Aged-based household carbon footprint in Spain: an inequality and carbon taxation approach

Topic: Regional Analysis
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Carbon taxation is a strategy that has been proven to effectively reduce household carbon emissions. This is achieved by internalising the negative environmental impact of production and distribution processes into prices. Furthermore, the application of carbon taxation has been shown to incentivise investment and innovation, leading to further reductions in emissions. However, it is important to consider potential negative effects, such as increased inequality. Understanding how these impacts affect different regions and types of households is crucial for designing effective mitigation policies. The impacts vary depending on the socio-economic characteristics of the households to which they are applied, with certain groups being particularly vulnerable, such as older people - a growing demographic even in developing countries due to improved living conditions. Households consisting of older individuals exhibit specific consumption patterns, with a higher consumption of household goods due to spending more time at home.

Although evidence suggests that environmental taxes can effectively reduce environmental impacts without generating significant economic impacts, their use in Spain is currently limited. Modifications to environmental taxation have been proposed to increase its effectiveness. For example, introducing state-level taxes with broader tax bases and fewer exemptions. This paper aims to analyze the effect of introducing a carbon tax of 100 euros per ton on households classified according to the age of the main breadwinner in the seventeen Spanish regions. It is estimated that the population over 65 years of age will represent 26% of the total population in 2037. To achieve this, information extracted from the Spanish Household Budget Survey's micro-data by region and several household characteristics was combined with the results of applying an environmentally extended input-output model using the multi-regional FIGARO database. The direct emissions generated by the combustion processes of household energy goods in the context of housing and transport are also calculated.

Preliminary results indicate that Spanish households were responsible for emitting 214.429 kilotons of CO2 in 2019. These emissions can be divided into their carbon footprint (150.233 kilotons) and their emissions related to the use of energy for housing and transport (64.197 kilotons). The most polluting households in Spain are those located in Navarra, Madrid, and Islas Baleares, with an average of 13,47, 12,79 and 12,64 tons of CO2 emissions. By contrast, the least polluting households are those located in Extremadura, Ceuta, and Islas Canarias, with an average of 9,51, 9,51 and 9,93 tons of CO2 emissions. When considering age, households where the main breadwinner is between 18 and 34 years old have the highest intensity of emissions per euro spent. In contrast, households where the main breadwinner is over 65 have the lowest emission instensity. An analysis of Spanish regions reveals that households with lower average expenditure tend to have more polluting consumption patterns. Therefore, households living in these regions are more affected by the tax implementation than those residing in areas with higher average expenditure and less CO2-intensive consumption patterns. These results can assist in proposing local policies and strategies aimed at reducing the intensity of pollution per euro spent, without compromising the economic situation of the most vulnerable households.