

Pre-Analysis Plan

Supporting Carbon Taxes and the Role of Justice

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Background and motivation

In normative social science, different conceptions of justice are well-known to lead to different positions about recommended policies (Fleurbaey and Maniquet 2011; Gosepath 2011; Millar 2017). For instance, prominent different positions in political philosophy refer to justice as equality, equity or needs. In empirical research about which values humans entertain, it is recognized that different groups in society entertain different conceptions about justice and fairness, too (Haidt 2007; Greene 2013).

However, while much research in economics has studied the implications of environmental taxation for income inequality (Fullerton 2011; Jacobs and van der Ploeg 2019), research about the *perceptions* of justice of carbon pricing reforms by citizens is scarce, even though the perception of a tax reform could be decisive for its political feasibility. In a recent review Maestre-Andrés et al. (2019) propose three fairness-related aspects: (1) personal, (2) distributional, and (3) procedural aspects. Most of the literature has focused on distributional fairness, i.e. fairness regarding the consequences to others for which the scheme to redistribute carbon pricing revenues is a well-known policy lever (e.g. Klenert et al. 2018).

In this paper, we extend the evidence for the importance of preferences about justice on the support for carbon prices and its interaction with revenue recycling schemes. We conduct a discrete-choice experiment with randomized information treatments that illustrate different fairness conceptions in a representative sample covering about 6,000 German household heads and measure the effect on the acceptability of a carbon tax. Besides filling a gap in the scientific literature, this study is of major relevance for the current debate on carbon pricing in Germany.

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Several studies have found that participants prefer redistributing revenues to vulnerable groups over other forms of redistribution and that this preference has a significant effect on the acceptability (e.g. Baranzini and Carattini 2017; Carattini et al. 2017; Kallbekken et al. 2011; Kotchen et al. 2017). However, the previous literature has not explicitly distinguished between different, well-known fairness conceptions prevalent in society and how they influence public support for different forms of revenue-recycling (Hammar and Jagers 2007, Dreyer and Walker 2013). Relatedly, the links between perceived personal and distributional effects and how this affects policy support is also largely unexplored (Maestre-Andrés et al. 2019). Furthermore, how to communicate fairness concerns and carbon pricing more broadly have not been explicitly considered. Yet it is well known that fairness is a potent frame that – if properly activated – can shape attitudes and thus strongly influence the acceptance of a policy (Lachapelle 2017, Marshall et al. 2018). Our research intends to close these gaps.

Different redistribution schemes embody the normative conceptions of justice (as equality, equity or needs) in pure or mixed form “by design”. For example, equal per-capita redistribution apparently adheres to the equality fairness principle (regardless of the actual distributional impacts). Yet, in previous studies the preference for one scheme or another was not explicitly connected to preferences for the underlying fairness concepts. Instead, scholars only conjectured that the choice is determined by “perceived fairness”. Moreover, if respondents realize that they are themselves financially affected differently by each theme, they should be more willing to support the form of redistribution in which they gain most, from the perspective of rational choice. Accordingly, personal gain may counteract the general social preference for different kinds of fairness.

This is one reason for analyzing the question in the opposite way: we first formulate fairness principles and then illustrate them with corresponding redistribution schemes. The guiding idea is to frame the choice of a redistribution scheme as a matter of social justice head on rather than a “simple” distributional design issue that only indirectly connects to fairness. This notably relates to who citizens think “deserves” support and recognition in society and thus puts carbon pricing in the context of social policy more broadly. Subsequently, we ask participants whether they think they will benefit from the preferred scheme – leaving out the equal per-capita scheme where obviously everyone would benefit.

Our main hypothesis is that the willingness to accept a carbon taxes is lower among respondents who perceive they would be negatively affected by the tax, but that it increases when it is designed according to the respondent’s preferences. Moreover, explicitly communicating different justice conceptions may additionally raise the support rate because respondents have a deeper understanding of these conceptions – or more generally pay higher attention to the issue potentially counteracting pre-existing skepticism. Moreover, we will investigate the determinants of the preferences for the different fairness conceptions.

Sample

We conduct a survey in collaboration with the German survey institute forsa, which maintains a household panel that is representative for the German population aged 14 and above. The data is gathered via a tool that allows respondents to complete the

questionnaire using the internet or a television. Respondents can complete the survey either at home or with mobile devices and can interrupt and continue the survey at any time.

We focus on household heads who are defined as those individuals of a household who are mainly responsible for financial decisions on the household level. A large set of socio-economic and demographic background information as well as a large suite on attitudes and environmental preferences is also gathered. The targeted sample size is 6,000 respondents and the survey will be launched on October 14, 2019. About six weeks after initiating the survey, forsa will deliver the data to the authors.

Experimental Design

Our analysis aims at identifying how fairness preferences influence the support for different carbon pricing and revenue recycling schemes. To this end we design a discrete-choice experiment. At first, we ask the respondents whether they generally support the idea of a higher energy prices to contribute to climate protection. Afterward, we inform the participants about the carbon emissions per capita and the carbon intensity of different activities. Subsequently, we ask them whether they are willing to accept the introduction of a carbon tax where we randomly assign a tax rate of 10, 50 or 100 Euro per ton.

