Food Policy 61 (2016) 141–155

Contents lists available at ScienceDirect

Food Policy

journal homepage: www.elsevier.com/locate/foodpol

Elicitation formats and the WTA/WTP gap: A study of climate neutral foods ☆

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ARTICLE INFO

Article history:
Received 9 November 2014
Received in revised form 11 March 2016
Accepted 13 March 2016
Available online 31 March 2016

JEL classification:
D12
C93

Keywords:
Climate neutral label
Willingness to pay
Willingness to accept
Contingent valuation
Inferred valuation
Payment card
Single bounded

ABSTRACT

Private carbon-labelling programmes for food products can be seen as short term strategies for curbing carbon emissions. We conduct a field valuation experiment to determine whether consumers place a positive value on foods with climate neutral labels. We explore whether the estimated value of climate neutral foods can be influenced by several methodological choices, such as the valuation method (contingent valuation vs. inferred valuation), elicitation format (dichotomous choice vs. payment card), and reference point (willingness-to-accept vs. willingness-to-pay). We find that the WTA/WTP gap is similar between valuations elicited with the contingent vs. the inferred valuation method. However, we also find that the gap can be muted by using a payment card elicitation format. Overall, we find average willingness to pay premiums of up to 28% and 23% for climate neutral eggs and olive oil, respectively.

1. Introduction

Large scale mitigation efforts in response to concerns about climate change are unlikely to materialize in the near future. Therefore, curbing greenhouse emissions with short term strategies may buy more time for reaching an agreement on economically efficient ways to tackle the global carbon problem. Food products embody a large fraction of generated emissions (Davis and Caldeira, 2010). As such, a private carbon-labelling programme for food products (Coley et al., 2009; Elofsson et al., 2016; Gadema and Oglethorpe, 2011; Grebitus et al., 2015) could help fill the policy gap by influencing both companies (i.e., by encouraging firms to identify efficiencies throughout the supply chain) as well as consumers (by influencing consumer choices) (Vandenbergh et al., 2011). Given the cost associated with implementing labelling schemes, this study seeks to provide insights on whether consumers are voluntarily willing to pay for the carbon impacts of their food choices.

In this paper we elicit valuations for climate neutral food products[1] and at the same time explore several methodological questions that arise in the valuation literature. This is important because, typically, data from valuation studies are used in policy making when doing required cost-benefit analyses (in our case, that might be the costs and benefits of climate neutral labels). In these cases, methodology is important because we want to use the 'right'

☆ Portions of this research were completed while Andreas C. Drichoutis was a faculty at the Department of Economics, University of Ioannina, Greece and Valentina Pappa was a graduate student at the same department.

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[1] Climate-neutral foods are foods certified by a climate-neutral label that distinguishes organisations that offset their CO_2 emissions in *myclimate* carbon offset projects. The non-profit foundation *myclimate* is an international initiative with Swiss origins founded in 2002 as an ETH Zurich spinoff regarding voluntary carbon offsetting measures. It offers a comprehensive package of services for offsetting CO_2 emissions using an international network of project partners and representatives who act on behalf of *myclimate* in their countries. *myclimate* develops and supports projects around the world that directly reduce greenhouse gases. The foundation calculates the climate-impacting emissions produced by activities and products and provides consultation services to businesses regarding the optimal way to offset CO_2 according to the principle of "Avoid - Reduce - Offset".

http://dx.doi.org/10.1016/j.foodpol.2016.03.001
0306-9192/

measure of benefits, otherwise the cost-benefit analyses will be incorrect.

Economic theory posits that with small income effects and many available substitutes, the economic value people place on a good should be independent of whether they own it (Hanemann, 1991). One of the more popular anomalies is the observed divergence between two measures of economic value that reflect ownership: willingness to pay (WTP) to obtain a good and the willingness to accept compensation (WTA) to forsake the good. The divergence between these two values, known as the WTA/WTP gap, is such a common empirical regularity that has led Horowitz and McConnell (2002) to state that "The pervasiveness of high WTA/WTP ratios and the wide variety of goods that have been used in the experiments have combined to sustain interest in WTA vs. WTP for roughly 30 years."

The contingent valuation (CV) method has become the most popular method to measure WTA and WTP, and these values are used in valuing the benefits of new goods, services, or amenities. Although the CV method was principally developed in environmental and transport economics, it has made considerable headway in the valuation of food products over the last decades (e.g., Buzby et al., 1998; Corsi, 2007). Most, if not all, CV studies are conducted in hypothetical contexts, particularly in environmental valuation studies where a real market with salient payments is difficult to establish and some number is considered better than no number at all (Carson, 2012; Haab et al., 2013; Kling et al., 2012).[2]

While there have been many different studies exploring the determinants of the WTA/WTP gap in the context of CV studies, herein, we examine the effect of two largely unexplored factors. First, we explore how an alternative to the CV method, the inferred valuation (IV) method, that was designed to mitigate social desirability bias can affect valuations and consequently the gap. Inferred valuation is a term coined by Lusk and Norwood (2009a, b) to describe a valuation method that aims in mitigating social desirability bias by asking the respondent to predict the WTP of the average consumer. Second, we explore how different elicitation formats can affect the propensity of individuals to report valuations that lead to a WTA/WTP gap.

