

Facilitating Socially Just Carbon Pricing in the EU

Identification of vulnerable groups, impacts of carbon pricing and compensation. Insights from the microsimulation model SEEK-EU.

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1 Introduction

The EU is currently discussing the introduction of a carbon price on road transport and buildings via a dedicated emissions trading system ("ETS-2"). Recognising the expected distributional impacts between and within Member States (MS), the European Commission has proposed to set up a Social Climate Fund (SCF) along with the establishment of the ETS-2 in order to shield vulnerable households from excessive costs and support them in the energy transition.

2 Research Questions

To explore how socially just carbon pricing in the EU can be facilitated, we investigate the following research questions:

1. Who is affected and at what rate by the introduction of a carbon price in the buildings and road transport sectors?
2. Who should be compensated because they are most vulnerable?
3. How can the most vulnerable be adequately compensated?

3 Data and Methods

We base our analyses on the microsimulation model SEEK-EU, which uses HBS and EU-SILC data sets. We use HBS data from 2015 and from 2010 for selected countries, where 2015 data is not available. We use EU-SILC data for the years 2014, 2015 and 2019, since those waves include different sets of questions. In addition to using each dataset separately, we carried out the linking of the HBS and EU-SILC data sets via the random hot deck approach.

When using HBS and EU-SILC data sets we experience data quality issues across MS, e.g., regarding the indication of missing values in the HBS data sets. For example, the HBS data for Romania reports a low percentage of car ownership compared to the number of officially registered private cars. This illustrates the need to carefully check all data and compare EU-wide data with national data sources.

We apply static microsimulation techniques, expecting a fairly good representation of reality, since elasticities in the heat and transport sectors are very low - at least in the short term (Feindt *et al.*, 2021; Gore, 2022). Nevertheless, we explore the impact of using elasticities on the results.

With regards to the first and second research questions, we simulate which MS and household groups are affected by the introduction of a carbon price in the road transport and buildings sector, at what rate and which indicators are suitable to determine who should be compensated. We divide households into groups based on i) their income ii) regional characteristics and iii) household type. We also investigate who is most vulnerable by comparing the impact of the introduction of a carbon price on vulnerability indicators such as the Low-Income-High-Cost indicator, the 2M-Indicator and the 10%-Threshold as well as self-reported indicators.

The way in which this compensation should take place is the focus of the third research question. The proposal of the SCF gives some indication that the focus should lie on targeted investment support for clean technologies rather than lump-sum rebates. Using information on investment cost from a number of previous studies (Braungardt *et al.*, 2022) we calculate the investment needs if the most vulnerable determined in the previous analysis are to be compensated. We compare this to other compensation options such as a lump-sum per capita rebate and also take into account the proposed distribution of funds from the SCF.

4 Preliminary Findings

We find that the impact of carbon pricing in both sectors is unevenly distributed amongst and also within MS with the general finding that MS with lower national incomes are (relatively) more affected. This also holds, in general terms, for households with low incomes in all MS at least for carbon pricing of heating energy. Regarding carbon pricing in road transport, lower income groups are less affected in some MS because of lower ownership rates. Regional characteristics and other sociodemographic variables also play a role.

We test vulnerability indicators across MS and find no “one-fits-all”-indicator capturing all dimensions of vulnerability. Thus, when identifying who should be compensated, we take into account important drivers of vulnerability. One important driver of (fossil) energy consumption and consequently household CO₂ emissions is the degree of urbanization. In lower income countries we find a higher share of individuals living in rural areas inside the vulnerable groups compared to the share of individuals living in urban areas. This is not always the case for higher income countries.

If proceeds from carbon pricing are not distributed lump-sum to all households but used to support targeted investment for those most vulnerable, a significant share of those vulnerable households can benefit from long-term reductions in fossil energy consumption thus no longer being vulnerable to higher carbon prices.

A strong case can be made for investigating in more detail who is most vulnerable and should be compensated and to emphasize investment support to the most vulnerable over lump-sum rebates. In this way, the limited funds can be used effectively and sustainably. Lessons from this research can also inform the ongoing debate about the policy response to the ongoing energy price crisis.

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5 Reference list

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