

# Environmental damage valuation and familiarity in a willingness to accept framework: the case of Valencia Port, Spain

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## *Abstract*

In this paper we report preliminary results of a latent class model aimed to identify and characterize unobserved preference heterogeneity in the context of a willingness-to-accept (WTA) framework involving negative environmental externalities stemming from port expansion. We hypothesize that familiarity towards the targeted good and the related environmental damage have a notable influence on stated WTA. Three clusters are identified based on six indicators in relation to the respondents' linkages to the Port of Valencia (familiarity) and their previous knowledge about the negative consequences of its expansion process. Results show that, contrary to what could be expected, familiarity with the targeted public good does not necessarily have a considerable effect on stated WTA.

**Keywords:** Latent class model; contingent valuation; willingness to accept; preference heterogeneity; negative externalities; familiarity.

JEL code: Q51, C38, D62.

## **1. Introduction**

In times of increasing environmental concern, the economic valuation of environmental damage arises as a key factor shaping environmental policies. Thus, economists have developed several techniques, as the Contingent Valuation Method (CVM) (Mitchel and Carson, 1989), aimed at estimating the benefits (or costs) resulting from a policy that improves (or worsens) the environmental quality. With this technique, analyzing the responses given by respondents to hypothetical surveys, the environmental benefits and costs of any policy are estimated in monetary terms. It is precisely the hypothetical nature of this technique what makes economic valuation of natural resources controversial. Critics argue that respondents do not reveal true preferences when facing a hypothetical situation with which they are unfamiliar (Hausman, 2012). Familiarity and experience with public environmental goods and their valuation are generally assumed to be important determinants of preference stability and certainty (Bateman and Turner, 1993; Shogren et al., 1994; Brower,

2011). Hence familiarity with the natural good in question increases the reliability of CVM surveys, i.e. the more familiar respondents are with the natural good, the easier for them to answer the hypothetical questions.

In this paper, taken the results from a CVM survey in which respondents were asked about their willingness to accept (WTA) for the damage caused to them as a consequence of the negative externalities derived from the expansion of the port of Valencia, Spain (Saz-Salazar et al., 2012), we attempt to delve into the connection between familiarity with the good in question and the WTA stated by the respondents. Thus, we hypothesize that the familiarity towards the targeted good and the related environmental damage have a significant influence on the magnitude of WTA.

To understand how the familiarity of respondents towards the targeted good and the related environmental issues and damages are connected to each other, social clusters are identified. For the segmentation analysis, we choose latent cluster models (LCM) that allow us to cluster dichotomous as well as categorical and continuous variables. Because survey respondents were asked a significant number of attitudinal questions besides of their WTA, we are able to include attitudinal groups in welfare estimates, and thereby to account for heterogeneity when considering the welfare effects and equity implications of policy changes and projects related to the environment (Aldrich et al., 2007).

While latent-class models are commonplace in social sciences, in environmental economics is relatively new and rare occurrence since the first studies were carried out in the early 2000's. Applications of latent-class models in environmental economics include, among others, Boxall and Adamowicz (2002), Provencher et al. (2002), Scarpa et al. (2003), Scarpa et al. (2005), Scarpa and Thiene (2005), Birol et al. (2006), Milon and Scrogy (2006), Morey et al. (2006), Morey et al. (2008), Hynes et al. (2008), Campbell et al. (2011) and Tabi (2013).

The rest of paper is organized as follows. Next section provides background on Valencia Port expansion project and its environmental consequences on nearby residents. Details about the survey design and administration are given in Section 3 while Section 4 describes the latent class approach for modelling the connection between the familiarity and WTA. Section 5 presents the results obtained and in section 6 we conclude with a summary of the analysis and a discussion of the implications of the findings for future research on preference elicitation and familiarity related to economic valuation of the environment.

## **2. Valencia Port expansion and negative environmental consequences**

Valencia, with a population of 814,208 inhabitants, is the third most populated city in Spain. Its seaport, in terms of container traffic measured in twenty-foot equivalent units (TEU), ranked in 2010 as the largest port in the Mediterranean area and the fifth largest port in Europe. In the last thirty years, the VP has grown dramatically and has achieved international status. In particular, container traffic has multiplied by thirty-five in the period considered, while the total traffic has increased eightfold. Unlike other ports that have been created around a natural bay, the VP is located along a straight shoreline, thus in order to continue growing successfully the only way to do so was by reclaiming land from the sea. Nevertheless, the port has also expanded to the south reclaiming land located in the outskirts of the city. As a result of this process the VP area increased fourfold since 1980, when it had an area of 1.5 million square meters compared to its current 5.5 million square meters.

