

# DICE REPORTS<sup>1</sup>

## TAXING CO<sub>2</sub> IN EUROPE

The importance of greenhouse gases, especially carbon dioxide (CO<sub>2</sub>) for the world climate was again highlighted at last year's World Climate Conference in the Hague. Whether nations will achieve the targeted reduction of the emission of these gases depends on how these pollutants are taxed.

Many countries in Europe tax the emission of CO<sub>2</sub>. All countries have a general consumption tax on energy. In addition, several countries have supplemental taxes explicitly labelled "environmental", "energy" or "eco" taxes and in some cases a tax earmarked for financing reserves of certain energy sources. All of these taxes on the consumption of energy are also indirect taxes on the substances that burning releases, including CO<sub>2</sub>. A few European countries have, in addition, introduced specific taxes on certain pollutants. Thus Denmark, the Netherlands, Norway and Sweden place a direct tax on the CO<sub>2</sub> content of energy sources.

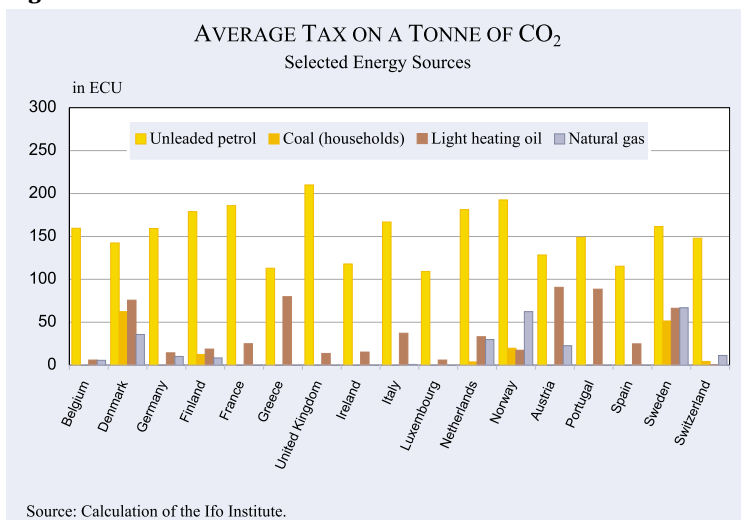
From an economic and ecological perspective, the tax burden on pollutants should not only be noticeable but should also be even. In other words, the tax on a tonne of CO<sub>2</sub> should be independent of the energy source that releases it. Only in this case do the substitution effects and savings efforts go in the right economic and ecological direction. The reasoning is that a tax on pollutants is not primarily aimed at raising revenue, but is to force companies to include the social cost of a by-product in the production process in their cost accounting.

CO<sub>2</sub> emissions differ greatly between countries and between

sources of energy (Fig. 1). Demands for identical taxation of the pollutants from each energy source are based on the desire to have the substitution processes and savings efforts carried out in an economically and ecologically meaningful way. Even taxation of pollutants is of practical relevance only if energy savings and substitutions actually do or at least could occur. This is indeed the case within types of energy use (road traffic, heating, industry, electricity generation) but rarely between these sectors. This implies that demands for an even CO<sub>2</sub> taxation is of practical economic and ecological relevance only within sectors of energy use but of less relevance between the sectors. Even great differences in taxation between the sectors would have few harmful effects as hardly any tax-induced substitution is possible.

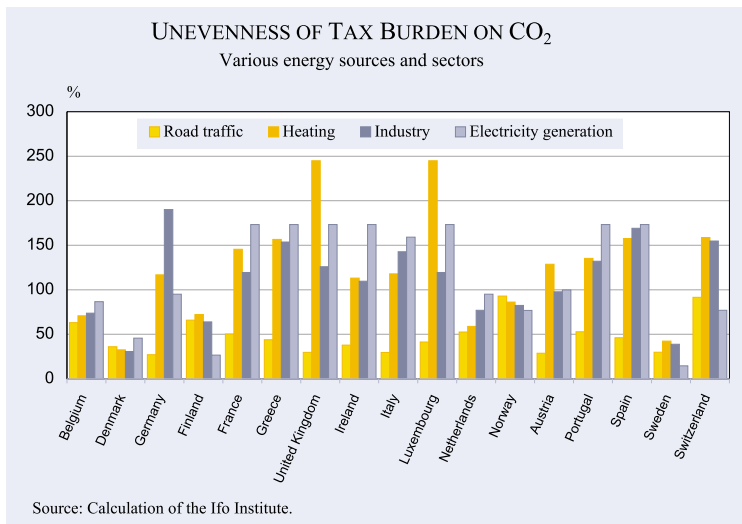
A comparison of the tax burden on CO<sub>2</sub> discharge within each of the four sectors of energy use (Fig. 2) shows that especially in road traffic the unevenness of CO<sub>2</sub> taxation is much less than in the other observed sectors. Thus, at 27%, Germany has the lowest coefficient of variation, whereas Norway has the highest, at 93%. In heating/households and industrial use, the size of the variation of CO<sub>2</sub> taxation is very different. Some countries like Sweden, Denmark, Belgium and the Netherlands have relatively low figures, whereas in Germany

**Figure 1**



<sup>1</sup> DICE = Database of Institutional Comparison in Europe ([www.cesifo.de](http://www.cesifo.de)).

Figure 2



for industrial use and in the United Kingdom for heating the differences in CO<sub>2</sub> taxation are large.

In no European country and in no sector does an even taxation of CO<sub>2</sub> emissions exist, although within end-use sectors even taxation would make sense because of the possible substitutability. A reasonable evenness of European CO<sub>2</sub> taxation may be found in the road traffic sector, with Germany displaying the greatest evenness and Norway and Switzerland the greatest unevenness.

Finally, taxation of a tonne of CO<sub>2</sub> is higher in those countries which have a specific CO<sub>2</sub> tax than in the others. Whereas the differences are small in road traffic and electricity generation, they are considerable in heating and industrial use. The variation in the taxation of the individual energy sources within sectors is lower in countries with specific CO<sub>2</sub> taxes overall and in the individual sectors than in the other countries.

In the long run, a rational and more effective economic/ecological policy will not get around a convergence of the marginal (not overall average) taxation of pollutants among the various sources of energy. Toward this end, taxes on specific pollutants are needed like those already applied by some European countries. The importance of such instruments which are able to achieve the targeted CO<sub>2</sub> reduction at the lowest possible cost will increase all over Europe and especially in those countries which plan to get out of nuclear energy and increase the number of conventional CO<sub>2</sub>-intensive power plants.

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