



The demand for climate protection—Empirical evidence from Germany

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ABSTRACT

An experiment designed to find the real demand for climate protection was conducted among a sample of the residential population in Mannheim, Germany. Participants were offered the opportunity to contribute to climate protection by purchasing European Union Allowances which were then withdrawn from the European Emissions Trading Scheme. Our experiment showed a median willingness to pay (WTP) of zero and a mean WTP of approximately 12€/tCO₂.

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1. Introduction

Beyond the fundamental incentive problems of international cooperation, climate change policy has an important political economy dimension. It can be assumed that national governments would only agree to climate protection targets which are acceptable to the median voter of their own national electorate. A clear correlation can therefore be drawn from the median voter's willingness to pay (WTP) for climate protection and the outcome of international climate negotiations. Furthermore, it has also been noted that individuals have started to reduce their CO₂ emissions and voluntarily contribute to this global public good (Hamilton et al., 2008), despite the lack of clear international and national climate policies. Therefore, an empirical evaluation of the demand for carbon offsets and the individual's WTP for climate protection is crucial in evaluating the prospects of future climate change mitigation.

Two methods exist for measuring the WTP for a particular good. First, the *revealed preferences* approach in which the WTP is

inferred from observing a given economic transaction, and second, the *stated preferences* approach in which participants are asked to state the amount they would be willing to spend for a given amount of the good, or the quantity they would expect to purchase at a given price. In reference to the topic of this investigation, the overwhelming majority of past studies investigating climate mitigation policies have utilised varieties of the *stated preferences* approach in their attempt to measure the WTP in € per ton of CO₂ reduced (e.g. Achtenicht (2012), Brouwer et al. (2008), MacKerron et al. (2009) and Viscusi and Zeckhauser (2006)).

Due to the hypothetical nature of the decision-making situation in the *stated preference* approach, a complementary method to observe preferences for climate protection is desirable. The introduction of the European Emissions Trading Scheme (EU ETS) in 2005 has, as a periphery effect of the scheme, permitted this by enabling researchers to offer individuals the chance to purchase and withdraw CO₂ emissions allowances from the market, in turn directly allowing them to observe the individual demand and the WTP for climate protection. Diederich and Goeschl (2011) also make use of documented retirement of emissions allowances.

Following such a revealed preference approach, our investigation offered participants a tangible opportunity to buy European Union Allowances (EUAs) from the EU ETS using their own income resulting in real-world outcomes, rather than results based on mere hypothetical intention.

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Table 1
Summary of purchasing behaviour.

Price range (in €) ↓	Units (in kg CO ₂)					
	Min.	1st qu.	Median	Mean	3rd qu.	Max.
4.20 ≤ P ≤ 5.00	0	0	0	59	50	900
3.20 ≤ P ≤ 4.00	0	0	0	76	100	1,100
2.20 ≤ P ≤ 3.00	0	0	0	112	100	1,400
1.20 ≤ P ≤ 2.00	0	0	0	333	500	2,800
0.20 ≤ P ≤ 1.00	0	0	100	841	1000	10,000
All prices (in €) ↓						
0.20 ≤ P ≤ 5.00	0	0	0	283	200	10,000

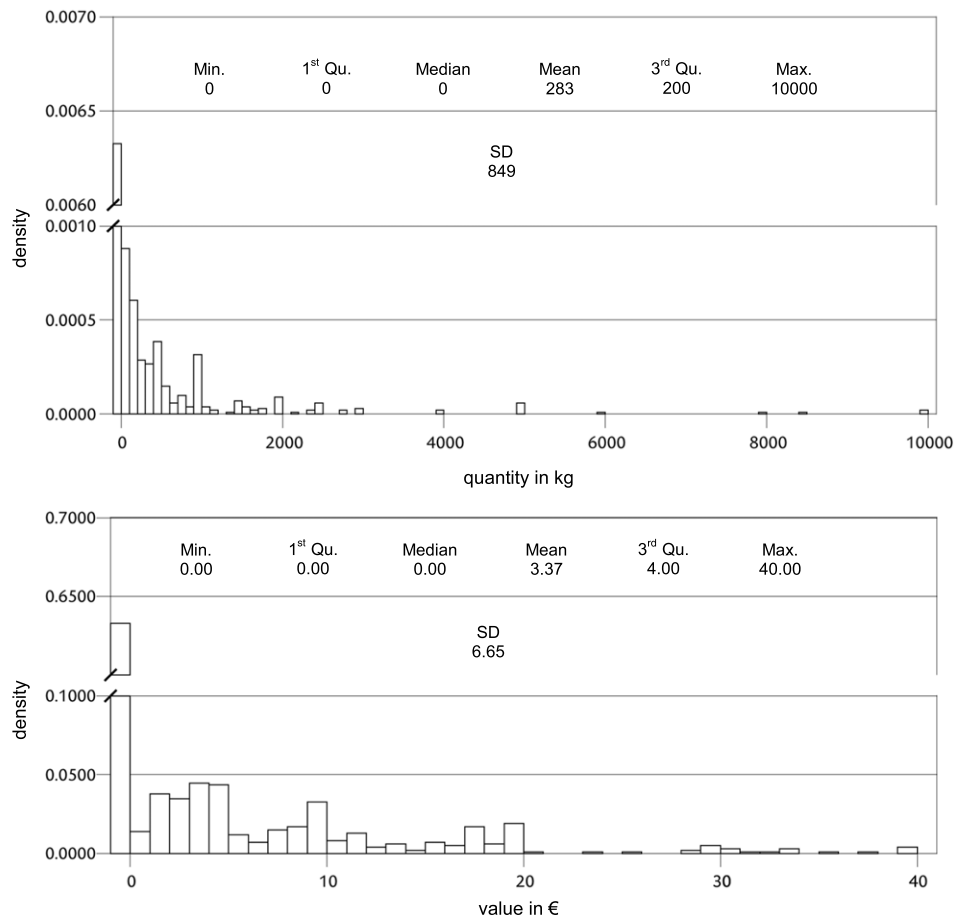


Fig. 1. Histogram for quantities (above) and expenditures (below).

2. Experiment

Participants were selected following the random distribution of approximately 2200 neutrally framed letters of invitation in Mannheim, Germany. It was emphasised in the invitation letter that participants would be remunerated to the amount of 40€ for their time in taking part in the study. The experiment took place in March 2010 over six sessions with a total of 202 participants at the Centre for European Economic Research (ZEW) in Mannheim. Our sample covered all age groups from 18 to 75 years of age and was representative of the residential population of Mannheim with respect to the variables 'age' and 'sex' (StaLa BWL, 2007).¹

Participants received their remuneration of 40€ along with their instructions at the beginning of each session. During the sessions, typically lasting between 60 and 75 min, participants were not permitted to communicate with one another.² A research administrator was on hand for the entirety of each survey session to answer any questions that may have arisen. Participants first completed an initial questionnaire enquiring into socio-economic characteristics and climate change. Instructions concerning the purchasing procedure were then explained. Participants were also presented with a tangible example of the market mechanism, unrelated to CO₂ permits, and were asked to complete a short quiz to verify their understanding of the procedure. Participants were

¹ Our sample failed to fully represent the Mannheim population with regard to all variables which may influence the WTP for climate protection. Namely, our sample displays (i) an underrepresentation of higher-earning individuals, and

(ii) an overrepresentation of participants with higher education. Given the results in Table 2, the demand and respective WTP is downwardly affected by (i) and upwardly affected by (ii).

² See Löschel et al. (2010) for the translated instructions and questionnaires.

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