The technical advice provided by the VP environmental unit, along with the meetings held with stakeholders (community groups and environmental groups) and focus groups allowed us to identify the main environmental effects related to the expansion of VP. The first environmental problem identified concerns the environmental consequences of land reclamation (mainly visual and ecological impacts) aimed at expanding the port area to the south, close to Nazaret neighbourhood. This area of land was used for the construction of a logistics facility. In addition, while expanding to the south, the VP ‘gobbled up’ the former beach of Nazaret to construct a new container terminal with an area of 683,232 square metres. The second environmental issue relates to the construction of new quays that protrude into the sea, thus altering the coastal hydrography, thereby changing marine currents and causing erosion of nearby beaches. The third environmental issue at stake concerns nuisances derived from the port activity affecting nearby residents, in particular those who live closest to the port, as is the case of Nazaret neighbourhood. Given the commercial nature of this port, which prohibits heavy industry within its limits, such as a refinery or chemical plant, the nuisances that nearby residents may have to bear sporadically are noise, odours, and dust from open storage of dry bulks cargoes. Finally, the last environmental issue relates to the possible negative landscape impact caused by the very existence of the port itself.

### 3. Survey design

After two pilot studies covering a quarter of the total sample, 400 face-to-face interviews were carried out in July 2010. The data gathered from the pre-test and the focus groups conducted was essential, on the one hand, in delimiting the extension of the market or area of influence and, on the other hand, in defining the bid vector offered to the respondents. The area covered by the survey process was precisely the population of the six neighbourhoods closer to the port and known as 'Maritime Districts'. This amounts to a total of 62,777 inhabitants. To this respect, the pilot study clearly showed that people living in more distant areas did not hold economic values with regard to the environmental problems at stake since their responses were not those expected by the economic theory. The weight assigned to each neighbourhood in the final sample was calculated by considering both its population and the proximity to the port area. The interviews were conducted in the respondents' dwelling places guaranteeing the representativeness of the sample. In this way the sample parameters closely resembled those of the entire population.<sup>1</sup> In order to maintain respondents' attention during the interview, visual aids showing the port area before and after its expansion process were used. This helped respondents to understand the real magnitude of the port's growth.

Using data from the pilot surveys, and following the procedures adopted by Cooper (1993) and Boyle et al. (1998), allowed us to identify a five-bid vector that ranged between €10 and €270. Here, in order to reduce or eliminate strategic answering, the challenge is to achieve the proper balance between probing a sufficiently wide range of cost figures and keeping these cost figures within a credible range (Schläpfer, 2008). The dichotomous-choice referendum format question was chosen given its advantages over open-ended question formats that are more prone to strategic behaviour and that demand a higher cognitive effort from respondents.

The payment vehicle used was a reduction in the real estate tax currently paid by respondents considering that it was both a WTA scenario and a familiar instrument to them. To minimise hypothetical bias, respondents were reminded of the average amount paid in 2009 by local residents in real estate taxes and they were also informed that the payment received would reduce the availability of funds for other public policies.

Finally, the survey concluded with a set of socio-economic questions that can be used later to interpret and validate WTA estimates. These involved attitudinal and behavioural indicators such as views towards the environment as well as a set of variables related to the social status of respondents (personal and familiar income after tax, formal education completed, age, family size, etc.).

#### **4. Latent cluster model approach**

To understand how the familiarity of respondents towards the targeted good and the related environmental issues and damages are connected to each other, social clusters are identified. For the segmentation analysis, we choose latent cluster model.

