue potential of an EU fuel tax surcharge on gasoline

EU fuel tax rate	Gasoline consumption in 2014	EU fuel tax surcharge			
		0.03 €	0.05 €	0.10 €	0.20 €
	Bn. liters	Bn. €			
EU28	**107.936**	**3.238**	**5.397**	**10.794**	**21.587**
Austria	2.205	0.066	0.110	0.221	0.441
Belgium	1.741	0.052	0.087	0.174	0.348
Bulgaria	0.580	0.017	0.029	0.058	0.116
Croatia	0.754	0.023	0.038	0.075	0.151
Cyprus	0.470	0.014	0.024	0.047	0.094
Czech Republic	2.089	0.063	0.104	0.209	0.418
Denmark	1.799	0.054	0.090	0.180	0.360
Estonia	0.325	0.010	0.016	0.032	0.065
Finland	2.031	0.061	0.102	0.203	0.406
France	**9.401**	**0.282**	**0.470**	**0.940**	**1.880**
Germany	**24.895**	**0.747**	**1.245**	**2.489**	**4.979**
Greece	3.366	0.101	0.168	0.337	0.673
Hungary	1.741	0.052	0.087	0.174	0.348
Ireland	1.567	0.047	0.078	0.157	0.313
Italy	**11.896**	**0.357**	**0.595**	**1.190**	**2.379**
Latvia	0.279	0.008	0.014	0.028	0.056
Lithuania	0.267	0.008	0.013	0.027	0.053
Luxembourg	0.418	0.013	0.021	0.042	0.084
Malta	0.099	0.003	0.005	0.010	0.020
Netherlands	5.107	0.153	0.255	0.511	1.021
Poland	4.817	0.144	0.241	0.482	0.963
Portugal	1.451	0.044	0.073	0.145	0.290
Romania	1.741	0.052	0.087	0.174	0.348
Slovakia	0.754	0.023	0.038	0.075	0.151
Slovenia	0.580	0.017	0.029	0.058	0.116
Spain	**6.209**	**0.186**	**0.310**	**0.621**	**1.242**
Sweden	3.946	0.118	0.197	0.395	0.789
United Kingdom	**17.409**	**0.522**	**0.870**	**1.741**	**3.482**

Source: Own calculations using the data from IEA.

Table A.6: Total transport fuel consumption in the EU28 countries and the revenue potential of an EU fuel tax surcharge

Country	Total transport fossil fuel consumption in 2014	EU fuel tax rate				Share in total revenues from gasoline tax	Share in total revenues from diesel tax
		0.03 €	0.05 €	0.10 €	0.20 €		
	Bn. Liters	Bn. €				%	%
EU28	431.008	12.930	21.550	43.101	86.202	25.04	74.96
Austria	11.026	0.331	0.551	1.103	2.205	20.00	80.00
Belgium	14.798	0.444	0.740	1.480	2.960	11.76	88.24
Bulgaria	2.495	0.075	0.125	0.250	0.499	23.26	76.74
Croatia	2.669	0.080	0.133	0.267	0.534	28.26	71.74
Cyprus	1.224	0.037	0.061	0.122	0.245	38.39	61.61
Czech Republic	7.254	0.218	0.363	0.725	1.451	28.80	71.20
Denmark	6.383	0.191	0.319	0.638	1.277	28.18	71.82
Estonia	1.195	0.036	0.060	0.120	0.239	27.18	72.82
Finland	6.790	0.204	0.339	0.679	1.358	29.91	70.09
France	64.472	1.934	3.224	6.447	12.894	14.58	85.42
Germany	87.568	2.627	4.378	8.757	17.514	28.43	71.57
Greece	8.298	0.249	0.415	0.830	1.660	40.56	59.44
Hungary	5.165	0.155	0.258	0.516	1.033	33.71	66.29
Ireland	5.455	0.164	0.273	0.545	1.091	28.72	71.28
Italy	44.857	1.346	2.243	4.486	8.971	26.52	73.48
Latvia	1.381	0.041	0.069	0.138	0.276	20.17	79.83
Lithuania	0.720	0.022	0.036	0.072	0.144	37.10	62.90
Luxembourg	2.739	0.082	0.137	0.274	0.548	15.25	84.75
Malta	0.534	0.016	0.027	0.053	0.107	18.48	81.52
Netherlands	14.914	0.447	0.746	1.491	2.983	34.24	65.76
Poland	18.976	0.569	0.949	1.898	3.795	25.38	74.62
Portugal	7.022	0.211	0.351	0.702	1.404	20.66	79.34
Romania	7.022	0.211	0.351	0.702	1.404	24.79	75.21
Slovakia	2.611	0.078	0.131	0.261	0.522	28.89	71.11
Slovenia	2.495	0.075	0.125	0.250	0.499	23.26	76.74
Spain	39.809	1.194	1.990	3.981	7.962	15.60	84.40
Sweden	10.155	0.305	0.508	1.016	2.031	38.86	61.14
United Kingdom	52.982	1.589	2.649	5.298	10.596	32.86	67.14

Source: Own calculations using the data from IEA.

