

DECOMPOSING ROAD FREIGHT CARBON DIOXIDE EMISSIONS IN SPAIN. 1996-2010.

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In the World Energy Outlook 2010 it is shown that worldwide the transport sector is responsible for 23% of greenhouse gas emissions, a sector which in turn consumes 27% of the final energy. Also, the European Environment Agency in two publications of 2011 alleged that, in terms of EU-27, greenhouse gas emissions from the transport sector account for 20% -a 42% excluding the energy sector- and the final energy consumption of the activity reaches 33%.

Data from Eurostat indicate that greenhouse gas emissions have shown a different pattern in Spain in relation to their neighbor countries during 1996-2009. While these emissions have increased 19.5% in Spain, they have diminished 13.6% in the EU-27. One significant sector that has contributed more to these negative results has been transport sector. This activity has experienced an augment of its greenhouse gases of 34.5% during the period, being responsible of 25.7% of total emissions in 2009 -of which 92.1% corresponds to road transport. The upward trend in emission from this sector is a result of increasing energy consumption -35.9% between 1996 and 2009-, reaching 42.5% of total final energy consumption in 2009 .

Usually transport sector and economic activity have followed similar trends. Moreover, in recent decades the way goods are transported has changed, and the type of goods transported and the distance and/or frequency with which they are transported. These changes have significant impacts on energy use and carbon dioxide emissions from the freight transport sector. The knowledge of these factors that influence the evolution of carbon dioxide emissions is important because it helps the design of new instruments of environmental policy and the valuation of the implemented measures.

Under this framework, a part of the literature devoted to the study of energy efficiency in the transport sector analysis based on descriptive models IPAT. Based on these models, the International Energy Agency has developed the ASIF equation (IEA, 1997) to investigate the impact of emissions of any pollutant in the transport sector.

In this context, the objective of this research is to analyze the negative contribution in carbon dioxide emissions of Spanish road freight transport during the period 1996-2010, focusing the investigation in heavy vehicles. The study is carried out through revising the influence of economic activity and of different key ratios in carbon dioxide emissions related to road freight transport applying decomposition analysis techniques. Therefore, the analytical contribution of these research is to link the evolution of the whole economy and a series of key ratios to carbon dioxide emissions from the road freight transport following the ASIF equation but at a more disaggregated level.

The decomposition analysis is a mathematical tool that in a period of time, allows to know the contribution of the changes in each one of the factors –economic activity and key ratios- on changes in carbon dioxide emissions. In this sense, the decomposition method chosen is LMDI-I as it enjoys a number of virtues that make it preferable to any other method of decomposition, as shown in the article of Ang (2004).

This work is inspired by the articles of Sorrell et al. (2009) and of Fosgerau and Kveiborg (2007). These are the only empirical studies, as far as I know that analyze the evolution of energy consumption of road freight transport of heavy vehicles to a highly disaggregated level. In these investigations economic activity and different key ratios are linked with energy consumption in road freight transport sector using the method of decomposition as an analytical tool. In particular, Sorrell et al. (2009) studied the contribution of a total of 11 variables in the evolution of the road freight transport energy consumption in the UK between 1989 and 2004, and Fosgerau and Kveiborg (2007) included in its analysis a total of 10 variables for Denmark in the period 1981-1997.