Latent cluster models (LCM) similarly to K-means techniques, create social clusters based on selected variables. Its advantage over K-means based clustering is that it is a model-based approach. While K-means uses an ad hoc approach based on minimizing the variations within-clusters, in latent cluster model posterior membership probabilities estimated by maximum likelihood methods are applied for classification (Magidson and Vermunt, 2002). Moreover, a latent class model enables the user to cluster dichotomous as well as categorical and continuous variables. Model estimations were carried out using Latent Gold 4.5 software (Vermunt and Magidson, 2005). LCM offers parameters to help determine the number of clusters. Selection of the model with the best data fit can be done using the following model parameters: likelihood-ratio ( $L^2$ ) and its  $p$ -value, the Bayesian Information Criterion (BIC) and the number of parameters (Npar). The  $L^2$  likelihood-ratio statistic shows the amount of association between the variables that remains unexplained by the model, in other words, the larger the value, the poorer the model fit. The  $p$ -value of  $L^2$  also measures the fit of the model and it assumes that the  $L^2$  parameter follows a chi-square distribution (consequently, a  $p$ -value of greater than 0.05 is desired for an adequate fit). The Bayesian Information Criteria takes the number of parameters into account to compare the models; a smaller BIC indicates a better fit. Finally, the model with the fewest number of parameters (Npar) (i.e. the most parsimonious model) is selected (Vermunt and Magidson, 2005).

To investigate the significance of familiarity in contingent valuation method we use a latent cluster model that based on six indicators (see Table 1) in relation with

the respondents' linkages to the Port Valencia and their previous knowledge about the environmental consequences of the Port expansion.

**Table 1: Selected variables for latent cluster analysis and other variables for further investigation**

<b>Selected variables for clustering</b>	<b>Description</b>
Direct view	Do you have a direct view of the port and its facilities from your home? (binary, 1=yes, 0=no)
Tie with the port	Do you have some kind of tie with the port? (binary, 1=yes, 0=no)
Recreational activities	Do you use free port areas access for some kind of recreational activity such as walking, running, cycling, have a drink, etc.? (binary, 1=yes, 0=no)
American Cup 2007	Did you visit Valencia harbor during the celebration of the 32nd America's Cup (the 2007)? (binary, 1=yes, 0=no)
American Cup 2010	Did you visit Valencia harbor during the celebration of the last America's Cup (the 2010)? (binary, 1=yes, 0=no)
Previous knowledge	Prior to conducting this interview, were you aware of the possible negative effects of the growth of economic activity in the Port of Valencia? (categorical, 1=much, quite, 2=something, little, 3=did not know anything)
<b>Socio-demographics</b>	
Age	Continuous
Marital status	Categorical (1=married or partnership; 2=single; 3=separated; 4=divorced; 5=widowed)
Family size	Categorical
Number of children	Categorical
Level of education	Categorical (1= No or primary education; (5-11); 2=High school (12-16), GCSEs; 3= Sixth-Form/College (16-18); 4= undergraduate; 5= BSc degree)
Household net income	Categorical (1=lower than 300 EUR; 2=300-599 EUR; 3=600-899 EUR; 4=900-1199 EUR; 5=1200-1499 EUR; 6=1500-1799 EUR; 7=1800-2099 EUR; 8=2100-2399 EUR; 9=2400-2699 EUR; 10=2700-3000 EUR; 11= higher than 3000 EUR)
<b>Willingness-to-accept (WTA) compensation</b>	
WTA (closed question)	We know that the negative effect from the economic growth of port activity is difficult to measure. However, from the University we are interested in obtaining an economic measurement for purely academic reasons. Therefore, given the damage it could cause this process, imagine that the Administration is financially compensate you through an annual reduction in local taxes, which could be the Real State Tax (IBI or urban tax). CHOOSE THE AMOUNT TO DELIVER. (Categorical, 1: 10 EUR; 2: 30 EUR; 3: 60 EUR; 4: 120 EUR; 5: 270 EUR)
<b>WTA corrected with open-ended question</b>	<ul style="list-style-type: none"> <li>• In case you feel hurt: Would you be willing to accept an annual reduction of... (binary, yes/no)</li> <li>• If yes, how much less compensation would you still willing to accept? Record number (must be less than or equal to the compensation offered)</li> <li>• If not, how much more compensation would you be willing to accept? Record number (must be greater than the compensation offered or indicate if do not accept any kind of compensation)</li> </ul>
<b>Measuring protest and true zero answers</b>	<p>Please indicate for what reason you do not accept compensation or do not provide answer (categorical):</p> <p>1= No compensation needed because I am in favor of this development process (expansion and growth) of the Port of Valencia</p> <p>2= I have not enough information to answer properly</p> <p>3= The question does not make sense</p> <p>4= It does not seem ethical to receive money in compensation for</p>