Table A.7: Estimation of the short- and long-term revenue potential of an EU fuel tax surcharge

Short-term price elasticity of demand for gasoline estimation					
EU fuel tax surcharge in €	Initial gasoline consumption	Demand decrease due EU fuel tax surcharge	Decreased gasoline consumption	Simulation with reduced demand	Initial simulation
	Bn. Liters	%	Bn. Liters	Bn. €	
0.03	107.936	-0.323	107.612	3.228	3.238
0.05	107.936	-0.539	107.396	5.369	5.397
0.10	107.936	-1.079	106.856	10.685	10.794
0.20	107.936	-2.158	105.777	21.155	21.587
Long-term price elasticity of demand for gasoline estimation					
EU fuel tax surcharge in €	Initial gasoline consumption	Demand decrease due EU fuel tax surcharge	Decreased gasoline consumption	Simulation with reduced demand	Initial simulation
	Bn. liters	%	Bn. Liters	Bn. €	
0.03	107.936	-0.744	107.191	3.215	3.238
0.05	107.936	-1.241	106.694	5.334	5.397
0.10	107.936	-2.482	105.453	10.545	10.794
0.20	107.936	-4.965	102.970	20.594	21.587
Short-term price elasticity of demand for diesel estimation					
EU fuel tax surcharge, in €	Initial diesel consumption	Demand decrease due EU fuel tax surcharge	Decreased diesel consumption	Simulation with reduced demand	Initial simulation
	Bn. liters	%	Bn. liters	Bn. €	
0.03	323.072	-0.459	321.589	9.647	9.692
0.05	323.072	-0.765	320.600	16.030	16.154
0.10	323.072	-1.531	318.128	31.812	32.307
0.20	323.072	-3.062	313.185	62.637	64.614
Long-term price elasticity of demand for diesel estimation					
EU fuel tax surcharge, in €	Initial diesel consumption	Demand decrease due EU fuel tax surcharge	Decreased diesel consumption	Simulation with reduced demand	Initial simulation
	Bn. liters	%	Bn. liters	Bn. €	
0.03	323.072	-1.329	318.778	9.563	9.692
0.05	323.072	-2.215	315.915	15.795	16.153
0.10	323.072	-4.431	308.759	30.875	32.307
0.20	323.072	-8.865	294.447	58.889	64.614

Source: Own calculations using data provided by Weekly Oil Bulletin and estimates from Havranek and Kokes (2015).

Table A.8. The revenue potential of aligning diesel and gasoline tax rate in the EU 28 Member States

Country	Diesel fuel consumption in 2014	Revenues potential of aligning nominal diesel tax rate with gasoline tax rate
	Bn. Liters	Bn. €
EU28	**323.072**	**35.833**
Austria	8.821	0.738
Belgium	13.057	1.477
Bulgaria	1.915	0.063
Croatia	1.915	0.204
Cyprus	0.754	0.022
Czech Republic	5.165	0.361
Denmark	4.584	0.897
Estonia	0.870	0.026
Finland	4.758	0.759
France	55.071	7.545
Germany	62.673	11.538
Greece	4.933	1.680
Hungary	3.424	0.053
Ireland	3.888	0.423
Italy	32.961	3.659
Latvia	1.103	0.104
Lithuania	0.453	0.047
Luxembourg	2.321	0.295
Malta	0.435	0.034
Netherlands	9.807	2.799
Poland	14.159	0.688
Portugal	5.571	1.199
Romania	5.281	0.162
Slovakia	1.857	0.305
Slovenia	1.915	0.144
Spain	33.600	3.156
Sweden	6.209	0.454
United Kingdom	35.573	0.000

Source: Own calculations using the data from Weekly Oil Bulletin.

