

RESEARCH PROJECT

The main topic of this thesis is the analysis of environmental impacts from different perspectives. In this way, the thesis considers the environmental impacts of structural, technological and consumption changes of the European Union in the last decades, to formulate several scenarios and trajectories, considering the Green Deal. We can distinguish two different parts in the thesis. The first part contains three chapters, which study the impacts of changes in consumption and production side. The first chapter focuses on CO₂ emissions analysis due to pattern consumption change in European households in the last 15 years, considering their income level and lifestyle, through a multisectoral input-output model. In addition, we use measures that could relieve poverty and diminish inequality and carbon emissions. The second chapter studies the diffusion, production and technology trajectories for a set of advanced and in developing economies, through an analysis of the diffusion pattern of key sectors for the reduction of emissions. For this aim, we use a set of value chain indicators to evaluate changes in their evolution and position throughout the period. The main aim is to model diffusion trajectories of innovation and technology and to study the dynamic gap to achieve low carbon sustainable pathways. Finally, the third chapter analyses the evolution of the different environmental impacts (GHG emissions, water consumption, land use and material footprint) associated with European households between 1999 to 2015. This research gives us a global framework of what is the situation of environmental footprints in the European Union. Besides, it shows how these environmental impacts are distributed by European Regions and also by the richest and poorest European countries, and also, which are the main drivers for their evolution.

Once we have characterized these behaviours and their impacts, we focus on the goals of the Green Deal. The main driver of the Green Deal is the just transition to a European Union climatically neutral by 2050. The Green Deal is a new growth strategy to transform the European Union into an equity society, with a modern economy in which people make efficient use of resources. Within its different goals, there is a claim to not leave anyone behind in this economic transition, and pay special attention to the households that suffer energy poverty. The European Union holds that the environmental tax is one way to reduce environmental impacts. However, the literature has demonstrated that these kinds of measures used to be regressive, being the most vulnerable households the ones who suffer the most these taxes. Nevertheless, some studies have shown that the lump sum of the tax revenues could be a way to solve this obstacle to achieve at the same time a just and sustainable economy.

In this context, using an environmentally extended multiregional and multisectoral input-output model for the EU countries (EU27+UK), plus the rest of the world, we evaluate different carbon tax scenarios that affect the European households and different environmental impacts. In this way, we consider different quintiles to evaluate how these measures affect each of them, paying special attention to those that live under energy poverty. We wonder which is the best way to establish an environmental tax. So, we analyse if an environmental tax that affects directly the income is better than one that influences the households' consumption. Our preliminary results demonstrate that a lump sum of the tax revenues could be the solution to move towards a sustainable and just European Union.

This fourth chapter is intended to be presented in the 35th Summer School. The experts' comments would be a great contribution to the better accuracy of this model.