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allowing these negative effects that can harm the environment  
5= I do not trust that I can be compensated by the Administration for the damage caused  
6= There is not enough money to compensate the damage caused  
7= I strongly oppose this process of expansion and growth of the port of Valencia given the consequences arising  
8= I prefer instead of lowering taxes, to be compensated by building public facilities such as gardens, sports facilities, bike lanes, youth centers and local meeting, etc.  
9= Other reasons

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The previous knowledge regarding the negative effects due to the expansion of the Port Valencia in the last 30 years are the followings:

- (1) An occupation of the soil affecting the orchards of Valencia by southward expansion and construction of Logistics Activities Zone 'La Punta'.
- (2) Has also reclaimed land from the sea which has caused an alteration of shoreline dynamics.
- (3) A strong pressure on nearby neighborhoods like Nazareth causing discomfort (noise, odors, dust in suspension, etc..)
- (4) An alteration of the traditional landscape of the maritime facade of Valencia causing a visual impact as seen in these pictures we showed you.

These effects has been shared with all respondents in the beginning if the questionnaire.

## **5. Results**

The latent cluster analysis included 400 cases and models which estimated 1-class trough 5-class solutions and were compared using model diagnostics. In the model summary (see Table 2), the log-likelihood (LL), BIC based on LL, number of parameters (Npar) and the proportion of classification error (Class. Err.), chi-squared statistics ( $L^2$ ), degrees of freedom (df) and the p-value for all models are provided. 3-cluster model has been chosen for the analysis based on the model diagnostics. From this, three clusters were identified that show three profiles on the basis of familiarity variables.

**Table 2: Model selection parameters**

	<b>LL</b>	<b>BIC(LL)</b>	<b>Npar</b>	<b>L<sup>2</sup></b>	<b>df</b>	<b>p-value</b>	<b>Class.Err.</b>
<b>1-Cluster</b>	-1523.32	3088.576	7	247.7687	88	4.00E-17	0
<b>2-Cluster</b>	-1441.13	2966.14	14	83.3917	81	0.41	0.0713
<b>3-Cluster</b>	-1429.34	2984.505	21	59.8169	74	0.88	0.1904
<b>4-Cluster</b>	-1423.45	3014.652	28	48.024	67	0.96	0.2041
<b>5-Cluster</b>	-1418.05	3045.809	35	37.2405	60	0.99	0.1857

Table 3 shows the overall model indicators for 3-class model;  $R^2$  indicates how well an indicator is explained by the model and Wald statistics assess the statistical significance of a set of parameter estimates. As we can observe, the visit of America's Cup events and recreational activities undertaken are of the greatest importance in our model followed by the previous knowledge. In Wald tests the non-significant p-value implies that the indicator does not discriminate between the clusters significantly. As we can see, almost all variables used in the model significantly differ except for Direct view and American Cup 2010 variables, that only show a bit weaker significance within the model.

**Table 3: Model indicators for 3-class model**

	<b>Beach residents</b>	<b>Beach fans</b>	<b>Ignorants</b>	<b>Wald</b>	<b>p-value</b>	<b>R<sup>2</sup></b>
<b>Direct view</b>	1.4851	0.7266	-2.2117	5.2828	0.071	0.0896
<b>Tie with the port</b>	0.6054	0.9998	-1.6052	6.6311	0.036	0.1138
<b>Recreation</b>	-1.3962	2.1059	-0.7097	31.7417	1.30E-07	0.3066
<b>American Cup 2007</b>	-1.9328	2.5403	-0.6075	43.4147	3.70E-10	0.4629
<b>American Cup 2010</b>	-2.7673	4.7249	-1.9576	4.4409	0.11	0.3292
<b>Previous knowledge</b>	-0.8301	-0.3586	1.1887	10.6159	0.005	0.1891

Table 4 and 5 depict conditional probabilities of cluster memberships. In Table 4 the profile output is presented that contains the size of each clusters or the overall probability of being in a cluster (for each one, the numbers sum to 100%) and the probabilities associated with each indicator that show the relationship of the clusters identified to the indicator variables, and within each variable the probabilities sum to 1 (Vermunt and Magidson, 2005). Table 5 describes also conditional probabilities that



that sum to 100% across rows. On the basis of these probability values we could identify three latent clusters based on the responses about the familiarity of the Port Valencia and the associated environmental consequences of its expansion.