Table A.9. Revenue potential of fuel tax surcharge using adjusted fuel tax rates according to each EU country GDP in PPS

Country	GDP in PPS, EU=100 in 2014	Total transport fuels	EU fuel tax rate 0.03 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.03 €	EU fuel tax rate 0.05 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.05 €	EU fuel tax rate 0.10 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.10 €	EU fuel tax rate 0.20 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.20 €
		Bn. Liter	**€**	**Bn. €**	**€**	**Bn. €**	**€**	**Bn. €**	**€**	**Bn. €**
EU28	100	**431.008**	**3**	**13.759**	**5**	**22.878**	**10**	**45.862**	**20**	**91.724**
Austria	129	11.026	3.87	0.427	6.35	0.700	12.9	1.422	25.8	2.845
Belgium	118	14.798	3.54	0.524	5.85	0.866	11.8	1.746	23.6	3.492
Bulgaria	47	**2.495**	**1.41**	**0.035**	**2.3**	**0.057**	**4.7**	**0.117**	**9.4**	**0.235**
Croatia	59	2.669	1.77	0.047	2.9	0.077	5.9	0.157	11.8	0.315
Cyprus	82	1.224	2.46	0.030	4.05	0.050	8.2	0.100	16.4	0.201
Czech Republic	84	7.254	2.52	0.183	4.25	0.308	8.4	0.609	16.8	1.219
Denmark	125	6.383	3.75	0.239	6.2	0.396	12.5	0.798	25	1.596
Estonia	76	1.195	2.28	0.027	3.7	0.044	7.6	0.091	15.2	0.182
Finland	110	6.790	3.3	0.224	5.4	0.367	11	0.747	22	1.494
France	107	64.472	3.21	2.070	5.3	3.417	10.7	6.898	21.4	13.797
Germany	126	87.568	3.78	3.310	6.25	5.473	12.6	11.034	25.2	22.067
Greece	73	8.298	2.19	0.182	3.55	0.295	7.3	0.606	14.6	1.212
Hungary	68	5.165	2.04	0.105	3.4	0.176	6.8	0.351	13.6	0.702
Ireland	134	5.455	4.02	0.219	7.25	0.395	13.4	0.731	26.8	1.462
Italy	96	44.857	2.88	1.292	4.75	2.131	9.6	4.306	19.2	8.613
Latvia	64	1.381	1.92	0.027	3.2	0.044	6.4	0.088	12.8	0.177
Lithuania	75	0.720	2.25	0.016	3.7	0.027	7.5	0.054	15	0.108
Luxembourg	**266**	**2.739**	**7.98**	**0.219**	**13.55**	**0.371**	**26.6**	**0.729**	**53.2**	**1.457**
Malta	86	0.534	2.58	0.014	4.45	0.024	8.6	0.046	17.2	0.092

Source: Own calculations using the data provided by Eurostat and IEA.

Table A.10. Revenue potential of fuel tax surcharge using adjusted fuel tax rates according to each EU country GDP in PPS

Country	GDP in PPS, EU=100 in 2014	Total transport fuels	EU fuel tax rate 0.03 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.03 €	EU fuel tax rate 0.05 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.05 €	EU fuel tax rate 0.1 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.1 €	EU fuel tax rate 0.2 € adjusted by GDP in PPS	Revenues potential of EU fuel tax rate of 0.2 €
		Bn. Liter	**€**	**Bn. €**	**€**	**Bn. €**	**€**	**Bn. €**	**€**	**Bn. €**
Netherlands	131	14.914	3.93	0.586	6.45	0.962	13.1	1.954	26.2	3.907
Poland	68	18.976	2.04	0.387	3.45	0.655	6.8	1.290	13.6	2.581
Portugal	78	7.022	2.34	0.164	3.85	0.270	7.8	0.548	15.6	1.095
Romania	55	7.022	1.65	0.116	2.85	0.200	5.5	0.386	11	0.772
Slovakia	77	2.611	2.31	0.060	3.85	0.101	7.7	0.201	15.4	0.402
Slovenia	82	2.495	2.46	0.061	4.15	0.104	8.2	0.205	16.4	0.409
Spain	91	39.809	2.73	1.087	4.6	1.831	9.1	3.623	18.2	7.245
Sweden	123	10.155	3.69	0.375	6.15	0.625	12.3	1.249	24.6	2.498
United Kingdom	109	52.982	3.27	1.732	5.5	2.914	10.9	5.775	21.8	11.550

Source: Own calculations using the data provided by Eurostat and IEA.

8 Project information

FairTax is a cross-disciplinary four year H2020 EU project aiming to produce recommendations on how fair and sustainable taxation and social policy reforms can increase the economic stability of EU member states, promoting economic equality and security, enhancing coordination and harmonisation of tax, social inclusion, environmental, legitimacy, and compliance measures, support deepening of the European Monetary Union, and expanding the EU's own resource revenue bases. Under the coordination of Umeå University (Sweden), comparative and international policy fiscal experts from eleven universities in six EU countries and three non-EU countries (Brazil, Canada and Norway) contribute to FairTax research.

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