There are several motivations for examining whether the WTA/WTP gap is affected by the valuation method. First, there are now several studies that show that when people are asked to predict other people's value, as in the IV method, they state a different value than their own. This would imply that valuations elicited under the CV method are different than valuations elicited under the IV method, which could significantly affect the gap. To make this more concrete, if we assume a symmetric unidirectional effect of IV on WTA and WTP e.g., of k magnitude, then the WTA/WTP gap under IV would be: $WTA_{IV}/WTP_{IV} = (WTA_{CV} - k)/(WTP_{CV} - k) \neq WTA_{CV}/WTP_{CV}$. On the other hand, if the effect is not additive but multiplicative then it would be: $WTA_{IV}/WTP_{IV} = (WTA_{CV} \cdot k)/(WTP_{CV} \cdot k) = WTA_{CV}/WTP_{CV}$, which is the only case where we would observe no effect on the WTA/WTP gap.[3] In the case where the effect is not symmetric e.g., it reduces WTP by k_1 and WTA by k_2, then the gap does not remain constant across methods. Thus, we would expect that the gap will differ across methods most of the times. There is only scant evidence in the literature regarding this issue. For example, in van Boven et al. (2000), owners of an item overestimated buyers WTP and buyers underestimated owners WTA such that owners and buyers underestimated the endowment effect by 40%. In Loewenstein and Adler (1995), subjects underestimated WTA when they had to predict for themselves which resulted in underestimation of the impact of the endowment effect by 84%. Similarly, van Boven et al. (2003) find that buyers underestimated the endowment effect and submitted bids sub-optimally lower than owners' WTA.

Lusk and Norwood (2009a,b) argued that the IV method generates valuations that are less likely to suffer from normative or moral response biases (such as social desirability bias), and they found that responses to the IV method better predicted actual shopping behavior than did those from a CV method. They also found that the IV method produced less hypothetical bias when social desirability was present. The authors showed that goods with normative dimensions are more prone to social desirability bias and thus the IV method is more effective in bridging the gap between the laboratory and field valuations. In contrast to Lusk and Norwood (2009a,b) and Frederick (2012) found that subjects tend to overestimate predicted WTP in real and hypothetical valuations. Frederick (2012) also found that predicted WTA was not statistically different than own WTA. Note, that the products used in Frederick (2012) lack a strong social desirability dimension (these are mostly end consumer products such as CDs, salmon, and pens) which may explain why his result is the opposite of that obtained in Lusk and Norwood (2009a,b). The results in Kurt and Inman (2013) also suggest a smaller WTA/WTP gap. They found that owners predict a lower WTA for other owners while buyers predict a higher WTP for other buyers. In the spirit of Lusk and Norwood (2009a,b), Pronin (2007) argues that people tend to recognize biases in human judgment except when that bias is their own which implies that predictions over other peoples' preferences should mitigate biases. Although some of the studies cited above have found effects on WTP and WTA in the opposite direction with each other, they are in general supportive of the fact that predicting or inferring valuations results in a lower WTA/WTP gap. We further re-examine this issue in our survey-experiment.

With respect to elicitation formats, in the CV literature it is generally reported that using different elicitation formats results in different valuations. The open-ended format was criticized by the National Oceanographic and Atmospheric Administration (Arrow et al., 1993) as providing 'erratic and biased' responses. The NOAA panel suggested the dichotomous choice (DC) format which became the favored approach for several years. Other alternatives that were not considered by the NOAA panel were later developed including the payment card (PC) elicitation format. Payment cards have made considerable headway in the valuation literature due to several results that showed it exhibits more desirable properties than DC (Reaves et al., 1999), less 'yeah-saying' at high bid amounts (Zhongmin et al., 2006) and results in more conservative estimates (Blaine et al., 2005). Due to all this properties, it is now considered by far the most common format for CV studies in the health economics literature (Smith and Sach, 2010).[4] Donaldson et al. (1997) argued in favor of the PC elicitation format due to its resemblance to every-day behavior (individuals 'shop around', observe different values for a good and choose the one that suits them most). As a result cognitive demand is potentially mitigated and the validity of the instrument is potentially increased.

[2] Climate neutral foods at the time of the survey were practically non-existent, so that only a handful of consumers would be aware of these types of labels and the prices of the corresponding products. Therefore, anchoring on market prices is not likely an issue with our data. Revealed preferences with market price data would be a more robust indicator of the carbon offset premium but we should also acknowledge the unavailability of these data (at least for the country where this survey-experiment took place) and of other relevant data (such as consumer characteristics) that would make demand analysis feasible.

[3] Harless (1989) argues that in order to examine the WTA/WTP gap one should consider the ratio of the valuation measures, since the simple difference i.e., WTA minus WTP, can be misleading.

[4] It's not a surprise that the payment card elicitation format has found its way into food (Brummett et al., 2007; Hsu et al., 2009; Aizaki et al., 2011; Hu et al., 2011) as well as resource economics studies (Lienhoop and MacMillan, 2007; Brouwer et al., 2008; Solomon and Johnson, 2009; Simpson and Hanna, 2009).