A total of 45.95% of all respondents were assigned to Cluster 1, 31.98% to Cluster 2 and 22.07% to Cluster 3. Cluster 1 contains 70.94% of people having a direct view from their homes and having the most knowledge about the negative consequences listed in Section 4. Thus, people from this cluster from now on are called the ‘Beach residents’. Cluster 2 members have a lower probability of living near the coast but have a higher probability to have a tie with the port within the cluster, that is underpinned by that more than the half of the members do recreational activities and also the majority of respondents who visited the American Cup events are assigned to Cluster 2. Therefore, this cluster represents the so-called ‘Beach fans’, who have a higher probability to undertake recreational activities associated with the Port. Finally, the members of Cluster 3 seem to have low probabilities in all familiarity indicators and possess the lowest previous knowledge about Port expansion (‘Ignorants’).

**Table 4: Profile output by cluster**

		Cluster 1: Beach residents	Cluster 2: Beach fans	Cluster 3: Ignorants
Cluster Size		45.95%	31.98%	22.07%
Direct view	0	0.6762	0.8168	0.9883
	1	<b>0.3238</b>	0.1832	0.0117
Tie with the port	0	0.5916	0.4941	0.9296
	1	0.4084	<b>0.5059</b>	0.0704
Recreation	0	0.6915	0.0633	0.5302
	1	0.3085	<b>0.9367</b>	0.4698
America’s Cup 2007	0	0.8348	0.0545	0.5731
	1	0.1652	<b>0.9455</b>	0.4269
America’s Cup 2010	0	0.9996	0.5791	0.9991
	1	0.0004	<b>0.4209</b>	0.0009
Previous knowledge	1	<b>0.6735</b>	0.5573	0.1804
	2	0.3143	0.4167	<b>0.6337</b>
	3	0.0123	0.026	<b>0.186</b>

**Table 5: Probability means output by cluster**

		Beach residents	Beach fans	Ignorants
Direct view	0	0.3931	0.3306	0.2763
	1	<b>0.7094</b>	0.279	0.0116
Tie with the port	0	0.428	0.2486	0.3234
	1	<b>0.5144</b>	<b>0.4437</b>	0.0419
Recreation	0	0.6989	0.0438	0.2573
	1	0.2597	<b>0.5502</b>	0.1901
America's Cup 2007	0	0.7278	0.0323	0.2399
	1	0.1601	<b>0.6406</b>	0.1993
America's Cup 2010	0	0.5311	0.2138	0.255
	1	0.0006	<b>0.9988</b>	0.0007
Previous knowledge	1	<b>0.5851</b>	0.3408	0.0741
	2	0.3505	0.312	0.3374
	3	0.0829	0.1775	<b>0.7397</b>

In order to test what relationship exists between clusters and the willingness-to-accept of compensation for environmental damages and also socio-demographic characteristics, a series of Mann-Whitney non-parametric tests were conducted (see Table 7). In Table 6 the descriptive statistics are shown for each cluster.

WTA questions were carried out in two steps; first, respondents were randomly offered a payment among a set of five different payments ranging from €10 to €270. As the elicitation question was the dichotomous one, they had to answer “yes” or “no” to the offered payment. In the second round, they were asked if this amount would be satisfying for them. In this second option, they could adjust their answers with a higher or lower amount or a zero response (true zero or protest answer). Additionally, if they chose a zero response, it was also investigated for what reason they did so. Although there is no significant difference found between clusters regarding the first WTA (closed) question, but the lowest average demanded for compensation can be discovered among Beach residents. When respondents were asked if they would really accept this amount a considerable amount of responses switched to zero response. If we take a look at the acceptance rate (yes/no), there is a significant difference between Beach residents and the other two clusters. More than the half of Beach residents would be willing to accept compensation from the Administration. Some respondents adjusted their answers with a lower or a higher amount boundary of acceptance in terms of annual tax reduction, which is represented by the WTA

corrected with open question variable. We can observe a great variability in answers, which is why there is no significant difference indicated by the tests. Socio-demographic variables have a weak explaining force, except for age and the household net income. Beach fans are in the highest net income category on average and also the youngest group showing significant difference in both cases from the other two clusters. Reasons for zero responses (people who were not willing to accept any compensation) were also investigated among clusters. Surprisingly, the most chosen answer among all clusters was the support of the expansion of the Port. The only striking difference in protest answers, that Beach fans significantly more in favor of getting the compensation in forms of building new recreational facilities than in reducing local taxes, compared to Beach residents.

