

# ***UNREVEALING PUBLIC PREFERENCES FOR CLIMATE CHANGE POLICIES IN SPAIN: A HYBRID MIXTURE MODEL***

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## **Overview**

Climate change has become a major concern for citizens across the world. The first worldwide poll on global warming, conducted by World Wide Views (2009), depicted a vast majority of people (close to 90%) favoring sizeable reductions in greenhouse gas (GHG) emissions for developed countries in the period 2020-1990. A similar proportion of citizens strongly supported keeping global warming within 2 degrees Celsius over pre-industrial levels. In Europe, the 2009 Eurobarometer Survey also found that two thirds of the European public considered global warming amongst the most serious problems faced by humankind. Although there are some geographical differences within Europe, Spain is among the countries well above the EU average in rating climate change as a very serious problem. At the same time, most Europeans (again, roughly two thirds) believe that governments and industries are not doing enough to fight the problem.

Intense social preferences for climate change mitigation that have not fully materialized in actual policy-making are thus a major concern. In this sense, Spain is probably the quintessential country, with strong citizens concerns, and even government actions (one of the three 'guiding issues' of the current Spanish government is climate change control) but few policies actually implemented. Spain faces a complex situation regarding its climate change policies. On the one hand, GHG emissions have shown a large increase since 1990, being far above the Kyoto commitment (15% over). On the other hand, Spain is likely to suffer significant impacts from climate change due to its geographical location: substantial temperature increases and an exacerbation of water shortages are to be expected in this century. However, there has been a rather limited application of corrective policies, particularly in the field of energy prices, which are generally below European averages.

In this paper, we intend to reconcile the strong Spanish social concern about climate change abatement with a corrective policy that is acceptable to citizens. We present evidence that certain programs for the reduction of GHGs would be publicly accepted even when they raise the price of energy. Although these programs are not necessarily ideal from a theoretical perspective, our evidence indicates that they could play an important role in climate change policy in Spain.

## **Method**

We employ a contingent valuation (CV) survey using a questionnaire that elicits respondents willingness to pay (WTP) for policies that reduce GHG emissions in two sectors especially responsible for those emissions in Spain: electricity and automobile transportation. A major innovation of this paper is the use of a large amount of attitudinal questions with latent modeling approaches. Therefore, we study in some cases for the first time, public preferences regarding alternatives for the design of corrective policies to confront climate change. Additionally, we provide information on the extent to which Spanish citizens know about the climate change phenomenon and how important they consider it to be. The paper is based on an in-person survey of a representative sample of the Spanish population conducted between May and June 2010.

The survey contains four separate parts: a) introduction, where several general issues on climate change awareness are presented; b) the valuation of electricity and gasoline policies associated with the reduction of GHG emissions; c) attitudinal variables; and d) socio-demographic questions. Surveys were carried out in Spain by an independent company that conducted the surveys in person applying quotas by age and sex. In total, 750 surveys were collected. A multiple-stage method was used for the sampling. First, different areas were selected in each region, including large, medium and small cities according to their frequency and how representative they were at a national level. Next, interviewers were assigned to the different areas and instructed on how to collect the data.

The selected modeling technique overcomes some of the limitations of the continuous mixture models, specially related to the sensibility of coefficients and therefore, welfare results, based on the selected distributions. Therefore, our interest to provide insights into individual preferences, have led us to the application of behavioral mixtures models (Walker and Ben-Akiva, 2011). Behavioral mixture models

employ latent constructs to represent the influence of higher-level attitudes and orientations on the choice process, such as preferences for green electricity policies and sustainable transportation in our case, and provide a behavioral rationale to the mixture distribution. We expect to contribute to the current narrow literature on latent constructs and valuation.

### **Results and conclusions**

The results show that Spanish households strongly favor the application of an electricity program that makes electricity more expensive but uses the extra revenues for the promotion of renewable sources to reduce carbon dioxide emissions. In particular, the mean willingness to pay per month and household is significant: 11€ over the current electric bill which implies a significant increase in percentage terms. Households also show a positive (although slightly smaller) WTP for a program implemented on automotive fuel producers to reduce GHG emissions even if it leads to an increase in the price of fuel. Special attention is also given to the impact of environmental attitudes on preferences and choices.

### **References**

Walker, J.L. and Ben-Akiva, M. (2011) "Advances In Discrete Choice: Mixtures Models," in de Palma, A., Lindsey, R., Quinet, E. and Vickerman, R. (eds.) *Handbook in Transport Economics*, Edward Elgar, Cheltenham.