Next, we inform the participants about three different revenue recycling schemes that are currently discussed in Germany – an equal payment to all citizens, a payment exclusively to poor households and a payment exclusively to households with high energy costs. These three schemes reflect three different fairness conceptions – equality, equity and needs. After the explanation of the concepts, we ask the respondents to rank the three fairness conceptions according to their preferences.

As a next step, we randomly split the participants into a control and a treatment group. In the control group, we merely inform the participants about the temporal evolution of the level of carbon emissions in Germany. Respondents in the treatment group receive the same information along with an extensive explanation of the fairness conceptions of the three revenue recycling schemes.

After receiving the respective information, we ask the respondents in both experimental groups again to rank the revenue recycling schemes according to their preferences and whether they would accept the introduction of a carbon tax conditional that their preferred revenue recycling scheme is implemented.

Analysis and Expected Main Results

Our analysis consists of four steps. First, we estimate the willingness to accept the implementation of a carbon tax. The randomization of the households into treatment groups allows us to identify the causal treatment effects using a linear probability model (Angrist and Pischke 2008). Specifically, we will estimate the following model

$$y_{1i} = \beta_1 + \beta_2 P_i + \beta_3^T X_i + \varepsilon_i, (1)$$

where y_{1i} is a binary variable that equals unity if a respondent is willing to pay a carbon tax and zero otherwise. P_i denotes the randomly assigned tax rate, X_i is a vector of socio-

economic as well as attitudinal control variables and ε_i is a random error term. The β are the parameters to be estimated.

As standard in economics, we hypothesize that the willingness-to-pay decreases with the carbon price, i.e. $\beta_2 < 0$. Regarding the variables comprised in X_i , we expect that the willingness to accept a carbon tax decreases with the respondents' extent of being affected by the tax. Specifically, we will analyze information on whether respondents own a car, how much they drive and on their heating system.

Second, regarding the revenue recycling schemes, we hypothesize that voters' justice preferences can be uniquely mapped to a redistribution scheme and the preference order is transitive. We will analyze the determinants of preferences for the three different revenue recycling schemes by estimating a multinomial logit model. In the analysis, we will control for the respondents' world views, such as environmental preferences and general preferences for redistribution from the rich to the poor.

Third, to analyze our main hypothesis that the willingness-to-pay for a carbon tax increases when it is designed according to the respondent's preferences, we extend Model (1) as follows

$$y_{2i} = \gamma_1 + \gamma_2 P_i + \gamma_3^T X_i + \gamma_4 T_i + v_i, (2)$$

Where y_{2i} is a binary indicator that equals one if a respondent is only willing to pay if the carbon tax is implemented according to her preferences and zero otherwise and T_i indicates the treatment status.

We expect that the willingness to accept a carbon tax is higher if it is designed according to the respondent's preference, i.e. $\gamma_1 > 0$. Yet, we hypothesize that the acceptance rate increases stronger in the treatment group than in the control group because respondents have a deeper understanding of the fairness conceptions, i.e. $\gamma_4 > 0$.

Besides the average treatment effect, we also quantify heterogeneous treatment effects. For this analysis, we extend the Model (2) by incorporating interaction effects between the treatment indicator T and specific covariates W . Specifically, we estimate

$$y_i = \gamma_1 + \gamma_2 P_i + \gamma_3^T X_i + \gamma_4 T_i + \gamma_5 W_i + \gamma_6 T_i * W_i + \epsilon_i, (3)$$

where W is a covariate and the vector X comprises the remainder of control variables. As interaction terms, we will mainly analyze respondents' extent of being affected, such as whether respondents own a car, how much they drive, and their heating system. We expect that the treatment has a stronger impact among respondents who would benefit from the regulation.

Furthermore, we will analyze whether the respondents' preferences for the distribution schemes change with the treatment. We expect that some respondents may still rank recycling schemes identically, because they understand its economic properties better than others. Moreover, respondents' fairness preferences may depend on the carbon price level and the extent of the distributional implications. The higher the price level, the more people might be concerned about the impacts on poor households. In addition, respondents may

value the impact on others (in terms of costs and transfers) lower than the impact on themselves. Last, we will also investigate how political preferences (left vs. right) and trust in the government affect the willingness to accept a carbon tax, but also their interactions with the preferences for a redistribution scheme and the treatment.

Power Analysis

Our experimental design provides for 6,000 respondents who are randomly split into two groups, i.e. 3,000 respondents each. Based on Baranzani and Carratini (2017), we assume that half of the respondents would accept higher carbon taxes ($SD = 0.5$). Using the standard significance level of 0.05, the standard power level of 0.80 and a two-sided test, the minimum detectable treatment effect amounts to roughly three percentage points.

Carratini et al. (2017) analyze the preferences for different redistribution schemes and find that 18.6% of the respondents prefer the redistribution of revenues from carbon pricing to households and the industry ($SD = 0.389$), while 11.5% prefer social cushioning ($SD = 0.320$). Given our sample size and the above parametrization, we can identify minimum effects of about two percentage points.

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