**Table 6: Descriptive statistics by cluster**

	Beach residents	Beach fans	Ignorants
<b>Socio-demographics</b>			
Age (years)	47.37 (18.37)	43.01 (16.32)	48.22 (19.60)
Marital status	1.73 (1.15)	1.60 (0.92)	1.75 (1.25)
Family size	2.08 (1.41)	2.04 (1.33)	1.82 (1.42)
Number of children	0.57 (0.99)	0.63 (0.93)	0.49 (0.97)
Level of education	2.10 (0.92)	2.42 (0.91)	2.13 (0.97)
Household net income	4.60 (2.32)	5.45 (2.29)	4.17 (1.77)
<b>WTA questions</b>			
WTA (closed) (EUR)	92.54 (93.02)	105.00 (96.33)	103.24 (94.01)
WTA (yes,%)	55.93%	40.41%	33.77%
WTA corrected with open question (excluding protest answers) (EUR)	104.82 (186.10)	137.98 (237.90)	41.30 (59.62)
<b>Number of protest answers (WTA, no answers)</b>			
No compensation needed because I am in favor of expansion (chosen %)	32.05%	39.08%	43.14%
Preferring building public facilities instead of lower taxes (chosen %)	12.82%	32.18%	23.53%
Ethical concerns to receive money for allowing harmful effects (chosen %)	16.67%	11.49%	11.76%

**Table 7: Results of Mann-Whitney pairwise test by cluster**

	Beach residents vs. Beach fans	Beach residents vs. Ignorants	Beach fans vs. Ignorants
<b>Socio-demographics</b>			

Age	0.045**	0.827	0.082*
Marital status	0.568	0.730	0.907
Family size	0.936	0.112	0.119
Number of children	0.591	0.418	0.263
Level of education	0.669	0.830	0.894
Household net income	0.001**	0.364	0.000**
<b>WTA questions</b>			
WTA (closed)	0.137	0.234	0.968
WTA (Yes/no)	0.006**	0.001**	0.332
WTA corrected with open question (excluding protest answers)	0.626	0.196	0.112
<b>Protest answers</b>			
No compensation needed because I am in favor of expansion	0.348	0.203	0.641
Preferring building public facilities instead of lower taxes	0.003**	0.115	0.281
Ethical concerns to receive money for allowing harmful effects	0.340	0.444	0.962

## 6. Conclusions

In this study using a latent class model, preference heterogeneity in the context of a WTA study involving negative externalities is analyzed. This model has allowed us to identify and characterize three attitudinal groups (“Beach residents”, “Beach fans” and “Ignorant respondents”) based on a set of variables that define the familiarity of the respondents with the targeted good (the port area). This set included variables as the “direct view” of the Valencia Port by the respondent, the use of the port area for “recreation activities”, “visits” to the port area during the celebration of the America’s Cup sailing race and the “previous knowledge” of the negative consequences on the surrounding environment related to the expansion of the Valencia Port.

The results show that the “familiarity model” assigned individuals to groups with notable consistence but contrary to it could be expected, the magnitude of WTA did not show significant differences among the found clusters. Thus, our hypothesis about the connectivity of the familiarity towards the targeted good and the related environmental damage and the magnitude of WTA based on our results has to be rejected. Tough, there was discovered notable divergence among clusters in the prosperity to accept any compensation for the externalities. People who were more

affected by the potential damages (Beach residents) are significantly more willing to take part in local tax reduction initiatives compared to others. Ignorants are in the lowest income category, with the lowest previous knowledge and also the rate of acceptance and the most in favor of the expansion of port. This study also revealed the role of the household net income in such decision-making process, since that was the only socio-demographic variable that might have an explanatory power on people's choices in such situation. Although WTA does not seem to follow the increase in income and the level of education, as it is in other studies indicated (e.g. Jianjun et al., 2013).

Thus, we can draw the conclusion that valuation technique of a non-market good might not as much as be influenced by the familiarity with the public good as it is originally assumed. People who are the most informed about the negative externalities and personally affected are not demanding significantly higher compensation. The great variability of answers given implies the confusion about the assessment of a public good that could not be resolved by familiarity. In this study the traditional survey design was applied and tested that is usually used in CVM surveys. Therefore, for future research in detecting preferences for public goods there is a room for improvement of contingent valuation methods by shifting the focus from direct to indirect questioning methods to be able to overcome the reluctance towards its direct monetization.

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